

Calculating and integrating the extent of pollution loads for toxic and major elements in the soil of Gadoon Amazai, Pakistan

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Abstract

The current study was carried out in Gadoon and surrounding areas in order to investigate and calculate the pollution load released by industrial state. A total of forty five samples were collected with twenty five soil samples from focus area and twenty samples from the background area. All these soil samples were analyzed for thirteen major and toxic metals using Perkin Elmer Atomic Absorption Spectrophotometer (AAS-700) equipped with Graphite Furnace (GF).

The results show that the mean concentrations of toxic metals (mg/kg) in the target area are 301.6, 8.8, 152.3, 58.8, 144.7, 359.4 and 32.5 for Cr, Cd, Pb, Ni, Cu, Zn and Co respectively, While the mean concentration of major elements (mg/kg) are 1097, 2508, 786.5, 2572, 4088.9 and 689.8 for Fe, Mn, Mg, Na, Ca and K respectively. Mean concentration for major and toxic metals (mg/kg) for background area are 93.6, 6.1, 35.5, 55.9, 59.1, 116.4, 24.1, 644.3, 1112.3, 549.4, 1275.1, 2364.4 and 995.2 for Cr, Cd, Pb, Ni, Cu, Zn, Co, Fe, Mn, Mg, Na, Ca and K respectively. Several approaches such as pollution load index, risk index, contamination degree, new pollution index etc. were applied in order to infer anthropogenic contribution. The majority of the toxic and major elements are contributed to soil pollution, but the toxic metals have high influence on the environment as compare to major elements. Therefore, industrial and commercial areas are prone to higher potential ecological risk when compared with background area. There is strong need for remediation and mitigation activity in the study area which could help to minimize the pollution loads produced by the Gadoon Amazai Industrial state.