

Destination Tourism and Environmental Sustainability: A Critical Review on Tourism Sector of Odisha, India

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Abstract: *Tourism has emerged as a significant driver of economic development, employment generation, and cultural exchange; however, its rapid expansion has also raised concerns regarding environmental sustainability. Odisha, located on the eastern coast of India, possesses a diverse range of tourism resources, including coastal ecosystems, wetlands, wildlife habitats, heritage monuments, religious destinations, and tribal cultural landscapes. While tourism contributes substantially to regional development, increasing visitor pressure, resource consumption, waste generation, biodiversity disturbance, and climate-related risks pose significant challenges to sustainable destination management. This review critically examines the relationship between tourism development and environmental sustainability in Odisha through a synthesis of academic literature, government reports, policy documents, and sustainability studies. The review evaluates major environmental challenges associated with tourism activities, including ecosystem degradation, pollution, water resource stress, energy consumption, carbon emissions, and climate vulnerability. It further explores opportunities for sustainable tourism through community-based ecotourism, renewable energy adoption, sustainable waste management, responsible tourist behavior, technological innovation, and effective governance mechanisms. The findings indicate that achieving long-term tourism sustainability in Odisha requires integrated planning, environmental monitoring, stakeholder participation, and stronger policy implementation. Community engagement, climate-resilient infrastructure, resource conservation, and environmentally responsible tourism practices are identified as key enablers of sustainable destination development. The review concludes that Odisha possesses considerable potential to emerge as a leading sustainable tourism destination in India if tourism growth is aligned with environmental conservation and inclusive governance principles.*

Keywords: Sustainable tourism; Environmental sustainability; Odisha tourism; Ecotourism; Community participation; Destination management; Climate resilience; Tourism governance

1. Introduction

Tourism has emerged as one of the fastest-growing sectors of the global economy, contributing significantly to economic growth, employment generation, infrastructure development, and cultural exchange [1]. The sector supports millions of livelihoods worldwide and plays an important role in regional development. However, the rapid growth of tourism has also generated substantial environmental concerns, including biodiversity loss, ecosystem degradation, excessive resource consumption, waste generation, and greenhouse gas emissions [2,3]. As a result, sustainable tourism has gained increasing attention as a framework for balancing economic development with environmental protection and social well-being [4]. The concept of sustainable tourism emphasizes the responsible use of natural and cultural resources while ensuring long-term economic benefits for local communities. Sustainable tourism seeks to minimize adverse environmental impacts, conserve biodiversity, promote community participation, and enhance visitor experiences without compromising the ability of future generations to meet their needs [4]. Consequently, environmental sustainability has become a critical component of tourism planning and destination management across the world.

Tourism can exert both positive and negative influences on the environment. On one hand, tourism can support conservation initiatives by generating revenue for protected areas, increasing environmental awareness, and creating economic incentives for biodiversity protection [5,7]. Ecotourism, in particular, has been widely recognized as a

mechanism for linking conservation objectives with local economic development [9]. On the other hand, unplanned tourism development may contribute to habitat destruction, pollution, resource depletion, overcrowding, and climate-related impacts that threaten environmental sustainability [6,8]. Therefore, achieving a balance between tourism growth and environmental conservation remains a major challenge for policymakers and destination managers. Table 1 presents the major tourism categories in Odisha along with their principal destinations and key attractions that contribute to the state's tourism development.

Table 1: Major Tourism Resources of Odisha

Tourism Category	Major Destinations	Key Attractions
Coastal Tourism	Puri, Chandrabhaga, Gopalpur, Chandipur	Beaches, recreation, religious tourism
Ecotourism	Chilika Lake, Bhitarkanika, Similipal	Biodiversity, wildlife, birdwatching
Heritage Tourism	Konark, Dhauli, Udayagiri, Khandagiri	Historical and cultural heritage
Tribal Tourism	Koraput, Rayagada, Kandhamal	Indigenous culture and traditions
Religious Tourism	Puri, Lingaraj Temple, Sameswari Temple	Pilgrimage and spiritual tourism

India possesses considerable tourism potential due to its diverse landscapes, rich cultural heritage, historical monuments, and ecological resources. The tourism sector contributes substantially to national economic development and employment generation. However, increasing tourist arrivals have intensified environmental pressures in many

destinations, particularly in coastal regions, mountain ecosystems, wetlands, forests, and heritage sites [8]. Sustainable tourism planning is therefore essential for ensuring that tourism development contributes positively to environmental conservation and community well-being.

Odisha, located on the eastern coast of India, is endowed with a unique combination of natural ecosystems, cultural heritage, religious significance, and tribal traditions. The state is home to several nationally and internationally important tourism destinations, including Chilika Lake, Bhitarkanika National Park, Similipal Biosphere Reserve, Konark Sun Temple, Jagannath Temple at Puri, Satkosia Tiger Reserve, and numerous tribal tourism destinations. These attractions contribute significantly to tourism development and regional economic growth. However, increasing visitor pressure, infrastructure expansion, waste generation, resource consumption, and climate-related vulnerabilities have raised concerns regarding the environmental sustainability of tourism activities within the state [10].

Although numerous studies have examined tourism development, ecotourism, and sustainability issues in India, comprehensive reviews focusing specifically on the relationship between tourism and environmental sustainability in Odisha remain limited. Existing studies are often fragmented and focus on individual destinations or specific tourism sectors rather than providing a holistic understanding of sustainability challenges and opportunities. Consequently, there is a need for a comprehensive review that synthesizes existing knowledge and identifies pathways for sustainable tourism development in the state. The present study aims to critically review the relationship between destination tourism and environmental sustainability in Odisha. Specifically, the review examines the state's tourism resources, identifies major environmental sustainability challenges associated with tourism development, evaluates sustainable tourism practices and governance mechanisms, and proposes recommendations for environmentally responsible tourism management. The findings of this review are expected to contribute to policy formulation, destination planning, and sustainable tourism development strategies aimed at balancing economic growth with environmental conservation.

2. Review Methodology

This study adopts a narrative review approach to examine the relationship between tourism development and environmental sustainability in Odisha. Relevant literature was collected from peer-reviewed journal articles, books, conference proceedings, government reports, tourism policies, and publications from national and international organizations. The objective was to synthesize existing knowledge on tourism development, environmental impacts, sustainability initiatives, governance mechanisms, and future opportunities for sustainable tourism management. The literature search was conducted using academic databases including Scopus, Web of Science, and Google Scholar. Additional information was obtained from reports published by the Government of Odisha, the United Nations World Tourism Organization (UNWTO), and other relevant institutions. Keywords used during the search process included “sustainable tourism,”

“environmental sustainability,” “ecotourism,” “destination management,” “tourism governance,” “community-based tourism,” “Odisha tourism,” “biodiversity conservation,” and “climate resilience.”

Publications addressing tourism-related environmental impacts, biodiversity conservation, resource management, community participation, tourism governance, and sustainability policies were included in the review. Studies that lacked relevance to tourism sustainability or provided insufficient environmental context were excluded. Priority was given to studies published between 2000 and 2025, although selected foundational works were also included to provide theoretical context. The collected literature was analyzed using a thematic approach. Four major themes were identified: tourism resources and destination characteristics, environmental sustainability challenges, sustainable tourism practices and opportunities, and governance and policy frameworks. The synthesis of these themes provides a comprehensive understanding of the interactions between tourism development and environmental sustainability within the context of Odisha.

3. Tourism Resources and Destination Profile of Odisha

Odisha is one of India's most diverse tourism destinations, possessing a rich combination of coastal ecosystems, wetlands, forests, wildlife habitats, heritage monuments, religious centers, and tribal cultural landscapes. These resources contribute significantly to tourism development and provide substantial opportunities for sustainable destination management. The state's strategic location along the Bay of Bengal and its diverse natural and cultural assets have enabled tourism to emerge as an important contributor to regional economic growth and employment generation.

Coastal tourism represents a major component of Odisha's tourism sector. The state possesses an extensive coastline of approximately 480 kilometers, featuring popular destinations such as Puri, Chandrabhaga, Gopalpur, Chandipur, and Paradeep. Among these, Puri is one of India's most important religious tourism destinations due to the presence of the Jagannath Temple and the internationally renowned Rath Yatra festival. These coastal destinations attract large numbers of domestic and international visitors and contribute significantly to local economic development. Ecotourism has gained increasing importance in Odisha because of the state's rich biodiversity and ecological resources. Chilika Lake, the largest brackish water lagoon in Asia, is one of Odisha's most significant ecotourism attractions. The lake supports diverse flora and fauna, including migratory birds and the endangered Irrawaddy dolphin, making it a globally recognized biodiversity hotspot [9]. Similarly, Bhitarkanika National Park is renowned for its mangrove ecosystems, estuarine biodiversity, and saltwater crocodile population. Similipal Biosphere Reserve, one of India's important tiger reserves, offers opportunities for wildlife tourism, nature-based recreation, and biodiversity conservation [8].

In addition to its natural attractions, Odisha possesses a rich cultural and historical heritage. The Konark Sun Temple, recognized as a UNESCO World Heritage Site, is one of the

most important examples of ancient Indian architecture. Other heritage attractions include Dhauli, Udayagiri, Khandagiri, Ratnagiri, and Lalitgiri, which collectively reflect the state's historical and cultural significance. Religious tourism centered around temples and pilgrimage destinations also contributes substantially to tourism activity within the state. Odisha is also known for its diverse tribal communities, which offer unique opportunities for cultural and community-based tourism. Tribal tourism destinations in districts such as Koraput, Rayagada, Kandhamal, and Malkangiri enable visitors to experience indigenous traditions, handicrafts, festivals, and local lifestyles. Such tourism activities contribute to cultural preservation while generating livelihood opportunities for local communities [9].

The growth of tourism in Odisha has been supported by various government initiatives aimed at improving infrastructure, destination development, ecotourism promotion, and heritage conservation [10]. These initiatives have enhanced accessibility and increased tourist arrivals across the state. However, the growing popularity of tourism destinations has also intensified environmental pressures on ecosystems, natural resources, and local communities. Consequently, understanding the environmental implications of tourism development has become essential for ensuring the long-term sustainability of Odisha's tourism sector.

4. Environmental Sustainability Challenges in Odisha Tourism

The continued growth of tourism in Odisha has generated substantial economic and social benefits; however, it has also introduced several environmental challenges that threaten the long-term sustainability of tourism destinations. As tourist arrivals increase across coastal, ecological, cultural, and religious destinations, concerns regarding biodiversity conservation, waste management, resource utilization, and climate resilience have become increasingly significant.

One of the primary challenges is biodiversity and ecosystem disturbance. Several major tourism destinations in Odisha are located within ecologically sensitive environments, including Chilika Lake, Bhitarkanika National Park, and Similipal Biosphere Reserve. Increasing visitor activities, unregulated movement, boating operations, and infrastructure expansion can adversely affect wildlife habitats and ecological processes [12]. Such disturbances may threaten migratory bird populations, aquatic ecosystems, and protected species that constitute important tourism attractions. Table 2 summarizes the major environmental challenges arising from tourism activities in Odisha, their primary causes, and potential impacts on destination sustainability.

Table 2: Environmental Sustainability Challenges Associated with Tourism in Odisha

Environmental Issue	Major Causes	Potential Impacts
Biodiversity Disturbance	Visitor pressure, habitat intrusion	Wildlife stress and habitat degradation
Solid Waste Generation	Tourist activities and festivals	Pollution and aesthetic degradation
Water Resource Stress	Increased tourism demand	Resource depletion and local conflicts

Carbon Emissions	Transportation and accommodation	Climate change contribution
Coastal Vulnerability	Climate change and infrastructure development	Erosion, flooding, ecosystem damage

Waste generation and pollution have emerged as another major concern. Popular destinations such as Puri, Konark, and Chilika experience significant increases in solid waste generation during peak tourist seasons and religious festivals. Plastic waste, food packaging materials, and other non-biodegradable materials often accumulate in public spaces and environmentally sensitive areas. Inadequate waste collection and disposal systems can degrade environmental quality and negatively affect visitor experiences [13]. Water resource stress is also becoming increasingly important in tourism destinations. Hotels, resorts, restaurants, and tourism facilities require substantial quantities of water for daily operations. Growing tourism demand may increase pressure on local water resources, particularly during peak seasons. Sustainable water management practices are therefore necessary to ensure that tourism-related water consumption does not adversely affect local communities and ecosystems [14]. Tourism-related transportation and accommodation services contribute to energy consumption and carbon emissions. Increasing visitor mobility, infrastructure development, and tourism operations require greater energy inputs, potentially increasing environmental impacts if sustainability considerations are not integrated into tourism planning. Environmental accountability and transparent sustainability assessment are increasingly recognized as important mechanisms for ensuring that environmental commitments are translated into measurable sustainability outcomes rather than symbolic compliance [18].

Climate change presents an additional challenge for tourism sustainability in Odisha. The state's coastal regions are highly vulnerable to cyclones, flooding, storm surges, and coastal erosion. These climate-related risks can damage tourism infrastructure, disrupt visitor activities, and affect destination attractiveness. Consequently, climate-resilient tourism planning and adaptive management strategies are becoming increasingly important for ensuring the long-term sustainability of tourism destinations [17].

5. Sustainable Tourism Practices and Opportunities

Despite the environmental challenges associated with tourism development, Odisha possesses considerable opportunities for promoting sustainable tourism. The state's natural resources, biodiversity, cultural heritage, and community participation initiatives provide a strong foundation for implementing environmentally responsible tourism practices. Community-based ecotourism has emerged as one of the most promising approaches for sustainable tourism development. Local communities play a crucial role in conservation, destination management, and cultural preservation. By involving local residents in tourism planning and benefit-sharing mechanisms, ecotourism initiatives can generate livelihood opportunities while strengthening environmental stewardship [9]. Successful community participation can also enhance destination authenticity and improve visitor

experiences. The adoption of renewable energy technologies presents another significant opportunity for improving tourism sustainability. Solar photovoltaic systems, solar water heating technologies, and energy-efficient infrastructure can reduce dependence on conventional energy sources and minimize carbon emissions. Recent studies have demonstrated the potential of renewable energy systems for improving environmental performance and supporting sustainability objectives [16]. Sustainable waste management is equally important for maintaining environmental quality in tourism destinations. Practices such as waste segregation, recycling, composting, and environmentally responsible disposal systems can significantly reduce tourism-related pollution [23]. The establishment of plastic-free tourism zones and community-based waste management initiatives can further contribute to environmental conservation and destination cleanliness.

Technology and digital innovation can also strengthen sustainable tourism management. Digital monitoring systems, smart tourism platforms, and automation technologies can improve operational efficiency, visitor management, and resource utilization. Technology-enabled decision-making tools can support sustainable destination management while enhancing the competitiveness of tourism enterprises and destinations [15]. Environmental awareness and responsible tourist behavior are essential components of sustainable tourism. Educational campaigns, interpretation centers, digital information systems, and eco-guides can encourage environmentally responsible practices among visitors [22]. Increased environmental awareness can contribute to reduced waste generation, responsible resource utilization, and enhanced support for conservation initiatives.

6. Governance and Policy Framework

Effective governance is fundamental to achieving sustainable tourism development. Odisha has implemented various tourism development initiatives aimed at enhancing tourism infrastructure, destination promotion, and investment opportunities. The Odisha Tourism Policy provides an important framework for tourism development and recognizes the need for environmentally responsible tourism practices [10].

However, sustainable tourism requires stronger integration of environmental considerations into policy implementation and destination planning. Institutional coordination among tourism, forestry, environment, urban development, and local governance agencies remains essential for effective destination management. Fragmented governance structures may reduce policy effectiveness and limit sustainability outcomes [19]. Governance effectiveness also depends on transparency, stakeholder engagement, and institutional accountability. Contemporary governance research emphasizes the growing importance of public accountability, responsiveness, and transparent decision-making in achieving long-term sustainability objectives [11]. Such principles are particularly relevant in tourism destinations where multiple stakeholders influence environmental outcomes. Local communities represent critical stakeholders in sustainable tourism development. Their participation in planning, implementation, and monitoring processes can strengthen

environmental conservation efforts while ensuring equitable distribution of tourism benefits. Community engagement also enhances social acceptance of tourism initiatives and supports long-term sustainability [20].

Partnerships among government agencies, local communities, tourism businesses, academic institutions, and civil society organizations are equally important. Collaborative approaches can facilitate environmental monitoring, knowledge sharing, capacity building, and evidence-based decision-making, thereby improving destination sustainability and governance effectiveness [21].

7. Recommendations

Promoting sustainable tourism development in Odisha requires an integrated approach that combines environmental conservation, community participation, technological innovation, and effective governance. The Odisha Tourism Policy should be strengthened by incorporating measurable sustainability indicators aligned with internationally recognized tourism sustainability frameworks. Destination-specific management plans should be prepared for major tourism destinations, particularly ecologically sensitive areas such as Chilika, Bhitarkanika, and Similipal. These plans should include carrying-capacity assessments, biodiversity conservation measures, environmental monitoring systems, and climate resilience strategies. Community-based ecotourism initiatives should be expanded through participatory planning, skill development programs, and equitable revenue-sharing mechanisms. Training local youth as eco-guides, biodiversity monitors, and tourism entrepreneurs can simultaneously support livelihood generation and environmental stewardship.

Investments in renewable energy systems, rainwater harvesting facilities, sustainable transportation infrastructure, and integrated waste management systems should be encouraged throughout tourism destinations. The adoption of digital technologies and smart tourism tools can further improve visitor management, environmental monitoring, and operational efficiency. Finally, awareness programs targeting tourists, tourism businesses, and local communities should be strengthened to promote responsible behavior, environmental conservation, and sustainable resource utilization. Table 3 highlights key sustainable tourism strategies and their expected environmental benefits for promoting long-term tourism sustainability in Odisha.

Table 3: Sustainable Tourism Strategies for Odisha

Strategy	Expected Environmental Benefit
Community-Based Ecotourism	Improved conservation and local stewardship
Renewable Energy Adoption	Reduced carbon emissions and energy consumption
Sustainable Waste Management	Reduced pollution and improved destination cleanliness
Smart Tourism Technologies	Better visitor management and environmental monitoring
Environmental Awareness Programs	Promotion of responsible tourist behaviour
Climate-Resilient Infrastructure	Enhanced adaptation to climate-related risks

8. Conclusion

Tourism plays a vital role in the economic and socio-cultural development of Odisha. The state possesses exceptional tourism resources in the form of coastal ecosystems, wetlands, forests, wildlife habitats, heritage monuments, religious destinations, and tribal cultural landscapes. These resources provide significant opportunities for sustainable tourism development and regional economic growth. However, increasing tourism activities have also generated environmental challenges related to biodiversity conservation, waste management, water resource utilization, carbon emissions, and climate vulnerability. Addressing these challenges requires a balanced approach that integrates tourism development with environmental protection and community well-being. The literature reviewed in this study indicates that community-based ecotourism, renewable energy adoption, sustainable infrastructure development, environmental awareness, and effective governance can significantly contribute to tourism sustainability. Strengthening environmental monitoring, stakeholder participation, policy implementation, and climate resilience will be essential for ensuring the long-term sustainability of tourism destinations in Odisha. Overall, Odisha possesses considerable potential to emerge as a leading sustainable tourism destination in India. Achieving this objective will require coordinated efforts among government agencies, local communities, tourism businesses, researchers, and visitors to promote environmentally responsible tourism practices that support conservation, resilience, and sustainable development.

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