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for managing natural resources and a better life for all”

## Multiple lines of evidence for assessing human pressures on aquatic ecosystems in Kenya and Uganda

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### Abstract

Across the world, pressure to use evidence-based environmental management is increasing, but little guidance exists as to what ‘evidence-based’ actually means. Accurate and informative methods for evidence synthesis that are simple and inexpensive to implement would significantly increase the ability to use scientific research results better to manage land/water resources in sub-Saharan Africa, particularly Kenya and Uganda. Increasing industrial and agricultural pollution, accompanied by climate change and extreme weather effects, severely threatens human and ecosystem integrity. Established water quality monitoring practices in Kenya and Uganda predominantly rely on short-term indicators, failing to provide a holistic, long-term perspective. Therefore, our research methodology aims to (1) advance and promote multiple lines of eco-evidence synthesis methods and (2) strengthen community-based research for river health and climate change mitigation in Eastern Africa. In doing so, we established a cause-effect database. We synthesized international and local literature, expert and traditional community knowledge, and empirical abiotic and biotic (benthic invertebrates) field data. Our results highlight the potential of socio-ecological evidence to complement and enhance cause-effect chains based solely on scientific literature. A significant correlation between drivers of agriculture, industry, urbanisation, and climate change as critical impacts for freshwater ecosystem degradation. In addition, cause-effect models operationalize complex socio-ecological findings into an accessible format to facilitate socio-ecological and environmental mitigation within a broad audience from local communities to policy. They address the need to respect aquatic ecosystems and their resilience and integrate community engagement and indigenous knowledge when developing sustainable socio-ecological strategies for effective ecosystems as opportunities to explore long-term perspectives in environment management in Uganda and other regions of sub-Saharan Africa.

**Keywords:** Cause-effect models, community-based methods, freshwater ecosystems, multiple-lines of evidence, water quality