



Case study title: Conserving and Reducing Water Consumption Using a Decentralized Wastewater Recycling System

Aravind Eye Care Hospitals, Pondicherry

GGHH Agenda Goals

- Water

Hospital Goal

- Encourage and Facilitate Water Conservation.
- Reuse water
- Significantly Reduce Hospital's Water Consumption from natural resource

Progress Achieved

- Environmental benefit: The hospital uses one borewell to pump 120 m³ of water every day of which 100 m³ of water is recycled every day. The recycled water is used for toilet flushing and irrigation.
- Other benefits: Reduction of waste to the community. Sludge settled in the recycling unit is used as composite.
- Financial benefits: The recycled water is being used for irrigation and fertilization which in turn produces USD \$6,250 worth of food per year.

The Issue

Adaptation to climate change has a significant link to water and its role in sustainable development. To acknowledge this reality and to respond presents development opportunities and challenges. Its consumption, usage and recycling will have an ecological and economic impact in the coming years. According the Tamilnadu State Ground and Surface Water Resources Data Centre of the Water Resources Department, there has been a plunge in the ground water table throughout the state and tier 1 and tier 2 cities are supposed to be most affected. With depleting ground water table and varying rainfall patterns due to climate change, waste water recycling presents an opportunity to facilitate water consumption and reduce water usage in certain areas. The few strategies for disposal of untreated sewage in India have focused mainly on implementation of conventional treatment technologies. These centralized treatment plants require high capital investment,

continuous power supply, high maintenance cost, and skilled operators. Very few municipal centralized treatment plants can claim to operate properly.

During the construction of the hospital in 2003, it was then decided to install a water recycling system, which will help reduce waste, and water consumption. But instead of opting for a conventional centralized treatment plant, the hospital management installed a decentralized wastewater treatment system called the DEWATS.



Figure 1: View of Aravind Eye Care Hospital and the decentralized system.

Sustainability Strategy Implemented

DEWATS- Sustainable treatment of wastewater at the local level

- DEWATS usually function without technical energy input and outside energy sources.
- They are based on a modular, technical configuration concept which let the user pick combinations of treatment modules depending on the required treatment efficiency, costs, land availability, etc.
- They are constructed from locally available materials which makes the system and its footprint more sustainable.

- DEWATS require few operation and maintenance skills while most operational tasks can be carried out by the users. Some maintenance services might require a local service provider, for instance, yearly sludge removal, filter bed cleaning, etc.
- DEWATS can reduce pollution load to fit legal requirements.

Task Force

- The Task Force is composed of heads and/or deputy heads in charge who are responsible for reporting their activities, developing strategies for a smooth function of the DEWATS unit.
- A yearly routine check on the DEWATS unit is done to ensure the quality of water being recycled and used is safe.

Implementation process

The implementation of water recycling system was part of the new hospital's construction plan because the system needed special piping from the beginning of construction. In response to increased awareness of water-saving and its benefit, the Founder and the office of planning decided to implement the system in the hospital.

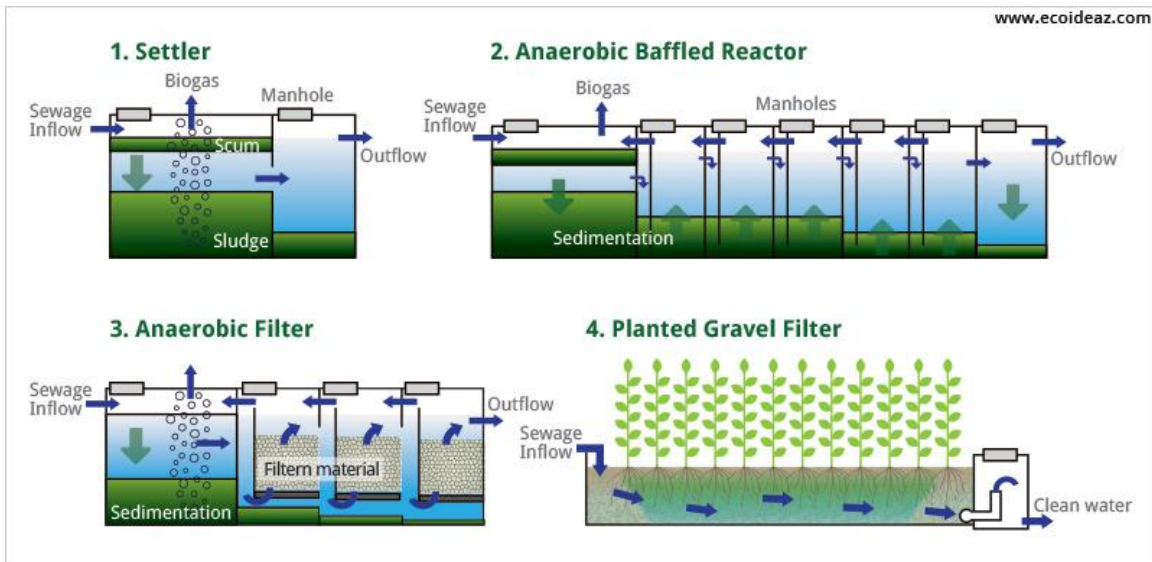


Figure 2: Decentralized Wastewater Treatment Systems working

- Assuring high quality usable water is produced by the system.
- The DEWATS system is regularly tested as part of quality assurance and to note possible actions for improvement.

Challenges and lessons learned

Aravind Eye Care Hospital in Pondicherry pumps out 120 m³ of water from a bore well every year, of which 100 m³ of water is recycled using the DEWATS system. The treated

water is being used in toilets, garden, vegetable cultivation, and irrigating the paddy field. The pumps used in the DEWATS unit use 5.7 watts per hour and they run for 8 hours every day. The monthly cost of energy used in the system is \$118 rupees per month. The borewell pump which runs at 7.5 HP consumes about 80-100 units of electricity per day. Thus, according to local cost of electricity, the monthly cost of energy used by borewell is about 500 per day on an average. The skum which gets settled in the system needs to be cleaned every 3 months. The cost for cleaning the skum and maintenance cost \$141. The sludge which gets settled in the bottom of the primary settlement tanks needs to be cleaned once a year. The vacuum pumps also need to be cleaned and maintained once a year. The cost involved in this yearly maintenance is \$680. There is a dedicated professional employed to look after the working of the system. So, the total cost involved in efficiently maintaining and running a DEWATS decentralized wastewater system costs \$0.75 per m³per month. Thus, the cost of energy saved from using the decentralized system is nearly 50%.

Next Steps

Looking forward, the hospital plans to maintain the current water consumption of the hospital in spite of the increasing number of patients being served. Under safety regulation, grey water quality will be monitored daily and tested regularly. There are future plans to generate biomass from the waste produced from the water recycling unit and also from the wet waste produced in the hospital. Will continue to abide by the set policy and standard.

Demographic information

Aravind Eye Care Hospital is an eye care hospital chain in India. It was first founded in 1976 in Madurai, the hospital chain now has 10 eye care hospitals in Tamilnadu. The Pondicherry facility was inaugurated in 2003. The facility has a capacity of 450 beds for in-patients and efficiently provides services for 1600 out-patients every day. The hospital is located on the highway connecting coastal towns Pondicherry and Cuddalore. The hospital is 25 acres wide and has housing facilities for physicians and staffs. It also has a paddy field for rice production, a vegetable garden for food production, a wide spread garden with a pond which also acts as an aerobic polish pond for treating the recycled water. The plant nursery located inside the campus sell plants for patients and visitors.

Links

To know more about the DEWATS system: <http://www.borda-sea.org/basic-needsservices/dewats-decentralized-wastewater-treatment.html>

To learn more case studies documented in Aravind Eye Care System: <http://www.aravind.org/default/aboutuscontent/casestudiesOnAravind>

To learn more about Health and Environment Leadership Platform's work and other case studies: <https://www.ceh.org.in/activities/help/about/>

Quotes:

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Submission date: September 2017