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Analyse the Impact of Ecotourism on Animal Biodiversity

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Abstract - Ecotourism has been linked to a decline in biodiversity, with some studies suggesting it can impact species occurrence, survival, or behavior. However, others argue that ecotourism acts as a "human shield" to deter negative practices like gold mining, logging, and hunting. Brownsberg. Most species avoid areas with many hikers or switch to nocturnal activity patterns, causing a significant decrease in the diversity of mammals. Vehicles have little impact on species avoidance or diversity but increase nocturnality more than hikers. Some species, like giant armadillos and spotted pacas, seem to be attracted by hikers and traffic, while others, like ocelots, margays, and red-rumped agoutis, favor human disturbance due to predator release. The most impacted species are jaguar, puma, and lowland tapir, all of which contribute significantly to ecosystem balance. Management measures should focus on reducing hikers in popular areas and limiting vehicle use in recreational areas.

Keywords - Ecotourism, Biodiversity,

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INTRODUCTION

The present study delves into the intricate nature of ecotourism its possible effects on biodiversity. We examine the role that ecotourism plays in biodiversity protection as well as the significance of biodiversity in designating natural areas as ecotourism destinations. However, there is a chance that ecotourism will disrupt species and harm the environment. Thus, both positive and negative effects are recognised; however, the specifics of these effects differ based on the kind of ecotourism activities and the degree to which travel service providers satisfy the needs of their clients. We shall adopt the stance that ecotourism is a distinct kind of travel that, possibly in contrast to many other types of travel, generally benefits biodiversity. This is in spite of the possibility that the growth and activities related to tourism are having actual, noticeable negative effects. However, we believe that ecotourism has the potential to be beneficial compared to many of the current threats to biodiversity. Political and socioeconomic variables that are relevant in the regions where biodiversity occurs also have an impact on the kind and intensity of environmental impacts. National parks and other protected areas are essential to the preservation of biodiversity, and the promotion of tourism is thought to be a key component of the parks' mission to engage the public in conservation. Managers of protected areas have a responsibility to actively promote sustainable tourism and educate the public about ecotourism (Aggarwal 2021).

This is accomplished by implementing various management techniques, such as offering and maintaining visitor amenities, regulating the locations and activities of tourists, and offering educational courses. Wider landscape-level impacts, such as the presence of weeds, pest animals, and human activities that jeopardise biodiversity protection, are among the landscape matrix's derived influencing elements that may interact with the possible detrimental effects of tourism on biodiversity. This chapter concentrates on the impact assessment's biodiversity components while acknowledging that it can also address more general environmental and socioeconomic issues. Because of this, we explore the implications for impact assessment in relation to the intricate features of ecotourism and its relationship to biodiversity as we wrap up this chapter. This will be accomplished by looking at the instance of the relationship between ecotourism and conservation that exists for iconic animals like gorillas in Africa. In general, we take into account the necessity of comprehending the favourable and unfavourable effects of ecotourism on biodiversity at different sizes and degrees of sociopolitical complexity. By doing this, we are able to disentangle the ways in which individuals and organisations interpret the relative impacts and combined effects of various land uses and human endeavors—tourism being just one example—on biodiversity (Samal et al. 2023)

ECOTOURISM

Ecotourism is more than just going to natural locations or attractions; it's about going there responsibly and sustainably. The phrase itself describes visiting natural regions with an emphasis on environmental preservation. The intention is to provide visitors with the opportunity to explore nature and to learn about conservation efforts (David et al. 2016)

By 2027, the global ecotourism industry is expected to generate $103.8 billion, up from $92.2 billion in 2019.The majority of writers have found a set of universal guidelines that apply to all forms of ecotourism, notwithstanding the abundance of classifications.

Among these guidelines for ecotourism are:

- The activity is situated in a natural setting;
- It incorporates environmental education as a fundamental aspect of the experience;
- It follows sustainable principles;
- It provides advantages to the surrounding area.

In addition, ecotourism is thought to encompass a range of goods and experiences depending on the kinds of natural sites visited, the way the experience is run, and the degree to which the above-mentioned fundamental values are prioritised. As a result, ecotourism is complicated since it includes a wide range of activities in different geographic regions and focal points, from mass tourism to specialised markets.

"Tourism that consists in travelling to relatively undisturbed or uncontaminated natural areas with the specific object of studying, admiring and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestations (both past and present) found in these areas" is the definition of ecotourism that was first attributed to a conservationist named Hector Ceballos-Lascurain in 1987.

Ecotourism is defined as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education [both in its staff and its guests]," according to the International Ecotourism Society (TIES), a non-profit organisation that has been working to develop ecotourism since 1990.

Ecotourism is viewed by the International Union for Conservation of Nature (IUCN) as an important instrument for conservation, but it shouldn't be thought of as a panacea for all conservation issues.

Certain places might not be suitable for the growth of ecotourism, and certain companies might not be successful in the broader travel industry. To make sure that your business idea is feasible and profitable and will most effectively help the local community and environment, it is crucial to grasp the fundamentals of creating and operating a successful business.

By promoting an ecosystem, species, or area to ecotourists, one can generate value, which in turn helps raise money for the preservation and protection of such natural resources (Samal et al. 2023)

Three fundamental tenets should steer sustainable ecotourism: education, communities, and conservation.

Conservation

Perhaps the most crucial aspect of ecotourism is conservation, as it should provide long-term, sustainable solutions for preserving and promoting biodiversity and the natural world. This is usually accomplished by means of financial rewards given by travellers looking for an outdoor experience, but it can also originate from tourism organisations themselves, research, or the management of environmental preservation initiatives.

Communities

In addition to empowering local communities and creating more job opportunities, ecotourism should also assist combat global societal challenges like poverty and achieve sustainable development.

Education

The educational component of ecotourism is one of its most underappreciated features. While it's true that everyone wants to see, these stunning, unspoiled locations, it also makes sense to educate yourself about them. Perhaps even more crucial than conservation is raising public knowledge of environmental challenges and encouraging a deeper respect and appreciation for the natural world (Shinde 2015)

ECOTOURISM AND BIODIVERSITY

Biodiversity is a term with many definitions and uses, much like ecotourism. According to Maier (2012), biodiversity is the literal meaning of "variety of life," however it can be difficult to define this term consistently in both conceptual and practical contexts. The variety of biotic components found in an environment across a range of scales is commonly understood to constitute biodiversity. The concept of biodiversity encompasses various discrete measurements, such as abundance, richness, and evenness, and can be evaluated at the local, regional, or global level (Myers et al., 2000). For instance, species diversity and abundance (including genetic diversity) within a habitat, habitat diversity and abundance within an ecosystem, and other concepts can all be included in the concept of biodiversity (Magurran and McGill, 2010). The definition will dictate the method of measurement and, consequently, the evaluation of the impact of ecotourism and other related activities on biodiversity. Due to its elusive character, erratic

nature, difficulty in fully quantifying all biotic components at a given scale, and specificity to biological, geographical, and temporal contexts, biodiversity is difficult to measure and evaluate. Therefore, it is impossible to establish universally applicable standards for what constitutes "good biodiversity" (Maier, 2012, p. 501). This means that evaluating the effects of ecotourism on biodiversity might be difficult in many situations. In addition to scientific measurements of biodiversity, visitor perceptions—such as assigning a subjective value—have a significant impact on judging the value and usefulness of a habitat, as implied by concepts like the "tourist gaze" (Urry, 1992). At a destination, tourism, including ecotourism, is an experiential product that is co-constructed by the traveller as a consumer of the experience and the operator or tourism manager as the provider of the experience. The different classifications of ecotourism reflect this dynamic, whereby some people may view mass ecotourism at a highly, managed location as a genuine or valuable nature experience, while others may only view true ecotourism as a niche-market, remote-area experience (Rolston, 1998; Waitt et al., 2001; Hughes, 2013). Similarly, a non-expert person may perceive a highly degraded natural area as pristine nature despite its low biodiversity measurements, and they will still derive the same satisfaction from the experience and related benefits as an expert in a distant, relatively pristine natural area with "good biodiversity" (Hughes, 2013, 2014). In other words, the majority of tourists derive their understanding of nature from their firsthand experience of the biota, which serves as a metaphor for nature as a whole. Metabolic cues are symbols that convey a deeper meaning about the natural world. Examples of such symbols are trees and wild animals. Thus, just by seeing individual biota, some people can have a fulfilling and meaningful experience with nature. Broadly speaking, however, biodiversity is a scientific notion that cannot be experienced in the same way on its own and is instead quantified using a variety of reasonable assumptions (Maier, 2012; Hughes, 2013). This illustrates how different ideas about nature and its relationship to biodiversity varies, and these distinctions are significant when taking into account the variety of ecotourism and its possible effects. Despite the difficulties, there are documented quantifiable connections between biodiversity and ecotourism.

LITERATURE REVIEW

Samal et al. (2023) Ecotourism, a nature-based tourism approach, aims to improve livelihoods and conserve biodiversity. This study conducts an integrative literature review on ecotourism, focusing on its growth and gaps for future research. The research is conducted in developing nations, where resources management remains a challenge. The review concludes that there is insufficient evidence for the functioning of ecotourism, and some studies have overlooked the importance of good governance, tour guides, and the impact of psychological, technical, and political factors. Climate change and carbon footprints are also a concern. The study recommends a "coexistence model" called community-based ecotourism (CBET) to maximize biodiversity conservation benefits. Measures of carrying capacity and vocational training for unskilled local communities can enhance the ecotourism sector's efficiency. Building knowledge about eco-tourism roles and eco-certification is crucial for a successful ecotourism business. The study also emphasizes the need for proper knowledge about eco-tourist roles and eco-certification for a successful ecotourism business.

Dimitri A Ouboter (2021) Ecotourism has been linked to a decline in biodiversity, with some studies suggesting it can impact species occurrence, survival, or behavior. However, others argue that ecotourism acts as a "human shield" to deter negative practices like gold mining, logging, and hunting. Brownsberg Nature Park in Suriname, the most visited protected area, has a clear gradient of tourism pressure, with the impact more significant in busiest areas. Most species avoid areas with many hikers or switch to nocturnal activity patterns, causing a significant decrease in the diversity of mammals. Vehicles have little impact on species avoidance or diversity but increase nocturnality more than hikers. Some species, like giant armadillos and spotted pacas, seem to be attracted by hikers and traffic, while others, like ocelots, margays, and red-rumped agoutis, favor human disturbance due to predator release. The most impacted species are jaguar, puma, and lowland tapir, all of which contribute significantly to ecosystem balance. Management measures should focus on reducing hikers in popular areas and limiting vehicle use in recreational areas.

Aggarwal (2021) Uttarakhand, a biodiversity-rich state, attracts millions of tourists for pilgrimage and recreational purposes. With 65% of its forest area being forests, about 12% is under protected areas. The state has 161 rare or threatened flora species, and over 150 of the 223 orchid species reported from the north-western Himalayas have been from Uttarakhand alone. Six national parks and six wildlife sanctuaries are part of the protected area network.

Graeme et al. (2017) Ecotourism, a revenue-generating method of wildlife use, is often seen as a sustainable alternative to traditional conservation efforts. However, human presence in natural areas can cause disturbances to wildlife behavior, impact population and ecological levels, and spread infectious diseases. Research on ecotourism impacts has grown rapidly, revealing the complex relationships between disturbance and ecological costs for wildlife species. Understanding and mitigating these impacts is crucial for conserving rare, geographically isolated, and sensitive species.

David et al. (2016) Ecotourism, a form of tourism that varies from mass to highly specialized niche

tourism, has both positive and negative impacts. The nature of these impacts depends on how it is understood and interpreted by tour operators and tourists. The impact of ecotourism is also influenced by political and socio-economic factors in the areas where biodiversity occurs. Protected area areas, such as national parks, play a crucial role in conserving biodiversity, and tourism promotes sustainable tourism and visitor facilities. However, potential negative impacts of tourism often interact with wider landscape-level impacts like pest animals and fire regimes. This chapter explores the implications for Environmental Impact Assessment of ecotourism and its interaction with biodiversity, considering the impacts at various scales, people's perceptions, and the cumulative effects of various land uses, including tourism.

Shinde et al. (2015) India is developing ecotourism spots in its states to promote environmental and cultural understanding and conservation. Biodiversity is crucial for maintaining a healthy ecosystem, but rapid urbanization has affected it. Protected areas are being established for rare and endangered species of flora and fauna. Maharashtra, with 15,732 sq km of forest, is rich in biodiversity. Ecotourism, a sustainable nature-based tourism, helps conserve endangered species by incorporating tourism in harmony with nature. It provides opportunities for tourists to experience nature and emphasizes the importance of protecting biodiversity and local culture. Ecotourism also contributes to economic development by creating employment and raising awareness about the importance of protecting endangered species. A detailed study is needed to investigate the pressure and negative impact on biodiversity. Adopting ecotourism based on environmental carrying capacity will lead to sustainable tourism development.

Singh et al. (2011) The topic of this paper was ecotourism and the impact that it has on living things. It is currently the case that ecotourism is a sector that is being developed in poor countries. On the other hand, the manner in which it affects native people and animals has become a contentious topic. This location, which is part of the Pachmarhi Biosphere Reserve, investigates the myriad of interactions that occur between the welfare of wildlife, conservation biology, and the socio-economic environment of the local people.

SOCIAL BENEFIT OF RESEARCH

In terms of environmental protection, ecotourism is the most crucial factor. India is witnessing a remarkable growth in ecotourism. Both domestic and foreign tourists are drawn to it in large numbers. Ecotourism is regarded as one of the primary sources of income generation due to the rising number of tourists. Ecotourism will cause a number of environmental, social, and cultural issues if it expands too quickly. Exceeding the carrying capacity of tourists may lead to the degradation of the places because of the growth of lodging, retail establishments, and other recreational amenities inside ecological areas. It poses the greatest threat to exterminate plant and animal species and has the potential to replace the natural ecosystem with man-made landscapes. The Indian government believes that biodiversity is a valuable resource for tourism and that it may be used to generate cash. This study aims to address this requirement.

In 2008, the Indian government created the "Eco-tourism Policy." The policy highlights include:

- Creating jobs
- Increasing community involvement
- Preserving the environment and culture
- Encouraging sustainable tourism in the state
- Infrastructure provision

OBJECTIVES

The research study that have been considered for this case study are related to the regions that have been made available for ecotourism, the current state of the laws, policies, and guidelines pertaining to ecotourism, and the effects of ecotourism on animal biodiversity,

METHODOLOGY

- **Research Design**

i. Primary Data

- **Interviews:** This was the primary technique used to gather data from local community representatives and the government. For each department or official being interviewed, a checklist and comprehensive set of questions were created as part of an interview guideline.
- Instead of using tape or video recordings to record the data from the interviews—which would not have been appropriate for some government officials—interviewers' notes were used to record the data.
- **Focus group talks:** Focus group conversations were arranged to get viewpoints from members of the local community. A discussion guideline was created in order to facilitate the conversations. Written and audiovisual materials have been created based on the data from the focus group talks.
- Field observation, particularly when it comes to the sociocultural and environmental effects of tourism. A significant amount of time was spent at various locations at each field site to examine visitor behaviour, interactions with locals, and the results of such interactions. Information gathered via field observation was promptly documented.
- Participant observation: In this method, study team members visited several locations as tourists to watch how visitors behaved and to gain firsthand knowledge of how locals perceived and interacted with visitors. Field notes were used to record observations.

ii. Secondary Data

Among other things, the primary secondary data sources that were looked at were:

- The official websites of the Indian government and the corresponding state governments
- Information and promotional materials from the state tourist offices and the Ministry of tourist and Culture, Government of India.

Table1. Animal Biodiversity of India

Group	World (number of species)	India (number of species)	(%) in India
Mammals	4629	397	8.58
Birds	8,400	458	5.45
Reptiles	5817	460	7.91
Amphibians	5150	248	4.81
Fishes	23,400	5749	24.56
Insects	867391	61151	7.04
Molluscs	66535	5072	7.62

RESULT AND DISCUSSION

Direct Effect: The eating, reproducing, and social behaviours of species, communities, and populations can all be directly impacted by nature tourism. Grey whale migration paths serve as the foundation for whale watching activities along North America's west coast. Whale watching enables tourists to get up close to whales via boat, which might interfere with feeding and cause calves to become separated from their mothers. Additionally, it's possible that the noise produced by boat engines and propellers disrupts whales' ability to communicate by sound. This was noted when studying the impact of nature tourism on American flamingos in Yucatan, Mexico. It was observed that when motorised tour boats were operating, the feeding period was shortened and the animals' alertness level rose.

The Megallanic penguin population is impacted by ecotourism activity. When humans visited the nesting sites of Megallanic penguins, it resulted in behavioural changes in both adults and chicks. These behavioural changes included increased nest predation, decreased egg hatching rates, increased nest abandonment, slower chick growth, and higher mortality rates. Effects on communities of water birds in Ding Darling National Park were noted by Klein. The behaviour of the species of water birds that overwintered in the reserve differed significantly from that of the birds that used it as a feeding and nesting area. It was obvious that the migratory birds obviously had not been accustomed to human presence, as they took off at the sight of people and cars.

Indirect Effect: The following are some indirect effects of ecotourism: the introduction of pests, loss of camouflage, increased predation, intra- and inter-specific competition, and pollution of air, streams, and terrain due to visitor support facilities. The long-term harm to wildlife habitat that can result from indirect effects is less likely than that of direct effects, and this can have a direct impact on wildlife survival. Poor ecotourism management and regulation combined with socioeconomic considerations lead to indirect effects. Effect on red pandas in Nepal caused by a tourism-driven demand for regional cheese. The red panda population's habitat was destroyed by local cattle overgrazing vast regions in an attempt to meet the demand for cheese production. The industry's economics, which are influenced by tourists' purchasing patterns, are mostly to blame for these consequences.

CONCLUSION

It is necessary to conduct research on difficulties over an extended period of time and to investigate other locations that are experiencing pressure from tourists. It is also necessary to conduct research in order to ascertain the quantity and rate of tourist traffic that causes animal populations to suffer adverse effects. Because of this, the forest department will be able to establish a level that will have the least amount of an effect on the biodiversity. There is a need for sustainable tourism development in India. It is imperative that the limitation on the number of tourist visits be adhered to in a stringent manner. The carrying capacity of the environment should serve as the foundation for any future ecotourism-related planning. The promotional methods for tourism should be planned to align with environmental quality, social equity, community empowerment, cultural integrity, and economic efficiency. This can be accomplished by the implementation of training and awareness programmes for all stake holders present. It is expected that the enormous potential for biodiversity in India will be beneficial to both society and the environment, as well as lead to the economic development of the region and the conservation of indigenous species.

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