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Economic and Environmental Impact of Coastal Tourism in Digha

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ABSTRACT

Digha is one of the principal coastal tourism destinations of West Bengal and has experienced long-term tourism-led expansion in accommodation, transport, commerce, and public infrastructure. Historical destination data show that Digha's tourist arrivals rose sharply during the 2001–2012 period, while recent official data indicate strong growth in West Bengal's overall tourism market in 2023. At the same time, Digha's development has increasingly been shaped by public interventions such as the ₹67.99 crore Beach Circuit project, the expansion of the Digha Sankarpur Development Authority (DSDA) planning area, and Integrated Coastal Zone Management (ICZM) investments in drainage, sewerage, cyclone shelters, mangrove plantation, and hawker rehabilitation. Economically, tourism has improved the local economy, created business opportunities, and diversified livelihoods. Environmentally, however, the same growth has generated shoreline erosion, dune and vegetation loss, habitat stress, sewage and garbage pressure, and built-up encroachment along the coast. Recent studies also show worsening vegetation indicators and continuing shoreline instability. The paper concludes that coastal tourism in Digha has produced substantial economic gains, but these gains remain vulnerable unless tourism growth is aligned with ecological carrying capacity, stricter coastal regulation, and community-based sustainable management.

Keywords: *Coastal Tourism; Digha; Economic Impact; Environmental Impact; Coastal Erosion; Sustainable Tourism; West Bengal.*

1. INTRODUCTION

Digha occupies a central place in the coastal tourism geography of West Bengal. The DighaSankarpur Development Authority states that its planning jurisdiction was progressively extended to include Sankarpur, Mandarmoni, and Tajpur, resulting in a 17,220.04-acre planning area intended for coastal tourism development and orderly regional growth. This institutional expansion shows that Digha is no longer treated as a small isolated beach resort but as part of a larger managed tourism zone.

Tourism growth has also been supported by state and national policy. The Ministry of Tourism reported that the Beach Circuit project linking Udaipur, Digha, Shankarpur, Tajpur, Mandarmani, Fraserganj, Bakkhali, and Henry Island was sanctioned for ₹67.99 crore and is physically complete. At the same time, the Ministry has clarified that it does not maintain district-wise tourist arrival data, so the present status of Digha must be interpreted through state-level tourism statistics, destination-specific infrastructure records, and published academic studies.

The importance of studying Digha lies in the double-edged nature of coastal tourism. On one hand, tourism stimulates income, trade, transport, hospitality, and local entrepreneurship. On the other hand, unplanned or high-intensity tourism puts stress on beaches, dunes, vegetation, water quality, and marine habitats. Research on Digha consistently describes this tension between economic opportunity and environmental fragility, which makes the destination an important case for sustainable coastal tourism analysis.

2. REVIEW OF LITERATURE

Duari (2018) examined the impact of coastal tourism on the local community in the Digha–Shankarpur area and found that tourism has a significant economic effect on local residents, especially for people engaged in tourism-related occupations. The study also identified erosion, congestion, sewage, garbage, and inadequate infrastructure as major concerns.

Ganguly and Sharma (2015) emphasized that coastal tourism in Digha involves economic, social, cultural, and political effects and argued that local residents' participation is necessary for sustainable development. Their work is important because it links tourism growth with stakeholder cooperation rather than viewing tourism only as a market phenomenon.

Roy (2020) analyzed environmental issues and sustainability in Digha and argued that unplanned mass tourism is causing environmental deterioration. The study concludes that sustainable ecotourism practices and public awareness are necessary if tourism growth is to continue without undermining the coastal resource base.

Roy and Pagaldiviti (2022/2023 online release) further developed the responsible tourism perspective by arguing that sustainable tourism is the only durable way to protect both the coastline and the tourism economy. Their work places environmental degradation at the center of Digha's future tourism strategy.

Acharya, Pathak, Mondal, Dash, and Bhadra (2021) assessed economic impacts and ecotourism potential in the coastal belt of Purba Medinipur, which includes major destinations such as Digha. Their findings show that residents perceive tourism as improving the local economy and increasing local income, while also pointing to CRZ violations, habitat loss, land degradation, and beach erosion.

Baitalik and Majumdar (2018) analyzed performance and seasonality of coastal tourism in West Bengal and provided long-run tourist-arrival data for Digha. Their work demonstrates that Digha has been a dominant beach destination over time and that its tourism base is large enough to shape the wider coastal economy of Purba Medinipur.

Bandyopadhyay, Mukherjee, and Pahari (2009) identified the Digha coast as an eroding tourist sector and estimated erosion at 1.15–5.15 hectares per year over a long historical period. This study remains important because it shows that environmental instability is not a recent issue but a structural condition of Digha's tourism landscape.

Khatun and Guchhait (2024) examined rapid tourism growth in Digha and adjacent coastal areas and found that urbanization, road construction, hotels, and small commercial encroachments have disturbed dune ecology and beach ecosystems. Their use of NDVI and respondent surveys gives recent evidence of vegetation degradation and pollution pressures.

3. OBJECTIVES OF THE STUDY

1. To examine the economic impact of coastal tourism in Digha.
2. To analyze the environmental impact of tourism development on the Digha coast.
3. To assess the present development pattern of tourism through secondary data and published studies.
4. To identify the major opportunities and major risks associated with tourism-led growth in Digha.
5. To suggest measures for more sustainable coastal tourism development.

4. DATA ANALYSIS AND MAJOR FINDINGS

Data Note: Since the Ministry of Tourism does not publish district-wise tourist-arrival figures for Digha, this section relies on state-level official tourism data, official infrastructure records, and peer-reviewed / academic studies focused on Digha and the Purba Medinipur coast.

1) Economic impact

1) Economic Impact of Coastal Tourism in Digha

The economic impact of coastal tourism in Digha can be examined through three linked indicators: long-run growth in tourist arrivals, the wider state tourism market, and local community perceptions of tourism-led income generation. Since the Ministry of Tourism does not maintain district-wise tourist-arrival data, recent Digha-specific growth must be interpreted through earlier destination-level studies and current West Bengal tourism statistics.

Table 1: Historical Tourist Growth in Digha

Year	Foreign Tourists	Domestic Tourists	Total Tourists
2001	3,168	873,737	876,905
2012	4,184	4,120,826	4,125,010

Source: *Baitalik and Majumdar, based on Department of Tourism, Government of West Bengal data.*

Between 2001 and 2012, Digha's total tourist arrivals increased by 3,248,105, and the total index rose from 100 to 470.4, showing that Digha had already become a mass coastal destination before the latest round of public tourism investment. Domestic arrivals accounted for almost the entire expansion.

Table 2: West Bengal Tourism Market Context

Category	2022	2023 (P)	Growth Rate
Domestic Tourist Visits	8,45,42,195	14,56,69,292	72.3%
Foreign Tourist Visits	10,37,017	27,06,942	161.0%

Source: *Ministry of Tourism, Government of India, Lok Sabha Unstarred Question No. 2226, answered on 05.08.2024. Growth rates calculated from published figures.*

Table 3: Selected Local Economic Perception Indicators

Economic Variable	Mean Score
Greater local income	4.83
New business opportunities	4.33
Improvement of local economy	4.17
Overall positive economic impact	4.36
Overall negative economic impact	2.45

Scale: 5 = Strongly Agree, 1 = Strongly Disagree.

Source: *Acharya et al. (2021).*

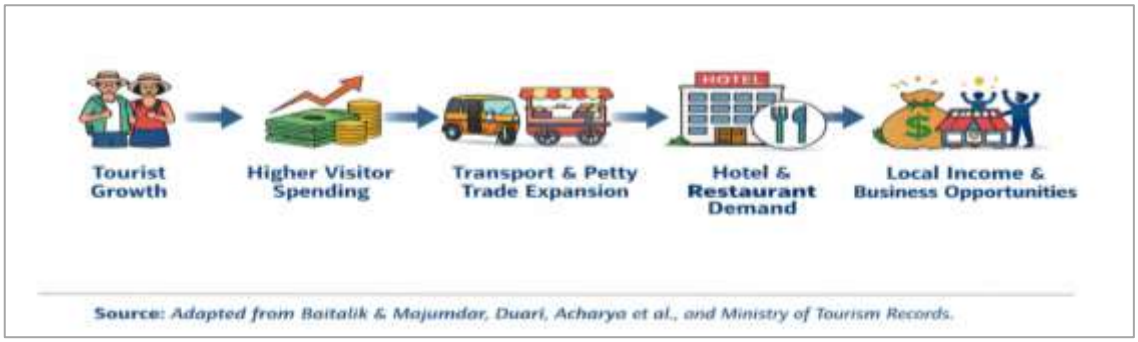

Figure 1: Economic Transmission Pathway in Digha

Tourist growth → higher visitor spending → transport and petty trade expansion → hotel/restaurant demand → local income and business opportunities

Source: *Researcher's interpretation based on Baitalik and Majumdar, Duari, Acharya et al., and Ministry of Tourism records.*

The historical evidence shows that Digha's tourism economy expanded very rapidly in the first decade of the 2000s. Total arrivals rose from 876,905 in 2001 to 4,125,010 in 2012, which means Digha's tourist volume became about 4.7 times its 2001 level by 2012. The structure of this growth is also important: domestic tourism was the main driver, increasing from 873,737 to 4,120,826, while foreign arrivals remained comparatively small. This confirms that Digha's economic base has been built primarily on mass domestic coastal tourism rather than on international tourism.

Recent official statistics reinforce this growth context. West Bengal's domestic tourist visits rose from 8.45 crore in 2022 to 14.57 crore in 2023, while foreign visits increased from 10.37 lakh to 27.07 lakh. These are not Digha-specific figures, but they indicate a sharply expanding state tourism market from which leading destinations such as Digha are likely to benefit. Because Digha is one of the state's best-known beach destinations, this wider rise in tourist mobility can reasonably be read as supportive of its hospitality, transport, and service economy.

Local-level studies make the economic effect more concrete. Acharya et al. found strong resident agreement that tourism improves income, opens new business opportunities, and strengthens the local economy. Duari likewise reports that local residents in tourism-related occupations directly benefit from visitor flows; the paper gives examples such as a van transport driver earning ₹750 per day in peak season, a coconut seller ₹650, a steward ₹400 in tips, and a barber ₹1,100 per day. These examples show that coastal tourism supports not only formal hotel employment but also informal livelihoods, petty trade, and seasonal service work.

This economic base has also been strengthened institutionally. The Ministry of Tourism reports that the ₹67.99 crore Beach Circuit project linking Digha with other coastal destinations is physically complete, and DSDA reports a 17,220.04-acre planning area. Together, these indicate that Digha is being integrated into a larger coastal tourism corridor rather than functioning as a stand-alone resort. That kind of integration generally improves accessibility, disperses visitor movement, and broadens the economic catchment for hotels, transport operators, local vendors, and tourism-linked small businesses.

Overall, the economic impact of coastal tourism in Digha may be described as substantial, livelihood-generating, and corridor-supported, though recent destination-specific arrival data remain unavailable from the Ministry

2) Environmental Impact

2) Environmental Impact of Coastal Tourism in Digha

The environmental impact of coastal tourism in Digha is both **physical** and **ecological**. Physically, the beach–shoreline system remains unstable because erosion has persisted for decades. Ecologically, rapid tourism growth since the 1990s has intensified built-up expansion, dune disturbance, vegetation loss, waste generation, and water pollution. Together, these effects show that Digha's tourism economy depends on a coastal environment that is under sustained stress.

Table 4: Shoreline Instability and Erosion in Digha

Indicator	Finding
Long-term coastal erosion	1.15–5.15 ha per year
Mean long-term shoreline change rate	–0.54 m/year
Transects under erosion	70.70%
Transects under accretion	29.30%
Most eroded sector in recent study	Zone III: –7.47 m/year

Source: *Compiled by the researcher from Bandyopadhyay, Mukherjee and Pahari; and recent shoreline-change analysis of the Digha coast.*

Table 5: Ecological Degradation Indicators Linked with Tourism Pressure

Indicator	Earlier Condition	Later Condition / Response
Upper NDVI value	0.42 (1995)	0.29 (2019)
Tourist vehicle parking on dune area	—	61% of vehicle owners surveyed
Use of official parking zone	—	21%
Main perceived cause of shallow-water pollution	—	Sewage: 43%
Second major cause of shallow-water pollution	—	Hotel food waste: 21%
Main cause of beach habitat destruction	—	Crowding: 55%
Second major cause of beach habitat destruction	—	Recreational transport: 23%

Source: *Compiled by the researcher from Khatun and Guchhait's field-based study on tourism growth and environmental impact in Digha.*

Table 6: Persistent Environmental Problems Reported in Digha

Problem area	Reported issue
Beach environment	Erosion and congestion
Urban-coastal interface	Sewage and garbage
Dune system	Destruction of vegetation and dune misuse
Coastal governance	Weak control over unmanaged tourist pressure

Source: *Compiled by the researcher from Duari's community-impact study and Khatun and Guchhait's tourism-environment study.*

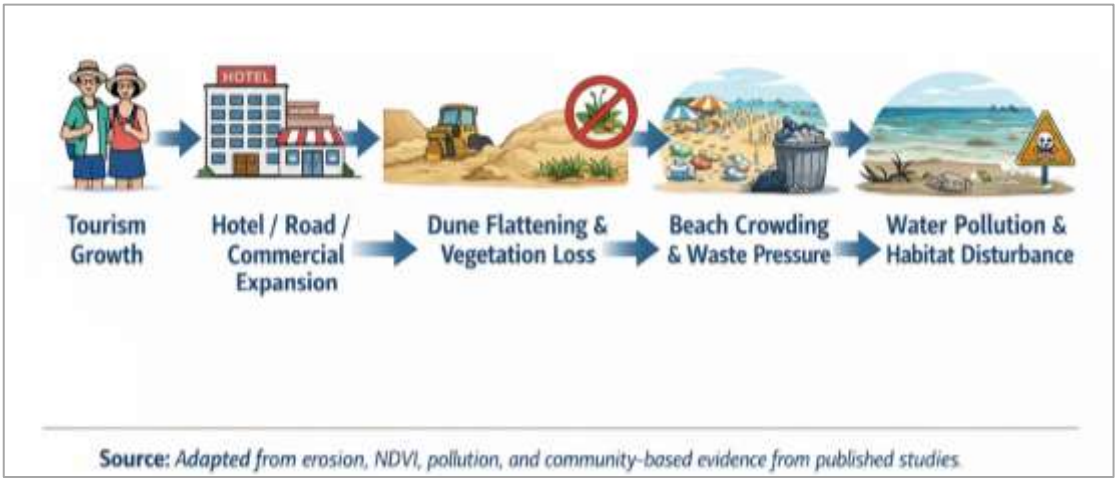

Figure 2: Environmental Stress Pathway in Digha

Tourism growth → hotel / road / commercial expansion → dune flattening and vegetation loss → beach crowding and waste pressure → water pollution and habitat disturbance → decline in coastal ecosystem quality

Source: Researcher's interpretation based on erosion, NDVI, pollution, and community-based evidence from published studies.

The first major environmental effect of tourism in Digha is shoreline instability. Long-term geomorphological research found that the Digha coastal sector has been eroding for decades at a rate of 1.15–5.15 hectares per year, while a more recent shoreline study estimated a mean long-term shoreline-change rate of –0.54 m/year and found that 70.70% of transects were under erosion. This means the basic resource on which beach tourism depends—the beach and shoreline itself—remains physically fragile. In practical terms, tourism development in Digha is taking place on a coast that is already under chronic erosional stress.

The second effect is degradation of the dune-vegetation system. Khatun and Guchhait show that since the 1990s rapid tourism growth has accelerated urbanization, hotel construction, road expansion, and commercial encroachment in the dune-based coastal tract. Their NDVI analysis shows a decline in the upper vegetation value from 0.42 in 1995 to 0.29 in 2019, indicating a marked weakening of vegetative cover and a shift toward more sparsely vegetated or bare land conditions. The same study also reports that 61% of surveyed vehicle owners parked on dune areas, showing that dunes are being used not only as natural barriers but also as informal tourism space.

A third effect is pressure on beach ecology and coastal biodiversity. According to the same field study, respondents identified crowding (55%) and recreational transport (23%) as the main causes of beach habitat destruction. The study further notes direct tourist intervention through parking, picnicking, hanging out on dunes, and open waste disposal. These pressures matter because dunes, beach fauna, and coastal vegetation are ecologically connected; once trampling, waste, and construction increase, the coast loses both habitat quality and natural protective capacity.

The fourth effect is water pollution and poor environmental management. In respondent-based evidence, 43% viewed sewage as the main cause of shallow-water pollution, followed by 21% who blamed hotel food waste; other cited causes included dead fish disposal and oil spill. This suggests that Digha's environmental problem is not only geomorphological but also managerial, involving sewage disposal, waste handling, and heavy tourism pressure near the shore. Duari's community study reinforces this interpretation by identifying erosion, congestion, sewage, and garbage as persistent problems in Old Digha.

Overall, the environmental impact of coastal tourism in Digha is cumulative and multi-layered. It extends from shoreline retreat to dune degradation, from vegetation loss to water pollution, and from beach crowding to biodiversity stress. The evidence therefore shows that tourism in Digha generates environmental costs at every level of the coastal system. Unless tourism growth is matched by strict dune protection, better sewage and waste management, and tighter control over beach use, the ecological base of the destination will continue to weaken.

3) Mitigation and Resilience Responses in Digha

Not all recent tourism-related change in Digha has been environmentally damaging. Official evidence from the Integrated Coastal Zone Management (ICZM) project for the West Bengal project area: Digha to Shankarpur and Sagar Island shows that tourism planning has increasingly incorporated sanitation,

disaster preparedness, ecological restoration, and livelihood protection. The Ministry of Environment, Forest and Climate Change reports 95 ha of mangrove plantation, 24 multipurpose cyclone shelters, 20 km storm-water drainage at Digha, 6.7 MLD STP and sewerage networking at Digha, beach beautification and rehabilitation of approximately 1,300 hawkers, and direct livelihood benefits to over 41,000 individuals, including nearly 29,000 women. These measures indicate a shift from a narrow beautification model toward a broader resilience-oriented tourism strategy.

Table 7: ICZM Achievements Relevant to Digha

Component	Achievement
Mangrove plantation	95 ha
Multipurpose cyclone shelters	24
Storm-water drainage at Digha	20 km
STP and sewerage networking at Digha	6.7 MLD
Hawker rehabilitation	Approx. 1,300 persons
Direct livelihood beneficiaries	Over 41,000 individuals
Women beneficiaries	Nearly 29,000

Source: *Compiled by the researcher from Ministry of Environment, Forest and Climate Change, Annual Report 2019–20.*

Table 8: Functional Significance of Mitigation and Resilience Measures

Intervention area	Tourism relevance
Mangrove plantation	Strengthens coastal ecology and natural buffering
Cyclone shelters	Improves tourist and resident safety during disasters
Storm-water drainage	Reduces waterlogging and improves urban beach management
STP and sewerage networking	Improves sanitation and reduces pollution pressure
Hawker rehabilitation	Supports regulated local livelihoods near the beach
Livelihood activities	Expands community participation in tourism-linked development

Source: *Researcher's interpretation based on official ICZM achievements.*

Environmental restoration + sanitation infrastructure + disaster preparedness + livelihood rehabilitation = more sustainable coastal tourism development

Source: Researcher's interpretation based on ICZM project achievements in the West Bengal coastal zone.

The first major implication of these data is that tourism planning in Digha now extends beyond physical beautification. The construction of 20 km of storm-water drainage and 6.7 MLD STP and sewerage networking is especially important because sanitation and drainage are foundational to coastal destination management. In a high-footfall beach town, poor wastewater disposal and inadequate drainage can quickly degrade beach quality, public health conditions, and visitor experience. Therefore, these investments show that environmental infrastructure is being treated as an essential component of tourism development rather than as a secondary municipal function.

The second important implication is disaster resilience. Digha lies in a cyclone-prone coastal region, so the construction of 24 multipurpose cyclone shelters and the plantation of 95 ha of mangroves directly strengthen the protective capacity of the coast. Cyclone shelters help reduce human vulnerability during extreme weather events, while mangroves contribute to ecological stabilization and natural coastal defense. This means that tourism development in Digha is increasingly being linked with climate adaptation and coastal risk reduction.

A third dimension is livelihood integration. The official report notes rehabilitation of around 1,300 hawkers and direct livelihood benefits to over 41,000 individuals, including nearly 29,000 women. This is significant because coastal tourism economies often depend heavily on informal workers, petty traders, self-help groups, and local service providers. By linking tourism-area development with livelihood support, the policy framework appears to recognize that sustainable tourism requires not only environmental management but also social inclusion.

Overall, the mitigation and resilience response in Digha can be described as infrastructure-based, ecologically aware, and community-sensitive. The evidence suggests that coastal tourism planning has begun to integrate sanitation, resilience, disaster preparedness, and livelihood protection alongside tourism promotion. Although these measures do not eliminate the environmental pressures already affecting Digha, they represent a clear institutional movement toward a more sustainable and risk-aware model of coastal tourism development.

Major Findings

1. **Coastal tourism has had a strong positive economic effect in Digha.** Historical tourist-arrival data, resident perception studies, and state-level tourism growth all indicate that tourism supports income generation, new business opportunities, and local economic expansion.
2. **The benefits are uneven and qualified.** Studies note seasonality, low wages in some services, inadequate skills, and infrastructure gaps, which means tourism growth does not automatically translate into broad-based prosperity.
3. **Environmental degradation is the principal long-term risk.** Erosion, dune loss, vegetation decline, sewage, garbage, and habitat stress threaten the natural assets on which Digha's tourism economy depends.
4. **Tourism pressure is partly a governance problem.** Several studies link environmental decline not only to visitor numbers but also to encroachment, poor waste management, and violations of coastal regulation.
5. **Recent policy interventions are moving in a more sustainable direction.** The Beach Circuit project, DSDA's regional planning role, and ICZM investments suggest that tourism governance is becoming more infrastructure-based, resilience-oriented, and regionally integrated.

5. CONCLUSION

The economic and environmental impact of coastal tourism in Digha is best understood as a relationship of gain under pressure. Tourism has clearly expanded the local economy through visitor spending, transport demand, hospitality growth, small business activity, and public investment. Yet these gains are inseparable from environmental costs: shoreline erosion, dune degradation, waste and sewage stress, habitat loss, and crowd-driven ecological decline. In effect, tourism has strengthened Digha's economy while simultaneously increasing the fragility of the coastal system that sustains that economy. The practical implication is that Digha cannot rely on volume growth alone. Its future depends on stricter coastal land-use control, better waste and wastewater management, dune and vegetation restoration, enforcement of coastal regulations, and greater participation of local communities in tourism planning. Sustainable coastal tourism in Digha therefore requires a shift from simple destination expansion to ecological stewardship backed by economic inclusion.

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