Geologists studying groundwater arsenic levels in India empower Bengali women, children

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A Kansas State University geologist and graduate student are finding that the most important tools in their fieldwork on groundwater arsenic pollution are women and children armed with pamphlets and testing kits.

"When going into a foreign land, you need the common people's help, support and understanding of the work you are doing," said Saugata Datta, a K-State assistant professor of geology.

Datta's research examines arsenic levels in the groundwater in Bangladesh and West Bengal, India. In his quest to understand how and why the naturally occurring arsenic gets into groundwater, Datta is helping Bengalis identify contaminated water sources so they can make more informed decisions about where to dig wells as they look for cleaner water. At K-State, Datta is joined by Andrew Neal, a master's student in geology from Byron, Ga.

"We are targeting the women and children 13 to 15 years old, because they are the most available people, more so than the men of the family," Datta said. "These women are not formally educated, but when it comes to this type of suffering, they have a huge voice and they can really articulate the message very clearly to their neighbors and their own families."

The researchers give women and children information about how

sediment traits like color and texture may indicate arsenic contamination. They also arm them with arsenic testing kits to use when wells are being drilled in their communities. If these water testing kits indicate high levels of arsenic, they can send a sample to a laboratory in the city for further testing before more contaminated water is distributed to the community. These tests are being done for both shallow and deep aquifers in those districts.

Although much research and action has been done to mitigate arsenic contamination in Bangladesh, the researchers said the process has been slower in India.

"They are very nice people in West Bengal, but when you talk to them you see that they are very frustrated," Neal said. "They want to have some way of knowing how they can get rid of this problem. They want to know where to get clean water to drink so their kids don't get sick."

Datta said that some of the wells that the researchers tested have 30 times more arsenic than is accepted by the World Health Organization and the U.S. Environmental Protection Agency. Datta said the effects of arsenic in groundwater aren't apparent immediately but rather build up over time. It causes skin lesions and skin cancer that spreads to other parts of the body. It can lead to paralysis and organ failure.

"Technically this is a natural source of pollution," Datta said. "The major hypothesis is that the Himalayan river systems that feed the Ganges-Brahmaputra-Meghna delta have been carrying down sediments that are the major source of arsenic. These sediments in the form of specific minerals and in the right environmental conditions trigger the release of arsenic into the groundwater."

The researchers suggest that as the arsenic-rich water enters the river, the chemistry causes it to precipitate and adhere to iron-bearing minerals in

the sediments.

In effect, they said, the sediments form an "iron curtain" to keep the arsenic out of surface water in the river. But recycling of these arsenic-laden sediments to the Ganges-Brahmaputra-Meghna delta aquifer may lead to further groundwater contamination.

Datta is collaborating with Karen Johannesson at Tulane University and John F. Stolz at Duquesne University.
Results of studies by Datta and Columbia University researchers in the Meghna River in Bangladesh appeared Oct. 6 in the journal *Proceedings of the National Academy of Sciences*. Neal presented their research at the Geological Society of America meeting Oct. 18-21 in Portland, Ore.

Source: Kansas State University (news : web)