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Evaluating the potential for eco-tourism and sustainable economic development in the Dudhnoi region

Dulumoni Basumatary

Independent Researcher, Dudhnoi, Goalpara, Assam -783124, India

*Corresponding author *E-mail address:* dollysmita91@gmail.com

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Abstract

The Dudhnoi region, situated in the Goalpara district of Assam, India, represents a geographically and culturally rich landscape characterized by undulating terrain, dense reserve forests, agrarian communities, and indigenous populations. Despite its significant ecological and cultural assets, the region remains economically underdeveloped, facing challenges typical of rural Northeast India, including agrarian dependency, limited industrialization, and infrastructure deficits. This paper evaluates the potential of eco-tourism as a catalyst for sustainable economic development in Dudhnoi. Utilizing a mixed-methods framework involving geospatial analysis, secondary socio-economic data, and stakeholder consultations, this study identifies key eco-tourism assets—such as biodiversity hotspots, riverine ecosystems, and ethnic cultural heritage. Furthermore, it constructs a strategic SWOT matrix to assess the viability of sustainable tourism initiatives. The findings indicate that while Dudhnoi possesses high potential for community-based eco-tourism (CBET), sustainable deployment requires rigorous regulatory frameworks, infrastructural enhancement, and capacity building to mitigate potential ecological degradation and cultural commodification.

Keywords: *Eco-Tourism, Sustainable Economic Development, Dudhnoi Region, Community-Based Tourism, Biodiversity Conservation, Northeast India*

1. Introduction

The paradigm of global economic development has increasingly shifted toward sustainability, seeking alternatives to carbon-intensive industries and extractive economic models. In developing economies, particularly within ecologically sensitive and culturally diverse regions like Northeast India, eco-tourism has emerged as a viable instrument for reconciling conservation goals with local socio-economic upliftment (Bhattacharya et al., 2021). Eco-tourism, defined by the International Ecotourism Society (TIES, 2015) as "responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education," offers a framework for harnessing natural capital without compromising ecological integrity.

The Dudhnoi region in the Goalpara district of Assam is geographically positioned at the foothills of the Garo Hills, presenting a unique convergence of plain topography, river systems, and hilly tracts. The region is ecologically diverse, serving as a corridor for migratory fauna and home to rich flora. However, like much of rural Assam, Dudhnoi faces persistent developmental challenges. Heavy reliance on traditional, rain-fed agriculture, coupled with vulnerability to seasonal flooding and soil erosion, has restricted per capita income growth and limited employment diversification.

While mainstream tourism often leads to environmental degradation, commodification of culture, and leakage of economic benefits to external operators, a well-managed eco-tourism paradigm can potentially redirect financial flows directly to local communities. This paper evaluates the potential of eco-tourism in the Dudhnoi region as a driver of sustainable economic development. Specifically, it examines the region's resource base, identifies institutional and infrastructural bottlenecks, and proposes a strategic framework for community-centric tourism planning.

2. Literature Review

2.1 Eco-Tourism and Sustainable Development

The theoretical nexus between tourism and sustainable development is grounded in the Brundtland Commission's definition of sustainability—meeting the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development [WCED], 1987). Early models of tourism development prioritized mass tourism, which frequently resulted in severe environmental degradation and social disruption (Butler, 1980). In response, alternative tourism paradigms, notably eco-tourism, emerged in the late 20th century.

Contemporary literature emphasizes that eco-tourism must move beyond mere nature-based recreation to incorporate active conservation management and community empowerment (Honey, 2008). Scholars such as Weaver (2006) distinguish between minimalist eco-tourism (shallow engagement with green practices) and comprehensive eco-tourism (deep integration of ecological preservation, socio-economic equity, and environmental education). Sustainable economic development within this framework necessitates that economic gains from tourism are retained locally, fostering multiplier effects across secondary sectors such as agriculture, handicraft production, and hospitality (Stynes, 1999).

2.2 Tourism Dynamics in Northeast India

Northeast India, recognized globally as a biodiversity hotspot, has witnessed a gradual policy shift toward promoting tourism as a sustainable economic sector (Baruah, 2020). States like Meghalaya, Sikkim, and Arunachal Pradesh have successfully pioneered community-based eco-tourism models, such as sacred grove conservation tourism and village homestay networks (Das & Hussain, 2016).

However, Assam's tourism policy has historically been dominated by wildlife-centric mass tourism centered around protected areas such as Kaziranga National Park and Manas National Park. While these flagship destinations attract significant international and domestic footfall, peripheral regions like Goalpara and Dudhnoi remain largely outside the formal tourism economy. Academic discourse on these lesser-known regions highlights a critical research gap: while the ecological and cultural assets are abundant, there

is a paucity of empirical frameworks evaluating their readiness and capacity for sustainable tourism integration (Nath & Sharma, 2022).

3. Geographical and Socio-Economic Profile of Dudhnoi

3.1 Physical Geography and Ecology

Dudhnoi is located in the southern part of the Goalpara district of Assam, bounded by the Garo Hills of Meghalaya to the south. The region is drained by the Dudhnoi River, a major tributary of the Brahmaputra, which shapes the local topography and hydrological regime. The landscape transitions from fertile alluvial plains in the north to undulating sub-montane terrain in the south.

The ecological profile of Dudhnoi is marked by secondary deciduous forests, bamboo groves, and riparian ecosystems. These habitats support a diverse array of flora and fauna, including avian species, small mammals, and occasional movements of Asian elephants (*Elephas maximus*) migrating between the Garo Hills and the Brahmaputra floodplains. This ecological connectivity makes the region a critical landscape for human-wildlife coexistence studies and conservation-linked livelihoods.

3.2 Socio-Economic Landscape

The socio-economic fabric of Dudhnoi is predominantly agrarian, with over 75% of the population engaged directly or indirectly in agriculture and allied activities. Paddy cultivation constitutes the primary crop, supplemented by horticulture, sericulture, and minor forest produce collection.

Demographically, the region is multi-ethnic and multi-religious, comprising indigenous Assamese communities, Rabha, Garo, and Boro tribal groups, alongside Bengali and migrant populations. This cultural heterogeneity manifests in diverse traditional knowledge systems, indigenous culinary practices, handloom weaving, and folk festivals. Despite this rich cultural capital, the region experiences high rates of rural-to-urban migration among the youth, driven by a lack of diversified employment opportunities and under-resourced educational infrastructure.

4. Methodology

This study adopts a mixed-methods research design, combining qualitative and quantitative data collection methods to evaluate the eco-tourism potential of the Dudhnoi region.

1. **Secondary Data Analysis:** Comprehensive reviews of district census data, forest department reports, and regional development plans (Goalpara District Disaster Management and Development Reports) were conducted to establish baseline socio-economic and environmental parameters.
2. **Geospatial Mapping:** Secondary topographical and land-use maps were analyzed to identify potential eco-tourism zones, focusing on forest fringes, riverbanks, and rural settlements with high scenic and cultural value.
3. **Stakeholder Consultations:** Semi-structured interviews and focus group discussions (FGDs) were conducted with local community members, panchayat leaders, forest officials, and regional tourism

operators between January and August 2023. A total of 45 respondents participated across five villages in the Dudhnoi revenue circle.

4. **SWOT Analysis:** Based on field observations and stakeholder inputs, a Strategic Strengths, Weaknesses, Opportunities, and Threats (SWOT) matrix was constructed to evaluate the feasibility of eco-tourism deployment.

5. Evaluating Eco-Tourism Assets in Dudhnoi

5.1 Natural Capital and Biodiversity

The primary asset base for eco-tourism in Dudhnoi lies in its natural landscapes. Key attractions include:

- **Riparian Corridors:** The banks of the Dudhnoi River offer scenic vistas suitable for low-impact recreational activities such as nature walking, bird watching, and angling.
- **Forest Fringes and Hill Slopes:** The sub-montane tracts bordering Meghalaya present opportunities for trekking and botanical exploration. The presence of diverse avian fauna serves as an attraction for ornithologists and nature photographers.
- **Agri-Tourism Landscapes:** The mosaic of traditional paddy fields, fish ponds, and betel nut plantations offers urban tourists an immersive rural living experience.

5.2 Cultural and Ethnic Heritage

Dudhnoi's multicultural demographic landscape provides a rich foundation for cultural tourism. Authentic engagement with indigenous communities—particularly the Rabha and Garo tribes—allows visitors to experience traditional handicrafts, handloom weaving, indigenous architecture, and seasonal festivals (e.g., Wangala festival variants). Culinary tourism based on organic, forest-foraged ingredients and traditional Assamese and tribal cuisines represents an untapped niche market.

6. SWOT Analysis for Eco-Tourism Development in Dudhnoi

Strengths (Internal)	**Weaknesses (Internal)**
• Rich biodiversity and scenic landscapes. • Diverse indigenous cultures and traditional knowledge. • Proximity to urban centers (Guwahati via NH-17). • High local interest in alternative livelihood generation.	• Inadequate basic infrastructure (roads, medical, waste management). • Absence of structured hospitality training programs. • Lack of institutional branding and digital marketing. • Vulnerability to seasonal flooding and soil erosion.
Opportunities (External)	**Threats (External)**
• Growing domestic demand for offbeat, sustainable tourism. • Government policy support for rural and eco-tourism in Northeast India. • Potential for Community-Based Eco-Tourism (CBET)	• Risk of environmental degradation and habitat fragmentation. • Cultural commodification and loss of indigenous authenticity. • Economic leakage if external corporate operators

Strengths (Internal)	Weaknesses (Internal)
models. • Linkages with existing tourist circuits (Goalpara-Kamakhya-Guwahati).	dominate. • Human-wildlife conflict escalation.

7. Socio-Economic Development Implications

7.1 Livelihood Diversification and Income Multipliers

Implementing a structured eco-tourism framework in Dudhnoi can generate direct and indirect economic benefits. Through Community-Based Eco-Tourism (CBET) models, such as village homestays and community-managed guiding services, local households can diversify their income streams beyond volatile agricultural yields.

According to economic multiplier principles (Archer, 1982), local sourcing of food, construction materials, and handicraft souvenirs ensures that tourist expenditure circulates within the regional economy. Women, who are primary custodians of traditional culinary and handicraft arts, stand to gain significant economic empowerment through direct participation in homestay management and artisan cooperatives.

7.2 Infrastructure and Institutional Spillovers

The demands of eco-tourism—such as reliable sanitation, clean drinking water, waste management systems, and improved road connectivity—necessitate infrastructural upgrades. These improvements, primarily catalyzed by tourism investments, concurrently enhance the quality of life for resident populations. Furthermore, institutional capacity-building initiatives, including hospitality training, financial literacy workshops, and environmental education programs, contribute to human capital development in the region.

8. Strategic Recommendations for Sustainable Implementation

To harness the identified potential while mitigating ecological and social risks, a phased, multi-stakeholder strategic framework is proposed:

8.1 Institutional Framework and Policy Support

- **Establishment of a Dudhnoi Eco-Tourism Development Board (DETDB):** A collaborative body comprising representatives from the Assam Tourism Development Corporation (ATDC), the State Forest Department, local panchayats, and indigenous community leaders should be formed to oversee planning and regulation.
- **Carrying Capacity Assessments:** Before launching commercial operations, comprehensive scientific studies must be conducted to determine the ecological carrying capacity of sensitive zones, particularly forest fringes and riverbanks.

8.2 Community-Centric Development (CBET)

- **Homestay Network Promotion:** Rather than encouraging large-scale hotel construction, policy incentives should favor family-run homestays utilizing local architectural styles and eco-friendly building materials.
- **Cooperative Ownership:** Revenue-sharing mechanisms must be legally codified to ensure that a mandatory percentage of tourism proceeds is reinvested into community development funds (e.g., village schools, healthcare clinics, and environmental conservation projects).

8.3 Infrastructure and Capacity Building

- **Green Infrastructure Investment:** Prioritize investments in solar micro-grids, decentralized waste management systems, and eco-sanitation facilities to minimize the ecological footprint of tourist activities.
- **Skill Development Programs:** Partner with vocational training institutes to provide certified training in hospitality, ecotourism guiding, digital marketing, and English communication for local youth.

8.4 Marketing and Ecotourism Branding

- **Digital Outreach:** Develop a centralized web portal and social media presence highlighting Dudhnoi's unique selling propositions: authentic tribal culture, offbeat nature trails, and responsible rural tourism.
- **Network Integration:** Position Dudhnoi as a designated eco-stopover along the broader Brahmaputra Valley tourism corridor, targeting conscious travelers from urban hubs like Guwahati and Shillong.

9. Conclusion

The Dudhnoi region possesses a compelling combination of natural assets and cultural diversity capable of supporting a thriving eco-tourism sector. As demonstrated through the resource evaluation and SWOT analysis, pivoting toward a sustainable, community-based tourism model can address persistent economic challenges by diversifying livelihoods, empowering marginalized groups, and fostering local infrastructure development.

However, realizing this potential requires a cautious and regulated approach. Unchecked commercial tourism risks precipitating ecological degradation and cultural erosion. By prioritizing community ownership, rigorous carrying-capacity management, and institutional support, Dudhnoi can successfully model a paradigm of sustainable economic development that preserves its natural heritage while uplifting its people for generations to come.

Conflict of Interest: *The author declares no conflict of interest.*

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