

## BIODIVERSITY CONSERVATION AND ECOTOURISM

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Dr. Yogita Tyagi\*

### ABSTRACT

*Biodiversity is the life insurance of life itself because the quality of life of present and future generation is dependent on conserving biological diversity and using natural resources sustainably. Depletion of biodiversity is a serious concern for survival of human being and climate change is a major factor for depletion of biodiversity. Climate change is a serious global environmental issue and poses a threat and challenge to mankind. The climate change not only effect economic activities, but also makes adverse effect on biological diversity. Climate change arises due to the increasing concentration of greenhouse gases in the atmosphere, deforestation etc. The emission of carbon dioxide is still increasing by at an alarming rate of 3 percent each year and it is the main reason of irreversible climate change. Conservation of Biodiversity is a serious concern for today's Societies. The decrease of biodiversity in an ecosystem or in an order frequently threatens its health. Calculate approximately of the figure of species at present living on soil choice broadly, mostly because most living species are microorganisms and small invertebrates, but the majority estimates go down between 5 million and 30 million species. Around 1.75 million species have been formally described and specified taxonomic names. The quantity of under scribed species is certainly a great deal higher, though, now one assembly of animals without help, the insects, may account for an implausible 50 million species.*

**Keywords:** Biodiversity, Ecotourism, Conservation.

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### Introduction

Biodiversity can be measured at most important levels, such as the genetic variation of populations the number, relative abundance and uniqueness of species, the variety extent and condition of ecosystems, the interrelationships between biodiversity and ecosystems and the like.

Estimate of the effects of climate change on crop yields are mainly negative for the tropics, still when description and direct effects of CO<sub>2</sub> on plant processes are taken into contemplation. Ecological output and biodiversity will be untouched by climate change and sea-level rise, with an amplified risk of destruction of some vulnerable species. Estimates point out that human action may eradicate 20 to 30 million species in the next generation alone. Natural systems are vulnerable to climate change, wild tiger numbers have fallen by about 95% over the past 100 years. Tiger survive in 40% less area than they occupied a decade ago. Therefore, it is of supreme meaning to defend our look after nature by protecting our valuable biodiversity. Biodiversity is imperative not just from of outlook of conservation.

### Effect of Tourism on Biodiversity

Tourism in India can have both positive and negative effects on biodiversity, depending on how it is managed and the specific context of the tourist activities. Here are some of the key effects of tourism on biodiversity in India:

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\* Department of Botany, S.S.G. Pareek P.G. College, Jaipur, Rajasthan, India.

### Positive Effects

- **Conservation Funding:** Revenue generated from tourism, particularly ecotourism, can contribute to funding conservation efforts and protected area management. Entrance fees, permits, and taxes collected from tourists are often reinvested into biodiversity conservation projects and habitat restoration.
- **Awareness and Education:** Tourism can raise awareness about the importance of biodiversity conservation among visitors, local communities, and stakeholders. Interpretive centers, guided tours, and educational programs in tourist destinations can help promote understanding and appreciation of the natural environment, leading to increased support for conservation initiatives.
- **Species Protection:** In some cases, the presence of tourists and tourism infrastructure can act as a deterrent to illegal poaching, logging, and habitat destruction in protected areas. Increased surveillance and monitoring associated with tourism activities can help protect vulnerable species and ecosystems from threats.
- **Community Engagement:** Responsible tourism practices can provide economic opportunities for local communities living near biodiversity hotspots. Community-based ecotourism initiatives empower local residents to participate in tourism activities, share traditional knowledge, and conserve natural resources while generating income and improving livelihoods.

### Negative Effects

- **Habitat Degradation:** Unsustainable tourism practices, such as unregulated infrastructure development, off-road driving, and waste generation, can lead to habitat degradation and fragmentation in ecologically sensitive areas. Loss of habitat can threaten biodiversity by reducing available resources and disrupting ecological processes.
- **Species Disturbance:** High levels of tourist activity, noise, and human presence can disturb wildlife and disrupt natural behaviors, particularly in fragile ecosystems. Activities such as wildlife viewing, trekking, and boating may inadvertently cause stress to sensitive species, leading to altered movement patterns, breeding disruptions, or habitat abandonment.
- **Invasive Species:** Tourism can facilitate the introduction and spread of invasive species through transportation of goods, vehicles, and equipment. Invasive species can outcompete native flora and fauna, disrupt ecosystem functioning, and pose a threat to biodiversity conservation efforts.
- **Resource Overuse:** Overexploitation of natural resources, such as water, fuel wood, and wildlife, to meet the demands of tourism infrastructure and services can deplete local ecosystems and compromise their resilience. Pressure on scarce resources can exacerbate conflicts between tourism development and conservation objectives.
- **Climate Change:** Tourism-related activities, including transportation, accommodation, and recreational pursuits, contribute to greenhouse gas emissions and climate change. Climate change can have profound impacts on biodiversity, including altered habitat suitability, shifts in species distributions, and increased frequency of extreme weather events.

### Examples of Negative Impacts

- The Kedarnath disaster, which occurred in June 2013, was one of the most devastating natural calamities in recent Indian history. The disaster was triggered by unprecedented heavy rainfall and cloudbursts in the region, leading to flash floods and landslides. The fragile Himalayan ecosystem suffered significant damage due to landslides and erosion, leading to concerns about long-term ecological impacts.

The Kedarnath disaster served as a wake-up call regarding the vulnerability of mountainous regions to extreme weather events and the need for better disaster preparedness and mitigation measures. It also underscored the importance of sustainable development practices and environmental conservation in ecologically sensitive areas. The Kedarnath disaster of 2013 was primarily caused by a combination of natural and human factors, exacerbating the severity of the event. Deforestation, unplanned construction, and infrastructure development in ecologically sensitive areas altered the natural landscape, increasing the risk of soil erosion, landslides, and flooding. Deforestation reduces the soil's ability to absorb water and destabilizes slopes, exacerbating the impact of heavy rainfall events.

The Himalayan region is home to numerous glaciers, and the melting of glaciers due to climate change can lead to the formation of glacial lakes. In some cases, the sudden breach of moraine dams holding back these lakes can result in catastrophic floods downstream. While the direct contribution of a GLOF to the Kedarnath disaster is debated, the overall impact of glacier melt and climate change on the region's hydrology is significant.

Inadequate urban planning, construction of buildings in flood-prone areas, and weak enforcement of building codes contributed to the vulnerability of settlements in the region. Many structures were not designed to withstand the forces exerted by flash floods and landslides, leading to widespread damage and loss of life. The high influx of pilgrims and tourists to the Kedarnath area during the pilgrimage season increased the population density in the region, placing additional stress on infrastructure and exacerbating the impacts of the disaster.

- The Joshimath disaster refers to the tragic event that occurred on February 7, 2021, in the Chamoli district of Uttarakhand, India. Joshimath is a town located in the Chamoli district of Uttarakhand, nestled in the Himalayas. The region is prone to natural hazards such as landslides, avalanches, and glacial lake outburst floods (GLOFs) due to its mountainous terrain and geological instability.

The disaster was triggered by a glacier burst near the Nanda Devi Mountain, causing a massive flood in the Dhauliganga and Alaknanda River valleys.

The exact cause of the glacier burst is believed to be a combination of factors, including the melting of glaciers due to climate change, seismic activity, and possibly a large ice avalanche. The flood caused significant environmental damage to the river ecosystem and surrounding areas, including debris deposition, sedimentation, and habitat destruction. The disaster prompted discussions on the safety of infrastructure projects in Himalayan regions and the need for stricter regulations and environmental assessments.

Overall, the impact of tourism on biodiversity in India depends on the balance between conservation priorities, sustainable development goals, and effective management strategies. Integrating biodiversity conservation into tourism planning and management is essential to mitigate negative impacts and maximize the benefits of tourism for both people and nature.

#### **Eco – Tourism is the need of Future**

Ecotourism is a form of sustainable tourism that focuses on experiencing and appreciating natural environments, wildlife, and local cultures while minimizing negative impacts on the environment and supporting conservation efforts. It seeks to promote responsible travel practices that contribute to the protection of biodiversity, preservation of natural habitats, and the socio-economic well-being of local communities.

#### **Key Principles of Ecotourism Include**

- **Conservation:** Ecotourism aims to conserve natural resources, protect biodiversity, and preserve cultural heritage by promoting environmentally friendly practices and supporting conservation initiatives.
- **Sustainability:** Ecotourism seeks to minimize its environmental footprint by adopting sustainable practices in transportation, accommodation, and recreational activities. This includes reducing energy and water consumption, minimizing waste generation, and promoting the use of renewable resources.

**Education and Awareness:** Ecotourism provides opportunities for visitors to learn about the natural and cultural significance of the destinations they visit. Interpretive programs, guided tours, and educational activities raise awareness about conservation issues and promote understanding and appreciation of local ecosystems and cultures.

- **Community Involvement:** Ecotourism encourages the participation of local communities in tourism planning, development, and management. By involving communities in decision-making processes and providing economic opportunities, ecotourism can contribute to poverty alleviation, empowerment, and the preservation of traditional livelihoods.
- **Responsible Travel:** Ecotourism promotes responsible travel behavior among tourists, including respecting local customs and traditions, minimizing waste and pollution, and supporting local businesses and artisans. Visitors are encouraged to leave a positive impact on the environment and communities they visit.

Examples of ecotourism activities include wildlife safaris, birdwatching tours, nature walks, trekking expeditions, and visits to protected areas such as national parks, wildlife sanctuaries, and biosphere reserves. Ecotourism destinations often offer opportunities for eco-friendly accommodation, sustainable transportation options, and community-based tourism experiences that showcase local culture and heritage, comprehensive ecotourism represents a holistic approach to tourism that seeks to balance the interests of visitors, local communities, and the sustainable biodiversity.

### Benefits of Ecotourism

Ecotourism offers numerous benefits, not only for the environment and biodiversity but also for local communities and economies. Here are some of the key benefits of ecotourism:

- **Conservation of Biodiversity:** Ecotourism promotes the conservation of natural habitats, wildlife, and ecosystems by generating economic incentives for their protection. Revenue generated from ecotourism activities often contributes to funding conservation initiatives, habitat restoration projects, and the establishment of protected areas.
- **Preservation of Cultural Heritage:** Ecotourism provides opportunities for visitors to experience and learn about local cultures, traditions, and lifestyles. By supporting indigenous communities and traditional practices, ecotourism contributes to the preservation of cultural heritage and the transmission of traditional knowledge from one generation to the next.
- **Sustainable Development:** Ecotourism promotes sustainable development by balancing economic growth with environmental protection and social equity. It provides economic opportunities for local communities through job creation, income generation, and the development of small-scale enterprises, while minimizing negative impacts on the environment and cultural integrity.
- **Empowerment of Local Communities:** Ecotourism empowers local communities by involving them in tourism planning, development, and management. Community-based ecotourism initiatives create opportunities for local residents to participate in decision-making processes, showcase their cultural heritage, and benefit directly from tourism revenues, thereby improving livelihoods and reducing dependency on external aid.
- **Education and Awareness:** Ecotourism fosters environmental awareness and education among visitors, local communities, and stakeholders. Interpretive programs, guided tours, and educational activities provide opportunities for learning about biodiversity conservation, sustainable development, and the importance of preserving natural resources, inspiring visitors to become advocates for environmental stewardship.
- **Alternative Livelihoods:** Ecotourism offers alternative livelihood options for communities living in ecologically sensitive areas, reducing reliance on environmentally harmful activities such as logging, poaching, and mining. By providing income-generating opportunities that are compatible with conservation objectives, ecotourism helps alleviate poverty and promote sustainable land use practices.
- **Diversification of Income Sources:** Ecotourism diversifies local economies by reducing dependence on single industries or sources of income. By tapping into the potential of natural and cultural resources, communities can create multiple revenue streams from tourism-related activities, resilience to economic fluctuations, and greater financial stability over the long term.
- **Promotion of Responsible Travel:** Ecotourism encourages responsible travel behavior among tourists, including minimizing waste and pollution, respecting local customs and traditions, and supporting sustainable businesses and initiatives. By raising awareness about the environmental and social impacts of tourism, ecotourism fosters a culture of responsible travel that benefits both visitors and host communities.

So, ecotourism represents a sustainable approach to tourism that promotes the conservation of biodiversity, the preservation of cultural heritage, and the equitable distribution of benefits among all stakeholders, while fostering environmental stewardship and promoting sustainable development.

- **Main Principles of Ecotourism:** In India, ecotourism is guided by principles that emphasize the sustainable use of natural resources, conservation of biodiversity, preservation of cultural heritage, and empowerment of local communities. Here are the key principles of ecotourism in India:

- Ecotourism in India prioritizes the conservation of natural habitats, wildlife, and ecosystems. It aims to minimize negative impacts on the environment and biodiversity while promoting sustainable tourism practices that support conservation efforts.
- Ecotourism emphasizes sustainability in all aspects of tourism development and operations. This includes reducing carbon emissions, conserving water and energy, minimizing waste generation, and promoting responsible consumption and production patterns
- Ecotourism in India actively involves local communities in tourism planning, development, and management. It seeks to empower communities by providing economic opportunities through job creation, income generation, and capacity building, while respecting their cultural values, traditions, and rights, and it promotes environmental education and awareness among visitors, local communities, and stakeholders. Interpretive programs, guided tours, and educational activities provide opportunities for learning about biodiversity conservation, sustainable development, and the importance of preserving natural and cultural heritage.
- Ecotourism encourages responsible travel behavior among tourists, including minimizing their environmental footprint, respecting local customs and traditions, and supporting sustainable businesses and initiatives. Tourists are encouraged to leave a positive impact on the places they visit and to contribute to the well-being of local communities.
- Ecotourism focuses on the protection and conservation of biodiversity-rich areas, including national parks, wildlife sanctuaries, and biosphere reserves. It promotes sustainable wildlife viewing and nature-based activities that minimize disturbance to wildlife and their habitats.
- Ecotourism respects and celebrates the cultural diversity of India's communities. It encourages tourists to engage with local cultures, traditions, and lifestyles in a respectful and sensitive manner, fostering cross-cultural understanding and appreciation.
- In India, Ecotourism seeks to ensure equitable distribution of benefits among all stakeholders, including local communities, tour operators, and conservation organizations. It promotes fair trade practices, transparency, and accountability in tourism operations to maximize socio-economic benefits for host communities.

By adhering to these principles, ecotourism in India strives to promote sustainable development, biodiversity conservation, and inclusive growth while offering memorable and enriching experiences for visitors.

#### **Ecotourism Acts in India**

Ecotourism in India is governed by various acts, policies, and guidelines aimed at promoting sustainable tourism practices while conserving the country's rich natural and cultural heritage. Here are some key acts and policies related to ecotourism in India:

- **Wildlife Protection Act, 1972:** This act provides legal protection to wildlife and their habitats in India. It regulates activities related to wildlife tourism, including safari tours, bird watching, and wildlife photography, to ensure minimal disturbance to animals and their habitats.
- **Forest (Conservation) Act, 1980:** This act aims to conserve and protect forests and biodiversity in India. It regulates the diversion of forest land for non-forest purposes, including tourism development projects, to prevent deforestation and habitat destruction.
- **National Ecotourism Policy, 1998:** This policy framework promotes ecotourism as a sustainable tourism model that fosters environmental conservation, community participation, and socio-economic development. It encourages the development of ecotourism destinations and activities that are compatible with nature conservation and local culture.

**Indian Forest Act, 1927:** This act governs the management and protection of forests in India. It includes provisions for regulating access to forests for tourism and recreational activities while ensuring the sustainable use of forest resources.

- **Environment Impact Assessment (EIA) Notification, 2006:** Under this notification issued by the Ministry of Environment, Forest and Climate Change (MoEFCC), ecotourism projects are required to undergo an environmental impact assessment to evaluate their potential environmental and social impacts. This helps in ensuring that ecotourism projects adhere to environmental norms and mitigate negative impacts.

### Rules to be followed during Tourism

When tourists visit ecotourism destinations in India, it's important for them to follow certain rules and guidelines to ensure a positive and sustainable experience. Here are some general rules for tourists when they visit ecotourism sites in India:

- **Respect Wildlife:** Observe wildlife from a safe distance and avoid disturbing or feeding animals. Do not approach or attempt to touch wild animals, and refrain from making loud noises or sudden movements that could startle or stress them.
- **Stay on Designated Trails:** Stick to designated trails and pathways to minimize trampling on vegetation and habitat disturbance. Avoid venturing off-trail, especially in sensitive ecosystems such as wetlands, mangroves, and coral reefs.
- **Leave No Trace:** Practice Leave No Trace principles by minimizing your impact on the environment. Pack out all trash and litter, including cigarette butts and food wrappers, and dispose of waste properly in designated bins or carry it out with you.
- **Reduce, Reuse, and Recycle:** Minimize waste generation by bringing reusable water bottles, bags, and containers. Avoid single-use plastics and disposable items whenever possible, and support eco-friendly businesses that promote recycling and waste reduction.
- **Conserve Water and Energy:** Practice water and energy conservation by taking shorter showers, turning off lights and electronics when not in use, and using water and electricity responsibly. Be mindful of your consumption patterns and minimize resource use during your stay.
- **Respect Local Customs and Traditions:** Learn about the local customs, traditions, and cultural norms of the communities you visit, and show respect for their beliefs and practices. Dress modestly and appropriately, ask for permission before taking photographs of people or sacred sites, and abide by local etiquette and rules.
- **Support Local Communities:** Patronize locally owned businesses, artisans, and guides to support the livelihoods of local communities. Purchase souvenirs and handicrafts directly from artisans, and consider participating in cultural experiences and homestays to learn about traditional lifestyles and contribute to community development.
- **Follow Rules and Regulations:** Familiarize yourself with the rules and regulations of the ecotourism destination you are visiting, including entry fees, permits, and operating hours. Follow instructions from park rangers, guides, and signage, and adhere to any restrictions or guidelines for visitor behavior.
- **Practice Responsible Photography:** Be considerate when taking photographs of wildlife, landscapes, and cultural sites. Avoid using flash photography or disturbing animals during sensitive times such as mating or nesting seasons, and respect restricted areas and no-entry zones.
- **Educate Yourself:** Take the opportunity to learn about the natural and cultural significance of the ecotourism destination you are visiting. Participate in guided tours, interpretive programs, and educational activities to gain a deeper understanding of the local environment, biodiversity, and conservation efforts.

By following these rules and guidelines, tourists can help minimize their impact on the environment, support local communities, and contribute to the conservation and preservation of ecotourism destinations in India.

### Ecotourism Places in India

India is blessed with a rich diversity of natural landscapes, wildlife habitats, and cultural heritage sites that offer unique ecotourism experiences. Here are some ecotourism places in different states of India like:

**In Kerala- Periyar National Park,** Located in the Western Ghats, Periyar National Park is known for its rich biodiversity, scenic beauty, and opportunities for wildlife watching. Visitors can enjoy boat safaris on Periyar Lake, trekking through dense forests, and exploring the park's diverse flora and fauna, including elephants, tigers, and endemic bird species.

**In West Bengal- Sundarbans National Park**, The Sundarbans, a UNESCO World Heritage Site, is the largest mangrove forest in the world and home to the iconic Bengal tiger. Boat safaris offer a chance to spot tigers, crocodiles, and rare bird species amidst the labyrinth of waterways and tidal creeks.

**In Uttarakhand Corbett Tiger Reserve**, India's oldest national park, Corbett Tiger Reserve is renowned for its tiger population and diverse ecosystems, including dense forests, grasslands, and riverine habitats. Jeep safaris, elephant rides, and bird watching tours provide opportunities to explore the park's natural beauty and wildlife.

**In Assam- Kaziranga National Park**, Kaziranga is a UNESCO World Heritage Site and one of the last remaining strongholds of the Indian rhinoceros. Jeep safaris and elephant rides offer thrilling encounters with rhinos, elephants, tigers, and a variety of bird species in the park's grasslands and wetlands.

**In Rajasthan -Ranthambore National Park**, Nestled in the Aravalli and Vindhya mountain ranges, Ranthambore is a popular tiger reserve known for its historic fort and ancient temples. Wildlife safaris provide opportunities to spot tigers, leopards, sloth bears, and other wildlife amidst the park's rugged terrain and dense forests.

**In Karnataka-Hampi**, Hampi is a UNESCO World Heritage Site renowned for its ancient ruins, rock formations, and cultural heritage. Visitors can explore the historic temples, monuments, and archaeological sites scattered amidst the stunning landscape of granite boulders and lush vegetation.

- **Western Ghats:** The Western Ghats, a UNESCO World Heritage Site, are a biodiversity hotspot known for their rich flora and fauna. Trekking expeditions, wildlife sanctuaries, and hill stations offer opportunities to explore the region's diverse ecosystems, waterfalls, and panoramic views.
- **Andaman and Nicobar Islands:** The Andaman and Nicobar Islands are renowned for their pristine beaches, coral reefs, and marine biodiversity. Snorkeling, scuba diving, and boat tours provide opportunities to explore vibrant coral gardens, colorful fish, and diverse marine life in the clear waters of the Andaman Sea.

These are just a few examples of the many ecotourism destinations in India that offer immersive experiences in nature, wildlife, and culture. Whether you're interested in wildlife safaris, trekking, bird watching, or cultural heritage, India has something to offer for every nature lover and adventure enthusiast.

### Conclusion

In conclusion, biodiversity conservation and ecotourism in India are intertwined in a delicate balance that aims to protect the country's rich natural heritage while providing sustainable economic opportunities for local communities.

India is blessed with a diverse array of ecosystems, ranging from lush forests and mountain ranges to coastal wetlands and marine environments. These ecosystems harbor a wealth of biodiversity, including iconic species such as tigers, elephants, rhinoceroses, and numerous endemic plants and animals. However, rapid urbanization, habitat destruction, poaching, and climate change pose significant threats to India's biodiversity. Ecotourism plays a crucial role in promoting the conservation of biodiversity by raising awareness, generating revenue for conservation efforts, and empowering local communities. By providing opportunities for responsible travel and sustainable tourism practices, ecotourism helps to mitigate the negative impacts of traditional tourism activities while fostering a greater appreciation for the natural world.

Through initiatives such as protected areas, wildlife sanctuaries, and community-based ecotourism projects, India has made significant strides in conserving its biodiversity while promoting sustainable tourism development. However, challenges remain, including the need for better enforcement of conservation laws, addressing human-wildlife conflicts, and ensuring equitable distribution of tourism benefits among all stakeholders.

In order to achieve long-term success in biodiversity conservation and ecotourism, India must continue to prioritize conservation efforts, invest in sustainable tourism infrastructure, and engage local communities in decision-making processes. By striking a balance between conservation and development, India can ensure that its natural and cultural heritage is preserved for future generations to enjoy.

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