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Green Dreams and Realities : A Dual Perspective on Ecotourism in Jhargram District, West Bengal

Uttam Bhunia[1] & Dr. Arvind Kumar Singh[2]

1. Ph. D Research Scholar, Geography, Social Sciences and Humanities, Mansarovar Global University, Billkisganj, Sehore, Madhya Pradesh, 466111, Email: bhuniauttam@gmail.com
2. Supervisor, Geography, Social Sciences and Humanities, Mansarovar Global University, Billkisganj, Sehore, Madhya Pradesh, 466111, Email: kumararvind726@gmail.com

Abstract:

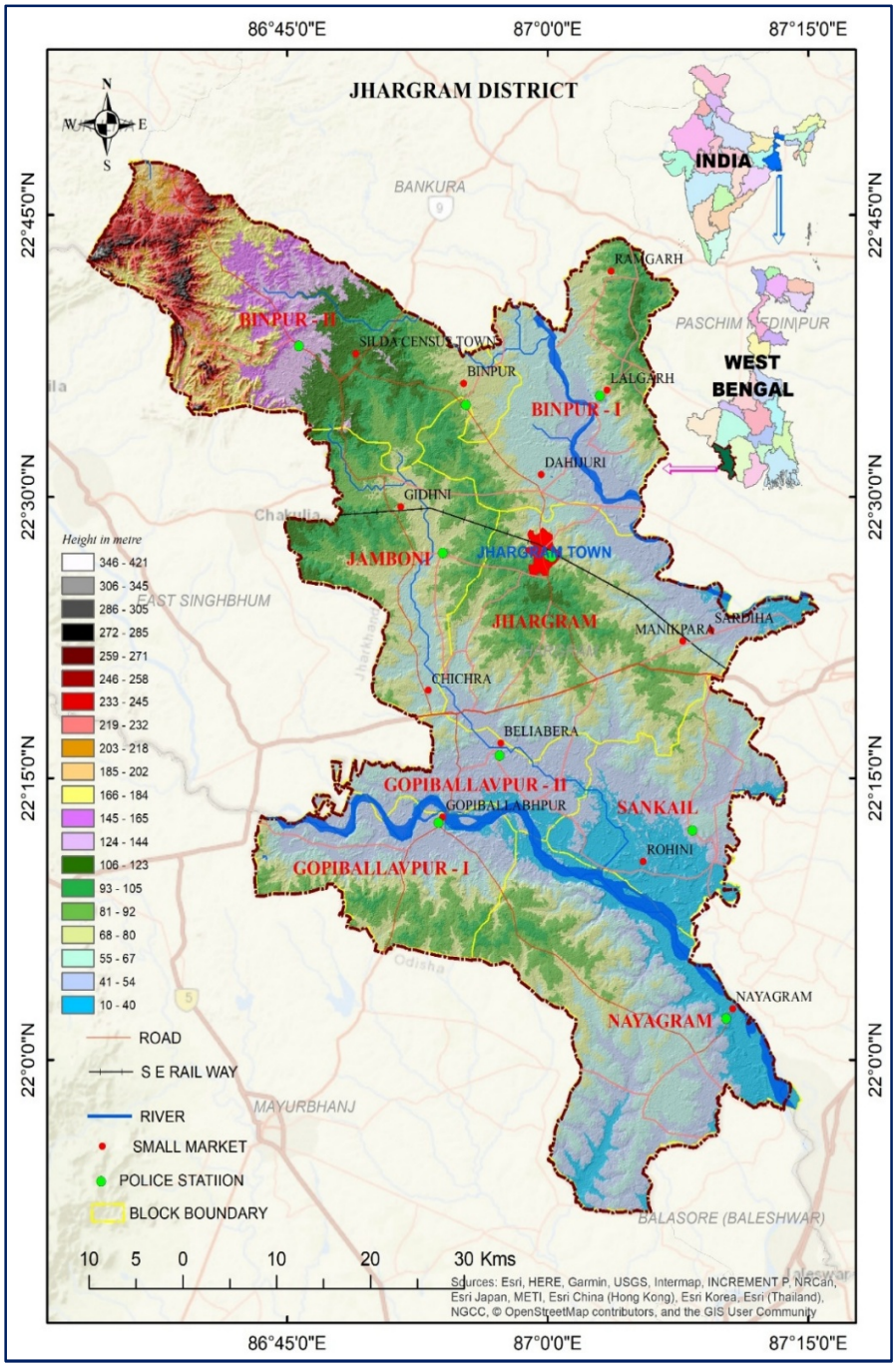
Ecotourism offers a sustainable pathway for rural development, particularly in ecologically and culturally significant regions like the Jhargram District of West Bengal. This study evaluates the impact of ecotourism on sustainable development by employing the Triple Bottom Line (TBL) framework, which integrates environmental, economic, and socio-cultural dimensions. A mixed-methods approach was adopted, utilizing both primary and secondary data sources. Primary data were collected through structured household and business surveys, tourist interviews, focus group discussions (FGDs), and key informant interviews (KIIs) across three key regions—Jhargram, Belpahari, and Gopiballavpur—covering 415 respondents. Secondary data included previous works of researchers. Sentinel-2 imagery, district statistics, and Census reports. Remote Sensing and GIS techniques were used to analyze land use/land cover changes from 2017 to 2023, forest cover variation, and solid waste management in ecotourism hotspots. The study also assessed tourism-related employment, income diversification, and cultural impacts on local communities. Results highlight that ecotourism contributes significantly to employment generation, skill development, and preservation of tribal culture, while promoting environmental awareness. However, challenges such as inadequate infrastructure, seasonal fluctuation in income, and environmental degradation persist. Spatial analysis identified zones of ecological stress and conservation potential. Thematic analysis of stakeholder perspectives revealed the importance of community involvement and policy support. The study concludes that a holistic, data-driven strategy—combining geospatial monitoring, economic assessment, and socio-cultural engagement—is essential for enhancing the sustainability of ecotourism in Jhargram. Such an approach can serve as a model for other rural ecotourism destinations aiming for inclusive and balanced development.

Keywords: *Ecotourism, Triple Bottom Line (TBL) Framework, Mixed-methods approach, Economic impacts, Social impacts, Environmental impacts, and Strategy planning.*

Introduction:

Tourism is a globally significant economic sector that contributes to employment, cultural exchange, and environmental conservation (Telfer & Sharpley, 2015; Khan et al., 2020). Among its various forms, ecotourism has emerged as a sustainable alternative, promoting responsible travel to natural areas while

enhancing biodiversity conservation and local livelihoods (Kiper, 2013; Svitlichna et al., 2024). It fosters environmental awareness, community participation, and cultural preservation, aligning with the principles of sustainable development (Rahman et al., 2022).



Jhargram District in West Bengal is endowed with forests, rivers, wildlife, and a vibrant tribal heritage (Sen, 2018), offering immense ecotourism potential. However, challenges such as inadequate infrastructure, limited planning, and low community participation threaten sustainability (Sahoo et al., 2023). Unregulated tourism can lead to environmental degradation, cultural erosion, and economic disparities (NITI Aayog, 2018).

This study evaluates the environmental, social, and economic impacts of ecotourism in Jhargram District using a comprehensive framework based on the Triple Bottom Line (TBL) approach. It draws on primary data from surveys, interviews, and focus groups across Jhargram, Belpahari, and Gopiballavpur, and secondary data including spatial analysis and census reports. The study also explores how ecotourism can generate employment, support traditional livelihoods, and enhance local capacities while preserving natural ecosystems.

Fig.1 Location map of the Study area, Jhargram district.

Globally, ecotourism research—such as Honey's (1999) analysis of Costa Rica and Kenya, or Nepal's (2002) mountain tourism framework—emphasizes the need for locally tailored, conservation-driven strategies. Bhutan's "high-value, low-impact" model (Rinzin et al., 2007) and Malaysia's community-based initiatives (Bhuiyan et al., 2012) illustrate the benefits of inclusive planning. In India, successful models from Sikkim, Kerala, and Karnataka show how ecotourism can boost rural development. However, districts like Jhargram remain underexplored in scholarly literature.

There is a critical gap in assessing ecotourism's multidimensional impact at the micro-regional level, especially in ecologically sensitive yet economically lagging areas. Most existing studies either focus on ecological preservation or income generation, seldom integrating both within a participatory planning framework.

This study aims to bridge that gap by assessing the environmental, economic, and socio-cultural impacts of ecotourism in Jhargram, identifying region-specific opportunities and challenges and embedding community voices and spatial data into ecotourism strategy design.Through this approach, the study aspires to develop a replicable, sustainable ecotourism model rooted in equity, resilience, and local empowerment.

Study Area:

Jhargram district, located in the southwestern part of West Bengal, was formed on April 4, 2017, after being carved out of Paschim Medinipur. Bordered by Odisha and Jharkhand, it spans 3,037.64 sq. km and has a population of approximately 1.13 million (Census 2011), with a density of 374 persons/km². Administratively, Jhargram comprises one subdivision, eight development blocks, one municipality (Jhargram), and one census town (Silda). The district includes 79 Gram Panchayats, 10 police stations, and 2,996 mouzas (2,513 inhabited).

The district's landscape features rolling hills, forests, and rivers like Subarnarekha, Kansabati, Dulung, and Tarafeni. It has a tropical climate with hot summers, cool winters, and an average annual rainfall of 1,400 mm. Scenic ecotourism spots include Khandarani Lake, Tarafeni Dam, Gadrasini Hills, and Ghagra Falls—ideal for trekking, birdwatching, and nature tourism. Jhargram's cultural richness stems from its tribal communities—Santal, Munda, and Lodha—who celebrate traditional festivals like Tusu Parab and Karam Puja and are known for crafts such as Dokra metalwork and patachitra. The Jhargram Raj Palace adds historical charm to its tourism appeal.

Economically, the district relies on rainfed agriculture, livestock, and forest-based livelihoods. Major crops include paddy, pulses, and vegetables. Despite natural resources, challenges such as fragmented landholdings, poor irrigation, and droughts drive seasonal migration for low-skilled jobs. Jhargram is accessible via National Highway 49 and the South Eastern Railway. The nearest airport is in Kolkata, about 180 km away. According to the 2011 Census, 96.52% of the population lives in rural areas. Scheduled Castes and Tribes make up 20.11% and 29.37%, respectively. The sex ratio is 977 overall and 1,002 among STs. The literacy rate is 62.61% (female literacy: 54.48%). The workforce participation rate is 45.29%, with 33.79% female workers. Among workers, 28% are cultivators, 18.94% agricultural labourers, 1.77% in household industries, and 13.28% in other sectors. Marginal workers comprise 52.79% of the total.

Data and Methods:

The study employs the Triple Bottom Line (TBL) approach, integrating environmental, economic, and socio-cultural sustainability indicators (Sherwood, P., 2007; Aleisa, E., & Al-Jarallah, R., 2018; Srivastava, S. et al, 2021). The assessment is conducted using a combination of Remote Sensing & GIS analysis, household and business surveys, stakeholder interviews, and sustainability reporting to ensure a comprehensive understanding of ecotourism's impact.

The study utilizes both primary and secondary data sources. Primary data includes field surveys, household and business surveys, and stakeholder interviews conducted in selected areas of Jhargram District. Primary survey was conducted across three key regions of Jhargram district—Jhargram, Belpahari, and Gopiballavpur—stratified based on proximity to major tourist attractions. Each region was further divided into sub-groups comprising tourist sites, surrounding villages (within 5 km), and key tourism stakeholders. A

total of 415 respondents were surveyed between December 2023 and December 2024 using structured schedules with Likert scales and GPS-based field verification. Ten households per village were selected using the lottery method (Birmeta et al., 2013), while shopkeepers, car drivers, and hotel/homestay operators were chosen randomly or purposively based on their relevance to tourism. Tourists were also interviewed at major sites to capture visitor perspectives. The survey covered demographic details, landholding patterns, livelihoods, migration and remittances, tourism-related occupations (e.g., handicrafts, transport, accommodations), and economic indicators such as income sources, credit, savings, and living conditions. Region-wise, data was collected from 155 respondents in Jhargram and Jamboni Blocks, 180 in Belpahari (Binpur II Block), and 80 in Gopiballavpur (Gopiballavpur I and Nayagram Blocks).

GPS and ground truthing data were collected to validate GIS-based land use classification, while focus group discussions (FGDs) and key informant interviews (KIIs) provided qualitative insights from local community members, tourism stakeholders and policymakers. Secondary data sources include remote sensing data such as Sentinel-2 imagery and Google Earth Pro for land use/land cover change analysis and environmental monitoring. GIS data from the Survey of India and NRSC, economic data from the District Statistical Handbook and West Bengal Tourism Development Corporation, and socio-cultural data from Census reports and local development studies supplement the analysis.

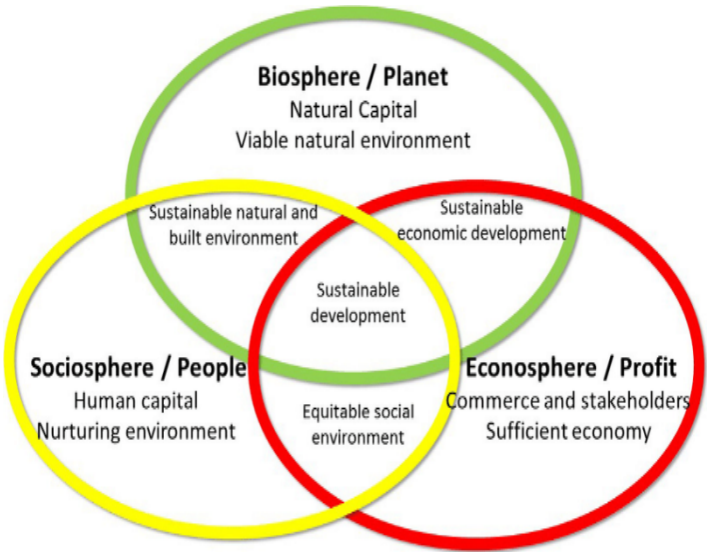


Fig. 2: Triple bottom line performance framework (Frederick, Howard, 2018).

The methodological framework follows a four-stage approach, integrating quantitative and qualitative techniques under the TBL framework.

For environmental sustainability assessment, Remote Sensing & GIS techniques were used to analyze land use land cover (LULC) changes (2017 - 2024), forest cover variations, and water resource management. Additionally, a waste management study was conducted to assess solid waste generation and disposal practices in ecotourism areas.For economic sustainability assessment, household and business surveys were conducted to analyze the economic benefits of ecotourism for local communities. The study also assessed local employment growth, focusing on job creation opportunities in tourism-related activities and skill development programs for community members.For socio-cultural sustainability assessment, community perception surveys were used to measure local attitudes towards ecotourism and its impact on traditional cultural practices. Stakeholder interviews and FGDs provided insights from tribal leaders, self-help groups (SHGs), and tourism entrepreneurs, highlighting the socio-economic benefits and challenges associated with ecotourism.

To integrate findings across all three sustainability dimensions, the study applied geospatial analysis, statistical analysis, and qualitative assessment methods. GIS-based spatial analysis using ArcGIS was employed to map environmental degradation and conservation zones. Thematic analysis of stakeholder interviews and FGDs helped interpret community perspectives and socio-cultural dynamics. A comparative case study approach was also used, drawing insights from similar ecotourism destinations.

This methodological framework ensures a comprehensive, data-driven assessment of ecotourism's sustainability impact in Jhargram District. By applying an integrated Remote Sensing-GIS approach, economic evaluation, and community engagement, the study provides a robust foundation for policy recommendations aimed at developing ecotourism as a sustainable livelihood option.

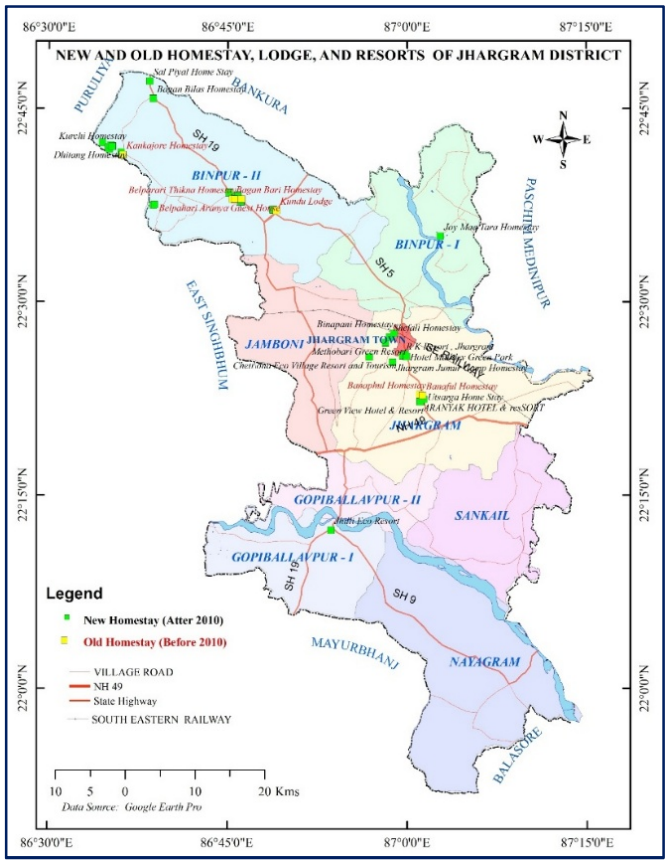


Fig. 3 Location and growth (old 17% and new 83% out of the total surveyed) of tourist-oriented Hotels, Homestays, Lodges, and Resorts.

Result and Discussion:

Positive Economic Impacts of Tourism in Jhargram:

I. Employment Generation

Tourism in Jhargram has significantly contributed to job creation across various sectors, particularly in hospitality, handicrafts, cultural tourism, and eco-tourism activities. The district has witnessed a rise in employment opportunities due to the growing influx of visitors.

- *Hospitality Sector:* The increasing number of tourists has led to the establishment of hotels, guesthouses, and homestays in Jhargram town, Belpahari, and Kankrajhore. A market survey indicates that 18.64% of locals employed in tourism-related jobs work as hotel staff, cooks, cleaners, and maintenance workers.

- *Tour Guiding and Eco-Tourism Activities*: A household survey in nearby tourism area indicates that out of total employment in tourism local youth have found employment as tour guides (1.69%), travel agents (2.37%), and cultural interpreters at historical and religious sites (5.42% at palaces and 7.12% at temples like Jhargram Raj Palace, Chilkigarh Raj Palace, and Kanak Durga Temple).

- *Handicrafts and Traditional Art Industries*: The demand for Dokra handicrafts, tribal jewelry, and bamboo products has increased with tourism, benefiting artisans who make up 12% of the total tourism-related workforce.

❖ *Food and Beverage Services*: The growth of roadside eateries, local restaurants, tea stalls, and grocery shops around tourist hotspots has boosted small businesses. This sector directly and indirectly employs 26.10% of the local workforce engaged in tourism-related activities.

❖ *Transport Services*: The demand for local transport, including rental vehicles, Toto rickshaws, and auto-rickshaws, has surged, employing 14.58% of locals in tourism-related jobs, such as drivers and mechanics.

While these employment opportunities have contributed to economic growth, many jobs remain seasonal, low-paying,and unstable, highlighting the need for more sustainable livelihood options.

Fig. 4: In two villages of Belpahari in Jhargram district, a photojournalist discovered skilled stone craft artisans earning a modest yet sustainable livelihood. Source: The Telegraph Online, Sunday, 06 April 2025.

II. Growth in Handicrafts and Cultural Industries

Tourism has played a crucial role in revitalizing traditional tribal arts and crafts, offering artisans and performers a platform to showcase their skills:

❖ *Handicrafts:* The villages surrounding Jhargram have experienced increased demand for handmade crafts and decorative items purchased by tourists (Mukherjee, S., 2012). However, inadequate marketing channels and financial support continue to restrict the full potential of this sector.

❖ *Tribal Dance and Music Performances*: Traditional dance forms such as Chhau, Jhumur, and Baha have gained prominence at tourism events, providing financial assistance to performers (Hussain, S., 2024). Nevertheless, commercialization has led to a decline in their ritualistic and seasonal significance.

Fig.5: In Dankikusum village of Belpahari, Jhargram, village artisans meticulously carve laterite stones from nearby hills into plates, bowls, idols, household items, and decorative pieces. Source: The Telegraph Online, Sunday, 06 April 2025.

❖ *Forest-Based Livelihoods*: Local communities have ventured into selling eco-friendly souvenirs, herbal products, and forest-based goods, such as mahua liquor, sal leaf plates, and wild honey.

Despite these benefits, inconsistent market demand and insufficient government support pose challenges to artisans (Sahoo, K. P. et al., 2023).

III. Infrastructure Development:

The expansion of tourism has spurred investments in roads, accommodations, and connectivity, indirectly benefiting the local economy (Ashley, C. et al., 2007).

4/6/25, 6:56 AM Art empowers villages in a once-troubled part of Bengal - The Hindu

Art empowers villages in a once-troubled part of Bengal

Starting in 2008 from his native Jhargram, artist Mrinal Mandal has extended his crowd-funded 'Khwaabgaon' project to develop 12 villages with a network of art

Published – June 22, 2024 06:28 pm IST – Kolkata

BISHWANATH GHOSH

Artist Mrinal Mandal | Photo Credit: Special Arrangement

A Bengal artist who transformed a once-nondescript forest village into an art hub has now connected with several other surrounding settlements — once the hotbed of the Maoist movement — to make art a way of life and empower marginalised communities.

It was in 2000 that Mrinal Mandal graduated from the Government Arts College in Kolkata, following which, as a landscape artist, he scanned the rural landscape of Bengal

https://www.thehindu.com/news/cities/kolkata/art-empowers-villages-in-a-once-troubled-part-of-bengal/article68320487.ece?utm_source=chatgpt.... 1/3

❖ *Road Network Improvements*: Roads leading to major tourist destinations such as Gadhrasini Hill, Ghagra Waterfall, Khandarani Lake, Dhangikusum village, Kankrajhore, Chilkigarh, and Hatibari Forest have been upgraded to accommodate the increasing number of visitors.

❖ *Hospitality Sector Expansion*: Since 2010, the number of lodges, resorts, homestays, and guesthouses in Belpahari, Kankrajhore, and Jhargram town has increased (fig. 3), generating new business opportunities for local entrepreneurs. A survey indicates that out of 42 hotels, homestays and resorts, 35 are new, which were formed after 2010.

❖ *Growth in Transport and Communication*: Enhanced transport services, expanded bus routes, and improved internet connectivity in remote areas have benefited both tourism and local businesses (Palit, S. et al., 2021).

Fig. 6: Starting in 2008 from his hometown of Jhargram, artist Mrinal Mandal has expanded his crowd-funded 'Khwaabgaon' project into a network of 12 art-driven villages.

Source: Published in The Hindu newspaper, June 22, 2024 06:28 pm IST - Kolkata

However, rapid and often unplanned tourism infrastructure development has led to socioeconomic and environmental challenges (Datta, S.K. et al., 2014). These include economic dependency on tourism, population pressure, agricultural expansion, rural-to-urban migration, and climate change impacts. Unregulated expansion of the tourism sector threatens the ecological balance and long-term sustainability of the region (Baloch, Q. B. et al., 2023). Moreover, infrastructure projects have frequently resulted in deforestation and environmental degradation, as many have not adhered to eco-friendly or sustainable planning principles.

Negative Economic Impacts of Tourism in Jhargram:

I. ***Economic Dependence on Tourism:*** Jhargram's growing reliance on tourism has made its local economy highly vulnerable to seasonal fluctuations (Malladeb, V. et al., 2023). A tourist survey indicates, Tourist inflow is highest in winter (Dec–Feb) with 824 visitors per day, moderate in post-monsoon (Sep–Nov) with 216 per day, and lower in summer (Mar–May) and monsoon (Jun–Aug) with 140 and 145 visitors per day respectively. This seasonality results in income instability for workers in hotels, transport services, handicrafts, and guiding professions, who struggle financially during the off-season. Additionally, many large-scale investments in tourism infrastructure are controlled by external stakeholders, leading to revenue leakage, where profits leave the local economy instead of benefiting local communities (Das, G.K. et al., 2021).

II. ***The lack of diversified income sources forces many locals to seek alternative livelihoods:*** As a result, an increasing number of people, particularly youth, migrate from villages to larger towns and cities such as Midnapore and Kolkata in search of stable employment (Sinha, C., 2020). This trend threatens the sustainability of traditional occupations and weakens the long-term economic stability of local communities.

III. Revenue Leakage & External Investor Dominance: A significant challenge in Jhargram's tourism economy is the outflow of financial benefits to external stakeholders. Many large resorts, guesthouses, and high-end lodges are owned by investors from outside Jhargram, particularly from Kolkata and other urban centers (Jalan, J. et al., 2019).

Figure 7: Satellite image from Google Earth Pro showing tourism-related infrastructure (Road, Homestay and Jhumar camp) development at Amjhorna village near Kanrajhore, Jhargram.

IV. ***Low Wages & Job Insecurity:*** Tourism-related jobs in Jhargram often come with low wages and lack of job security, particularly for those from marginalized communities. Primary survey indicates that out of 30% total ST, only 9 % ST people (out of the total employment in tourism) work in tourist-related jobs. In areas near Lodha and Santhal villages, unregulated tourism has disrupted traditional ways of life, pushing many locals into low-paying tourism jobs instead of their traditional occupations in agriculture and forest-based livelihoods (Kamra, L., 2016).Many Scheduled Tribe (ST) workers in the tourism sector earn less than ₹200 per day, often without formal employment contracts.Workers in hotels, restaurants, and resorts are frequently employed on a daily-wage basis, making them vulnerable to job losses during the off-season.Jobs such as

cultural performances, artisan work, and tour guiding are often informal and poorly paid, providing no long-term career stability (Mohanty, A. et al., 2022).

V. *Rural-Urban Migration & Population Pressure*: The concentration of tourism-related activities in Jhargram town and Belpahari has contributed to increased migration from rural areas, leading to unplanned urbanization (Mandal, M. et al., 2023). This migration has resulted in several socio-economic challenges.

Additionally, the commercialization of cultural tourism has affected the authenticity of tribal traditions. Traditional dance forms like Chhau, Jhumur, and Baha are frequently performed for tourists, but their ritualistic and seasonal significance has diminished as they are now staged primarily for financial gain (Karmakar, M. et al., 2023).

Positive Social Impacts of Tourism in Jhargram:

1. Preservation and Promotion of Tribal Culture and Heritage: Traditional dance forms such as Chhau, Jhumur, and Baha have gained new audiences through cultural programs and tourism festivals (Karmakar, M. et al., 2023). These events not only raise awareness but also create platforms for cultural dialogue and recognition.Tourists witnessing tribal rituals and performances help revitalize traditional art forms and strengthen cultural identity (Pereira, C., 2017).Interaction between locals and tourists fosters cultural exchange, allowing residents to share food, music, folklore, and customs, thereby expanding their social worldview (Abram, S. et al., 2021).Bandarvula Tribal Interpretation Centre, a museum created by the state government, was established to preserve rich tribal art and culture.

*2. Employment and Skill Development:*The rise of tourism has opened up numerous employment avenues in sectors such as hospitality, tour guiding, local crafts, food services, and transport (Milman, A. et al., 1988; Deery, M. et al., 2012).Tribal women and youth have gained employment in homestays, resorts, restaurants, and as tour guides, improving household income and gender inclusion in the workforce (Chambers, E., 2009). A market survey indicates the employment diversification in tourism as follows…

Employment	Tourist guide	Travel agencies	Transport system	Homestay& restaurants	Historical palaces	Religious sites
%	1.68	2.36	14.57	18.65	5.43	7.13
Employment	Resorts	Shopping outlets	Photography	Handicrafts producers	Restaurant suppliers	Others
%	5.43	26.10	2.36	3.05	5.42	6.10

Table 1: Employment diversification in tourism-related jobs. Source: Market Survey.

Negative Social Impacts of Tourism in Jhargram:

1. Cultural Erosion and Commercialization of Traditions: While tourism has supported cultural exposure, it has also led to the commercial staging of tribal practices, often stripping them of their ritual and spiritual essence (Karmakar, M. et al., 2023).Sacred tribal performances like Chhau and Jhumur are increasingly reduced to entertainment spectacles, distorting their original purpose and meaning.Tourists' perception of culture as performance can weaken its community value, shifting the focus from tradition to economic gain.This trend increases the risk of cultural assimilation, where younger generations may abandon their heritage in pursuit of profit.

2. Disruption of Traditional Lifestyles and Livelihoods: The expansion of tourism has diverted many local youth away from agriculture, forest-based livelihoods, and indigenous crafts, leading to the gradual loss of traditional knowledge and skills (Mbaiwa, J. E., 2005).Many now opt for seasonal, low-paid jobs in hospitality and guiding, leaving behind sustainable and community-rooted occupations (Rana, J. C. et al., 2023).Dependence on a volatile tourism industry, prone to seasonal drops and external shocks, increases long-term economic insecurity (Tsao, C. Y. et al., 2016).

3. Rural-Urban Migration and Social Dislocation: As job opportunities become concentrated in urban tourism centers like Jhargram town and Belpahari, there is a growing trend of rural-to-urban migration, particularly among the youth.This outmigration leaves behind an aging population in villages and reduces the local workforce for agriculture (White, B., 2012).Rapid population growth in urban centers leads to overcrowding, pressure on housing, sanitation, and limited resources, straining civic infrastructure.

4. Economic Inequality and Social Stratification: Despite the growth of the tourism sector, benefits are not equitably distributed, especially among marginalized communities (Datta, S.K. et al., 2014). A household survey revealed that General and OBC groups make up 79% of tourism employment, while SCs hold 12% and STs only 9%, despite tribal communities comprising nearly 30% of the district population. 32% of ST individuals surveyed were found working in seasonal, low-paying jobs (below ₹200/day) in shops, hotels, and homestays, mainly during the tourist peak season (Nov–Feb). This pattern reinforces economic disparity, where a small segment benefits from tourism while a large section remains marginalized

Fig. 8: Rapid growth (2010 - 2024) of Jhargram town (North-Western part of the town in Photos)

Source: Google Earth Pro.

5. Loss of Traditional Knowledge and Cultural Memory: As younger generations embrace tourism jobs and urban lifestyles, vital indigenous knowledge systems related to agriculture, forest conservation, and herbal medicine are disappearing (Chambers, E., 2009).The traditional wisdom of the tribal communities in sustainable forest use, biodiversity protection, and eco-crafts is no longer being transmitted (Majumdar, K. et al., 2021).Oral traditions, folklore, and tribal rituals risk fading away as cultural transmission weakens over time.

Positive Environmental Impacts of Tourism in Jhargram

1. Promotion of Environmental Awareness: Ecotourism activities such as nature walks, wildlife viewing, and forest trekking have increased awareness among both tourists and locals about the importance of protecting natural habitats (Kiper, T. 2013).Tourists visiting sites like Ghagra Waterfall, Khandarani Lake, Gadhrasini Hill, Dhangikusum, Chilkigarh Forest, and Kankrajhore are exposed to key ecological themes such as biodiversity conservation, ecosystem balance, and sustainable tourism practices. These are often imparted through guided tours, nature interpretation centers, and educational signage.This exposure encourages environmentally responsible behaviors such as reduced littering, water conservation, and respect for local wildlife.

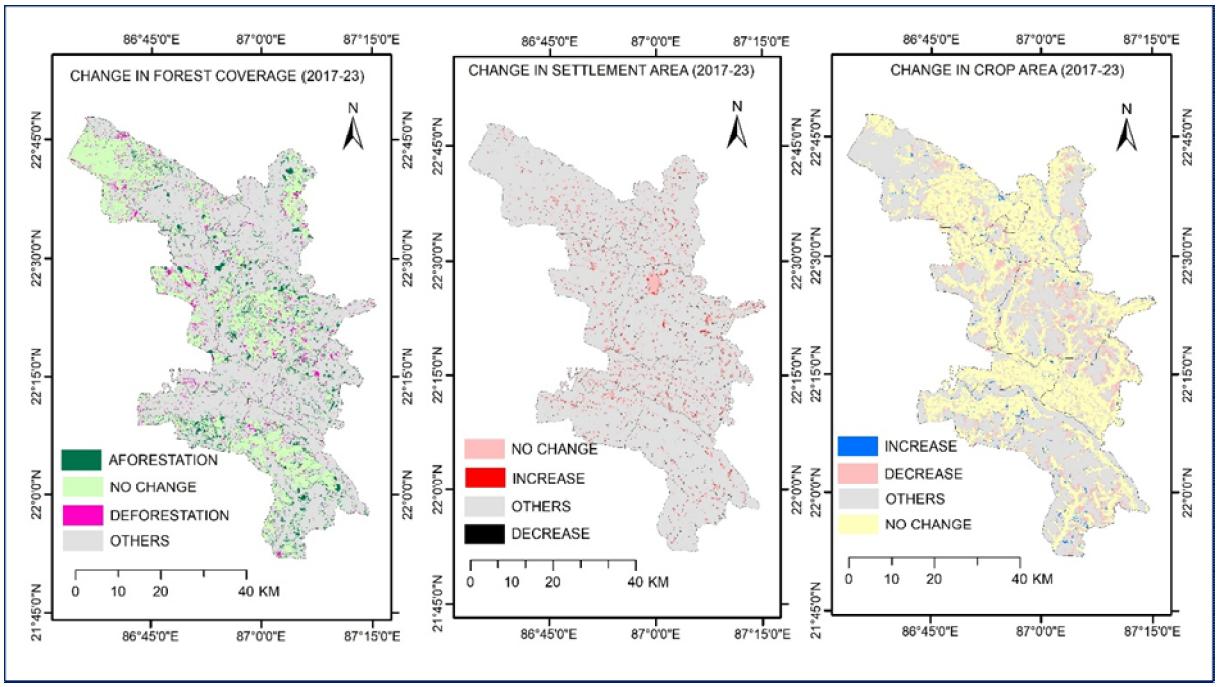


Fig. 9: LULC change from 2017 to 2023, Data source- Sentinel 2 LULC data.

*2. Incentives for Conservation:*Tourism creates financial incentives for conserving forests and wildlife (Mahata, S. 2021). Revenue from entrance fees, guided tours, and eco-lodging supports the protection of natural resources.Income from ecotourism is being reinvested into afforestation, habitat conservation, and biodiversity preservation programs.Tribal communities are increasingly involved in tourism-based conservation efforts, enhancing their environmental stewardship (Sahoo, K. P. et al., 2023).

3. Sustainable Land Use and Construction Practices: Tourism has encouraged low-impact land use through nature-based tourism and sustainable agriculture (Baloch, Q. B. et al., 2023).Activities such as birdwatching, trekking, and agro-tourism require less infrastructural development and cause minimal disruption to the environment.Many eco-lodges and homestays—such as those in Kankrajhore and Amjharna—have adopted green architecture, solar energy, and waste management techniques.Agro-tourism sites like KodopalAgro Tourism Park, spread over 75 acres, integrate afforestation with tourism, encouraging eco-friendly farming and drawing tourists to farm-based experiences.

Negative Environmental Impacts of Tourism in Jhargram

1. Deforestation and Habitat Loss: Unregulated ecotourism activities can result in environmental degradation rather than sustainability.In Belpahari and Kankrajhore, the construction of roads and accommodations without ecological assessment has led to forest clearance, habitat fragmentation, and wildlife disturbance (Mallick, J. K. 2019).Sites like Ghagra Waterfall have experienced erosion, vegetation loss, and changes in natural water flow due to unmanaged tourist footfall.Increased use of plastic and water in tourism zones has further degraded soil and groundwater quality (Saha, D. et al., 2020).

*2. Land Use and Land Cover (LULC) Changes:*As discussed in Chapter 2, Jhargram District has experienced significant LULC changes between 2017 and 2023, particularly in forest cover, settlements, and agriculture.While afforestation programs have increased green cover in some pockets, deforestation persists due to urbanization and agricultural expansion.149.46 sq. km of cropland has been converted into rangeland, and 100 sq. km into dense vegetation, indicating reforestation or abandonment. Conversely, dense vegetation was also replaced by croplands (27.74 sq. km) and rangelands (58.61 sq. km), indicating environmental

pressure from agriculture.Built-up areas expanded by 17.66 sq. km, reducing forest area and impacting ecological equilibrium.

3. Pollution and Waste Management Challenges: Despite ecotourism's goals, the lack of proper waste management infrastructure has resulted in pollution.At Khandarani Lake (Binpur-II Block), tourist waste such as plastic wrappers and bottles pollutes the water due to an absence of disposal systems.Informal food stalls near tourist hubs, such as the Jhargram Mini Zoo, often dispose of waste improperly, harming the surrounding ecosystem.

4. Disturbance to Wildlife: Tourist activity in core ecological zones disrupts wildlife behavior, particularly in protected forest areas (Wolf, I. D. et al., 2019).Endangered species face habitat displacement and stress due to noise, human presence, and trail encroachment.

*5. Threats to Endemic Plant Species:*Species such as Sal (Shorea robusta), Mahua (Madhuca indica) and Kendu (Diospyros melanoxylon)—vital to tribal communities—are endangered due to overharvesting, land conversion, and climate change (Das, D. K. et al., 2021; Sarkar, M. et al., 2024).

6. Man-Animal Conflicts: Forest encroachment has led to increased human-wildlife conflicts, especially withElephants damaging crops and property, Wild boars and deer raiding farmlands (Mandal, M. et al., 2023). The disruption of elephant migration routes and lack of wildlife corridors have worsened the situation (Das, G. K. et al., 2021).

9. Climate Change Impacts: Rising temperatures and erratic rainfall affect forest regeneration and water availability (Mandal, L. 2024).Areas like Belpahari and Kankrajhore face longer dry spells and higher risk of wildfires, threatening biodiversity and tourism viability.

Management Strategies for Sustainable Ecotourism in Jhargram District

To ensure long-term sustainability, ecotourism in Jhargram must balance economic growth, community well-being, and environmental integrity. Below are key management strategies:

1. Diversify Livelihoods: Over-dependence on tourism can create economic vulnerabilities due to seasonal and global fluctuations (Dioko, 2022). Promoting agro-tourism, eco-entrepreneurship, and forest-based crafts like sal leaf plate-making can stabilize incomes. Inspired by the Sundarbans' post-Amphan recovery (Mitra, 2023), wage schemes and value-added forest products should be encouraged.

2. Ensure Local Ownership: Revenue leakage to external stakeholders is a major concern. Community-Based Tourism (CBT) ensures profits stay local through homestays and eco-lodges owned by residents. Models from Mawlynnong and Kanha National Park, where over 80% of tourism jobs benefit locals (Poyyamoli, 2018; Sinha et al., 2012), should guide implementation in Jhargram, backed by training and microfinance.

3. Formalize Employment: Tourism jobs in Jhargram often lack stability (see Table 47). Structured skill development with certification, like Sikkim's homestay program (Bhutia et al., 2022), along with wage protection and social security, can improve job quality. Promoting high-skill roles like wildlife interpretation boosts income and satisfaction.

4. Decentralize Tourism Growth: Unplanned growth fuels rural-urban migration. A decentralized approach—spreading tourism across blocks like Belpahari, Nayagram, and Gopiballavpur—can distribute benefits. Bhutan's "High-Value, Low-Impact" model (Møller, 2016) offers a path through artisan villages and eco-rural stays.

5. Preserve Cultural Integrity: Tourism risks diluting tribal heritage. Creating cultural tourism zones, promoting community-run festivals, and enabling direct engagement with tribal artisans can safeguard traditions. Ziro Valley's community-centric model (Singh, 2024) offers a replicable framework.

6. Integrate Traditional Livelihoods: Rather than displacing traditional occupations, tourism should support them. Agro-tourism, lac cultivation, and forest product trails can enhance rural livelihoods. The Spiti Valley model (Kumar, 2023) shows how tourism and tradition can coexist.

7. Promote Inclusive Development: Tourism must be equitable. Tribal and women-led cooperatives, supported by training and financial aid, can ensure fair benefit-sharing. Kerala's Responsible Tourism initiative (Gladwell, 2015) exemplifies inclusive growth.

8. Conserve Ecology: Infrastructure expansion can degrade ecosystems. Eco-zoning, visitor caps, and eco-friendly designs (e.g., bamboo huts, solar power) are essential. Periyar and Sikkim's green tourism models (Sharma et al., 2022; NITI Aayog, 2018) stress afforestation, plastic bans, and community-based conservation.

9. Monitor Land Use Changes: Unregulated development leads to forest and farmland conversion. GIS-based monitoring and strict land-use planning are needed. Lessons from Kumarakom and Mawlynnong (Mathew, 2016) highlight effective participatory planning.

10. Manage Waste and Pollution: Tourism can strain fragile ecosystems. Zero-waste practices—segregation, composting, recycling, and eco-taxation—must be enforced. Plastic bans and biodegradable alternatives, as in Mawlynnong and Sikkim (Rai et al., 2024), are vital.

11. Address Water Scarcity: Tourism increases water demand, especially in dry months. Mandating rainwater harvesting, greywater reuse, and water-efficient systems can balance usage. Sikkim's integrated model (NITI Aayog, 2018) is a practical example.

12. Protect Medicinal Plant Biodiversity: Tourist foraging threatens endemic herbs. Ethnobotanical trails, botanical gardens, and community monitoring—like in the Valley of Flowers (Singh, 2019)—can prevent species loss.

13. Mitigate Human-Wildlife Conflict: Increased tourism raises wildlife encounters, especially with elephants. Wildlife corridors, buffer zones, early warning systems, and community awareness are essential. Periyar's participatory conflict mitigation (PEOPLES, 2012) offers a strong template**.**

Conclusion:

Ecotourism represents a dynamic intersection between environmental conservation, economic development, and cultural preservation—three foundational pillars of sustainable development. In regions like Jhargram District, where natural landscapes, tribal heritage, and biodiversity coexist, ecotourism provides a viable strategy for balancing ecological integrity with socio-economic growth. The impacts of ecotourism on sustainable development are evident in its ability to create alternative livelihoods, reduce dependence on extractive industries, and revitalize traditional crafts and knowledge systems. When carefully managed, it fosters community empowerment, encourages environmental education, and strengthens the resilience of local economies against global uncertainties such as pandemics, climate change, and economic shocks.

However, the success of ecotourism depends on several critical factors. First, the active participation of local communities—particularly indigenous groups—must be ensured through inclusive planning, ownership of tourism enterprises, and access to training and capacity-building initiatives. Models like Community-Based

Tourism (CBT) have proven effective in keeping revenues local and enhancing community pride and stewardship over natural and cultural resources. Second, environmental safeguards must be strictly implemented to prevent issues such as habitat loss, pollution, and resource overuse. This includes enforcing land-use zoning, limiting tourist numbers in ecologically sensitive zones, adopting green infrastructure, and promoting waste-free tourism practices.

In the case of Jhargram, ecotourism has the potential to contribute significantly to sustainable rural development by integrating existing agricultural and forest-based livelihoods into the tourism value chain. Initiatives such as agro-tourism, homestays, eco-crafts, and nature-based tourism can stimulate year-round employment and reduce rural-to-urban migration. Furthermore, such development aligns with India's commitment to achieving the United Nations Sustainable Development Goals (SDGs)—particularly SDG 1 (No Poverty), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), and SDG 15 (Life on Land).

Moreover, successful ecotourism in Jhargram can serve as a model for other underdeveloped districts across India where ecological richness coexists with socio-economic backwardness. For this vision to be realized, multi-stakeholder collaboration is essential—bringing together government agencies, NGOs, researchers, community leaders, and private sector actors. Policies should support public-private partnerships, offer financial incentives for green enterprises, and ensure legal protection of community rights over natural resources. Education and awareness campaigns are equally crucial to instill a sense of shared responsibility among both tourists and hosts.

In conclusion, ecotourism is not merely a niche sector of tourism—it is a transformative approach to development that aligns economic aspirations with environmental ethics and cultural identity. For districts like Jhargram, it offers a pathway to inclusive, resilient, and sustainable futures. By embedding sustainability into the core of tourism planning and execution, we can ensure that future generations inherit not only economic prosperity but also a thriving natural and cultural heritage.

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