Soil Pollution

1-Global soil pollution by toxic metals threatens agriculture and human health

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Abstract

Toxic metal pollution is ubiquitous in soils, yet its worldwide distribution is unknown. We analyzed a global database of soil pollution by arsenic, cadmium, cobalt, chromium, copper, nickel, and lead at 796,084 sampling points from 1493 regional studies and used machine learning techniques to map areas with exceedance of agricultural and human health thresholds. We reveal a previously unrecognized high-risk, metal-enriched zone in low-latitude Eurasia, which is attributed to influential climatic, topographic, and anthropogenic conditions. This feature can be regarded as a signpost for the Anthropocene era. We show that 14 to 17% of cropland is affected by toxic metal pollution globally and estimate that between 0.9 and 1.4 billion people live in regions of heightened public health and ecological risks.

Keywords

Keywords Plus

HEAVY-METALSSPATIAL-DISTRIBUTIONANTHROPOGENIC SOURCESOXIDATIVE STRESSEUROPEAN-UNIONGISCONTAMINATIONURBANRISKIMPACT

Soil Pollution

2-Heavy metals pollution from smelting activities: A threat to soil and groundwater

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Abstract

Throughout the literature, the word "heavy metal" (HM) has been utilized to describe soil contamination; in this context, we characterize it as those elements with a density greater than 5 g per cubic centimeter. Contamination is one of the major global health concerns, especially in China. China's rapid urbanization over the past decades has caused widespread urban water, air, and soil degradation. This study provides a complete assessment of the soil contamination caused by heavy metals in China's mining and smelting regions. The study of heavy metals (HMs) includes an examination of their potential adverse impacts, their origins, and strategies for the remediation of soil contaminated by heavy metals. The presence of heavy metals in soil can be linked to both natural and anthropogenic processes. Studies have demonstrated that soils contaminated with heavy metals present potential health risks to individuals. Children are more vulnerable to the effects of heavy metal pollution than adults. The results highlight the significance of heavy metal pollution caused by mining and smelting operations in China. Soil contaminated with heavy metals poses significant health concerns, both carcinogenic and noncarcinogenic, particularly to children and individuals living in heavily polluted mining and smelting areas. Implementing physical, chemical, and biological remediation techniques is the most productive approach for addressing heavy metal-contaminated soil. Among these methods, phytoremediation has emerged as a particularly advantageous option due to its cost-effectiveness and environmentally favorable characteristics. Monitoring heavy metals in soils is of utmost importance to facilitate the implementation of improved management and remediation techniques for contaminated soils.

Keywords
Author Keywords
Heavy metalsSmelting polluted soilSourcesRemediation

Keywords Plus
HEALTH-RISK ASSESSMENTAGRICULTURAL SOILSREMEDIATION TECHNOLOGIESMERCURY POLLUTIONECOLOGICAL RISKCHINACONTAMINATIONWASTEINDUSTRIALCADMIUM