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# HEALTH RISK ASSESSMENT AND SOURCE IDENTIFICATION OF HEAVY METALS IN AGRICULTURAL SOILS OF MIAN-AB PLAIN, KHUZESTAN, IRAN

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## Abstract

Over the past few decades, the issue of heavy metal contamination in agricultural soils has gained significant attention due to its potential threat to soil ecosystems, food security, and human health. This research studied the source and potential risk associated with heavy metals in agricultural soils of Mian-Ab plain, Khuzestan, Iran. Source identification of the heavy metals using different methods indicated a combination of natural and anthropogenic (agricultural activities and vehicle emissions) origin. According to the positive matrix fraction (PMF) model, natural sources were found to be dominant for elements such as As (69%), V (58%), Mn (55%), Co (54%), Cr (50%), and Ni (48%). In contrast, atmospheric deposition, mainly from vehicle emission was a major contributor to Pb (72%), Cu (30%), and Zn (30%), while, agricultural activities, particularly fertilizer use, were associated with Zn (29%), Cd (29%), Cr (28%), and Cu (26%). The quality assessment of the agricultural soil in the study area showed low to moderate contamination of Cd, Cu, Pb, and Zn in some stations. Human health risk assessment indicated that non-carcinogenic and carcinogenic risks for adults through different pathways were negligible. However, the total carcinogenic risk for children ($6.8 \times 10^{-6}$) exceeded the safety level ($1 \times 10^{-6}$), indicating a potential risk of developing cancer. Notably, heavy metals such as As and Ni were identified as the primary contributors to this carcinogenic risk.

*Key words:* agricultural soils, heavy metals, positive matrix factorization, source apportionment

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