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# A Short Note on Heavy Metal Pollution of Water and Soil

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## Abstract

Heavy metals are highly toxic substances that persist in the natural environment. This causes their effects to spread up the food chain and harm human and environmental health. As a result, heavy metal pollution has received a lot of attention from researchers. The current state of heavy metal pollution monitoring, management, and mitigation is evaluated in this review, which reveals a lack of systematic risk evaluation criteria. Methods for multivariate analysis and risk assessment are also discussed. The fundamental steps in selecting treatment technologies are risk assessment and multivariate statistical analysis. The method used is always unique to the site, and it frequently combines various strategies. Appropriate restoration and treatment plans can only be developed by thoroughly considering the contaminated time, the concentration and nature of the contaminant, the characteristics of the soil, water, and site, the availability of the contaminant, and the existence of specific regulations.

**Keywords:** Heavy metal pollution; Environmental health

## Introduction

For the purpose of analyzing the risk posed by heavy metal pollution, it appears that the most effective combination of GIS and modeling is achieved. Many physical, chemical, and biological technologies have been used to remove heavy metal pollution from water and soil in recent years, each with its own benefits and drawbacks. For the time being, there isn't a single method that works for all heavy metals. The inter-governmental, cross-border prevention and monitoring of heavy metals for the purpose of controlling sources of anthropogenic pollution can be made more efficient by combining various technologies. Scaled-up heavy metal treatment technologies that are both efficient and commercially viable will have a significant impact not only on economic output but also on the health of people and the environment. This audit gives an outline of the presently accessible techniques, to illuminate specialists and different partners in the avoidance of weighty metal contamination of water and soil.

Water resources systems have been threatened by rapid urbanization and industrialization, limiting the sustainable development of economies and societies. Watersheds are significantly impacted by water pollution, climate change, and high-intensity human activities. According to Calzadilla et al., water scarcity affects approximately . According to Zhou et al., the major rivers and lakes in China typically have varying degrees of heavy metal contamination. The majority of heavy metal pollution is caused by a combination of factors. Despite the fact that anthropogenic activities are the primary causes of heavy metal pollution, natural phenomena such as heavy rainfall can contribute to an increase in water pollution. Particularly, there has been a sharp increase in the direct discharge of polluted water into rivers and lakes, resulting in extensive heavy metal pollution [1-5].

## Discussion

Aquatic pollution is exacerbated by the accumulation of heavy metal pollutants, which directly affects the safety of drinking water, food production, and crops, putting human health at risk. Non-point sources of pollution include agricultural compost, construction land use, and vegetation destruction, among others, whereas point sources of pollution include industrial waste discharge, sewage disposal, coal, power generation, and mining. 2011). In the Ganges River (India), the distribution of trace metals (Cd, Cr, Cu, Fe, Mn, Ni, and Pb) in water and sediments was examined. The results showed that high concentrations of Cd may be caused by the use of chemical fertilizers and fuel industry pollution, while variation may be caused by the discharge of industrial sewage. Zn, Pb, Ni, Cu, Cr, Cd, and as concentrations were measured in the Yellow River in China, and their pollution status and potential risks were evaluated. According to Yan et al., high enrichment factors were found for Cu and Cr, which may be the primary pollutants in rivers. 2016).Ali et al. investigated the levels of As, Cr, Cd, and Pb in the Bangladeshi Karnaphuli River basin. The findings demonstrated that the concentration of these heavy metals in the water was higher than what is considered safe for consumption, necessitating an immediate risk assessment of heavy metal exposure in the Karnaphuli River basin. Varol and en looked at the levels of heavy metal contamination in surface water and sediment samples from the upper Tigris River in Turkey. The results of the Enrichment Index (EF) and the Geologic Accumulation Index (I-geo) suggest that most metals, particularly Cu, came from human activity.

The total soil exceeding standard rate reached 16.1% in 2014, with heavy metal pollution accounting for a significant portion. Soil heavy metal pollution is common. Cr, Hg, Pb, and As are the heavy metals that pollute the most. Of these, Cr and As pollute the most, accounting for about 40% of the contaminated farmland. Heavy metal contamination of the soil is usually a challenge that goes unnoticed and cannot be directly measured or observed. Heavy metal pollution poses a serious threat to natural ecosystems and human health because, unlike organic pollutants, most heavy metals do not undergo microbiological or chemical degradation. Consequently, research into heavy metal pollution control and remediation is essential.

To guarantee the success of treatment, prevention, and control measures, risk assessment tools are required to determine a location's pollution status, locate sources, and anticipate potential risks in the future. The water and sediments of twenty Swarnamukhi River Basin (India) tributaries were subjected to heavy metal risk assessments. High

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levels of Cu, Cr, Pb, and Zn contamination are indicated by enrichment factors. The ecological risk assessment index ranks pollution levels from aquatic to biological to sediment, with Cd and Hg listed as the most important pollutants. Models, extensive statistical analysis, and geographic information systems (GIS) are all needed to determine the origin and distribution of heavy metals in complex aquatic systems. To effectively simulate the transport and toxicity of heavy metals, models must be calibrated and validated because they are based on assumptions [6-10].

## Conclusion

For instance, Mohammed and Babatunde (2017) laid out a unique recreation model of weighty metal movement and destiny in an upward stream built wetland framework. The model is able to simulate the concentration of heavy metals and the efficiency of adsorption processes for their removal. Estimates of non-point sources of nutrient pollution (nitrogen and phosphorus) have been made using the SWAT model. Meng and others created SWAT-HM to investigate the spatiotemporal variation in watershed-scale heavy metal transport and transformation.

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