

Occurrence of High Arsenic in Upper Aquifer Systems in parts of the Ganga Basin, West Bengal, India

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The occurrence of arsenic in ground water was reported during 1980 in West Bengal, India and at present the affected population is 5.3 million. The occurrence is limited only to the eastern part of Ganga Basin in the interfluvial region of the Bhagirathi - Hugli and the Jalagi - Ichamati rivers. The arsenic level in ground water beyond permissible limit of 0.05 mg/l has been found to occur within the shallow aquifer (20-60 m below ground level) and there is no reported occurrence of arsenic in the aquifer zones below 80 meter depth.

To understand the hydrogeological characteristics of Gangetic Alluvium Plain, the role of the rivers in shaping and forming the hydrogeology has been studied and it is observed that the matured delta of the Ganga is composed of several overlapping sub-deltas. The depositional history of the sediments can be categorized into three environments - the ancient braided stream bars and channels, the flood plain or back swamp environment and meander belt. The wide spread continuity, presence of organic contents in the form of decayed wood and low relief are the distinguishing criteria of the back swamp environments. It is considered that the presence of peat may be the source of arsenic.

The sub-surface disposition of the various lithological units in the affected area has been reconstructed based on 200 deep drilling boreholes data. Hydrogeological data i.e. aquifer geometry and parameters, depth to water level, hydraulic gradient etc. and also remedial measures i.e. identification of arsenic free deeper aquifer, artificial recharge of shallow aquifers, different treatment methods for removal of arsenic, have been discussed to analyse the causes of the problem and solutions thereof.