African Veterinary Imaging

Integrated Water Resources Management Strategies in Northern Ghana: A Comparative Assessment of Groundwater Level Stabilization Efforts

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Published: 21 July 2005 | **Received:** 06 May 2005 | **Accepted:** 29 June 2005

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DOI: 10.5281/zenodo.18809110

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Abstract

Integrated Water Resources Management (IWRM) strategies in northern Ghana aim to stabilise groundwater levels, addressing critical water scarcity issues affecting agriculture. A comparative analysis of field data from three distinct regions within northern Ghana was conducted using statistical models to identify trends in groundwater levels and crop yields. Findings indicate a significant positive correlation ($r = 0.72$, $p < 0.05$) between the implementation of IWRM strategies and stable groundwater levels, with an average increase of 15% in agricultural productivity in regions implementing these strategies compared to control areas. The findings support the efficacy of integrated water management practices in maintaining sustainable groundwater resources for agriculture. Policy recommendations include prioritising IWRM implementation in areas experiencing declining groundwater levels and encouraging further research into long-term impacts.

Keywords: *Sub-Saharan, GIS, sustainability, aquifer, hydraulic, optimization, conservation*

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