



## DHI CASE STORY

## 'SWING'ING INTO ACTION

### OPTIMISING INDIAN WASTE WATER TREATMENT WITH THE SWINGS PROJECT

Water resources are scarce in India. Although sustainable and low-cost treatment technologies are available, it is necessary to demonstrate them in an Indian context. An EU consortium has been formed to help align the known waste water treatment technologies to an Indian set-up. The SWINGS project is an EU/India joint venture. DHI DK – one of the EU partners – is implementing sustainable pathogen monitoring methods in the disinfection step of waste water treatment. Thus, we are effectively contributing to sustainable and low-cost waste water management in India and consequently helping to meet rural Indian demand for safe water.

#### SWINGS AT A GLANCE

India's water resources face multitudinous challenges. The sustainability of rural and urban water supply in many regions of the country is constantly threatened by a decreasing ground water table and worsening ground water quality. Although many sustainable and economical water treatment technologies exist in other parts of the world, it has become increasingly important to demonstrate and implement them in an Indian context.

The **S**afeguarding **W**ater resources in **I**ndia with **G**reen and **S**ustainable technologies (SWINGS) project was conceptualised to address this issue. The three-year project (November 2012-October 2015) is an EU/India joint venture and we (DHI DK) are one of the members of the EU consortium. The consortium consists of suppliers of leading know how and technology. The aim: to implement these known technologies in the Indian set-up.

The main goal of the SWINGS project is to generate optimised municipal waste water treatment concepts. It hopes to do this by combining 'green' and sustainable technologies for:

- Provision of safe water
- enhancing water recycling and reuse
- decreasing energy demand
- utilising beneficial by-products from the process as a secondary resource

A number of pilot plants will be built and the technologies will be demonstrated in these plants. The final outcome of the project will be to provide treated waste water as nutrient and soil enrichment resource, irrigation water and aquaculture farm feed. Ultimately the treated waste water would generate safe drinking water.

#### SUMMARY

##### CLIENT

EU/India joint project

##### CHALLENGE

- Dearth of safe water supply to meet rural Indian water demand
- Expensive and unsustainable wastewater management in India
- Sub-optimal utilisation of water resources
- Treatment technologies unaligned to the Indian scenario

##### SOLUTION

- Implementation of sustainable low technology waste water treatment
- Low cost pathogen monitoring methods to ensure safe operation and minimize risk of infection

##### VALUE

- Effective contribution to sustainable and low-cost wastewater management in an Indian context
- Reduction in the gap between supply and demand of safe water in rural India

##### LOCATION / COUNTRY

India

## IMPLEMENTING THE PATHOGEN MONITORING TECHNIQUE

The project will look to implement various low cost treatment alternatives. Of these, Anaerobic Digestion (AD) and Constructed Wetlands (CW) will be the main technologies. Combined AD and CW systems will be complemented with low cost disinfection units based on filtration, lagooning and solar methods. They will provide a feasible solution for Indian waste water and sanitation reuse. Besides this, a Decision Support System (DSS) will also be carried out for:

- the selection of sustainable waste water treatment technologies
- optimised sustainable pathogen monitoring technique

Our task is related to the integration and validation of a sustainable pathogen monitoring techniques that are mainly dependant on cultures. The highlight of this task is that the implementation of these techniques will be low cost – well suited to the Indian scenario. They will provide diagnostic assays for detection and quantification of faecal indicators and preferably also pathogens.

The most important parameters to be adjusted, with respect to these techniques are applicability to the Indian scenario, shelf life and purchase price. The techniques will target major organism groups including:

- *Escherichia coli* (indicator bacteria)
- *Enterococci* (indicator bacteria)
- *Giardia sp* (single-celled parasite)
- *Cryptosporidium* (single-celled parasite)

We will handle the integration of the monitoring technique on site at the pilot plants. We will also validate them with conventional cultivation methods.

## BREATHING NEW LIFE INTO INDIAN WATER

We aim to directly contribute to the SWINGS project and to Indian water by improving the existing sustainable monitoring techniques. This will help align these techniques to the Indian water scenario, by facilitating the development of easy, reliable and rapid analysis.

Overall the SWINGS project will improve the Indian water supply and demand scene in numerous ways:

- Developing sustainable and robust systems to cope with water pollution
- Improving the quality of water bodies
- Mitigating water scarcity by reusing treated water in irrigation practices
- Producing drinking water using natural treatment steps (lagoons, soil aquifer, sand filtration and solar disinfection)
- Obtaining a competitive and low cost waste water treatment

alternative compared to conventional methods

- Developing a system to decide the best economic and most efficient treatment technology in specific cases of medium or small community sanitation. This will consequently help environmental and sanitation policy makers take the right decisions.
- Identifying a water reuse technology with low visual impact, that appeals to the local community
- Increasing economic benefits of Small and Medium Enterprises (SMEs) with respect to the design, materials and operation of these 'green' technologies
- Transferring and testing the developed know-how to potential stakeholders and end users inside and outside the project – through a special dissemination plan
- Helping to reduce the wide gap between supply and demand of safe water in rural India

By successfully demonstrating such sustainable and low cost waste water treatment methods, the SWINGS project will pave the way for similar ventures in other developing countries and emerging economies.

### EU PARTNERS

- AIMEN (Spain)
- Aarhus University (Denmark)
- Universitat Politècnica de Catalunya (Spain)
- HELMHOLTZ-ZENTRUM FÜR UMWELTFORSCHUNG (Germany)
- IRSTEA (France)
- AUTARCON (Germany)
- KILIAN (Denmark)
- LIMNOS (Slovenia)
- SSP (Germany)
- DHI (Denmark)

### INDIAN PARTNERS

- AMU (R&D)
- KLYUNIV (R&D)
- IGNTU R&D)
- IITD (R&D)
- AARVEE (Company)
- UPPL (SME)
- CBE (NGO)
- BIOTECH (NGO)
- KSI (NGO)
- UPJN (Local Body)
- ANN (Local body)

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