

Assessment of heavy metal contamination of agricultural and mining soil around Chini Lake: Implication of seasonal variation

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ABSTRACT

The surface soils are the essential part of the terrestrial ecosystem which receives contaminations from many sources including plants in urban regions. In general, the quality of soil in the Tasik Chini Catchment area increased with annual rainfall, slope steepness, and land use categories. The metal-polluted surface soil adversely affects the health of humans and the ecosystem in towns and cities. Ten selected heavy metals (Mn, Cd, Co, Cu, Zn, As, Cr, Ni, Ba, and Pb) were correlated with soil properties to assess the quality of surface soil in the Tasik Chini area. Based on the result, the soil of the study area it was found that between the dry and rainy seasons, the stations showed a declining trend in Cu. In the mining zone and downstream, Co concentrations were found to be higher than the low alert level (LAL). Mn concentrations at various locations remained nearly constant across the seasons, however, station AGS1 exhibited a considerable increase during the wet period. Over the seasons, Ba concentrations were measured relatively even at different locations. Suddenly, station AGS3 displayed extremely high Ba concentration readings. This could be a result of uphill mining in that basin. Pb, on the other hand, was partially above the LAL, while the other heavy elements were not involved in the pollution. From the dry to the wet season, Pb concentrations at various locations decreased. Heavy metals were discovered in soil from the lake's farmland, mining zone, and draining area. This indicates that the heavy metals come from mining and agriculture and make their way to the lake's draining point. The statistical analysis as mean and standard deviation was calculated for all the heavy metals in soil along with ten stations as listed in. Furthermore, those values were used for the computation of correlation analysis, PCA, and CA.

KEYWORDS

Chini watershed; soil physico-chemical properties; Concentration; Heavy Metals Contamination

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