

A review of wetland vulnerability assessment and monitoring in semi-arid environments of sub-Saharan Africa

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Abstract

This study presents a comprehensive literature review exploring the effects of artisanal mining on wetlands in semi-arid regions of sub-Saharan Africa. The review encompasses relevant literature sourced from Google Scholar, SCOPUS and Web of Science databases, using specific key search terms. The findings reveal a substantial body of research dedicated to artisanal mining. The study findings reveal that wetlands are currently facing threats, and extensive scientific research has been conducted on wetland monitoring and assessment. Ecohydrological and geomorphological assessment studies are found to be critical in understanding wetland vulnerability. Among the frequentist-interpretation methods used in most wetland assessment studies, Bayesian belief networks (BBNs), geospatial and earth observation analysis, and expert elicitation are prominently highlighted. In addition, many countries, including Congo, Niger, South Africa, and Zimbabwe, have experienced extensive artisanal mining activities, leading to notable wetland and habitat losses, compromised eco-hydrology integrity, riverbed siltation, and severe mercury pollution, resulting in neurological poisoning of both invertebrate and vertebrate wetland species. The review underscores the urgency of adopting a transdisciplinary scientific approach to wetland monitoring and assessment to prevent further degradation of these ecosystems. By embracing such an approach, scientists can gain a comprehensive understanding of the impacts of human activities on wetlands and develop more effective strategies for mitigating these adverse effects.