

LEVERAGING ARTIFICIAL INTELLIGENCE TO OPTIMIZE ECOLOGICAL RESILIENCE IN ADAPTIVE ENVIRONMENTAL MANAGEMENT SYSTEMS IN SRI LANKA: A CONTEXTUAL ANALYZE

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Sri Lanka is an island rich in biodiversity, faces mounting environmental challenges including climate change impacts and natural disasters. The ecological management system of Sri Lanka has traditionally relied on conventional methods, which fall short in addressing the complexities of contemporary environmental issues. This study explores how Artificial Intelligence (AI) can be leveraged to enhance ecological resilience in Sri Lanka's adaptive environmental management systems contextually. The research problem is to determine how AI can address these limitations and improve the adaptivity, resilience of environmental management systems in Sri Lanka. The objective of the research is to access the potential of AI in enhance ecological resilience in Sri Lanka by analyzing its application in adaptive environmental management systems, it involves data integration, predictive modeling and real -time monitoring to support better decision-making processes. The study consists a mix research methodology. Qualitative case studies such as; "2017 Kegalle floods", Ongoing deforestation issues in the "Sinha Raja Forest Reserve" were used and as quantitative data it includes with AI models used in environmental monitoring and management with focusing on remote sensing data, machine learning algorithms and their application in floods and other issues. Data sources include government reports, academic journals too. It was founded that the integration of AI in environmental management systems of Sri Lanka have yielded notable improvements like; flood prediction and response (AI in after math of 2017 Kegalle floods demonstrated 30% improvement in prediction accuracy compared to traditional methods), deforestation monitoring and real time monitoring. Conclude the study highlights that AI holds a significant enhancing ecological resilience in Sri Lanka and future efforts should focus on expanding AI applications, integrating local knowledge for fully realize the benefits of AI in sustainable environmental management practices.

Keywords: Adaptive Management, Artificial Intelligence, Ecological Resilience, Environment Management Systems, Sri Lanka.

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