RECYCLING WASTE WATER

During Auroville's early days, the future city's land holdings were scattered; there was no infrastructure for power, water supply or waste water disposal. This absence of essential facilities stimulated experimentation with new ideas, methods and technologies.

The quest for finding a practicable method of treating and re-using waste water was initiated during that period. In the beginning, a typical recurring problem was foul waste water smell spreading in communities from overflowing soak-pits; this lead to a search for a way to re-use waste water.

The aim was to fully control the smell and ensure that the treated water could be safely re-utilised for garden and farming activities. Early experiments used the knowledge of visiting experts, who promised easy results with minimal infrastructure at low cost. However, even meticulously applying those simple (or more elaborate) systems didn't produce the desired results.

In the mid-nineties, despite multiple failures, the perseverance in continuing small experiments started to pay off. A German expert provided basic knowledge and input about natural waste water systems and processes. During the same period, a leading German NGO (BORDA) asked to become a local partner for an EU project aiming at developing decentralised waste water treatment in developing countries. The project put Auroville on the map of pioneers for developing natural waste water treatment methods. It had several spin-offs:

- creating a scientific knowledge base with the help of a French consultant;
- helping with the implementation of three DEWATS plants (Decentralised Waste Water Treatment Systems) in Auroville;
- establishing a core cell of Aurovilians for the designing and implementation of such systems.

Tency Baetens

The Centre for Scientific Research (CSR) in Auroville became the hub for all these research and development activities.

The next several years became a developmental phase to increase the volume capacity, to add and test new devices, to improve the output performance, and to use ferro-cement technology for the prefabricated modules. In that period, the bulk of the 60 small scale treatment plants of Auroville were installed and commissioned.

Natural waste water treatment is achieved through a process that makes use of physical principles combined with the biological activities of micro-organisms. Bacteria colonies used in the treatment devices are generated and maintained by microbial populations that exist naturally in the waste water. The microbes and bacteria are the actual cleaners of the pollutants in the water.

The first treatment plants were a combination of different devices copied from systems operating under temperate climatic conditions, and later perfected with devices from Latin America and China.

It took the CSR a couple of years to find out the weaknesses of such 'imports' from different climate zones. The device used for neutralising the smell, a planted filter, is a device constructed with filter material through which the waste water flows. The surface of this device is planted with deep rooted species of plants. Those plants provide the necessary oxygen to the waste water flowing through the system. This device proved to be the weak link in the layout; not performing as expected, requiring regular maintenance due to clogging of the filter material. The reason was that the microbial activity

in a tropical climate was completely different to that in a temperate zone. While seasonal variations take care of a natural cleaning cycle in temperate areas, the constant high tropical temperatures did not allow for a natural resting period within the filtering material. This climatic hyper activity blocked and clogged the filter, making the waste water pass on the surface instead of through the filter material, resulting in emitting the typical waste water smell. The failure of the device to neutralise the smell put us back to square one.

A NEW SOLUTION?

The search for a suitable replacement came through the dedicated work of an Auroville chemical engineer who took interest in waste water treatment processes and experimented with a 'controlled tornado effect'.

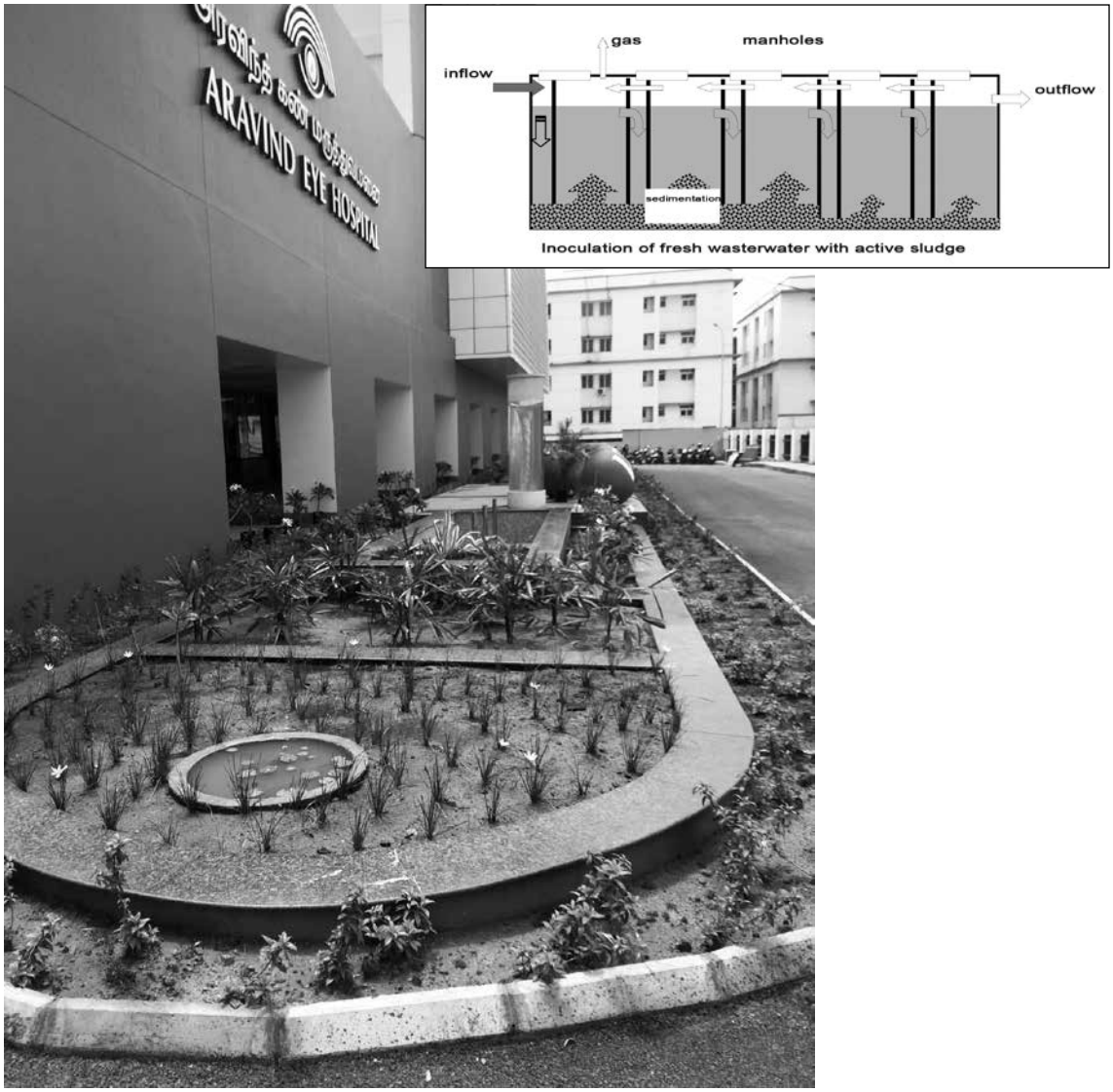
This monumental breakthrough gifted us the vortex system, mimicking a natural phenomenon in a miniature version under controlled conditions, where the swirling water column produced a continuous oxygen supply available for the passing waste water.

It took several years to fine-tune the design and manufacture a workable vortex system usable under a variety of conditions and able to treat different volumes. The outcome of the vortex system showed consistently better pollution reduction figures than the planted filter. The space needed for the innovative device was also reduced to less than half a square metre, a dramatic reduction compared to the planted filter.

The next phase was testing the vortex in different site conditions, overcoming design implementation hurdles, and aiming for consistent pollution reduction figures. The vortex-DEWATS natural treatment technology has the same advantage as in conventional treatment methods, though requiring lower energy utilisation. Additionally, it led to a drastic reduction in maintenance requirements. These two aspects, combined, opened the door to implementation of the technology on national and even international levels.

Each new implementation project brought along new challenges, and so after designing more than 200 systems over more than 37 years of pre-occupation with waste water, the CSR water and sanitation team is still discovering new issues to address in the ongoing search for the perfect method to render smelly water into an odour-free resource.

DEWATS waste treatment has the following advantages:



Waste water treatment plant installed by Auroville for the Aravind Eye Hospital in Chennai

About resources re-use: the treatment system converts waste water into re-usable water for irrigation and toilet flushing.

Waste recovery: the treatment system transforms the left-over sludge into manure, usable for agriculture.

Energy efficiency: the vortex system uses 75% less energy than conventional methods for oxygenating the waste water.

Material reduction: decentralised waste water treatment cuts costs by cutting down the use of sewage pipe lines – the costliest element in the treatment system.

❑

Tency