

About the Project



The FP7 project "Saph Pani - Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India" addresses the improvement of natural water treatment systems such as river bank filtration (RBF), managed aquifer recharge (MAR) and wetlands, building on a combination of local and international expertise. The project aims at enhancing water resources and water supply particularly in water stressed urban and peri-urban areas in different parts of the sub-continent. The project focuses on a set of case study areas in India covering various regional, climatic, and hydrogeological conditions as well as different treatment technologies.

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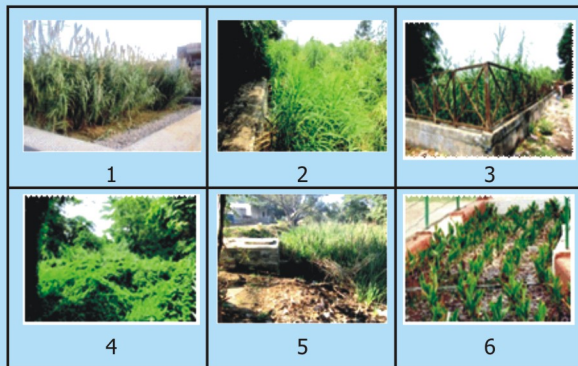
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Constructed Wetlands- An Appropriate Technology for Wastewater Treatment and Reuse: The Indian Experiences

A class of sewage treatment technologies that mimic natural processes such as interactions of soil-micro-organisms, plants and other living organisms in natural settings with pollutants in wastewaters are called Natural Treatment Systems (NTSS). Natural water and wastewater treatment systems include river banks, wet-zones and their modified versions such as constructed wetlands (CWs), waste stabilization ponds, sewage fed aquaculture ponds, duckweed ponds or algal bacterial systems (Arceivala and Asolekar, 2007). They are known to render quite effective environmental services by treating biodegradable carbonaceous matter and by separating suspended solids. However, not all NTSS are effective in removing nitrogen and phosphorus. In spite of their limitations, CWs and other NTS have attracted attention of environmental engineers and scientists by the virtue of their abilities of treating sewage and wastewaters at phenomenally low Operation and Maintenance (O&M) costs (Arceivala and Asolekar, 2012). They have been favourably looked upon in the developing countries, especially because of their low power requirement.

Current practices of constructed wetlands for wastewater treatment and reuse across India

A recent India-wide survey of NTSs (designed and established for wastewater treatment) was conducted by IIT Bombay. 108 locations were identified where natural treatment systems are in use. At 14 of those locations CWs are in practice. In most of the cases constructed wetlands are used for decentralised treatment and reuse of waste water. The constructed wetlands treat a small portion of wastewater as compared with waste stabilization ponds but their number is significant (Examples in Pictures 1-6).



Pictures (1-6): Constructed wetlands operated in India

1. : 8,000 KLD CW, Jaipur
2. : 80 KLD CW, Bhopal
3. : 50 KLD CW, Bhopal
4. : 70 KLD CW, Bhopal
5. : 500 KLD CW, Ropar
6. : 50 KLD CW, Agra

Focused Research on constructed wetlands at IIT Bombay

The CW is prone to engineering adaptation and modular applications. This is why IIT Bombay focuses on these natural treatment technologies in SaphPani. A pilot scale CW for sewage treatment was commissioned in November, 2013 at IIT Bombay campus (Picture 7). The plant satisfactorily removes pollutants from the waste water and the treated effluent is subsequently treated by lab-scale membrane units. Further investigation of possibilities on combining constructed wetlands with an advanced tertiary treatment unit will be undertaken.



Picture 7: CW-based research facility at IIT, Bombay

KLD* = Kilo Liters per Day

Techno-economic and social aspects: a case study

A CW with a capacity of 500 KLD was constructed in Ropar, Punjab in 2006 for decentralized treatment of domestic wastewater of the village community (Picture 5). In the past few years, the system performed satisfactorily and helped in rejuvenation of adjoining pond and create employment through pisciculture with an annual income of 250,000 to 300,000 INR.

References

- Arceivala SJ and Asolekar SR, (2007) "Wastewater Treatment for Pollution Control and Reuse" Tata-McGraw-Hill, New Delhi.
- Arceivala SJ and Asolekar SR (2012) "Environmental Studies: A Practitioner's Approach", Tata McGraw Hill Education (India) Pvt. Ltd., New Delhi

References

- Saph Pani Deliverable 1.1 (2012) Database of relevant pollutants in urban areas and their attenuation at RBF sites. Available: <http://www.saphpani.eu/downloads>
- Saph Pani Deliverable 1.2 (2013) Guidelines for flood-risk management of bank filtration schemes during monsoon in India. Available: <http://www.saphpani.eu/downloads>



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