Royal International Global Journal of Advance and Applied Research
Peer Reviewed International, Open Access Journal.
ISSN: 2998-4459 | Website: https://rlgjaar.com Volume-2, Issue-12 | December - 2025

Original Article

Impact of Deforestation on Biodiversity

Shyamal Namdeorao Sonone
G. S. Tompe Arts, Commerce & Science College, Chandur Bazar, Dist. Amravari

Manuscript ID:
RIGJAAR-2025-021214

ISSN: 2998-4459
Volume 2
Issue 12
Pp. 76-79
December 2025

Submitted: 10 Nov. 2025
Revised: 15 Nov. 2025
Accepted: 12 Dec. 2025
Published: 31 Dec. 2025

Correspondence Address:
Shyamal Namdeorao Sonone
G. S. Tompe Arts, Commerce & Science College, Chandur Bazar, Dist. Amravari
Email-
shyamalsonone75@gmail.com

Quick Response Code:

Web. https://rlgjaar.com

DOI:
10.5281/zenodo.18136594

DOI Link:
https://doi.org/10.5281/zenodo.18136594

Abstract

Deforestation has emerged as one of the most critical environmental issues threatening global biodiversity. The clearing of forests for agriculture, urbanization, logging, and industrial purposes has led to the loss of numerous species, disruption of ecological balance, and degradation of natural habitats. This research paper explores the relationship between deforestation and biodiversity loss from a geographical perspective, focusing on global, national, and regional contexts. Using secondary data from the Food and Agriculture Organization (FAO), World Wildlife Fund (WWF), and Ministry of Environment, Forest and Climate Change (MoEFCC, India), this study investigates the causes, consequences, and possible solutions to mitigate biodiversity loss. The findings reveal that while deforestation drives economic growth in the short term, it causes irreversible ecological damage that undermines ecosystem services, climate stability, and human well-being. The paper concludes with policy recommendations emphasizing sustainable forest management, community participation, and reforestation initiatives.

Keywords- *Deforestation; Biodiversity Loss, Habitat Destruction, Forest Degradation; Ecosystem Services, Species Extinction, Habitat Fragmentation, Sustainable Forest Management, Conservation Strategies, Climate Change; Reforestation, Indigenous Communities, Environmental Policy, India Forests; Global Biodiversity*

Introduction

Forests are among the most vital ecosystems on Earth, providing habitat for over 80 percent of terrestrial biodiversity and offering essential ecosystem services such as carbon sequestration, water regulation, and soil conservation. However, rapid industrialization, agricultural expansion, and urbanization have resulted in widespread deforestation. The Food and Agriculture Organization (FAO) estimates that approximately 10 million hectares of forest are lost every year globally. This rate of forest loss is alarming, as it poses a serious threat to biodiversity the variety of life forms including plants, animals, fungi, and microorganisms that interact within ecosystems.

Biodiversity is the cornerstone of ecological resilience. It ensures that ecosystems remain productive and adaptive in the face of environmental change. The destruction of forest ecosystems through deforestation disrupts this balance, leading to habitat fragmentation, extinction of species, and alteration of biogeochemical cycles.

The purpose of this paper is to analyse the impact of deforestation on biodiversity, to understand its underlying causes, and to discuss potential strategies for conservation and sustainable management.

Objectives of the Study

1. To examine the major causes and patterns of deforestation across the world.
2. To analyze the impacts of deforestation on biodiversity at global and regional scales.
3. To study the specific case of deforestation and biodiversity loss in India.
4. To suggest practical measures and policy frameworks for forest and biodiversity conservation.

Research Methodology

This study is descriptive and analytical in nature and is based on secondary data sources. Data have been obtained from various government and non-governmental organizations including FAO (Global Forest Resources Assessment), United Nations Environment Programme (UNEP), WWF, MoEFCC, and published academic papers. Reports, books, and online journals were reviewed to ensure accuracy. Graphs and tables were used for interpretation where necessary.

How to cite this article:
Sonone, S. N. (2025). Impact of Deforestation on Biodiversity. Royal International Global Journal of Advance and Applied Research, 2(12), 76–79. https://doi.org/10.5281/zenodo.18136594

Royal International Global Journal of Advance and Applied Research
Peer Reviewed International, Open Access Journal.
ISSN: 2998-4459 | Website: https://rlgjaar.com Volume-2, Issue-12 | December - 2025

The methodology focuses on

- **Literature review:** Scholarly analysis of past research and global case studies.
- **Comparative approach:** Assessing regional variations between tropical, temperate, and boreal forests.
- **Case study approach:** India as a regional example to highlight the intersection of deforestation and biodiversity issues.

Meaning and Concept of Deforestation

Deforestation refers to the permanent removal or clearance of forest cover for non-forest uses such as agriculture, logging, mining, or urban development. The term also includes degradation, where forests lose their ecological functions even if some vegetation remains. Deforestation can be classified as:

- **Planned deforestation** (e.g., for infrastructure or irrigation projects)
- **Unplanned deforestation** (e.g., illegal logging, slash-and-burn agriculture)

According to FAO (2020), global forest area declined from 4.28 billion hectares in 1990 to 4.06 billion hectares in 2020, indicating a net loss of 178 million hectares over three decades. Tropical forests in South America, Africa, and Southeast Asia are the most severely affected.

Causes of Deforestation

(a) Agricultural Expansion

The conversion of forests into agricultural land is the leading cause of deforestation, especially in developing countries. The growing demand for food, biofuels, and cash crops like soy, palm oil, and coffee accelerates forest clearing.

(b) Logging and Timber Extraction

Commercial logging for timber, furniture, and paper industries contributes significantly to forest loss. Unsustainable logging practices degrade forest quality and disrupt habitats.

(c) Urbanization and Infrastructure Development

Rapid urban expansion requires land for housing, roads, and industrial activities. Infrastructure projects such as dams, highways, and mining operations also contribute to forest clearance.

(d) Mining Activities

Extraction of minerals like coal, iron, bauxite, and gold leads to large-scale deforestation. Mining also pollutes soil and water, making ecosystems uninhabitable for many species.

(e) Forest Fires and Climate Change

Forest fires, both natural and human-induced, destroy vast forest areas annually. Rising temperatures due to climate change have increased the frequency and intensity of forest fires globally.

(f) Fuelwood Collection

In rural areas, dependence on forests for firewood and fodder exerts continuous pressure on forest resources.

Impact of Deforestation on Biodiversity

Deforestation affects biodiversity through various ecological and environmental pathways. The loss of forest cover leads to:

(a) Habitat Loss

Forests provide shelter and food for millions of species. When forests are cleared, animals and plants lose their habitats. This forces species to migrate, adapt, or face extinction. Approximately 70% of Earth's land animals and plants live in forests.

(b) Habitat Fragmentation

Deforestation often results in fragmented landscapes where isolated patches of forests remain. These fragments are too small to support viable populations, leading to genetic isolation and species decline.

(c) Species Extinction

According to the International Union for Conservation of Nature (IUCN), deforestation is responsible for nearly 85% of the global threat to endangered species. For instance, the orangutan populations in Borneo and Sumatra have declined drastically due to palm oil plantation expansion.

(d) Disruption of Ecological Balance

Forests regulate ecological cycles such as water, carbon, and nutrient cycles. Deforestation disrupts these cycles, altering the structure and function of ecosystems.

(e) Loss of Genetic Diversity

Genetic diversity ensures species adaptation to environmental changes. Deforestation reduces population sizes and genetic variability, increasing vulnerability to diseases and climate stress.

(f) Soil Degradation

Loss of tree cover leads to soil erosion, nutrient depletion, and reduced fertility. The microorganisms essential for soil health also decline with deforestation.

(g) Impact on Indigenous Communities

Many indigenous tribes depend on forests for their livelihoods, culture, and identity. Deforestation displaces these communities, eroding traditional knowledge and social structures.

Global Case Studies

Amazon Rainforest (South America)

The Amazon, often called the "lungs of the planet," has lost about 17% of its forest cover in the last 50 years due to cattle ranching, logging, and soy cultivation. This deforestation has led to the extinction of thousands of plant and animal species and disrupted rainfall patterns across South America.

Congo Basin (Africa)

The Congo Basin is home to the second-largest tropical rainforest. Logging and mining have led to a decline in gorilla and elephant populations. It also threatens one of the largest carbon sinks on Earth.

Southeast Asia (Indonesia and Malaysia)

Palm oil production is the major driver of deforestation here. The loss of lowland rainforests has severely impacted species like the Sumatran tiger and the orangutan.

Deforestation and Biodiversity Loss in India

India is one of the world's 17 megadiverse countries, hosting about 8% of global biodiversity. However, the nation has experienced substantial forest cover loss, especially in the northeastern, central, and Western Ghats regions.

Royal International Global Journal of Advance and Applied Research
Peer Reviewed International, Open Access Journal.
ISSN: 2998-4459 | Website: https://rlgjaar.com Volume-2, Issue-12 | December - 2025

According to the India State of Forest Report (ISFR) 2021, India's total forest cover is about 21.71% of its geographical area. Although the overall area has shown a marginal increase due to plantations, natural forests have declined in quality.

(a) Regional Impacts

- **Northeast India:** Shifting cultivation (jhum) and infrastructure projects have reduced forest area and fragmented wildlife habitats.
- **Central India:** Mining and industrialization in states like Madhya Pradesh, Chhattisgarh, and Maharashtra have degraded natural forests.
- **Western Ghats:** Deforestation for plantations (coffee, tea, rubber) threatens endemic species such as the lion-tailed macaque and Malabar civet.

(b) Biodiversity Consequences

Deforestation in India has caused habitat loss for elephants, tigers, and leopards. Fragmentation leads to human–wildlife conflict, endangering both species and human livelihoods.

Consequences for Ecosystem Services

Deforestation undermines essential **ecosystem services** such as:

- **Carbon sequestration:** Trees absorb CO_2; their loss increases greenhouse gas concentrations.
- **Hydrological regulation:** Forests regulate water flow and maintain rainfall patterns.
- **Climate moderation:** Forests influence temperature and humidity.
- **Pollination and seed dispersal:** Forest biodiversity ensures agricultural productivity.

Loss of these services has long-term economic and social costs that far exceed short-term gains from deforestation.

Policy and Conservation Measures

(a) Sustainable Forest Management (SFM)

Promoting selective logging, afforestation, and community forestry ensures resource use without ecosystem destruction.

(b) Protected Areas and Wildlife Corridors

Expanding national parks, biosphere reserves, and wildlife corridors protects habitats and facilitates species movement.

(c) Community Participation

Programs like Joint Forest Management (JFM) in India involve local communities in forest protection and benefit-sharing.

(d) Reforestation and Afforestation

Planting native tree species restores degraded lands and strengthens ecological networks.

(e) Legal and Policy Frameworks

- **Forest Conservation Act (1980)**
- **National Forest Policy (1988)**
- **Biological Diversity Act (2002)**

These laws aim to conserve biodiversity and regulate forest land diversion.

(f) Education and Awareness

Environmental education and citizen awareness campaigns encourage sustainable consumption and conservation ethics.

Discussion

The relationship between deforestation and biodiversity loss is complex and multidimensional. While economic growth often drives forest clearance, the ecological costs are profound and long-lasting. Forest ecosystems act as biodiversity reservoirs, carbon sinks, and climate stabilizers. Their destruction not only accelerates species extinction but also disrupts human societies dependent on ecological balance.

The challenge lies in balancing development with conservation. Countries like India demonstrate that community participation, legal safeguards, and reforestation can yield positive outcomes. Yet, global cooperation is essential, as forest ecosystems transcend national boundaries. The United Nations Sustainable Development Goals (SDG 15 – Life on Land) emphasize this interconnection, highlighting the need for concerted efforts to halt biodiversity loss.

Conclusion

Deforestation remains one of the gravest threats to biodiversity. It fragments habitats, drives species extinction, and undermines ecosystem stability. The study emphasizes that biodiversity is not merely an environmental concern but a foundation for human survival and sustainable development. Protecting forests requires a multidimensional approach integrating environmental policy, local governance, economic incentives, and scientific innovation.

Reforestation, strict monitoring of illegal logging, sustainable land use planning, and global collaboration can mitigate biodiversity loss. Ultimately, preserving forests means preserving life itself for the planet's health, for humanity's future, and for the integrity of the natural world.

Acknowledgment

The author expresses sincere gratitude to all individuals and institutions whose support and guidance contributed to the successful completion of this research paper titled "Impact of Deforestation on Biodiversity."

I am deeply thankful to the Principal and the Department of Geography, G. S. Tompe Arts, Commerce & Science College, Chandur Bazar, for providing a supportive academic environment and necessary facilities for carrying out this study. I extend my heartfelt appreciation to my colleagues for their valuable suggestions, encouragement, and constructive feedback throughout the research process.

Finally, I express my sincere appreciation to all those who have directly or indirectly contributed to the completion of this research work. Any shortcomings in this paper remain solely the responsibility of the author.

Financial support and sponsorship

Nil.

Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References

1. FAO (2020). *Global Forest Resources Assessment 2020.* Food and Agriculture Organization of the United Nations.

2. WWF (2022). *Living Planet Report 2022*. World Wildlife Fund International.
3. IPBES (2019). *Global Assessment Report on Biodiversity and Ecosystem Services*.
4. MoEFCC (2021). *India State of Forest Report 2021*. Government of India.
5. UNEP (2020). *Deforestation and Biodiversity Loss*. United Nations Environment Programme.
6. Myers, N. (2000). "The Biodiversity Crisis and Deforestation." *Environmental Conservation*, 27(1), 10–17.
7. Gadgil, M., & Meher-Homji, V. M. (1990). *Ecological Dimensions of Sustainable Development*.
8. Pandey, D. N. (2001). *Forest Conservation in India: Policy and Practice*.
9. Geist, H. J., & Lambin, E. F. (2002). "Proximate Causes and Underlying Driving Forces of Tropical Deforestation." *BioScience*, 52(2), 143–150.
10. National Geographic Society (2021). *Deforestation Overview*.