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Assessment of Heavy Metal Contamination and Related Human Health Risk in Groundwater in West Tripura, India

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Abstract: *Contamination of groundwater emerges as a concerning menace to the sustainability of ecosystem services and the preservation of natural resources. In this study, the region was examined as a case study to assess heavy metal pollution indices, and their repercussions on human health. For the research purposes, a total of 38 groundwater samples were gathered from the West Tripura district. The sequence of trace metal contaminations is as follows: Fe > Pb > Mn > Zn > Cu. In 53% of the samples, the most prevalent metal, Fe, surpasses its contamination threshold. The findings from the heavy metal indices indicate that over 57% of the samples are exposed to a high risk attributed to elevated levels of Fe and Mn contamination. The results of the health risk assessment study suggest that children are subjected to significantly higher levels of both carcinogenic and non-carcinogenic risks compared to adults due to elevated concentrations of Fe. Given the aforementioned factors, it is recommended that regular monitoring of physicochemical parameters and heavy metals be conducted to safeguard water resources. Furthermore, there should be a focus on implementing management practices aimed at upholding water quality standards. The study additionally proposes that treatment and sustainable management of groundwater resources are essential to mitigate trace metal contaminations prior to public utilization.*

Keywords: Groundwater, Heavy metal indices, Human health risks, Sustainability

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