"The one-year monitoring program updates of shallow dugwells to provide arsenic-safe water in West Bengal, India"

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Although the tube well revolution during the last three decades for supplying bacteria-free, clean water to the rural population of Bangladesh, Nepal and West Bengal may have some success stories, it has also unfolded the "invisible killer" called arsenic. It has its colourless presence in the groundwater that is used for drinking, cooking and irrigation purposes and today it has entered into our food chain also. There are hundreds of people who are affected and many have succumbed to death. Studies carried out in West Bengal, India, indicate that about 42.7 million people residing in 2600 villages in 78 blocks of 9 out of 19 districts (including Tamluk) are at risk of exposure to this environmental catastrophe. Various safe water options available in West Bengal to combat this menace include: a) Supply of water from rivers and natural lakes after disinfection; b) Deep tube wells, c) Arsenic removal filter plants and d) Dugwells.

"Project Well", with a team of scientists from various research fields (Geology, Chemistry, Public Health, Geography and Environmental science) is involved in mitigation of arsenic poisoning and supply of arsenic-safe water through shallow dugwells to the arsenic affected villages of the district of North 24 Parganas in West Bengal. It carries out systematic and scientific activities through: a) Site identification and selection for digging of the dugwells; b) Geological sampling of the dugwell sediments for detecting arsenic concentration; c) Monitoring, based on the water analysis report weekly, fortnightly, monthly and seasonal for arsenic levels and bacterial counts; d) Conducting monthly health survey on the consumers of the dugwell water; e) Geocoding of the dugwell sites for mapping and planning; f) developing a DATABASE for tracking and monitoring the ongoing activities, g) Conducting awareness camps through multimedia presentations, puppet-shows and g) Maintaining registers to record the number of consumers, distribution of the information and instruction pamphlets, water-cards that record the monthly contribution of the beneficiaries for the disinfectant used, annual water analysis for bacterial counts and arsenic levels and the physical maintenance of the dugwells, thus making it more public participatory that is one of the main components to achieve sustainability.

The present paper updates the findings of five dugwells monitored over a period of one year. The salient findings indicate that arsenic concentrations of the dugwell water consistently remained below the permissible limit of 0.05 ppm (Indian Bureau Standards) throughout the whole year except for one that exceeded the limit in the summer months. However, the bacterial count was high during the monsoon period. Application of the disinfectant, Sodium hypochlorite

in solution containing 5% chlorine, the local trade name is Theoline, reduced the bacterial counts to zero as observed on the 7^{th} day of application. Theoline has been administered once a month and a remarkable decreasing trend is observed in the one-year period. During the health survey it was observed that there was no incidence of stomach illnesses, diarrhea or dysentery that may be attributed to the consumption of the dug well water. These features, along with the low unit cost of construction with indigenous methods, makes dugwell a sustainable and viable short-term option for supplementing the supply of arsenic-safe drinking water in affected areas of West Bengal.