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## REVIEWER'S REPORT

**Manuscript No.: IJAR-57747**

**Title: Economic Growth, Public Health Expenditure and Air Pollution: A Panel Analysis of Indian States**

**Recommendation:**

**Accept as it is** .....

Accept after minor revision.....

Accept after major revision .....

Do not accept (*Reasons below*) .....

| Rating | Excel. | Good | Fair | Poor |
|---|---|---|---|---|
| Originality | ✓ | | | |
| Techn. Quality | | ✓ | | |
| Clarity | ✓ | | | |
| Significance | ✓ | | | |

**Reviewer's ID: JPR- 002**

## *Detailed Reviewer's Report*

The manuscript titled "Economic Growth, Public Health Expenditure and Air Pollution: A Panel Analysis of Indian States" addresses a highly relevant and contemporary issue concerning the relationship between economic growth, public health expenditure, industrial productivity, and PM2.5 air pollution across Indian states. The topic is significant due to increasing concerns regarding sustainable development, environmental degradation, and public health challenges in rapidly industrializing economies like India. The study demonstrates good academic relevance by integrating environmental economics with public policy and public health dimensions. The abstract clearly outlines the purpose, methodology, variables, and expected outcomes of the study, thereby providing readers with a concise understanding of the research focus.

The introduction is well-structured and effectively establishes the context of rising pollution levels alongside rapid economic growth and urbanization in India. The discussion linking PM2.5 exposure with labour productivity, healthcare burden, and economic efficiency is logically developed and supported with practical observations. The manuscript successfully explains the trade-off between economic expansion and environmental sustainability, which enhances the significance of the research problem. The objectives and research question are clearly framed and align appropriately with the overall theme of the study.

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The literature review is comprehensive and incorporates both national and international studies relating to PM2.5 pollution, productivity, healthcare expenditure, and environmental economics. The author effectively identifies the research gap by emphasizing the limited state-level panel studies in the Indian context over an extended period. The inclusion of theoretical frameworks such as the Environmental Kuznets Curve strengthens the conceptual foundation of the paper. The references to previous empirical findings improve the scholarly quality of the manuscript and demonstrate adequate engagement with existing literature.

The methodology section is one of the major strengths of the paper. The use of balanced panel data covering 29 Indian states from 2014–15 to 2024–25 reflects substantial research effort and enhances the reliability of the findings. The selection of explanatory variables such as NSDP, government health expenditure, wages, and rainfall is appropriate and theoretically justified. The adoption of a fixed-effects panel regression model with Driscoll–Kraay standard errors demonstrates sound econometric understanding and strengthens the technical quality of the analysis. The empirical model is clearly presented and adequately explained, making the methodology transparent and academically rigorous.

The results and analysis section is detailed, systematic, and logically interpreted. The study effectively explains the positive association between economic growth and PM2.5 concentrations, highlighting the environmental costs of industrialization and rapid development. The interpretation of findings through the Environmental Kuznets Curve framework adds analytical depth. Similarly, the positive relationship between industrial productivity and pollution is well explained with practical economic reasoning. The finding that government health expenditure has a negative and significant relationship with pollution levels is particularly interesting and contributes meaningful insight to environmental governance literature. The discussion on rainfall and pollution control also reflects balanced interpretation by acknowledging statistical insignificance despite theoretical expectations.

The conclusion effectively summarizes the major findings and emphasizes the need for sustainable policy frameworks integrating economic growth with environmental protection. The recommendations regarding clean energy adoption, stronger environmental regulations, and enhanced public health investment are policy-relevant and socially important. The study contributes significantly to understanding the growth–environment relationship in India and offers valuable implications for policymakers, environmental economists, and public administrators.

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However, the manuscript can be improved further in certain areas. Some portions of the discussion are repetitive and may be condensed for better readability. The paper would benefit from additional graphical presentations such as trend charts, correlation matrices, or state-wise comparisons to visually strengthen the analysis. Inclusion of robustness checks or alternative econometric models could further improve technical rigor. Minor grammatical and formatting corrections are also recommended to enhance presentation quality. Additionally, clearer explanation regarding causality limitations and possible endogeneity concerns would strengthen the econometric discussion.

Overall, the manuscript is academically sound, methodologically strong, and highly relevant to current environmental and economic policy discussions. The study makes a meaningful contribution to environmental economics and public policy literature by examining the interaction between growth, pollution, and public health expenditure at the state level in India. Subject to minor revisions relating to language refinement, presentation improvements, and additional robustness discussion, the manuscript is suitable for publication.