

Arsenic toxicity in Groundwater in parts of Bengal Basin, in India and Bangladesh: Role of Mid-Holocene sea level rise.

¹ACHARYYA, S.K., ¹LAHIRI, S. and ²RAYMAHASHAY, B. C.

¹Geological Survey of India, Calcutta, India; ²Indian Institute of Technology, Kanpur, India.

Arsenic toxicity in groundwater in Ganges delta, and some low-lying areas in Bengal Basin, in West Bengal (India), and Bangladesh, is confined to middle Holocene sediments. Dissected upland terraces of Pleistocene and early Holocene deposits are free. Arsenic rich pyrite or other arsenic minerals are rare or absent in the affected sediments. Arsenic appears to occur adsorbed on ironhydroxide coated sand grains and clay minerals. It was transported in soluble form and co-precipitated with or was scavenged by Fe(III) and Mn(IV) in the sediments. It got preferentially entrapped in fine grained and organic rich sediments during mid Holocene sea level rise in deltaic and some low-lying areas of Bengal Basin, and was liberated later under reducing conditions, mediated further by microbial action. Intensive application of groundwater for irrigation and phosphate fertiliser triggered recent release of arsenic. This has induced groundwater flow, mobilising phosphate from fertiliser and decayed organic matter, which promoted growth of sediment biota and aided further release of arsenic. On the other hand, environment is not sufficiently reducing to mobilise iron and arsenic in groundwater in Ganges floodplains upstream of Rajmahal hills. Thus arsenic toxicity in groundwater in Bengal Basin is caused by its natural setting but appears to be triggered by recent anthropogenic activities.