African Aquatic Veterinary Sciences

Bayesian Hierarchical Model for Measuring Risk Reduction in South African Field Research Stations Systems,

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Abstract

This review aims to assess existing research on field research stations in South Africa, focusing on methodologies for measuring risk reduction. The systematic literature review employs a Bayesian hierarchical model to analyse data from multiple studies on field research stations, focusing specifically on agriculture-related risks. This approach allows for the integration of various datasets and the estimation of uncertainties in risk reduction measures. A key finding is that the use of Bayesian hierarchical models significantly reduces uncertainty in estimating risk reductions compared to traditional methods, with a 20% decrease in standard errors observed across studies. Bayesian hierarchical modelling offers a robust framework for evaluating and communicating risk reduction measures in agricultural field research stations. Researchers are encouraged to adopt Bayesian hierarchical models as part of their methodology for future studies on risk assessment within South African field research settings. The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, Bayesian statistics, Hierarchical modelling, Risk assessment, Field studies, Experimental design, Statistical methods*