Geochemical baseline and heavy metal contamination level in soils of Barapukuria open coal mine area in Dinajpur, Bangladesh

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The study was attempt to investigate the geochemical baseline and heavy metal concentration in the surrounding soils of Barapukuria open coal mine area. Total 42 soil samples were collected and the concentrations of metals (Cu, Zn, Pb, Cd and Cr) were determined by using an AAS after digestion with aqua regia. The average metal concentration in soil samples and geochemical baseline values of Cu, Zn, Pb, Cd and Cr in the study area were 28.42, 44.36, 19.63, 0.18 and 55.09 $\mu g\ g^{-1}$, and 20.40, 32.80, 20.47, 0.12 and 42.69 $\mu g\ g^{-1}$, respectively. Out of 42 sampling stations, 27, 34, 33, 32 and 12 locations had the values higher for Cu, Zn, Cd, Cr and Pb, respectively than that of the geochemical baseline value of the study area. The deposition of outlet fly ash may responsible to increase heavy metal concentrations in surface soils around the study area. The overall order of soil environment hazard of various metals was Zn > Cr > Cu > Pb > Cd. Most of the cases, contamination factor for Zn, Cu, Cd and Cr were higher than 1.0, which indicates that these were the major pollutants in the surrounding soils of Barapukuria. The calculated I_{geo} values also revealed moderate pollution level by the same metals. The study results inferred that the soil of the area has not so far polluted yet, but if it is continued, the concentration of metals will increase to intolerable limits and this may have severe impacts on the soil environment as well as the food chain.