African Hydrogeology (Earth Science)

Bayesian Hierarchical Model for Measuring Adoption Rates in Senegal's Field Research Stations Systems

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Abstract

This study evaluates the adoption rates of field research stations in Senegal's agricultural sector using a Bayesian hierarchical model. A Bayesian hierarchical model was employed to analyse data collected from field research stations across Senegal. This approach accounts for spatial and temporal variation in adoption rates by incorporating prior knowledge through a hierarchical structure. The analysis revealed that the rate of adoption varied significantly between different regions, with an average adoption rate of 45% across all stations analysed. The Bayesian hierarchical model effectively captured the variability in adoption rates and provided robust estimates for policy makers to consider. Based on these findings, it is recommended that localized interventions be prioritised to increase adoption rates where they are currently low. The empirical specification follows $Y = \beta_{0+\beta}^{\rightarrow} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Sub-Saharan, Bayesian, Hierarchical, Adoption, Quantitative, Methodology, Analysis*

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