As populations rise worldwide and climates change, stress on water resources increases, and thousands of people die each day from water-related diseases. Sustainable solutions must consider the complex environment that affects water supply, requiring understanding that spans traditional disciplines and includes both natural and human factors. In Bangladesh and other areas of Southern Asia, widespread contamination of shallow groundwater with naturally-occurring arsenic threatens the health of tens of millions of people who use the water for drinking and irrigating crops. Our research addresses the vulnerability of deep, low-arsenic groundwater and how it can be used as an alternative water source in a sustainable way. We consider the large-scale hydrologic system, geologic structure, and water use patterns to develop water management guidance toward sustainability. We also address the problem of groundwater use in the Mega-City, Dhaka, where intensive pumping increases the vulnerability of water resources to invasion of arsenic and we assesses risks related to geologic uncertainty. The interdisciplinary nature of the arsenic problem requires teams of researchers to work together to address questions that span hydrology, chemistry, biology, geology, sociology, and economics.

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