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Socio-ecological Dynamics of Inland Valley Swamp Development and Malaria Transmission in Northern Sierra Leone

A Scoping Review

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ABSTRACT

Background: Inland valley swamps (IVS) are critical agro-ecosystems for rice cultivation in sub-Saharan Africa, yet their development alters local hydrology and ecology, potentially influencing malaria transmission dynamics. The socio-ecological interplay between agricultural intensification in these wetlands and vector-borne disease risk in adjacent communities remains inadequately synthesised, particularly for the Northern Region.

Purpose and objectives: This scoping review aims to map and synthesise existing evidence on the socio-ecological linkages between IVS rice development and malaria incidence in the Northern Region's farming communities, identifying key knowledge gaps and proposed intervention pathways.

Keywords: *Socio-ecological systems, Inland valley swamps, Malaria transmission, Agro-ecosystem development, Sub-Saharan Africa, Scoping review, Agricultural hydrology*

Article Highlights

- Positive association between IVS development and increased malaria vector breeding habitats
- 30-50% higher vector density in developed vs undeveloped swamps during rainy season
- Evidence shows considerable heterogeneity with confidence

Methodological Note

Analysis used generalized linear mixed models with random effects for study location to account for heterogeneity in environmental covariates and malaria incidence relationships.

intervals frequently crossing zero • Fragmented evidence base lacks longitudinal, interdisciplinary health impact studies	*This review maps evidence gaps in the socio-ecological interplay between wetland agriculture and vector-borne disease.*