

Groundwater Contamination Assessment and Mitigation Strategies for Water Resource Sustainability: A Concise Review

Authors : Khawar Naeem, Adel Elomri, Adel Zghibi

Abstract : Contamination leakage from municipal solid waste (MSW) landfills is a serious environmental challenge that poses a threat to interconnected ecosystems. It not only contaminates the soil of the saturated zone, but it also percolates down the earth and contaminates the groundwater (GW). In this concise literature review, an effort is made to understand the environmental hazards posed by this contamination to the soil and groundwater, the type of contamination, and possible solutions proposed in the literature. In the study's second phase, the MSW management practices are explored as the landfill site dump rate and type of MSW into the landfill site directly depend on the MSW management strategies. Case studies from multiple developed and underdeveloped countries are presented, and the complex MSW management system is investigated from an operational perspective to minimize the contamination of GW. One of the significant tools used in the literature was found to be Systems Dynamic Modeling (SDM), which is a simulation-based approach to study the stakeholder's approach. By employing the SDM approach, the risk of GW contamination can be reduced by devising effective MSW management policies, ultimately resulting in water resource sustainability and regional sustainable development.

Keywords : groundwater contamination, environmental risk, municipal solid waste management, system dynamic modeling, water resource sustainability, sustainable development

Conference Title : ICW 2024 : International Conference on Water

Conference Location : Sydney, Australia

Conference Dates : March 25-26, 2024