



THE IMPORTANCE OF FOREST AND FOREST CONSERVATION FOR CLIMATE BALANCE

Urmila Choudhary¹ and Rajendra Kumar Yadav²



¹ Research Scholar, Department of Soil Science and Agricultural Chemistry, Swami Ksheshwanand Rajasthan Agricultural University, Bikaner, 334006, India.

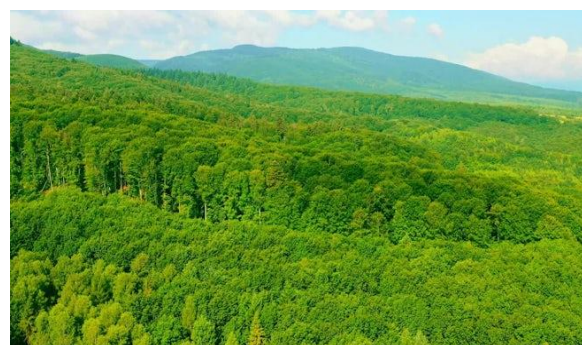
² Agricultural Research Station, Agricultural University, Kota, 324001, India

Forests are much more than just clusters of trees. They are living, breathing entities, repositories of all life sustaining elements; be it air, water, soil, food, shelter, and much more. They are the cradle of diverse flora and fauna, where myriad species find sanctuary. From the dense canopies of the Western Ghats to the arid expanse of the Thar -desert, from the mangroves of the Sundarbans to the alpine meadows of the Himalayas, India's forests embrace a rich diversity of ecosystems, each with its unique character and contribution to the nation's ecological wealth. Forests are one of the most vital natural resources on Earth, playing a central role in maintaining environmental stability and supporting life. They cover about one-third of the planet's land surface and provide essential ecological, economic and social benefits. Among their many functions, forests are critical for maintaining climate balance. They regulate temperature, absorb greenhouse gases, support biodiversity and influence global weather patterns. However, rapid deforestation, urban expansion, industrial activities and unsustainable land use have severely threatened forest ecosystems worldwide. The loss of forests has contributed significantly to climate change, biodiversity loss and environmental degradation. Forest conservation has therefore become an urgent global priority. Protecting and managing forests sustainably is essential not only for preserving nature but also for ensuring a stable climate and a sustainable future for humanity.

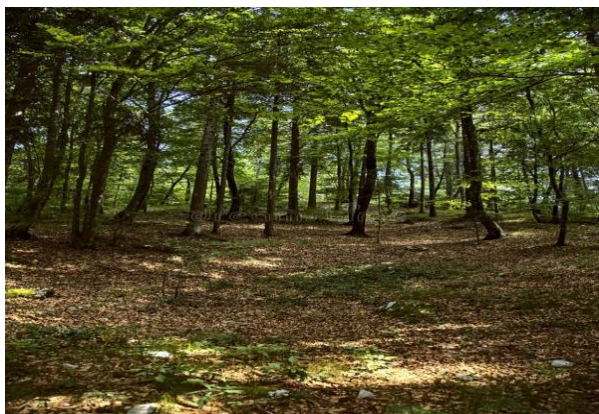
In order to manage our vast forest resources, it became imperative over time to assess, evaluate, and monitor these resources on an increasingly robust scientific footing at pan India level. The first and foremost requirement, therefore, was to undertake systematic aerial surveys of our forests, and prepare an inventory of the forest resources. The 'Pre-Investment Survey of Forest Resources' (PISFR) was, thus, established in 1965 as an FAO/UNDP/ GOI project. The scope

of PISFR's activities was expanded and it was re-organized as the Forest Survey of India (FSI) in 1981. One of the major tasks assigned to FSI is to publish the biennial India State of Forests Report (ISFR). This report is the 18th report in this series. The ISFR stands as a testament to our nation's commitment towards the conservation and sustainable management of our invaluable forest resources. Primary objective of the ISFR 2023 is to present an in-depth analysis of the current status of forests in India, providing critical insights into the health, extent, and distribution of forested areas. India has achieved a significant milestone in global forest statistics by advancing to the 9th position worldwide in terms of total forest area, according to the Food and Agriculture Organization (FAO)'s Global Forest Resources Assessment (GFRA) 2025 released on 22 October 2025. The classification of forest cover based on tree canopy density is given under Table 1.1 below:

Class	Description
Very Dense Forest	Canopy density $\geq 70\%$
Moderately Dense Forest	$40\% \leq$ Canopy density $< 70\%$
Open Forest	$10\% \leq$ Canopy density $< 40\%$
Scrub	Canopy density $< 10\%$, generally with shrubs interspersed with trees
Non Forest	Lands that do not fall into any of the above classes. It includes areas such as cropland, settlements, water bodies, grasslands, snow-clad areas, deserts, etc



Very dense forest

*Moderately Dense Forest**Open Forest**scrub*

Importance of Forest

- Forests lower the air temperature by releasing water vapor into the air.
- At day time trees generate oxygen and store carbon dioxide, which helps to clean air.
- Forest attracts wild life and offer food and protection to them.
- Forests offer privacy, reduce light reflection, offer a sound barrier and help to guide wind direction and speed.

- Trees offer artistic functions such as creating a background, framing a view, complementing architecture, and so on.
- Well managed forests supply higher quality water with less impurity than water from other resources.
- Some forests raise total water stream, but this is not true for all forests, Forests help in controlling the level floods.
- Forest provides different kind of wood which are used for different purposes like making of furniture, paper/ pencils and so on.
- Forest helps in keeping environment healthy and beautiful. Forests also minimize noise pollution.
- They store carbon, aid in regulating the planetary climate, purify water & mitigate natural hazards such as floods & landslides. Forests also contain roughly 90 percent of the world's terrestrial biodiversity.

The explores the importance of forest conservation in maintaining climate balance by the role forests play in carbon sequestration, climate regulation, water cycles, biodiversity protection, soil conservation, disaster prevention, human livelihoods and global climate goals.

Forests as Natural Carbon Sinks

India ranked 5th among the top global carbon sinks, with its forest removing 150 Million tonne of CO₂ per year during 2021-2025. One of the most important roles of forests in climate balance is their ability to act as carbon sinks. Through the process of photosynthesis, trees absorb carbon dioxide from the atmosphere and store it in their leaves, trunks, roots and surrounding soil. This process reduces the concentration of greenhouse gases that contribute to global warming. Forests store billions of tons of carbon, making them one of the most effective natural systems for climate change mitigation. When forests are destroyed or degraded, the stored carbon is released back into the atmosphere, increasing carbon dioxide levels and accelerating climate change. Deforestation and forest fires are among the largest sources of human-induced carbon emissions. Conserving existing forests and restoring degraded ones helps maintain this natural carbon storage system. Forest conservation

is therefore one of the most cost-effective and immediate solutions to reducing greenhouse gas emissions and stabilizing the global climate.

Regulation of Global and Local Climate

Forests play a crucial role in regulating both global and local climate systems. They help control temperature by providing shade and releasing moisture into the atmosphere through a process known as transpiration. This natural cooling effect helps moderate extreme temperatures, especially in tropical and temperate regions. Large forest areas influence atmospheric circulation and rainfall patterns. They help maintain regional climate stability by contributing to cloud formation and precipitation. The loss of forests can disrupt these processes, leading to reduced rainfall, prolonged droughts and unpredictable weather conditions. At a local level, forested areas experience cooler temperatures compared to deforested or urbanized regions. This helps reduce heat waves and creates more stable living conditions for humans and wildlife. Forest conservation is therefore essential for preventing climate extremes and maintaining environmental balance.

Forests and the Water Cycle

Forests are deeply connected to the global water cycle. Tree roots absorb water from the soil and release it into the atmosphere through transpiration, contributing to cloud formation and rainfall. Forests help regulate water flow by slowing down rainfall, allowing water to infiltrate the soil and recharge groundwater supplies. When forests are cleared, the natural water cycle is disrupted. Rainwater runs off quickly instead of being absorbed, leading to floods during heavy rainfall and water shortages during dry periods. Deforestation also reduces soil moisture and contributes to desertification. Forest conservation helps maintain healthy watersheds, ensures a steady supply of fresh water and reduces the risks of floods and droughts. By protecting forests, societies can secure water resources essential for agriculture, industry and daily life.

Protection of Biodiversity and Ecosystem Stability

Forests are among the most biologically diverse ecosystems on Earth. They provide habitat for countless species of plants, animals, insects and microorganisms. This biodiversity plays a crucial role in maintaining ecosystem stability and

resilience to climate change. Healthy forest ecosystems are better able to adapt to environmental changes such as rising temperatures, altered rainfall patterns and extreme weather events. Biodiversity strengthens natural systems by ensuring that ecological functions continue even when some species are affected by climate stress. The loss of forests leads to habitat destruction, species extinction and weakened ecosystems. This reduces nature's ability to regulate climate processes effectively. Forest conservation protects biodiversity and ensures that ecosystems remain strong and adaptable in the face of climate change.

Preventing Soil Erosion and Land Degradation

Forests play a vital role in protecting soil health. Tree roots bind the soil together, preventing erosion caused by wind and water. Forest cover also protects the soil surface from heavy rainfall, reducing the loss of fertile topsoil. When forests are removed, soil becomes exposed and vulnerable to erosion. This leads to land degradation, reduced agricultural productivity and increased sedimentation in rivers and lakes. Degraded soil also loses its ability to store carbon, further contributing to climate change. Forest conservation helps maintain soil fertility, supports sustainable agriculture, and enhances the land's capacity to store carbon. Protecting forests is therefore essential for both environmental and economic sustainability.

Reducing the Impact of Natural Disasters

Forests act as natural barriers against various natural disasters. They help reduce the intensity of floods by absorbing excess rainfall and slowing down water flow. In mountainous areas, forests prevent landslides by stabilizing slopes with their root systems. Coastal forests protect shorelines from storms, cyclones, and rising sea levels by reducing wave energy and preventing erosion. The loss of forests increases the vulnerability of communities to climate-related disasters. Forest conservation strengthens natural defense systems, reducing the social and economic costs of disasters. Preserving forests is a proactive approach to climate adaptation and disaster risk reduction.

Supporting Human Livelihoods and Communities

Millions of people around the world depend

directly on forests for their livelihoods. Forests provide food, fuel, medicine, building materials and income opportunities. Indigenous and local communities, in particular, have strong cultural and spiritual connections to forests. Sustainable forest management supports economic development while preserving ecological balance. Forest-based livelihoods such as eco-tourism, sustainable logging and non-timber forest products can generate income without harming the environment. Forest conservation ensures that these resources remain available for future generations. Protecting forests also supports social stability and reduces poverty, which are important factors in achieving long-term climate resilience.

Forest Conservation and Global Climate Goals

Forest conservation is a key component of global efforts to address climate change. Protecting forests helps reduce emissions, enhance carbon storage and support climate adaptation strategies. Reforestation and afforestation projects restore degraded lands and improve climate balance. Many climate strategies emphasize nature-based solutions, recognizing that forests provide powerful and sustainable ways to combat climate change. Conserving forests complements technological solutions and reduces the need for costly artificial climate interventions. By prioritizing forest conservation, countries can make significant progress toward achieving climate stability and sustainable development.

Challenges to Forest Conservation

Despite its importance, forest conservation faces many challenges. These include illegal logging, agricultural expansion, mining, infrastructure development and weak enforcement of environmental laws. Economic pressures often prioritize short-term profits over long-term sustainability. Climate change itself also threatens forests through increased wildfires, pests and diseases. Addressing these challenges requires strong policies, international cooperation, community involvement, and increased awareness. Education, sustainable land-use planning and responsible consumption patterns are essential for reducing pressure on forests and promoting conservation.

CONCLUSION

Forest conservation is essential for

maintaining climate balance and ensuring a sustainable future for the planet. Forests act as carbon sinks, regulate climate and water cycles, protect biodiversity, prevent soil erosion, reduce natural disasters and support human livelihoods. The destruction of forests not only accelerates climate change but also threatens ecological stability and human well-being. Protecting and managing forests sustainably is one of the most effective and natural solutions to climate change. Governments, businesses, communities and individuals all have a role to play in conserving forests. By recognizing the value of forests and taking action to protect them, humanity can restore climate balance and safeguard the environment for future generations.

**Corresponding E-mail:
choudharyurmila030@gmail.com*