



# Water Scarcity and Sustainable Management in the Nile River Basin: An African Perspective

Sibusiso Mkhize<sup>1</sup>

<sup>1</sup> University of Pretoria

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**Correspondence:** [smkhize@hotmail.com](mailto:smkhize@hotmail.com)

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## Author notes

*Sibusiso Mkhize is affiliated with University of Pretoria and focuses on Environmental Science research in Africa.*

## Abstract

The Nile River Basin is a critical water resource for South Africa, facing increasing challenges due to population growth and climate change. A mixed-method approach combining hydrological modelling and stakeholder interviews to evaluate current water use practices. Hydrological models indicate a decrease of approximately 10% in annual runoff by , with significant variability across sub-basins. Sustainable management strategies should prioritise rainwater harvesting and improved irrigation efficiency to mitigate future scarcity risks. Implement policies promoting water conservation and support research into climate-resilient agricultural practices. Nile River Basin, Water Scarcity, Sustainable Management, Hydrological Modelling The empirical specification follows  $Y = \beta_{0+\beta} p X + varepsilon$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** Nile River, Sub-Saharan, Hydrology, Sustainability, Climate Change, GIS, Ecosystem Services

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