

REVIEWER'S REPORT

Manuscript No.: IJAR- 58828

Title: DEFORESTATION AND CLIMATE CHANGE: ENVIRONMENTAL IMPACTS AND SUSTAINABLE SOLUTIONS.

Recommendation:

Accept as it is

Accept after Major revision.....

Accept after minor revision

Do not accept (*Reasons below*)

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

Reviewer Name: **ANAPANA GOPAL**

Reviewer's Comment for Publication.

General Comments

The manuscript addresses an important and highly relevant environmental issue: the reciprocal relationship between deforestation and climate change, with particular attention to biodiversity, carbon storage, hydrological processes, forest loss, and sustainable management. The paper uses secondary information from major institutional sources including FAO, World Bank, UNEP, IPCC, MoEFCC and Forest Survey of India, and presents global, regional and India-specific forest-cover trends.

The manuscript has good breadth and includes useful tables, graphs and maps. The distinction between gross deforestation, forest expansion and net forest loss is particularly useful. However, in its present form, the manuscript is **more descriptive than analytical**, and several methodological, citation, data interpretation and organizational issues need attention before publication.

Content and Originality

Strengths:

- The manuscript covers an important contemporary environmental problem.
- It appropriately presents deforestation and climate change as a **two-way relationship**, rather than treating deforestation only as a cause of climate change.
- It integrates environmental, ecological and socioeconomic dimensions.
- The India-specific analysis adds value by comparing national forest-cover trends with global and regional patterns.
- The manuscript recognizes that increasing forest cover does not necessarily mean recovery of natural forest ecosystems or improvement in forest quality.

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- The proposed solutions extend beyond tree planting and include forest protection, restoration, sustainable agriculture, community participation, governance, satellite monitoring and economic incentives.

Concerns:

1. The originality/contribution of the paper is not sufficiently established. Much of the manuscript summarizes existing literature and institutional statistics.
2. The authors should clearly state **what new synthesis, analytical framework, comparison or interpretation this paper contributes** beyond existing reviews and FAO/FSI reports.
3. The literature review is largely presented as a sequence of individual study summaries. It would be stronger if studies were synthesized according to themes such as:
 - carbon and climate;
 - biodiversity;
 - hydrology;
 - socioeconomic drivers;
 - restoration;
 - governance and policy.
4. The paper should clearly distinguish between **review/synthesis, secondary-data analysis**, and **original statistical analysis**.

Technical Quality

Minor concerns

1. **Methodology is not sufficiently reproducible.**

The manuscript states that it uses secondary data from FAO, World Bank, UNEP, IPCC, MoEFCC, FSI and other sources, and that percentage change, growth rates, averages, trend analysis, correlation and regression may be used.

However, the manuscript does not adequately specify:

- exact datasets used for each variable;
- exact years included in each analysis;
- sample/data-point size;
- missing-data treatment;
- statistical software;
- correlation method;
- regression model;
- significance threshold;
- assumptions tested;
- whether the analyses are based on annual observations or assessment-period observations.

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If correlation and regression are claimed as part of the methodology, the corresponding results must be presented. Otherwise, these methods should be removed from the methodology.

2. **Correlation does not establish causation.**

The paper proposes treating deforestation as an explanatory variable and temperature/carbon emissions as dependent variables.

However, climate variables and forest loss are affected by many confounding factors. If correlation/regression is retained, the authors should clearly acknowledge that the analysis demonstrates **association rather than causal effects**, unless a more rigorous causal framework is employed.

3. **Forest cover and deforestation are not equivalent.**

The manuscript itself correctly acknowledges this problem in the India section, explaining that FSI primarily reports forest-cover changes and that forest-cover change should not automatically be treated as gross deforestation.

This distinction should be maintained consistently throughout the entire manuscript, especially in the title, tables, graphs and interpretation.

4. **The global statistics require clearer definitions.**

The manuscript reports a decline in annual gross deforestation from 17.6 million ha/year during 1990–2000 to 10.9 million ha/year during 2015–2025, while net forest loss increased in the latest period because forest expansion slowed.

This is an important finding, but the manuscript should explain the distinction between:

- gross deforestation;
- forest degradation;
- forest expansion;
- afforestation;
- natural regeneration;
- net forest loss.

The concepts are introduced, but their implications should be integrated more consistently into the discussion.

5. **India-specific interpretation requires caution.**

The reported increase in India's forest cover from 640,819 km² in 1987 to 715,343 km² in 2023 is clearly presented.

However, forest-cover increase should not be interpreted as equivalent to restoration of biodiversity, ecosystem integrity or primary/natural forest. The manuscript does

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recognize this issue, but it deserves considerably stronger discussion because it is central to the paper's theme.

Language and Presentation

The manuscript is generally understandable, but substantial editorial improvement is required.

Specific issues

- Several sentences are unnecessarily long.
- Some paragraphs repeat the same information.
- Terminology should be standardized.
- The manuscript sometimes shifts between “forest loss,” “deforestation,” “forest degradation,” and “forest-cover decline” without sufficient distinction.
- Some expressions are overly general, such as “one of the most serious environmental challenges,” and could be made more scientific.
- There are instances where the writing appears more like a report than a research article.

The authors should undertake a comprehensive English-language and scientific-style revision.

Structure and Organization

The manuscript has a broad and logical structure, including:

1. Introduction
2. Review of Literature
3. Research Methodology
4. Global/regional/India-specific trends
5. Maps and graphical analysis
6. Key findings
7. Conclusion
8. References

The inclusion of global, regional and India-specific comparisons is a strength.

However, the organization can be improved.

Recommended restructuring

A more scientific structure would be:

- 1. Introduction**
- 2. Objectives / Research Questions**
- 3. Literature Review**

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4. Materials and Methods

5. Results

- Global trends
- Regional trends
- India trends
- Environmental impacts
- Climate relationships

6. Discussion

- Carbon cycle
- Biodiversity
- Hydrology
- Climate feedbacks
- Socioeconomic drivers
- Policy implications

7. Sustainable Solutions

- Forest protection
- Restoration
- Sustainable agriculture
- Community forestry
- REDD+
- Monitoring
- Economic incentives

8. Limitations and Future Research

9. Conclusion

At present, the manuscript contains considerable overlap between literature review, results and discussion.

References and Citations

The reference section contains several recent and relevant sources, including FAO FRA 2025, recent reviews and studies on forest disturbances, agriculture-linked deforestation, forest regeneration and climate effects.

However, the references require careful editorial checking.

Minor recommendations

1. Ensure **every major numerical claim has a directly corresponding citation**.
2. Use consistent reference formatting throughout.

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3. Avoid relying on vague descriptions such as “a review from the University of Seoul” or “a ScienceDirect review.” The actual authors and publication details should be given in the text.
4. Verify all DOI links and bibliographic information.
5. Ensure every reference cited in the manuscript appears in the reference list and vice versa.
6. Use the journal's required citation style consistently.
7. Where primary institutional datasets are used, cite the **specific FAO/FSI/UN report**, rather than citing a secondary source.
8. Several statements in the literature review contain precise numerical values; these require particularly careful verification against the original publications.

Additional Minor Scientific Comments

1. The paper needs a stronger climate-change analysis

The title emphasizes **climate change**, but the quantitative analysis is dominated by forest-cover and deforestation statistics.

The paper should strengthen the actual relationship between forest loss and:

- atmospheric CO₂;
- temperature;
- rainfall;
- drought;
- wildfire;
- carbon storage;
- regional climate feedbacks.

Currently, some of these are discussed conceptually, but they are not systematically analyzed.

2. Biodiversity impacts need deeper treatment

Biodiversity is listed among the keywords and is repeatedly mentioned, but the paper provides relatively limited quantitative analysis of biodiversity loss.

The authors should consider discussing:

- habitat fragmentation;
- species richness;
- endemic species;
- functional diversity;
- edge effects;
- wildlife displacement;
- extinction risk.

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The literature review already identifies biodiversity and ecosystem-service consequences as important components of forest disturbance.

3. The India section is useful but could be substantially improved

The India analysis provides valuable long-term forest-cover data from 1987–2023 and shows state-level variation. For example, Andhra Pradesh, Karnataka, Kerala and Odisha show increases during 2015–2021, while several northeastern states show declines.

However, the authors should discuss why these differences occur rather than merely reporting them.

Possible analytical categories include:

- natural regeneration;
- plantations;
- land-use change;
- forest management;
- infrastructure;
- mining;
- agricultural expansion;
- climatic stress.

4. The maps require better integration with the text

The manuscript includes global deforestation-hotspot maps and an India forest-cover map. The global map highlights the Amazon, Congo Basin, Southeast Asia, East/West Africa and other tropical hotspots.

The maps are useful, but the manuscript should explain what each map demonstrates analytically rather than simply presenting it.

5. Figures and tables need improved scientific presentation

The manuscript contains several useful tables and graphs, including:

- global forest area, 1990–2025;
- global deforestation rate;
- regional net forest change;
- India's long-term forest cover;
- recent Indian forest-cover changes;
- forest and tree cover.

The global forest-area table, for example, shows a decline from approximately 4.34 billion ha in 1990 to 4.14 billion ha in 2025.

However:

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- all figures should have consistent numbering;
- axes should contain complete units;
- sources should be placed consistently;
- figure captions should be informative;
- tables should clearly distinguish observed values from approximate values;
- the text should explicitly interpret each major table/figure.

Overall Recommendation

The manuscript addresses a **relevant and important environmental topic** and has several strengths, particularly its broad literature coverage, use of recent FAO/FSI information, global-to-India comparison, and discussion of sustainable solutions.

The paper's strongest contribution is its attempt to connect **deforestation, climate regulation, biodiversity, forest restoration and sustainable development** within a single framework. The conclusion appropriately argues that forest conservation should be considered critical infrastructure for climate stability, biodiversity and sustainable development.

However, the manuscript currently has a number of important weaknesses:

- limited methodological detail;
- unclear implementation of the proposed correlation/regression analysis;
- predominantly descriptive rather than analytical treatment;
- insufficiently demonstrated originality;
- some conceptual overlap between forest cover and deforestation;
- limited quantitative treatment of climate and biodiversity impacts;
- repetitive literature synthesis;
- insufficient discussion of limitations;
- need for stronger integration of figures and maps;
- extensive reference and presentation checking required.

Therefore, the manuscript requires **substantial revision before it can be considered suitable for publication**.

Final Decision: Minor Revision

The manuscript has publication potential, but the authors should undertake a **Minor scientific and structural revision**, particularly strengthening the methodology, clarifying the statistical analysis, improving the distinction between forest cover and deforestation, strengthening the climate/biodiversity analysis, and clearly articulating the paper's original contribution.