



Assessment of Contamination Levels and Ecological Risk Indices of Environmentally Hazardous Metals for Granite Mining Waste

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Abstract: The heavy metals (HMs) present in the granite mining waste soils were identified, assessed the contamination levels and ecological risks posed by potentially hazardous HMs. Twenty soil samples were collected from mineral bench, dump yard and stockyard, including agricultural land at mining area in Chimakurthy, Andhra Pradesh, India. Six heavy metals (*Cr*, *Co*, *Ni*, *Cu*, *Zn* and *Mn*) were identified using Energy Dispersed Spectroscopy (XRD) and measured the concentrations of HMs using Atomic Absorption Spectrometer (AAS). Furthermore, the contamination levels and the risk indices of granite waste soils with HMs were determined by the pollution index (PI), integrated pollution index (IPI), Geo-accumulation index (I_{geo}) and potential ecological risk index (RI). The calculated the contamination levels and the overall risk indices of mining waste soils were $PI > 3$, $IPI > 2$, $2 < I_{geo} \leq 3$ and $184 > RI > 223$ respectively, which indicated that the mining soils were highly contaminated and moderate ecological risk by the HMs, particularly Co, Cu and Zn. According to risk map analysis, the dump yard soils were highly contaminated than mineral bench and stockyard soils. It might be the reason that the accumulation of overburden soil at dump yards due to various opencast mining activities.

Keywords: Granite, Heavy metals, Geo-accumulation index, Risk index, EIA
