

## Metal pollution assessment of subsurface profile in saline water affected area of Bengal Delta

\*SUSHMITA HOSSAIN<sup>1,2</sup>, Asma Akter<sup>4</sup>, Shirin Akter<sup>2</sup>, Yeasmin Nahar Jolly<sup>2</sup>, Bilkis Ara Begum<sup>2</sup>, Takashi Ishiyama<sup>3</sup>, Shoichi Hachinohe<sup>3</sup>, Aziz Hasan<sup>4</sup>, Kazi Matin Ahmed<sup>4</sup>

1. Graduate school of Science and Engineering, Saitama University, Japan, 2. Chemistry Division, Atomic Energy Centre, Bangladesh Atomic Energy Commission, Bangladesh, 3. Research Institute, Center for Environmental Science in Saitama, Japan, 4. Department of Geology, University of Dhaka, Bangladesh

Groundwater of southern part of Bengal Delta is severely affected by saline water along with heavy metals and trace elements e.g., Arsenic (As), Iron (Fe), Manganese (Mn), Copper (Cu) and Zinc (Zn) etc. Groundwater management in this area needs detail risk assessment of metal pollution and potential mobility of metal from sediment to groundwater. Sediment plays major role to transfer metals to groundwater under different environmental conditions. Determination of total heavy metal content in surface soil, sediment of aquitard and aquifer is necessary to understand overall risk of mobility and to take initiative for groundwater management. Recently Managed Aquifer Recharge (MAR) has been introduced to improve the groundwater quality of near coastal area of Bengal Delta. In this study, total 18 soil, channel fill deposit aquifer and overbank deposit aquitard sediment samples of two MAR boring locations had been collected up to depth of 100 ft at 10 to 20 ft interval. Total content of As, Cu, Zn, Fe and Mn were determined using XRF (X-Ray Fluorescence) spectrometer. In aquifer sediment, total As, Cu, Zn, Mn and Fe content ranges from total As, Cu, Zn, Mn and Fe content ranges from 10.5-15.8 mg/kg, 29.7-38.7 mg/kg, 36.3-44.8 mg/kg, 257.6-487.8 mg/kg and 2.1-2.7 % respectively. Metal content in aquitard is variable at different depth. Metal pollution assessment has been carried out using some pollution indices like Geo accumulation index (Igeo), Contamination Factor (Cf), Pollution Load Index (PLI), Elemental Contamination Index (ECI) etc. Based on comparing the natural abundances and results of different indices, it is found that both location is moderate to highly contaminated with As, Mn and Fe whereas not contaminated with Cu and Zn. However, metal like As has strong affinity with iron manganese oxyhydroxide, therefore further speciation analysis will give precise information for potential mobility of metals.

Keywords: Heavy metal, Pollution Index