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## Smart Monitoring for Smart Management

Author: Sreya Prakash, AQUA-Hub project, HubManager Coimbatore

It is believed that one can't improve what is not measured. This statement voices the present condition of Coimbatore and her water. The most common problem statement from our Stakeholders Meeting of April 2022 was: 'We know our water is polluted, but we don't know to what extent.' The people of the city indeed, possess the will to improve the condition of the water system. However, lack of concrete and conclusive data has restricted them from taking drastic measures in this direction. Efforts are often limited to periodic cleaning of lakes and drains. Treatment plants remain under-planned and under-utilized.

Many quality monitoring efforts have been undertaken by Coimbatore-based scholars and researchers. However, they have been scattered in both time and geographical area. In order to add constructive interventions to the system, the water needs to be monitored over a long period of time, in maximum number of monitoring stations, and with subsequent compilation of the resulting monitoring data for integrated assessments. In a country like India where flows are extremely weather-dependent, monitoring over a longer duration helps determine the flow patterns and fluctuations. Understanding the present situation contributes to motivating people of all sectors— from the government to the industry— to imbibe practices that improve waterway health into their way of life and functioning and to link these practices to technologies, institutions and knowledge. Good planning of core areas of water management strategies like Decentralized Wastewater Treatment for dynamic urban spaces will help improve the condition of wetlands and aquifers. To improve the water, we need to measure.

Team AQUA-Hub takes immense pleasure in introducing our vision, a **Smart Monitoring System**, to measure the wastewater flows in Coimbatore, both in quantity and quality. The pilot system is an integration of sensor-based and laboratory-based analysis mechanisms. The parameters to be measured range from the basic ones like pH and EC to complex ones like heavy metals. The sensor-based systems are exclusively designed and developed by the German industry partners for the present site conditions. We believe that the use of state-of-the-art technologies will help collect accurate data, in high temporal resolution, that can be used for further decision-making.

As a step towards enhancing the cooperation between stakeholders from Germany and their counterparts in Coimbatore, the Smart Monitoring System will also involve local laboratory-based studies. This is to be done by local academic institutions, who will join AQUA-Hub project as Local Research Partners. The analysis will be supplementary to the sensor-based measurements and will be done on a regular, scheduled basis. The laboratory measurements will focus on both nutrient and pollutant concentrations in the water samples. We hope to

actively engage with the local academic community and elicit their support in our collective goal of making Coimbatore a leader in sustainable water management.

The measurements, both from the sensor network and the laboratories, will be remotely transferred to a cloud and integrated to a Water Data Management System (WDMS). The WDMS provides interfaces for communicating, visualizing and analysing the data. Automated data input from the sensor network, coupled with the results from the periodic laboratory analysis will help in the creation of a comprehensive set of data points. The data points can be analysed by means of graphics like time series, contours, bar graphs etc. Visualization can also be done over maps that can be integrated into the system. The WDMS can also function as a platform for several user-defined statistical calculations.

Real-time information will be available on the state of the water bodies, via the internet. Over time, it will help us identify hotspots of pollution in the system, and will also help in introducing new interventions for rehabilitation. The effectiveness of these interventions can be assessed by regular monitoring of water quality parameters. We also aim to make the data available to all stakeholders for both research and urban planning purposes. Beginning with the lakes, we hope to create a network of monitoring stations spread across Coimbatore. We believe that the availability of enough data and a comprehensive analysis system will assist us in planning the Hub's future activities.

The team was fortunate to present the activities of the Water Innovation Hub in Coimbatore at the Indo-German Strategic Networking Meet hosted at the Indo-German Centre for Sustainability, IIT-Madras on 21<sup>st</sup> September 2022. The concept and action plans were widely accepted and we wholeheartedly thank the industry partners who have expressed interest in the project.

The Smart Monitoring System has also been green-lit by the Commissioner of Coimbatore City Municipal Corporation (CCMC). The envisioned scheme was discussed in detail and we express our gratitude to the Commissioner for his valuable inputs. We also thank the local community for the positive responses and insights towards the AQUA-Hub project and hope to work in close coordination towards achieving the Sustainable Development Goal of Clean Water and Sanitation.

Historians refer to Coimbatore as a beautiful woman adorned with a garland of Navaratnams of her lakes. While many initiatives have been undertaken by the different stakeholders in Coimbatore towards their water, the Smart Monitoring System will most certainly bring the stakeholders together to support the common cause. Team AQUA-Hub hopes to be the thread that ties together the jewels that are the knowledge, expertise and experience of the local government, academic institutions, industry leaders and non-governmental organizations-forming the garland of a water-secure Coimbatore.

## Newspaper Sources

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## Contact

B.Tech. Sreya Prakash	AQUA-Hub project, Water Innovation Hub Coimbatore, HubManager Coimbatore/India, <a href="mailto:sreya.prakash@gmail.com">sreya.prakash@gmail.com</a>
Dr. Stefan Liehr	ISOE – Institute for Social-Ecological Research, Frankfurt am Main/Germany, AQUA-Hub subproject head, <a href="mailto:liehr@isoe.de">liehr@isoe.de</a>
M.Sc. Marc Beckett	Fraunhofer Institute for Interfacial Engineering and Biotechnology (IGB), Stuttgart/Germany, AQUA-Hub project coordination, <a href="mailto:marc.beckett@igb.fraunhofer.de">marc.beckett@igb.fraunhofer.de</a>
Dr. Marius Mohr	Fraunhofer Institute for Interfacial Engineering and Biotechnology (IGB), Stuttgart/Germany, AQUA-Hub project coordination, <a href="mailto:marius.mohr@igb.fraunhofer.de">marius.mohr@igb.fraunhofer.de</a>

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## The AQUA-Hub project

In the AQUA-Hub project Water Innovation Hubs are being implemented in the two Indian Smart Cities, Coimbatore (Tamil Nadu) and Solapur (Maharashtra), and accompanied by pilot measures of German technology for water quality monitoring. AQUA-Hub addresses the needs of the local water sectors identified in previous projects, as well as the challenges of the German water industry to develop projects, relationships and business on the Indian market. Qualified HubManagers as a local presence of the Water Innovation Hubs are of great importance for the relations and the exchange of information between the German and Indian actors. In addition to network activities and the mediation of business partners, the hubs fulfil the function of project centres for the realisation of technical demonstration projects, provide information on current developments in the water sector for the respective local situations and support the access to water technologies "Made in Germany".

For more information: [www.aqua-hub.de](http://www.aqua-hub.de)

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AQUA-Hub project

ISOE – Institute for Social-Ecological Research

Hamburger Allee 45, 60486 Frankfurt am Main, Germany

Phone +49 69 707 69 19-0, E-Mail: [info@isoe.de](mailto:info@isoe.de)

# Appendix

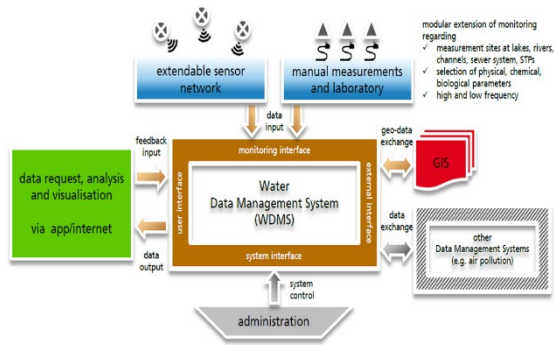


Figure 1: Smart Water Monitoring Concept. Source: AQUA-Hub Project Team (Liehr)



Figure 2: Potential site Selvachintamani Lake in September 2022. Source: AQUA-Hub Project Team (Prakash)



Figure 3: Presentation on AQUA-Hub at Indo-German Strategic Networking Meet. Source: AQUA-Hub Project Team (Fuke)



Figure 4: Team AQUA-Hub with Mr. M. Prathap IAS, Commissioner, Coimbatore City Municipal Corporation. Source: AQUA-Hub Project Team (Fuke)