REVIEWER'S REPORT

Manuscript No.: IJAR-55848

Title: Assessment of Half-decadal variability of Mangrove health cover over the Indian Sundarban region using Remote Sensing and GIS technique

Recommendation:
Accept

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

Reviewer Name: Dr. Ashish Yadav

Detailed Reviewer's Report

Reviewer's Comment for Publication.

Acceptance Comment are mentioned below suitable for the paper titled "Assessment of Half-decadal variability of Mangrove health cover over the Indian Sundarban region using Remote Sensing and GIS technique"

Reviewer Comments: Accept

Reviewer Comments –

1. Introduction

The introduction effectively establishes the ecological and climatic importance of mangrove ecosystems, particularly in the context of the Indian Sundarban region, which is highly vulnerable to climate change, sea-level rise, and anthropogenic pressures. The authors clearly articulate the research gap related to long-term, half-decadal assessment of mangrove health using remote sensing indices. The objectives are well defined and aligned with sustainable coastal zone management and climate change mitigation. The introduction is well contextualized, scientifically relevant, and successfully justifies the necessity of long-term spatio-temporal analysis of mangrove health.

2. Literature Review

The literature review demonstrates a strong grasp of previous research on mangrove monitoring using Remote Sensing and GIS techniques. Studies utilizing NDVI, Landsat imagery, and climate variables such as rainfall and shoreline dynamics are appropriately cited. The authors effectively identify

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limitations in earlier studies, particularly the lack of half-decadal temporal resolution and integration of bio-carbon flux analysis, thereby establishing the novelty of the present research. The literature review is comprehensive and well synthesized. It clearly positions the study within existing research and highlights its methodological and analytical contributions.

3. Solution Approach / Methodology

The methodology is robust, transparent, and scientifically sound. The use of multi-temporal Landsat TM and OLI data with 30 m spatial resolution is appropriate for long-term vegetation monitoring. The derivation of NDVI composites and the calculation of Half Decadal Change of Mangrove Density (HDCMD) are methodologically well explained. The correlation analysis with Net Rainfall Change (NRC) and bio-carbon flux adds depth to the study and strengthens its interdisciplinary relevance. The methodological framework is well designed and reproducible. The integration of climatic and carbon dynamics with vegetation indices significantly enhances the analytical rigor of the study.

4. Results and Discussion

The results reveal substantial spatio-temporal variability in mangrove density across the study period. The identification of peak HDCMD during 1995, 2000, and 2014 is clearly supported by quantitative analysis. The strong positive correlation with rainfall (0.85) and negative correlation with bio-carbon flux (-0.82) are well interpreted and grounded in ecological reasoning. The discussion effectively links observed patterns with erosional and depositional coastal processes, reinforcing the relevance of geomorphological controls on mangrove dynamics. The results are clearly presented, logically discussed, and well supported by data. The interpretation demonstrates strong scientific insight and regional understanding.

5. Conclusion

The conclusion concisely summarizes the key findings and confirms an overall improvement in mangrove cover during 1989–2019, while appropriately acknowledging persistent threats such as coastal erosion. The study's implications for sustainable coastal zone management, climate adaptation, and carbon sequestration strategies are clearly articulated. The conclusion is well structured and aligns effectively with the study objectives and results.