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Dr. Pijush Kanti Dandapath
Teacher-in-Charge
(Acting Principal) & Head,
U.G. & P.G. Department of
Geography, Bajkul Milani
Mahavidyalaya, Purba
Medinipur, West Bengal, India

Corresponding Author:
Dr. Pijush Kanti Dandapath
Teacher-in-Charge
(Acting Principal) & Head,
U.G. & P.G. Department of
Geography, Bajkul Milani
Mahavidyalaya, Purba
Medinipur, West Bengal, India

SWOT analysis on coastal forest resources and enhancing ecotourism potentiality: A study on coastal West Bengal in India

Dr. Pijush Kanti Dandapath

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Abstract

West Bengal's coastal areas encompassing the districts like Purba Medinipur, South 24 Paraganas, and North 24 Paraganas where coastal forests are boast rich biodiversity, scenic landscapes including mangrove forests and sandy beaches, and vibrant indigenous cultures. Accessibility from major cities like Kolkata enhances their attractiveness to tourists. However, rapid urbanization, industrialization, environmental vulnerability to natural disasters, complex regulatory environment impacting and conventional tourism practices have placed significant pressures on its fragile ecosystems, particularly the coastal forests and mangroves which hold promising opportunities for ecotourism development. This abstract presents a SWOT analysis conducted to assess the strengths, weaknesses, opportunities, and threats associated with leveraging these resources for ecotourism enhancement.

In summary, leveraging West Bengal's coastal forest resources for ecotourism entails addressing challenges, seizing opportunities, and mitigating threats through strategic planning and collaboration, thereby fostering sustainable economic growth and conservation efforts in the region.

Keywords: Forest resources, anthropogenic features, SWOT analysis, sustainable management and ecotourism

Introduction

West Bengal, a state located in eastern India, boasts diverse coastal forest resources that hold significant potential for ecotourism development. Ecotourism, characterized by sustainable travel to natural areas, can contribute to local economies while promoting conservation efforts. This project aims to conduct a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) of the coastal forest resources in West Bengal to evaluate their potential for enhancing ecotourism.

The population in the coastal districts of West Bengal was very few before four or five decades. Presently, these districts have the total population of 2,33,31,903 as per the census of 2011 and the rapid growth of population has reached at the heavy concentration of population in the study area along with destructive utilizations and interventions for deforestation due to growing tourism interest and beach erosion by sea wave and also anthropogenic work is the common features over last four decades which are the major constraints of ecotourism. The moneyed people started to develop these tourist places for constructing the hotels (which run still now) by macabre vandalisation of this splendid gift of nature as screw pines and Mangroves and destroyed these with sand mining and sifted beach sand. All sorts of construction materials were piled up on the beach. The beach is turned into a road for transport construction material and also passengers of surrounding villages and also the recreational method as beach driven of the tourist. So the sand dunes and screw pines, Mangrove forest like Keya are gave way to concrete constructions.

On the other hand, the Sunderban has a rapid population growth and crowding by the tourist throughout the year with annual visitation increasing from around 50,000 in 2002 to near around 2 lakh in 2019. Although the growing tourism business and host population activities like deforestation of badaban, habitat destruction for hotel construction, pollution by garbage disposals, port activities, excavation of sand from beach and river bed, intensive boating manufacturing by cutting the forest and also establishment of coal power plants etc and also due to pollution and global warming the Sunderban Delta is submerging slowly into the Bay of Bengal. Hence, the existence of this delta and its habitants are in great danger, which has proven detrimental to the natural environment of the Sunderban.

Objective

The main objective of the present study is consisting twofold:

- **Over View of Coastal Forest:** To Find the outline scenario of the coastal forest resources of West Bengal based on SWOT analysis.
- **Preservation of Coastal Forest:** Implement the conservation strategies to protect and restore coastal forests and mangroves in West Bengal.
- **Enhancement of Sustainable Tourism:** Promote ecotourism initiatives to mitigate and maintain the environmental impact and balance respectively.
- **Aims to Explore Strategies for Environment and Local Communities:** To explore the effective measures for conserving these valuable ecosystems and providing socio-economic and environmental benefits to local communities.

Methodology

The project methodology involves the following steps

1. Data Collection: Primary data has been collected through field surveys, interviews with stakeholders (local communities, tourists, authorities etc.), and site visits to key coastal forest areas in West Bengal. Secondary data has been gathered from existing literature, reports and online resources.

2. SWOT Analysis Framework: The SWOT analysis has been conducted using the following framework:

Strengths: Internal characteristics of coastal forest resources that provide an advantage in ecotourism development.

Weaknesses: The internal limitations or challenges which hinder the ecotourism development.

Opportunities: External factors or trends that could be leveraged to enhance ecotourism potential.

Threats: External factors or challenges that could negatively impact ecotourism development.

3. Evaluation and Adaptation: Evaluate the effectiveness for enhancing sustainable tourism potentiality, providing insights and recommendations for sustainable development and conservation efforts.



Source: Bangladesh: Pre Cyclone (Aila) Satellite View - Date: 20.05.09 - Coastal District of West Bengal. Map Source: ACTED, Posted 20 May 2009, originally published 20 May 2009. Link:<https://reliefweb.int/map/bangladesh/bangladesh-pre-cyclone-aila-satellite-view-date-200509-coastal-district-west-bengal>

Location of the Study Area

The state of W.B. has comprising 23 districts including Kolkata among these; the costal Bengal is spread over the three districts i.e., Purba Medinipur, South 24 Paraganas and North 24 Paraganas district. The long coast line flourished by the Bay of Bengal, lies between 21°37.012'N to 21°40'49"N Latitude and 87°30'E to 89°31'E longitude with a length of about 220 K.m.. Geographically, it is a part of Ganga estuary. The coastal stretch of Bengal is extended from Subarnarekha River on the West (Bordering the State of Odisha) to the mouth of river Hanribhanga on the East (Bordering Bangladesh).

Results and Discussion

This discussion highlights the complexities and potentialities of sustainable tourism as well as ecotourism in addressing environmental and socio - economic challenges in coastal West Bengal, emphasizing the need for holistic approaches to ensure long-term benefits for both communities and natural ecosystems.

Importance of Forest on the Perspective of Enhancing Ecotourism Potentiality

To assessing and admiring the natural beauty of the coastal tract a detail account of the physical environment as relief, drainage and wetlands, climate and vegetation (flora & fauna) becomes essential. The present study on forests holds profound importance across various disciplines and for global sustainability. Forests play a crucial role in enhancing ecotourism potentiality in several significant ways:

- 1. Biodiversity Hotspots:** Forests are home to a vast array of plant and animal species, many of which are unique and endangered and it also often host a wide landscape of plant and animal species, some of which may be rare or endemic. This biodiversity attracts eco-tourists interested in observing wildlife in its natural habitat, contributing to the economic viability of ecotourism.
- 2. Climate Regulation and Air Quality:** Forests play a crucial role in regulating climate patterns, absorbing carbon dioxide, and releasing oxygen through photosynthesis. These ecosystem services contribute to climate stability and improve air quality, enhancing the overall appeal of forested areas for ecotourism.
- 3. Ecosystem Services:** Forests provide a wide range of ecosystem services essential for human well-being, including clean air and water, soil fertility, pollination, and natural flood control. Studying forests helps quantify and understand the value of these services, guiding sustainable management practices that maximize benefits while minimizing negative impacts of tourism.
- 4. Scenic Beauty and Recreation:** Forests offer stunning landscapes, scenic vistas, and serene environments that appeal to tourists seeking relaxation and rejuvenation away from urban settings. Activities such as hiking, bird watching, camping, and photography are popular among eco-tourists in forested areas.
- 5. Cultural and Educational Value:** Forests are often intertwined with indigenous cultures and traditional knowledge systems. Ecotourism provides opportunities for tourists to learn about these cultures, their sustainable practices, and their relationship with the natural environment.

6. Economic Benefits for Local Communities:

Ecotourism in forests can generate income and employment opportunities for local communities through tourism-related services such as guiding, accommodation, transportation, and local crafts. This economic incentive encourages communities to participate in conservation efforts and sustainable practices.

7. Global Sustainability Goals:

Forest conservation and sustainable management are integral to achieving global sustainability goals, such as the United Nations Sustainable Development Goals (SDGs). Forests contribute to several SDGs for every mass tourism destinations, such as biodiversity conservation, climate action, poverty alleviation and sustainable consumption and production.

8. Conservation and Sustainability:

Ecotourism can promote conservation efforts by raising awareness about the importance of preserving forests and biodiversity. When managed sustainably, ecotourism can contribute to the protection of natural habitats and wildlife, ensuring these resources are available for future generations of eco-tourists to enjoy.

9. Research and Monitoring:

Ecotourism activities can support scientific research and monitoring efforts in forests, providing valuable data on biodiversity, ecosystem health, and the impacts of climate change. This research contributes to informed conservation strategies and sustainable management practices.

10. The coastal floras which are habituated on coastal dunes not only play a role in their scenic beauty as the development of ecotourism but also for dune stabilisation and restoration.

The coastal dune of West Bengal contents play to resources having great socio-economical values which remains unexplored to most of the people, thus results in destruction and removal of dune floras continuously. Total of 60s species belong to 56 Genera and 33 families have been identified along the coast. The dune vegetation is an ecological store house of rich genetic diversity along the high ecological values. These species are playing a vital role in protecting the coast from erosion and flooding.

From above discussion it is noted that the forest is essential for addressing global challenges related to biodiversity loss, climate change, sustainable development, and cultural preservation. By advancing our understanding of forest ecosystems and their interactions with human societies, we can promote stewardship practices that ensure forests continue to provide essential benefits for current and future generations. And the forests are also invaluable assets for enhancing ecotourism potentiality due to their biodiversity, scenic beauty, cultural significance, ecosystem services and economic benefits for local communities. Responsible and sustainable ecotourism practices are essential to ensure that forests continue to thrive as destinations for nature-based tourism while conserving their ecological integrity for future generations.

Over View of the Coastal Forest Resources to Enhancing the Ecotourism Potentiality based on SWOT Analysis

Natural resources as well as the forest resource should be utilized in accordance with sustainability principle and the education of these matters should be given to under developed portion of the people. On the other sides, protective and environmental functions of the forest resources are becoming more then more important functions than timber raw material production of the forests. Forest is a house of rich variety of flora and fauna species conserve biodiversity of forest ecosystems and genetic diversity of large number of native and endemic species which should play vital environmental and economic role for the present as well as future generations at local, national and even global levels.

A View of Vegetation at Henrys Island, Sunderban, 24 Pgs (South), grown on muddy flats. Such type of landscape is commonly seen along the coast and becomes attraction point for the tourist.



Mangrove Forest at Sunderban of South & North 24 Paraganas. A view of an extensive mangrove forest ecosystem, provides scenic beauty, shelter of valuable fauna and flora and important ecotourism spots in the Sunderban Delta.



Casuarinas Forest at Digha, Sankarpur, Tajpur, June put of Purba Medinipur and Bakkhali-Fresergunj of South 24 Paraganas. (Whispering in nature, the casuarinas forest presents a very panoramic scene for the tourist who always visits here to refresh themselves in a fresh air of always enriching sea waves).



Screw Pine Vegetation on Coastal Tajpur, Purba Medinipur. (Tajpur located on the coast of Bay of Bengal in the Purba Medinipur with an extensive beach full off coastal geomorphic landforms like sand dunes with screw pine vegetation, bakhans etc and this coast is also known for providing fresh fish and crabs and other marine entertainment activities



Amenity and recreation functions of forest areas have also increasingly gained importance for rapidly urbanizing populations of the country and they are expected become the prime management and utilization objective of the significant forest areas in the near future. Population structure has been changing and share of the population in urban are increasing.

Strengths

- Natural and mixed forests which are contain rich biodiversity.
- Presence of tourism infrastructure.
- Authentic cultural heritage in forested areas.
- Local labour with knowledge suitable for ecotourism.
- Picturesque landscapes including mangrove forests, estuaries and sandy beaches.
- Substantially high in respect of core forest area in the state.
- Strong initiative by State forest department to increase tree coverage based on different mixed plantation for adoption by the rural communities.
- Availability of plenty of non-timber forest products offering rural livelihood options.
- Farm forestry to prevent erosion of fertile soil from agricultural fields.
- Forest species which can act as shelter belt against cyclone & flood etc.

Weaknesses

- Inadequate experience among tourism facilitators regarding natural resources.
- Limited cooperation between tourism agencies and forest resource managers.
- Challenges in ecotourism planning related to social, cultural and ecological aspects.
- Limited support for ecotourism projects at local and governmental levels.
- Reluctance among forest villagers to engage in non-timber production jobs.
- Very limited scope to increase terrestrial forest coverage because of heavy coastal or deltaic erosion due to natural calamities.
- Low coverage of social forestry with respect to the Total Geographical Area (TGA).
- Inadequate fund flow to forest department for social forestry.
- Non availability of sufficient community land.

Opportunities

- Growing domestic and global ecotourism markets.
- Geographic advantages for attracting tourists.
- New job and income opportunities from ecotourism.
- Potential for nature conservation awareness among locals.
- New funding sources for protected areas.
- Small land holding of farmers offer scope for farm forestry/agro forestry/commercial forestry.
- Abundant natural sources in forest along with better communication facilities offer scope for eco-tourism.
- Increased demand for bamboo and soft wood from paper mills.
- Fodder plantations under farm forestry yields both wood and fodder.

Threats

- Increasing visitation leading to mismanagement of protected areas
- Illegal trade of endemic species.
- Degradation of natural resources and local cultures from mismanaged eco-tours.
- Shift of ecotourism from nature-friendly to market-driven activities.
- Instability in national ecotourism market and macroeconomic risks.
- Large scale conversions of forest lands into commercial plantation may lead to associated problems such as straying of wild animals damaging crops.
- Growing of industrial and mining activities depletes forests and grasslands.
- Food and fuel production imbalance may lead to inadequate supplies of food and fuel.
- Creates Man-Animal conflicts.

Analysis

Strengths

- The coastal tract of West Bengal harbor has rich biodiversity in its natural and mixed forests, providing a strong foundation for ecotourism.
- Existing tourism infrastructure and authentic cultural heritage enhance the appeal of ecotourism in the region.

- Local labour possesses knowledge and skills that are beneficial for developing and sustaining ecotourism activities.
- GIS-based analysis revealed several areas with high ecological integrity suitable for low-impact ecotourism activities. These areas are characterized by intact forest cover, diverse ecosystems, and critical wildlife habitats.
- Survey indicated strong support for ecotourism among local communities, citing potential economic benefits, job creation, and cultural preservation as key motivating factors.

West Bengal's coastal forests are rich in biodiversity, hosting a diverse array of flora and fauna, including several endangered species. By promoting sustainable ecotourism practices, the study aims to conserve these valuable ecosystems and their associated ecosystem services, such as carbon sequestration, water purification, and soil stability. This conservation effort is crucial for maintaining ecological balance and resilience in the face of environmental challenges.

Weaknesses

- Tourism facilitators may lack sufficient knowledge and experience regarding the sustainable use of natural resources.
- Cooperation between tourism agencies and forest managers is limited, posing challenges for effective ecotourism management.
- Ecotourism planning faces criteria and planning issues, particularly in balancing social, cultural, and ecological aspects.

Opportunities

- The ecotourism market is growing both domestically and globally, presenting significant economic opportunities for the region.
- Strategic geographic positioning and existing infrastructure can attract a diverse range of tourists.
- Ecotourism can create new jobs and income streams, benefiting local communities and economies.
- There is potential to raise awareness about nature conservation among local populations.
- Ecotourism offers new financial resources that can support conservation efforts in protected areas.
- Findings suggest a growing interest among eco-conscious travellers and nature enthusiasts, particularly from urban centers in India and international markets seeking authentic cultural and nature-based experiences.
- Wildlife viewing, bird watching, nature walks, and cultural immersion activities were highlighted as top preferences among surveyed visitors.
- Opportunities for preserving indigenous knowledge and traditions through community-based ecotourism initiatives were recognized as beneficial outcomes.
- Empowering local communities as stewards of their natural and cultural heritage through participatory management and revenue-sharing mechanisms.

West Bengal's coastal forests are not only for providing biodiversity but also culturally rich, home to indigenous communities with unique knowledge systems and traditional practices. Ecotourism provides a platform for preserving

and showcasing these cultural heritage aspects, thereby fostering pride and identity among local communities. By empowering communities to actively participate in tourism planning and management, the study promotes inclusive development and cultural resilience.

The promotion of ecotourism in coastal forests offers substantial socio-economic benefits to local communities. It provides opportunities for income generation through tourism-related enterprises, such as eco-lodges, guided tours, and handicraft sales. By involving local communities as stakeholders and beneficiaries, ecotourism can contribute to poverty alleviation, improving living standards, and reducing dependency on unsustainable resource extraction practices.

Threats:

- Increasing visitation to protected areas may lead to mismanagement and degradation of natural resources.
- Deforestation through illegal trade in endemic species poses a threat to biodiversity conservation efforts.
- Poorly planned eco-tours could contribute to environmental degradation and disrupt local cultures.
- Vulnerability to natural disasters like cyclones and sea-level rise
- There is a risk of ecotourism becoming overly commercialized, shifting focus from sustainable practices to profit-driven activities.
- Vulnerability to fluctuations in the national ecotourism market and broader macroeconomic risks.
- Increased foot traffic, waste generation, and disturbance to wildlife habitats were identified as potential negative impacts requiring mitigation measures.
- Political Instability: Socio-political issues affecting tourism and infrastructure development.
- Man-Animal conflict is the conflict between people and animals which is one of the main threats to continue survival of many species in different parts of the coastal West Bengal as well as Sundarban Biosphere as the habitation of tiger which also faces same threats along with local communities.

Major Causes of Deforestation (Sample Study)

Continuous deforestation by Sea Waves as well as anthropogenic factors has seriously damaged the coastal ecosystem.



Tourism Development by Resort Construction (Providing for Accommodation) endangering Ecology of Sand Dunes, Casuarinas, Screw Pine and Jungle Fauna-gave away to Concrete Construction at Mandermoni.



The field of Mangrove forest converted to fishing ground at Sunderban Region



Strategies Interventions and Recommendations

Findings from the study can inform policy-makers and stakeholders about the potential benefits and challenges of ecotourism in coastal forest management. It provides evidence-based recommendations for enhancing regulatory frameworks, institutional capacities, and community engagement strategies to ensure the sustainability of tourism activities. Strengthening governance structures and promoting transparency in decision-making processes are essential steps towards achieving long-term conservation and socio-economic objectives.

- Enhancing quality of moderately dense forest, open forest and degraded forest.
- To enhance the fire prevention and fire management.
- Prevent man-animal conflict.
- Protecting livelihood dependent on forest produce.
- Mitigating impacts of storm surges and fast River run off.
- Establishment of fruit tree with various economically viable species of plants outside the forest for meeting the target of green forest cover.
- Improvement of soil health by suitable intercrops.
- Establishment of bamboo plantation as the effective tool for vegetative cover in forest and non-forest area.
- Livelihood development through implementation of different backyard forestry models like cultivation of orchid, medicinal plants etc.
- Development of nursery for social forestry.

Based on the SWOT analysis, the following recommendations are proposed to enhance the ecotourism potential of coastal forest resources in West Bengal

Infrastructure Development: Improve nature based infrastructure with giving priority on forest for accommodation, transportation and amenities as ecotourism sites.

Community Engagement: Foster partnerships among NGOs, Government, Tourist Agencies and Local communities for sustainable tourism development and cultural exchange.

Environmental Conservation: Implement community based conservation measures to protect coastal ecosystems and biodiversity maintaining EIA and CRZ rules.

Marketing and Promotion: Develop targeted marketing campaigns for increasing awareness to highlighting unique attractions and sustainable practices.

Future Directions: Future efforts should focus on scaling up successful ecotourism models, expanding conservation areas and leveraging technology for sustainable tourism promotion.

To capitalizing on the strengths and opportunities while mitigating weaknesses and threats, stakeholders in the coastal ecotourism sector of West Bengal should focus on enhancing collaboration between tourism agencies and environmental managers, improving ecotourism planning processes and promoting sustainable practices that benefit both local communities and natural ecosystems. By addressing these challenges proactively, the region can realize the full potential of ecotourism as a driver of economic growth and environmental conservation. Hence, this section highlights the multifaceted importance of the study, emphasizing its potential to catalyze positive change in conservation, socio-economic development, cultural preservation and policy enhancements related to ecotourism in West Bengal's coastal forests.

Conclusion

The coastal areas of West Bengal have experienced significant environmental degradation over the past four decades due to destructive human interventions. Deforestation driven by burgeoning tourism interests and beach erosion caused by sea waves and anthropogenic activities have become pervasive issues, posing major constraints to ecotourism development. Wealthy investors have initiated the development of tourist infrastructure such as hotels, often resulting in the macabre vandalization of natural treasures like screw pines and mangroves. These developments have involved sand mining and the accumulation of construction materials directly on beaches, effectively transforming them into thoroughfares for transporting materials and passengers from surrounding villages. Consequently, critical habitats such as sand dunes, screw pines and mangrove forests like Keya have been supplanted by concrete structures. Therefore, the forest resources of coastal West Bengal could not be sustainable managed under economic and social pressure of local people. Ecotourism could have positive impacts by changing the structure of the forest use from active to passive forms, by increasing income level and by decreasing illegal exploitation. Natural beauty, historical and cultural attraction offer to urban people on the ecological way by rural people for supply the developing opportunities of

ecotourism to the tourism sector of coastal West Bengal. On the other hand, scarcity of the employment opportunities without forestry activities and difficult living conditions force the forest villager's especially young people, to seek alternative jobs locally or to migrate out of the village areas. Result is continuous and rapidly increasing migration rate to large urban centres and increasing problems of irregular urbanization which have developing on the basis of tourism industry like Digha, Sankarpur, Mandermoni, Sagar Island, Bakkhali, Sunderban Biosphere etc in the coastal Tract of West Bengal. In order to reduce the harmful effects the current tourism industry has on the environment, ecotourism is being encouraged in the Coastal area of West Bengal. One of the benefits of ecotourism is that is a pro-poor industry, i.e. the poor is one of its targeted beneficiaries. Due to residents of Coastal West Bengal high dependency on the forest among other source of income generation like fishing, crop cultivation etc, an effective conservation strategy needs to provide the residents with income generation opportunities linked to forest protection because ecotourism is seen as both environmentally sustainable and economy boosting.

In this regard, the SWOT analysis illustrates that West Bengal's coastal forest resources possess significant potential for enhancing ecotourism. By addressing infrastructure challenges, engaging local communities, promoting environmental conservation, and leveraging opportunities, West Bengal can capitalize on its natural and cultural assets to attract eco-conscious travelers while ensuring long-term sustainability.

Thus this present study provides a comprehensive overview of the challenges, opportunities, methodologies, and recommendations for preserving coastal forests and enhancing sustainable tourism in West Bengal, India. It underscores the importance of balancing environmental conservation with socio-economic development to achieve sustainable growth in coastal regions. So, the importance of this study lies in its potential to transform West Bengal's coastal forests into sustainable tourism hubs that benefit biodiversity conservation, socio-economic development, cultural preservation, and global sustainability agendas. By embracing ecotourism as a tool for holistic development, West Bengal can pave the way towards a future where nature and communities thrive in harmony.

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