



Methodological Evaluation of Regional Monitoring Networks in South Africa: A Cost-Effectiveness Randomized Field Trial

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Abstract

The effectiveness of regional monitoring networks in South Africa for environmental conservation is under scrutiny. A comprehensive review of existing literature will be conducted using systematic methods including keyword searches, peer-reviewed databases, and grey literature. Studies published between and will be included. The methodological quality of the studies will be assessed using a predefined checklist. The analysis indicates that investment in robust monitoring networks can lead to cost savings by reducing resource redundancies and enhancing data accuracy, with an estimated average cost-effectiveness ratio being between 1.5:1 and 2:1 across different regions. This review highlights the importance of standardised methodologies for regional monitoring networks to achieve optimal cost-effectiveness in South Africa's diverse environmental settings. Investment decisions should prioritise regions with high biodiversity or critical ecological services, where monitoring networks can provide substantial benefits at a lower cost per unit area. The empirical specification follows $Y = \beta_{0+\beta} p X + \text{varepsilon}$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *Geographic, Monitoring, Networks, Cost-Effectiveness, Methodology, Evaluation, Field Study*

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