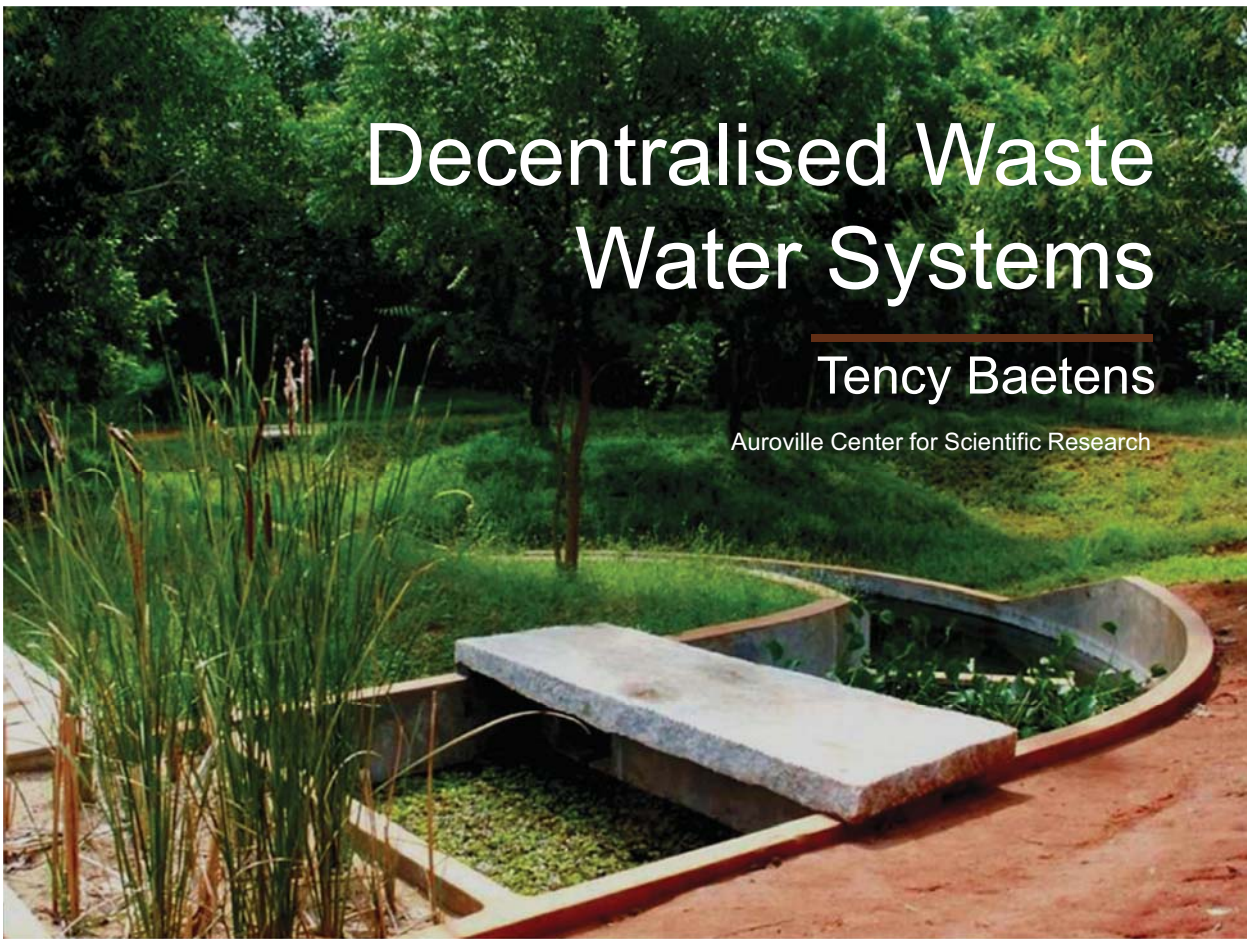
Presented at

Auroville
Green Practices

Seminar and Site Visits
26-28 August, 2010



Decentralised Waste Water Systems

Tency Baetens

Auroville Center for Scientific Research

Drinking water . Dirty effluent . Clean waste water

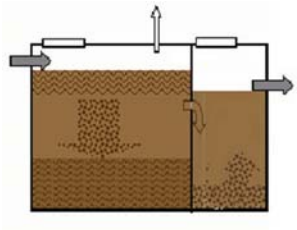
- Water scarcity will create awareness of unsustainable water practices, thereby augmenting the need for water reduction measures and proper treating of waste water
- Treating waste water with minimal dependency on external energy and maintenance procedures
- To achieve discharge standards
- To be able to reuse wastewater and its contents

Decentralized waste water treatment systems

- Suitable for treatment of wastewater flows from 1-1000 m^3/d
- Tolerant to inflow fluctuations
- Uses as much as possible gravity instead of pumps, avoiding valves
- Aims towards reliable and long-lasting devices
- Anaerobic technology in warm climates, aerobic technology in colder climates
- The treatment is achieved by channeling the waste water through different devices, using natural anaerobic and aerobic processes

Settler

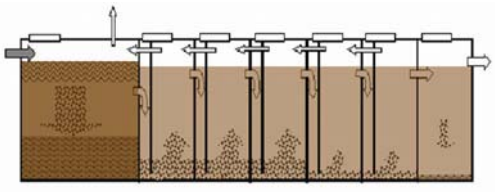
Pre-treatment **Settler** ▸ First-treatment Baffled Tank ▸ Second-treatment Anaerobic Filter ▸ Third-treatment Planted Gravel Filter ▸ Post-treatment Polishing Ponds



- Separates the liquid from the solid
- Retention time is only 2 hours.
- Pollution reduction is around 30%

Baffled Tank

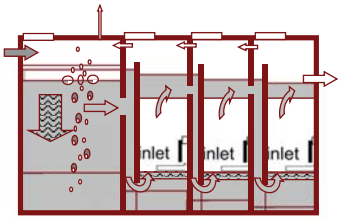
Pre-treatment Settler ▸ First-treatment **Baffled Tank** ▸ Second-treatment Anaerobic Filter ▸ Third-treatment Planted Filter ▸ Post-treatment Polishing Ponds



- Effluent moves from top to bottom through identical sized chambers
- Retention time is **24 hours.**
- Pollution reduction is around 80%

Anaerobic Filter

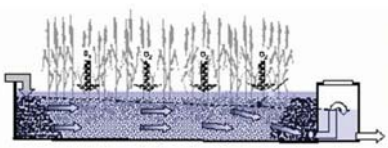
Pre-treatment: Settler ▸ First-treatment: Baffled Tank ▸ Second-treatment: **Anaerobic Filter** ▸ Third-treatment: Planted Gravel Filter ▸ Post-treatment: Polishing Ponds



- Effluent moves through filter material (cinder) from top to bottom
- Retention time is around **8 hours**.
- Total pollution reduction is around 90%
- CPCB standards are met, but the effluent still has an odour

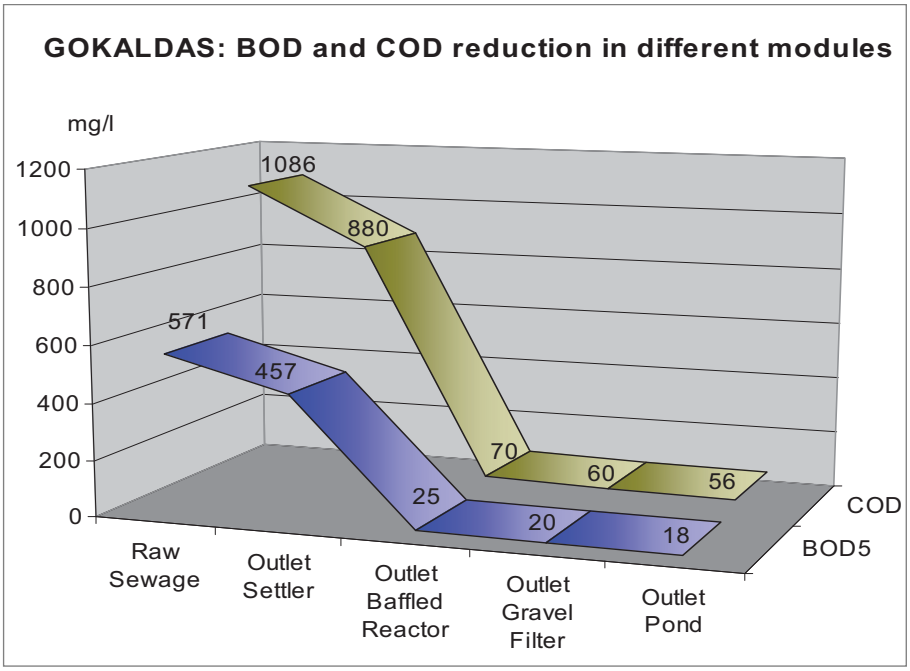
Planted Gravel Filter

Pre-treatment: Settler ▸ First-treatment: Baffled Tank ▸ Second-treatment: Anaerobic Filter ▸ Third-treatment: **Planted Filter** ▸ Post-treatment: Polishing Ponds



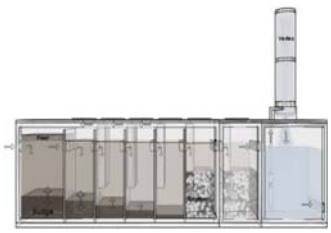
- A structure filled with gravel material
- Water resistant plants provide oxygen to the passing effluent
- Retention time is **1 day.**
- Pollution reduction is 90%

Treatment Efficiency



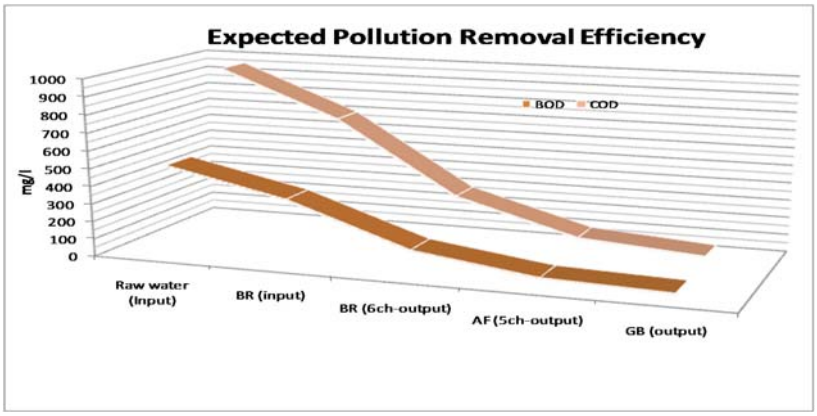
Vortex System

Pre-treatment Settler ▸ First-treatment Baffled Tank ▸ Second-treatment Anaerobic Filter ▸ Third-treatment **Vortex System** ▸ Post-treatment Polishing Ponds



- A vertically positioned tube with a funnel shaped bottom element
- Inside the tube a natural occurring self-purification effect from the effluent takes place during the continuous swirling movement.
- Pollution reduction is 95%

Treatment Efficiency



Guaranteed BOD below 15 mg/l (targeted below 10 mg/l), COD below 50 mg/l

Polishing Ponds

Pre-treatment Settler ▸ First-treatment Baffled Tank ▸ Second-treatment Anaerobic Filter ▸ Third-treatment Planted Filter ▸ Post-treatment **Polishing Pond**

- Aquatic plants and fish transform waste water from a lifeless state into living water again
- Ponds with aquatic plants are an efficient way to combine treatment with landscaping for an aesthetic water reuse
- Ponds can also act as storage devices

Surya Nivas, 2002
Domestic effluent, 2 m^3

Centre Field, 1995
Kitchen effluent

Invocation,1998
Domestic effluent

Solar Kitchen, 1998
Domestic effluent, 40 m³

Maintenance requirement:
Desludging every 2-3 years

Udyogam, 2004
Food processing, 12 m³

Aurobhakti, 2008
Domestic effluent, 10 m³


Aravind Eye Hospital, Pondi, 2003
Hospital effluent, 500 m³

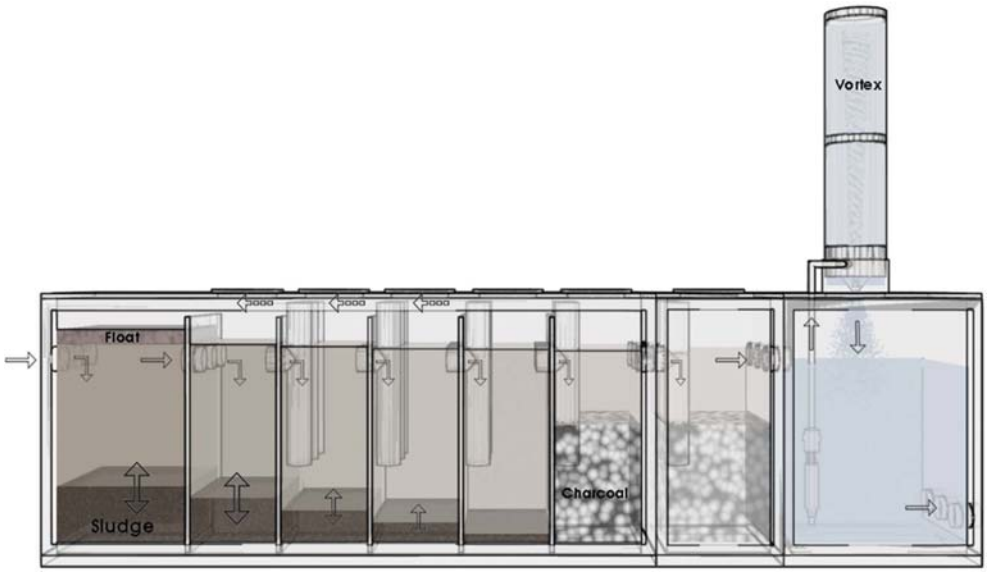

GIDC settlement, Bhuj,
Domestic effluent
400 households

City Greenbelt Dewats, Bhuj
Municipal effluent, 15 m³

ITC Surya Nepal, 2007
Industrial effluent, 120 m^3

Kadambadi settlement, 2008
183 households
43 prefab dewats modules

Innovative Decentralised Waste Water Treatment Systems with vortex

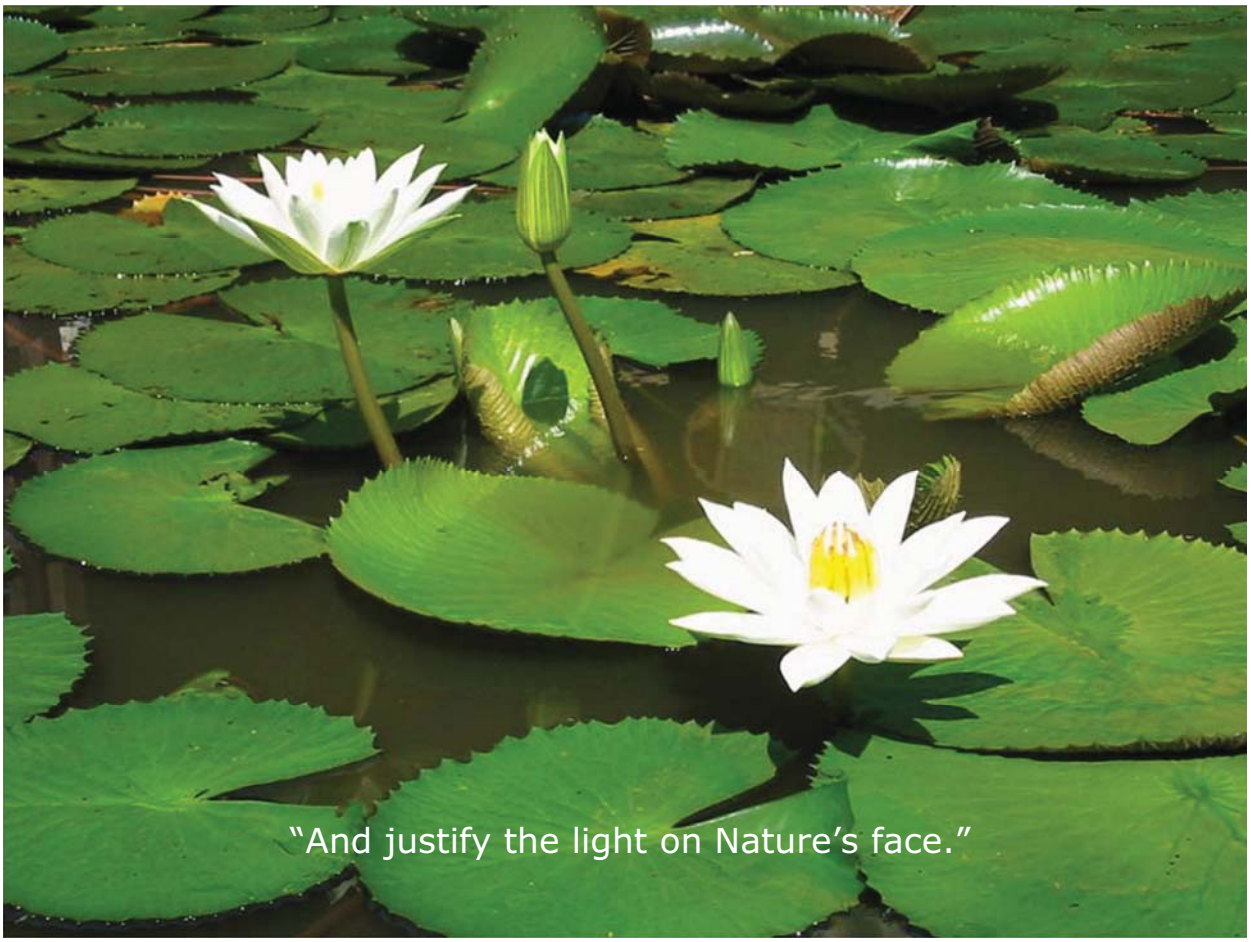


Mitra Youth Hostel, 2009
Domestic effluent, 10 m³

Citadyne, 2010
Domestic effluent, 7 m³

CSR, Auroshilpam, 2007
Domestic effluent

Solar Kitchen XLL Vortex Research for VBHC Bangalore Domestic effluent , 850 m³



Decentralised Waste Water Systems

Tency Baetens

Contact
Auroville Centre for Scientific Resesearch
tency@auroville.org.in

Auroville
Green Practices

green.aurovilleportal.org