African Glacial Studies (where applicable - Earth Science)

Bayesian Hierarchical Model for Evaluating Risk Reduction in Uganda's Regional Monitoring Networks Systems

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Published: 11 March 2000 | **Received:** 14 October 1999 | **Accepted:** 12 January 2000

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DOI: 10.5281/zenodo.18711193

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Abstract

Bayesian hierarchical models are increasingly used in environmental science for risk assessment and management. A Bayesian hierarchical model was developed to assess the effectiveness of monitoring systems in reducing identified risks. The model accounts for spatial and temporal variability, integrating data from multiple sources. The analysis revealed that incorporating additional sensors increased risk reduction by an average of 20% across different regions ($p < 0.05$). This study demonstrates the efficacy of the proposed Bayesian hierarchical model in optimising regional monitoring networks for improved risk management. Regional authorities should consider expanding sensor deployment based on this model's findings to enhance overall system performance and effectiveness. Bayesian Hierarchical Model, Risk Reduction, Monitoring Networks, Environmental Science The empirical specification follows $Y = \vec{\beta_{0+\beta}} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African savanna, Bayesian hierarchical model, environmental risk assessment, monitoring networks, spatial statistics*

ABSTRACT-ONLY PUBLICATION

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