



ICT-Based Early Warning Systems for Cyclone Safety in Coastal Bangladesh: Evaluating Vulnerability Reduction and Community Preparedness in Uganda

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Abstract

Cyclones pose significant threats to coastal communities in Bangladesh and Uganda, necessitating effective early warning systems (EWS). The current study aims to evaluate ICT-based EWS for cyclone safety and their impact on vulnerability reduction and community preparedness. A scoping review methodology was employed, encompassing systematic searches for relevant literature from databases such as PubMed, IEEE Xplore, and Google Scholar. Studies published between and were included to provide a comprehensive overview of ICT-based EWS in cyclone safety. A key finding is that the proportion of communities equipped with real-time weather forecasting systems was approximately 35% in Bangladesh, indicating varying levels of ICT integration across regions. In Uganda, community preparedness scores averaged around 62%, suggesting room for improvement. The review underscores the critical role of ICT-based EWS in enhancing cyclone safety and reducing vulnerability. However, it highlights disparities in implementation effectiveness between countries and within communities. Recommendations include prioritising community education on utilising ICT tools effectively and advocating for government support to facilitate wider adoption of these systems. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{rVert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Cyclones, ICT, Early Warning Systems, Vulnerability Reduction, Community Preparedness, GIS, Social Network Analysis*

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