



Methodological Assessment of Regional Monitoring Networks for Yield Improvement in Ghana: A Randomized Field Trial

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Abstract

The effectiveness of regional monitoring networks in enhancing water yield is a subject of interest for sustainable development in Ghana's hydrogeology. A stratified random sampling approach was employed to select 10 sites across different regions of Ghana. Water yield data were collected over two seasons using established hydrological models with robust standard errors calculated for uncertainty quantification. - A significant positive correlation ($r = 0.72$, $p < 0.05$) was observed between the number of monitoring points and water yield improvements in the trial area. The randomized field trial demonstrated that denser monitoring networks lead to higher yields, validating the effectiveness of the implemented data collection methods. Based on these findings, it is recommended to expand regional monitoring networks by increasing the number of strategically placed water level sensors and temperature probes in critical hydrological zones.

Keywords: *Sub-Saharan, African, Spatial, Hydrology, Geostatistics, Quantitative, Ghanaian*

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