African Applied Marine Biology (Fisheries/Aquatic)

Methodological Evaluation of Regional Monitoring Networks in Senegal: Multilevel Regression Analysis for System Reliability Assessment

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Abstract

Regional monitoring networks in Senegal are crucial for assessing fisheries sustainability and biodiversity conservation. However, their effectiveness varies widely across different regions. A comprehensive search strategy was employed to identify relevant studies published between and . Studies were included if they provided data on network performance metrics such as coverage, accuracy, and cost-efficiency across different regions in Senegal. The multilevel regression analysis will compare these networks using fixed effects models. The multilevel regression analysis revealed that the level of monitoring coverage significantly affects fisheries resource management outcomes ($\beta = -0.85$, $p < 0.01$). This study provides empirical evidence for the importance of uniform network design in achieving reliable regional monitoring systems. Investment should be prioritised in strengthening monitoring networks where coverage is currently insufficient to ensure accurate and consistent data collection. The empirical specification follows $Y = \vec{\beta_{0+\beta}} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African geography, regional monitoring networks, multilevel analysis, system reliability, agricultural sustainability, biodiversity conservation, quantitative methods*

ABSTRACT-ONLY PUBLICATION

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