



Water Scarcity and Basin-Wide Sustainable Management in the Nile River, Togo Context

Akwasi Atchade¹

¹ University of Lomé

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Correspondence: aatchade@aol.com

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Author notes

Akwasi Atchade is affiliated with University of Lomé and focuses on Environmental Science research in Africa.

Abstract

The Nile River Basin is a critical source of water for Togo, but recent years have seen increasing concerns about water scarcity and its impacts on agriculture, urban development, and ecosystems. The study employed a mixed-method approach combining hydrological modelling with participatory community surveys to evaluate water scarcity patterns and identify potential solutions. Analysis revealed significant variability in annual rainfall distribution, affecting both surface water availability and groundwater recharge rates across the Basin. This heterogeneity highlights the need for adaptive management strategies that consider local climate conditions and socio-economic factors. The findings underscore the importance of integrating hydrological data with community feedback to develop effective and sustainable water resource management plans in Togo's Nile River Basin. Recommendations include implementing early warning systems, promoting efficient irrigation practices, and fostering collaborative governance structures among stakeholders for equitable water distribution. The empirical specification follows $Y = \beta_{0+\beta}^{-1} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: Nile basin, Togo, water scarcity, sustainable development, watershed management, hydrology, eco-hydrology

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