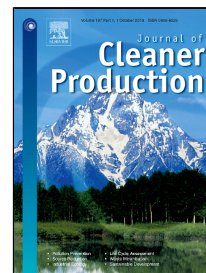


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M. Annie Jenifer, Madan K. Jha

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# Comprehensive Risk Assessment of Groundwater Contamination in a Weathered Hard-Rock Aquifer System of India

M. Annie Jenifer<sup>a</sup> and Madan K. Jha<sup>b</sup>

<sup>a</sup>School of Water Resources, Indian Institute of Technology Kharagpur, West Bengal, India

<sup>b</sup>AgFE Department, Indian Institute of Technology Kharagpur, West Bengal, India

E-mail: annie@iitkgp.ac.in; madan@agfe.iitkgp.ac.in

## Abstract

Risk assessment is indispensable for the efficient monitoring and management of groundwater contamination. This study presents the first application of comprehensive risk assessment in a weathered hard-rock aquifer of India at a macro-scale by integrating aquifer vulnerability with the sources and consequences of groundwater contamination. Aquifer vulnerability was evaluated using a modified DRASTIC model, contaminant sources were identified using hazard inventory, and the consequences of groundwater contamination were estimated based on the significance of groundwater. Finally, these three components were integrated in the GIS environment to determine the risk of groundwater contamination. The results were validated using two approaches based on the concentration of groundwater-quality parameters that pose threat to groundwater contamination. The results of aquifer vulnerability reveal that 70% of the study area has 'High' to 'Very High' vulnerability and the hazard map indicates that about 44% of the area has 'Rare' likelihood of hazard incidence. On the other hand, the consequence map reveals that 83% of the study area may experience 'Maximum' to 'Extreme' consequences due to groundwater contamination. The developed risk map shows that 37% of the study area has 'Major' risk of groundwater contamination, whereas 10% has

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