Methodological Evaluation of Regional Monitoring Networks in Ethiopia: Quasi-Experimental Design for Cost-Efficiency Measurement

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Abstract

Regional monitoring networks in Ethiopia are essential for environmental and climate studies, particularly in physics applications such as atmospheric science. A systematic literature review was conducted to assess the methodologies employed by various monitoring networks. Quantitative analyses were performed on selected studies, employing statistical models and uncertainty statements to determine the robustness of findings. The analysis revealed a significant proportion (30%) of studies used regression discontinuity design for cost-effectiveness measurement, with a notable variance in the effectiveness across different network structures. This review highlights the need for standardisation and cross-network comparisons to enhance the reliability of cost-effectiveness measurements within Ethiopian monitoring systems. Standardised methodologies should be adopted by all regional networks to ensure comparability and consistency, thereby improving the overall effectiveness and efficiency of cost-effectiveness measurement in physics studies. regional monitoring networks, cost-effectiveness, quasi-experimental design, regression discontinuity, Ethiopia, environmental physics The empirical specification follows $Y = \vec{\beta}_{0+\beta} \, p \, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

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