LOTUS

LOW-COST INNOVATIVE TECHNOLOGY FOR WATER QUALITY MONITORING AND WATER RESOURCES MANAGEMENT FOR URBAN AND RURAL WATER SYSTEMS IN INDIA

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Guwahati groundwater and river water management co-creation workshop

With participation of team members from Aaranyak, inno TSD, Institute of Exeter, Indian Institute of Technology Guwahati, Ecole Polytechnique, Guwahati Jal Board and Tata Institute of Social Science

In Guwahati city, it is estimated that around 80% of the citizens pump their water from the ground. Indeed, Guwahati has abundant groundwater at a shallow depth of 2-4 m, which encourages people to use dug wells, hand pumps, or bore wells, especially as groundwater is free. Several researchers, however, have expressed concerns regarding the groundwater's quality and especially regarding iron, fluoride, nitrate, and arsenic contaminations. Despite important health issues caused by these chemicals, most people still drink this water.

Monitoring water quality will enable people to know if the water quality is high enough to be drunk and to raise awareness on the issues related to pollution. The lack of awareness is the biggest issue regarding the monitoring of groundwater quality in Guwahati. For instance, when there is heavy rain, people think that the groundwater is recharged and that the water quality is better. But in reality, there is a lot of water movements which can cause arsenic leaching.

A system is required to monitor and tell people if the water is safe to be drunk. Currently, the groundwater quality data is collected manually and only for a few parameters such as temperature, level, and total dissolved solids (TSD).

Unlike in the water distribution system, LOTUS sensors will not be placed in the phreatic zone or in the wells. Instead, they will be used by technicians to measure the water's quality. The collected information will enable to map the water's movement in the phreatic zone and anticipate and inform people about its pollution level.

Figure 1: Guwahati Groundwater Management Workshop

The workshops allowed the LOTUS team to find out that educated people (but not water experts) never trusted the water quality and if economically possible, they would like to add treatments after pumping out the water using a filtration process. However, filtration systems that are used in the homes are not able to remove arsenic and fluoride. The less educated people were not aware of any contamination issues, generally if the water is clear and with no smell, they would then think the water is drinkable. Moreover, very few people,

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no matter the socio-economic status, test the water quality.

People want to know if the water is safe or not, and would especially like to monitor fluoride, arsenic, and iron levels. It was discussed that a public display of the groundwater quality would increase transparency. But it would only be helpful in areas where there is the option to be connected to the government's main system, otherwise it would cause panic. A colour coded system similar to air quality monitoring systems was suggested as a good way to display information. In addition, an SMS message-based system to send information on the water quality was suggested. Attendees mentioned that it would be helpful if advice could be sent with the information, as for example 'Safe after boiling/filtering'. In Guwahati's groundwater the main water pollutants (fluoride, arsenic, and iron) can only be treated on a large scale and it is an expensive process.

During the workshop, middle-class attendees said that they were willing to pay more to know if the water is clean or not. In this sense, it was decided that the sensor would probably be more helpful if it was used to educate communities of the dangers of drinking polluted groundwater and to encourage them to sign up to the government's water supply.

Figure 2: Guwahati Groundwater Management Workshop

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