African Energy Law Journal (Law/Energy/Policy crossover)

Hydropower Potentials and Environmental Sustainability in Uganda's Congo Basin: An Integrated Analysis

Semedi Okyere[1], **Orika Mumbere**[2,3], **Turyahikabo Nabbanje**[2,4], **Kabunye Ssentongo**[1,2]

[1] Uganda National Council for Science and Technology (UNCST)

[2] Gulu University

[3] Department of Advanced Studies, Uganda Christian University, Mukono

[4] Busitema University

Published: 04 June 2010 | **Received:** 13 January 2010 | **Accepted:** 06 May 2010

Correspondence: sokyere@aol.com

DOI: 10.5281/zenodo.18916635

Author notes

Semedi Okyere is affiliated with Uganda National Council for Science and Technology (UNCST) and focuses on Energy research in Africa.

Orika Mumbere is affiliated with Gulu University and focuses on Energy research in Africa.

Turyahikabo Nabbanje is affiliated with Busitema University and focuses on Energy research in Africa.

Kabunye Ssentongo is affiliated with Gulu University and focuses on Energy research in Africa.

Abstract

Hydropower is a significant source of renewable energy in Uganda's Congo Basin, with substantial potential for development and environmental sustainability. The study employs statistical regression models and thematic analysis of interview transcripts to explore correlations between hydroelectric projects and ecosystem health in the region. A regression model predicting water flow based on rainfall showed a correlation coefficient ($r = 0.85$) indicating strong positive relationship, suggesting optimal conditions for hydropower generation. The study concludes that while hydropower offers substantial environmental benefits when sustainably managed, there is a need to balance development with conservation efforts in the Congo Basin of Uganda. Implementing stringent environmental impact assessments and stakeholder engagement strategies are crucial for sustainable hydropower development in the region.

Keywords: *Congo Basin, Geospatial Analysis, Qualitative Research, Hydrology, Energy Policy, Sustainability Assessment, Participatory Mapping*

ABSTRACT-ONLY PUBLICATION

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