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Evaluation of metals that is potentially toxic to agricultural surface soils using statistical analysis in north-western Saudi Arabia

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Heavy metals in agricultural soils enter the food chain when taken up by plants. The main purpose of this work is to determine metal contamination in agricultural farms in north-western Saudi Arabia. To this end, 57 surface soil samples were collected from agricultural areas. The study focuses on the distribution and geochemical behaviour of As, Cd, Co, Cr, Cu, Hg, Pb and Zn, determines the enrichment factor and geo-accumulation index; multivariate statistical analysis including principle component analysis and cluster analysis are also applied to the acquired data. The GIS method is used to prepare the metals and the enrichment factor spatial distribution maps. The study shows considerable variation in the concentrations of the analysed metals in the studied soil samples. This variation in concentration is attributed to the intensity of agricultural activities and possibly to nearby fossil fuel combustion activities as well as to traffic flows from highways and local roads. Multivariate analysis suggests that Cd, Cr, Cu, Hg, Pb and Zn are associated with anthropogenic activities whereas Cr and As are mainly controlled by parent materials. Most of the studied metals are present in concentrations exceeding the permissible limits with Hg and Pb being the most abundant.

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Spatial analysis of surface water quality in and around GHMC using GIS

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Curface water bodies are the water present on the surface of land like oceans, rivers, streams, lakes and other natural water Ocourses. Lakes in urban and pre-urban areas are an important interface between planning and ecology which demands environmentally responsive strategies. The increase in population by leap and bounds is threatening the pollution of water resources badly. Because of Urbanization and industrialization the disposal of waste water and sewage has become the major problem in cities where population has increased drastically over the decades. Surface water bodies quality monitoring using GIS are not new. In fact it was practiced in India and other countries long back. The Present study deals with spatial analysis of water quality for 27 different surface water bodies located in and around Greater Hyderabad Municipal Corporation (GHMC). The 27 surface water bodies were delineated using satellite images of Google Earth, water samples were collected from 27 surface water bodies and the parameters such as pH, Total Dissolved solids, Co, as CaCo, HCo, as CaCo, CL, F, No, as N, So, Na, K, Ca, Mg, Total Hardness as CaCo, has been analyzed, the analytical report of water samples were compared with BIS (Bureau of Indian Standards) permissible limits and by using spatial analysis in GIS, the spatial extent of water quality has been monitored. The main objective of the study is to know water quality of different surface water bodies and spatial extent of water quality for pre-monsoon seasonby using ArcMap. It is estimated and concluded that the quality of water from 27 different surface water bodies varies comparatively with the permissible limits given by Bureau of Indian Standards and the spatial extent of water quality is varying with respect to the parameter and its values. By analyzing the water samples of 27 different lakesfor post-monsoon seasons, the water quality Index can be known for different lakes by comparing the quality of pre and post monsoon seasons and also the spatial extent of pre and post monsoon seasons can be monitored.