African Cartography and Geovisualization (Earth Science Methodology)

Bayesian Hierarchical Model for Measuring Adoption Rates in Municipal Water Systems in Rwanda

Imbellu Mukasi[1], **Ingabiriro Nshuti**[1,2], **Kigutu Mutabazi**[1,3], **Habyaremanga Uwimana**[4]

[1] University of Rwanda

[2] Department of Advanced Studies, University of Rwanda

[3] Department of Interdisciplinary Studies, African Leadership University (ALU), Kigali

[4] Department of Interdisciplinary Studies, University of Rwanda

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Correspondence: imukasi@gmail.com

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Author notes

Imbellu Mukasi is affiliated with University of Rwanda and focuses on Environmental Science research in Africa.
Ingabiriro Nshuti is affiliated with University of Rwanda and focuses on Environmental Science research in Africa.
Kigutu Mutabazi is affiliated with Department of Interdisciplinary Studies, African Leadership University (ALU), Kigali and focuses on Environmental Science research in Africa.
Habyaremanga Uwimana is affiliated with Department of Interdisciplinary Studies, University of Rwanda and focuses on Environmental Science research in Africa.

Abstract

This study focuses on evaluating municipal water systems in Rwanda, aiming to understand adoption rates through a Bayesian hierarchical model. A Bayesian hierarchical model was employed to analyse data on municipal water systems. The model incorporates spatial dependencies and heterogeneity across different municipalities within Rwanda. The analysis revealed a significant variation in adoption rates among municipalities, with some areas showing higher rates than others, indicating the need for targeted interventions. A Bayesian hierarchical model successfully captured the variability in municipal water system adoption rates, providing nuanced insights into factors affecting user acceptance and system performance. Policy recommendations include focusing on improving access to water services in underserved areas based on identified patterns of adoption rate variation. Bayesian Hierarchical Model, Municipal Water Systems, Adoption Rates, Rwanda, Geovisualization 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, adoption rates, water systems, econometrics, spatial analysis*

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