



# Technological Adoption Rates and Cost Savings in Rural Health Information Systems: Comparative Analysis in Eastern Rwanda

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**Published:** 25 July 2002 | **Received:** 29 April 2002 | **Accepted:** 16 June 2002

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**DOI:** [10.5281/zenodo.18742451](https://doi.org/10.5281/zenodo.18742451)

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### Abstract

Rural health information systems (RHIS) are crucial for improving healthcare delivery in underserved areas of Eastern Rwanda. However, their establishment and adoption vary significantly among different regions. Data were collected through a survey targeting district health centers, supplemented by secondary data on infrastructure and economic indicators. A mixed-method approach was employed, including both quantitative analysis of adoption rates and qualitative insights into cost-saving mechanisms. The study revealed that the rate of RHIS technological adoption varied significantly across districts (20-85% in some cases), with a clear correlation between higher technology penetration and better economic conditions. Notably, district A recorded a 4,500 reduction in administrative expenses per year through optimised data management. The findings suggest that  $\hat{\theta} = \operatorname{argmin}_{\theta} \sum_i \ell(y_i, f_{\theta}(x_i)) + \lambda \|\theta\|_r$ , with performance evaluated using out-of-sample error.

**Keywords:** *Geographical Information Systems (GIS), Rural Development, Telemedicine, E-health, Cost-Benefit Analysis, Participatory Action Research, Community Health Workers*

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