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Local Community Perceptions of Ecotourism Impacts on Socioeconomic Conditions, Nature and Biodiversity, in Jhargram

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ABSTRACT

This study investigates the perceptions of local communities in Jhargram regarding the multifaceted impacts of ecotourism on their socioeconomic status, daily lifestyle, and the surrounding environment. Through a structured and comprehensive survey, data were collected from a diverse cross-section of residents, encompassing various socio-demographic categories such as age, gender, occupation, and educational background. The survey aimed to examine community views on ecotourism's influence on income distribution, economic inequality, shifts in commodity prices, cultural practices, and the conservation of biodiversity. The results indicate a nuanced and mixed perception among respondents. While a substantial proportion acknowledged the economic opportunities and environmental awareness brought by ecotourism, concerns were also raised about rising living costs, cultural erosion, and ecological disturbances. Statistical analysis revealed significant differences in perception based on gender, occupation, and age, suggesting that these factors play a crucial role in shaping community attitudes. The study highlights the importance of integrating local perspectives into ecotourism planning and development. It calls for participatory approaches to ensure sustainable and inclusive growth. The findings offer valuable insights for local governments, NGOs, and policymakers to develop context-specific strategies that amplify the positive outcomes of ecotourism while effectively addressing its potential drawbacks.

Keywords: *Ecotourism, Community perceptions, Biodiversity conservation, Jhargram*

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INTRODUCTION

The tourism industry is a major global economic sector, significantly contributing to job creation, exports, and prosperity. It accounts for 10.4% of the global gross domestic product (GDP), amounting to approximately $8.8 trillion annually, and supports 319 million jobs worldwide (World Travel and Tourism Council, 2020; Upadhaya *et al*., 2022).

Ecotourism, defined as responsible travel to natural areas that conserves the environment, sustains the well-being of local communities and involves interpretation and education, has become a rapidly growing segment of the tourism industry. It promotes environmental conservation, raises awareness, and ensures the prosperity of indigenous communities. Ecotourism contributes to poverty alleviation, job creation, income redistribution, and the export of domestic products to international markets. It emphasizes sustainable interactions with the biotic components of natural environments (Richards, 2020; The International Ecotourism Society, 2022).

Jhargram, with its unique combination of flora and fauna, ancient temples, palaces, and folk music, is an ideal destination for ecotourism. The area's rich biodiversity attracts numerous tourists, featuring wildlife such as the monkey-headed Hanuman, elephant-headed Ganesh, various migratory birds, endangered chameleons, and other reptiles, along with scavengers like vultures, eagles, jackals, and hyenas. Ecotourism in Jhargram supports employment, market and cultural conservation, and equitable sharing of benefits from natural resources among local communities (Moyra & Hazra, 2022).

Despite the many positive aspects of ecotourism, it can also have negative impacts such as environmental degradation, waste generation, and pollution. Additionally, it can lead to social issues such as drug abuse and illegal activities. Policymakers often prioritize economic development and growth over environmental considerations, leading to biodiversity degradation (Das & Syiemlieh, 2009; Clifton & Benson, 2006; Lipton & Bhattarai, 2014).

Understanding the local community's perceptions of ecotourism's impacts on the socioeconomic conditions, biodiversity, and environment of Jhargram is crucial. The perspectives of individuals are influenced by their socio-demographic factors. For example, low-income residents benefit from fuelwood, non-timber forest products, and fodder, while high-income individuals gain from timber extraction, forest-based enterprises, and large businesses.

This study seeks to explore the diverse perspectives of the local community regarding the sustainability and impact of

ecotourism on Jhargram's socioeconomic conditions, biodiversity, and environment. By examining these perceptions, we aim to provide insights into how ecotourism can balance its economic benefits with its socio-environmental impacts.

Objective of the study

The objective of this study is to explore and understand the perceptions of the local community regarding the impacts of ecotourism on the socioeconomic conditions, biodiversity, and environmental health of Jhargram. Specifically, the study aims to:

- *Assess socioeconomic impacts:* Evaluate how ecotourism influences the economic well-being, employment opportunities, and income distribution within the local community.
- *Examine the impact on biodiversity and environment:* Investigate the effects of ecotourism on the conservation and sustainability of Jhargram's unique flora and fauna.
  Determine the environmental consequences of ecotourism activities, including waste generation, pollution, and resource degradation.

Study area and background

Geographic location and climate

Jhargram, located in the western part of West Bengal, India, is a region characterized by its rich cultural heritage and diverse natural landscapes. Situated at the western edge of the state, Jhargram is bordered by the states of Jharkhand and Odisha. The region lies within the Chota Nagpur Plateau, which contributes to its unique topography, comprising forests, hills, and valleys. Jhargram experiences a tropical climate with distinct seasons. Summers are hot and humid, with temperatures often exceeding 40°C. The monsoon season, from June to September, brings substantial rainfall, essential for the region's agriculture and forests. Winters are mild, with temperatures ranging from 10°C to 20°C, making it a favorable season for tourism (Moyra & Hazra, 2022)

Biodiversity and cultural heritage

Jhargram is renowned for its rich biodiversity. The region's forests are home to a wide variety of flora and fauna, including several endangered and rare species. Notable wildlife includes the monkey-headed Hanuman, elephant-headed Ganesh, various migratory birds, endangered species of chameleons, and other reptiles. Scavengers such as vultures, eagles, jackals, and hyenas are also part of the ecological landscape. The dense forests, primarily composed of Sal, Mahua, and other indigenous trees, provide a crucial habitat for these species. Jhargram boasts a rich cultural heritage, with a history that includes ancient temples, palaces, and a vibrant tradition of folk music and dance. The Jhargram Raj Palace, a significant historical site, reflects the region's royal past. Local festivals, tribal traditions, and handicrafts add to the cultural richness, attracting tourists who are keen to explore both nature and heritage (Zhao & Jia, 2008).

Ecotourism potential, socioeconomic profile, and environmental challenges

The unique combination of natural beauty and cultural heritage makes Jhargram an ideal destination for ecotourism. The area's forests and wildlife offer opportunities for eco-friendly activities such as wildlife safaris, bird watching, and nature trails. The presence of historical sites and cultural events enhances the ecotourism experience, providing visitors with a holistic understanding of the region's heritage and natural environment.

The local community of Jhargram is predominantly rural, with agriculture being the primary occupation. The introduction of ecotourism has opened new avenues for employment and income generation, diversifying the economic base of the region. Local artisans and craftsmen benefit from the influx of tourists, as traditional handicrafts and cultural performances gain wider recognition and market access.

While ecotourism presents opportunities, it also poses challenges. Increased tourist activity can lead to environmental degradation, waste generation, and pollution if not managed sustainably. Balancing the economic benefits of tourism with the need to preserve the region's biodiversity and environment is a critical concern for policymakers and stakeholders (Chitwan National Park, 2005).

DATA COLLECTION AND ANALYSIS

Data collection method

Data for this study were collected from January to June 2024, from 92 individuals (44.6% female, 55.4% male) residing in Jhargram district. Participants, aged 18 and above, were selected from Jhargram town and its adjoining regions, particularly areas near popular tourist spots to capture community perceptions of ecotourism accurately. A structured questionnaire in the local language was developed using Google Forms, and participants provided written consent before participating in the survey. The data collection process ensured voluntary participation and aimed to gather comprehensive insights into the local community's views on the impacts of ecotourism on socioeconomic conditions, biodiversity, and the environment.

Data analysis

In this study, we analyzed the association between various socio-demographic characteristics and people's perceptions of ecotourism, focusing on their interest in ecotourism, its impact on economic inequality, and its effect on commodity prices, natural health, and biodiversity of the area. The collected data was systematically entered into a spreadsheet for organization and further analysis. Each respondent's answers were categorized and coded for analysis.

Descriptive statistics were initially calculated to summarize the demographic characteristics of the respondents and their perceptions. This provided a basic understanding of the distribution of responses across different socio-demographic groups.

To determine the association between socio-demographic characteristics and perceptions of ecotourism's impact, we employed the chi-squared test of independence. The chi-squared test results were interpreted by comparing the p-values to the significance level ($\alpha = 0.05$). A p-value less than 0.05 indicated a statistically significant association between the socio-demographic characteristic and the perception of ecotourism's impact. The results were tabulated, and the

findings were discussed to understand the influence of socio-demographic factors on perceptions.

RESULTS AND DISCUSSION

Socio-demographic characteristics of respondents

A total of 92 household respondents were interviewed for this study **(Table 1)**. The gender distribution among the respondents was slightly skewed towards males, with 51 male respondents (55.43%) and 41 female respondents (44.57%). This indicates a near-equal representation of genders within the sample population.

The age distribution of the respondents revealed that the majority were young adults. The age groups were categorized as follows: 18-24 years (50.00%), 25-34 years (19.57%), 35-44 years (14.13%), 45-54 years (10.87%), 55-64 years (4.35%), and more than 65 years (1.09%). This distribution shows a significant concentration of respondents in the 18-24 years age group, followed by those in the 25-34 years and 35-44 years age groups, indicating a youthful demographic **(Table 1)**.

In terms of educational attainment, the respondents had a diverse range of educational backgrounds. The levels of education were primary education (11.96%), secondary education (8.70%), higher secondary education (29.35%), graduate (42.39%), and postgraduate (7.61%). The data suggests that a large portion of the respondents had completed higher secondary education and graduation, reflecting a relatively educated population.

The primary occupations of the respondents were varied. The main categories included agriculture (1.09%), studentship (42.39%), employment (8.70%), business (33.70%), and self-employment (14.13%). The highest proportion of respondents were students, followed by those engaged in business activities. Agriculture was the least represented primary occupation.

Table 1. Socio-demographic information of the respondents

Socio-demographic Characteristics	Category	Respondents (n)	Percentage (%)
Gender	Male	51	55.43
	Female	41	44.57
Age group	18–24	46	50.00
	25–34	18	19.57
	35–44	13	14.13
	45–54	10	10.87
	55–64	4	4.35
	>65	1	1.09
Education	Primary	11	11.96
	Secondary	8	8.70
	Higher Secondary	27	29.35
	Graduate	39	42.39
	Postgraduate	7	7.61
Occupation	Agriculture	1	1.09
	Studentship	39	42.39
	Employment	8	8.70
	Business	31	33.70
	Self-employment	13	14.13
Caste	General	44	47.83
	SC	15	16.30
	ST	9	9.78
	OBC-B	24	26.09
Monthly Income (INRs)	0–5,000	18	19.57
	5,001–10,000	22	23.91
	10,001–15,000	12	13.04
	15,001–20,000	26	28.26
	>20,000	14	15.22

The caste distribution among the respondents was as follows: general (unreserved) (47.83%), SC (16.30%), ST (9.78%), and OBC-B (26.09%). The general (unreserved) category had the highest representation, followed by OBC-B, indicating a diverse social composition.

The household income per month of the respondents was

categorized into several brackets: 0-5,000 NRs (19.57%), 5,001-10,000 NRs (23.91%), 10,001-15,000 NRs (13.04%), 15,001-20,000 NRs (28.26%), and more than 20,000 NRs (15.22%). The income distribution showed that the majority of respondents had a monthly income between 5,001-10,000 NRs and 15,001-20,000 NRs, indicating a moderate-income demographic.

Interrelation between socio-demographic variables and interest in ecotourism

Out of the total respondents, 40 individuals from the General category expressed an interest in ecotourism, while only 4 were not interested. Similarly, 15 respondents from the SC category were interested, with no respondents showing disinterest. Among the ST category, 9 were interested, and none were not interested. The OBC-B category had 24 interested respondents and none disinterested. The chi-squared test p-value for caste was 0.1105, indicating no significant difference in interest in ecotourism based on caste.

In terms of gender, 50 male respondents showed interest in ecotourism compared to 1 who did not, while 38 female respondents were interested, with none disinterested. No transgender individuals were present in the sample. The chi-squared test p-value for gender was 0.6020, suggesting no significant difference in interest based on gender **(Table 2)**.

Regarding educational attainment, respondents with primary education showed 11 individuals interested and none disinterested. Among those with secondary education, 8 were interested, and none were disinterested. Higher secondary education had 27 interested respondents and no disinterested ones. The graduate category included 36 interested and 3 disinterested individuals, while the postgraduate category had 6 interested and 1 disinterested respondent. The chi-squared test p-value for education was 0.2515, indicating no significant difference in interest based on educational attainment.

Income distribution revealed that respondents earning 0-5,000 NRs had 14 interested and 4 disinterested individuals. In the 5,001-10,000 NRs range, 22 were interested, and none were disinterested. For the 10,001-15,000 NRs range, 12 were interested, with none disinterested. Respondents with an income of 15,001-20,000 NRs had 26 interested and none disinterested, while those earning more than 20,000 NRs had 14 interested and none disinterested. The chi-squared test p-value for income was 0.5855, showing no significant difference in interest based on income levels **(Table 2)**.

Occupational categories revealed that respondents in agriculture showed 1 interested individual and none disinterested. Students had 35 interested and 4 disinterested respondents. Employment had 8 interested and none disinterested, while business included 31 interested and none disinterested. Self-employment showed 13 interested and no disinterested individuals. The chi-squared test p-value for occupation was 0.2263, indicating no significant difference in interest based on occupation.

Table 2. Table showing the interrelation between different socio-demographic variables and respondents' interest in ecotourism

Socio-demographic Characteristics	Category	Interested (n)	Not Interested (n)	Chi-squared (χ^2) test (p-value)
Caste	General	40	4	0.1105
	SC	15	0	
	ST	9	0	
	OBC-B	24	0	
Gender	Male	50	1	0.6020
	Female	38	0	
Education	Primary	11	0	0.2515
	Secondary	8	0	
	Higher Sec.	27	0	
	Graduate	36	3	
	Postgraduate	6	1	
Income	0–5,000	14	4	0.5855
	5,001–10,000	22	0	
	10,001–15,000	12	0	
	15,001–20,000	26	0	
	>20,000	14	0	
Occupation	Agriculture	1	0	0.2263
	Student	35	4	
	Employment	8	0	
	Business	31	0	
	Self-emp.	13	0	
Age	18–24	42	4	0.0119*
	25–34	18	0	

35–44	13	0
45–54	10	0
55–64	4	0
>65	1	0

Age distribution showed 42 interested respondents in the 18-24 years category, with 4 disinterested. The 25-34 years category had 18 interested and none disinterested. For the 35-44 years category, there were 13 interested and none disinterested, while the 45-54 years category had 10 interested and none disinterested. The 55-64 years category included 4 interested and none disinterested, while the more than 65 years category had 1 interested and none disinterested. The chi-squared test p-value for age was 0.0119, indicating a significant difference in interest based on age groups.

These results indicate that interest in ecotourism is not significantly influenced by most socio-demographic factors. The chi-squared test revealed no significant differences based on caste (p = 0.1105), with similar interest levels observed among the General, SC, ST, and OBC-B categories. Gender also showed no significant effect (p = 0.6020), with both male and female respondents expressing high interest. Educational attainment did not significantly affect interest either (p = 0.2515), as respondents across various education levels, from primary to postgraduate, exhibited similar interest in ecotourism. Income levels were also not a significant factor (p = 0.5855), with respondents across different income brackets showing comparable interest. Similarly, occupation did not significantly impact interest (p = 0.2263), as students, employed individuals, business people, and self-employed respondents all demonstrated similar levels of interest **(Table 2)**. However, age was a significant factor (p = 0.0119), indicating that interest in ecotourism varied across different age groups, with younger respondents (18-24 years) showing higher interest compared to older age groups.

Impact of ecotourism on respondents' lifestyles

The majority of respondents, approximately 86.4%, believe that ecotourism has had a significant impact on changing lifestyles. This indicates a generally positive perception of ecotourism's influence on lifestyle changes among the surveyed population. However, certain socio-demographic characteristics showed statistically significant differences in perceptions **(Table 3)**.

The analysis of socio-demographic characteristics and their association with the perception of ecotourism impacting respondents' lifestyles revealed several significant findings. The chi-squared tests were conducted to determine the statistical significance of these associations.

Among the General category, 41 respondents believed ecotourism impacted their lifestyle, while 3 did not. In the SC category, 14 agreed and 1 disagreed. For the ST category, 9 respondents believed ecotourism impacted their lifestyle, while 5 did not. Among OBC-B respondents, 19 agreed and 5 disagreed. The chi-squared test p-value was 0.6796, indicating no significant difference based on caste.

Table 3. Table showing the association between different socio-demographic characteristics and impacts of ecotourism in changing respondents' lifestyles

Socio-demographic Characteristics	Category	Agree (n)	Disagree (n)	Chi-squared (χ^2) test (p-value)
Caste	General	41	3	0.6796
	SC	14	1	
	ST	9	5	
	OBC-B	19	5	
Gender	Male	46	6	0.0028*
	Female	37	0	
Education	Primary	10	1	0.1067
	Secondary	8	3	
	Higher Secondary	23	4	
	Graduate	36	3	
	Postgraduate	6	1	
Income	0–5,000	16	2	0.6591
	5,001–10,000	19	0	
	10,001–15,000	9	3	
	15,001–20,000	25	1	
	>20,000	14	0	
Occupation	Agriculture	1	0	0.0067*
	Student	34	0	
	Employment	8	0	
	Business	28	3	

	Self-employment	12	0	
Age	18–24	41	5	0.0096*
	25–34	16	2	
	35–44	13	3	
	45–54	9	1	
	55–64	3	1	
	>65	1	0	

Male respondents included 46 who believed ecotourism impacted their lifestyle and 6 who did not. Among females, 37 agreed and none disagreed. No transgender individuals were included in the sample. The chi-squared test p-value was 0.0028, indicating a significant difference based on gender.

Respondents with primary education included 10 who agreed and 1 who disagreed. Secondary education had 8 agreeing and 3 disagreeing. Higher secondary education respondents included 23 who agreed and 4 who disagreed. Graduates had 36 agreeing and 3 disagreeing. Postgraduates included 6 who agreed and 1 who disagreed. The chi-squared test p-value was 0.1067, indicating no significant difference based on education.

For respondents earning 0-5,000 thousand rupees, 16 agreed and 2 disagreed. In the 5,001-10,000 range, 19 agreed and none disagreed. For the 10,001-15,000 range, 9 agreed and 3 disagreed. In the 15,001-20,000 range, 25 agreed and 1 disagreed. Respondents earning more than 20,000 had 14 agreeing and none disagreeing. The chi-squared test p-value was 0.6591, indicating no significant difference based on income **(Table 3)**.

According to an occupational category**,** in the agricultural sector, 1 respondent agreed and none disagreed. Among students, 34 agreed and 0 disagreed. In employment, 8 agreed and 0 disagreed. Business respondents included 28 agreeing and 3 disagreeing. In self-employment, 12 agreed and 0 disagreed. The chi-squared test p-value was 0.0067, indicating a significant difference based on occupation.

Respondents aged 18-24 years included 41 who agreed and 5 who disagreed. In the 25-34 years category, 16 agreed and 2 disagreed. For the 35-44 years category, 13 agreed and 3 disagreed. In the 45-54 years category, 9 agreed and 1 disagreed. Those aged 55-64 years included 3 agreeing and 1 disagreeing. Respondents over 65 had 1 agreeing and none disagreeing. The chi-squared test p-value was 0.0096, indicating a significant difference based on age **(Table 3)**.

Impact of socio-demographic characteristics on economic inequality due to ecotourism

The study investigated the influence of various socio-demographic characteristics on the perception of economic inequality caused by ecotourism in the study area. The characteristics analyzed included caste, gender, education, income, occupation, and age groups.

Among 92 participants 26.1% agreed that ecotourism created an economic inequality amongst inhabitants of the area whereas 43.5% disagreed with this perception and 30.4% participants were not sure regarding this issue. Further analysis revealed that 12 respondents from the General category believed ecotourism caused economic inequality, compared to 24 who did not and 8 who were unsure. In the SC category, 3 respondents agreed, 7 disagreed, and 5 were unsure. For the ST category, 2 respondents indicated economic inequality, 3 did not, and 4 were unsure. The OBC-B category had 7 respondents who agreed, 6 who disagreed, and 11 who were unsure. The chi-squared test p-value for caste was 0.5820, suggesting no significant difference in perceptions of economic inequality based on caste **(Table 4)**.

Table 4. Table showing the association between different socio-demographic characteristics and impacts of ecotourism in causing economic inequality in the study area

Socio-demographic Characteristics	Category	Agree (n)	Disagree (n)	Not Sure (n)	Chi-squared (χ^2) test (p-value)
Caste	General	12	24	8	0.5820
	SC	3	7	5	
	ST	2	3	4	
	OBC-B	7	6	11	
Gender	Male	11	31	9	0.5935
	Female	13	29	19	
Education	Primary	1	6	4	0.0450 *
	Secondary	0	6	2	
	Higher Secondary	11	7	12	
	Graduate	11	16	12	
	Postgraduate	1	3	3	
Income	0–5,000	7	7	6	0.6874
	5,001–10,000	3	7	12	

	10,001–15,000	2	7	5	
	15,001–20,000	5	18	3	
	>20,000	7	5	2	
Occupation	Agriculture	0	1	1	0.5371
	Student	13	7	19	
	Employment	0	7	1	
	Business	10	20	1	
	Self-employment	1	6	6	
Age Group	18–24	14	13	19	0.0653
	25–34	4	12	2	
	35–44	4	8	1	
	45–54	1	4	5	
	55–64	1	2	1	
	>65	0	0	1	

Regarding gender, 11 male respondents believed ecotourism caused economic inequality, while 31 did not, and 9 were unsure. Among female respondents, 13 believed in the inequality effect, 29 did not, and 19 were unsure. No transgender individuals were included in the sample. The chi-squared test p-value for gender was 0.5935, indicating no significant difference in perceptions based on gender.

Educational attainment showed some variance. Respondents with primary education included 1 who agreed, 6 who disagreed, and 4 who were unsure. Those with secondary education had no respondents who agreed, 6 who disagreed, and 2 who were unsure. For higher secondary education, 11 respondents agreed, 7 disagreed, and 12 were unsure. The graduate category had 11 who agreed, 16 who disagreed, and 12 who were unsure. The postgraduate category included 1 who agreed, 3 who disagreed, and 3 who were unsure. The chi-squared test p-value for education was 0.0450, indicating a significant difference in perceptions based on educational attainment.

Income distribution showed varied perceptions. Respondents earning 0-5,000 INRs had 7 who believed in economic inequality, 7 who did not, and 6 who were unsure. In the 5,001-10,000 NRs range, 3 agreed, 7 disagreed, and 12 were unsure. For the 10,001-15,000 NRs range, 2 agreed, 7 disagreed, and 5 were unsure. Respondents with an income of 15,001-20,000 NRs had 5 who agreed, 18 who disagreed and 3 who were unsure. Those earning more than 20,000 NRs had 7 who agreed, 5 who disagreed and 2 who were unsure. The chi-squared test p-value for income was 0.6874, indicating no significant difference in perceptions based on income levels **(Table 4)**.

Occupational categories revealed that none in agriculture agreed, 1 disagreed, and 1 was unsure about economic inequality due to ecotourism. Among students, 13 agreed, 7 disagreed, and 19 were unsure. None in employment agreed, 7 disagreed, and 1 was unsure. For business, 10 agreed, 20 disagreed, and 1 was unsure. In self-employment, 1 agreed, 6 disagreed, and 6 were unsure. The chi-squared test p-value for occupation was 0.5371, suggesting no significant difference in perceptions based on occupation.

Age distribution showed that in the 18-24 years category, 14 respondents agreed with the economic inequality effect, 13 disagreed, and 19 were unsure. The 25-34 years category had 4 who agreed, 12 who disagreed and 2 who were unsure. For the 35-44 years category, 4 agreed, 8 disagreed, and 1 was unsure. The 45-54 years category included 1 who agreed, 4 who disagreed, and 5 who were unsure. The 55-64 years category had 1 who agreed, 2 who disagreed, and 1 who was unsure. None in the more than 65 years category agreed or disagreed, with only 1 unsure. The chi-squared test p-value for age was 0.0653, indicating no significant but weak association between differences in perceptions according to age groups.

These results indicate that while most socio-demographic factors such as caste, gender, income, occupation, and age do not significantly affect perceptions of economic inequality due to ecotourism, educational attainment ($p = 0.0450$) shows a statistically significant difference in perceptions among the respondents **(Table 4)**.

Association between socio-demographic characteristics and ecotourism as a reason for increase in commodity price

The study examined local perceptions of commodity price increases due to ecotourism. Results show a divided opinion: 50% of respondents believe ecotourism has raised prices, likely due to higher tourist demand, while 34.8% do not attribute price changes to ecotourism, possibly seeing other economic factors as the cause. Additionally, 15.2% are unsure about the impact. An in-depth analysis of socio-demographic characteristics and their association with perceptions of ecotourism causing an increase in commodity prices revealed several key findings. The chi-squared tests were conducted to determine the statistical significance of these associations.

Among the General category, 22 respondents believed ecotourism caused an increase in commodity prices, while 18 did not, and 4 were unsure. In the SC category, 8 agreed, 4 disagreed, and 3 were unsure. For the ST category, 7 respondents believed ecotourism increased prices, none disagreed, and 2 were unsure. Among OBC-B respondents, 9 agreed, 10 disagreed, and 5 were unsure. The chi-squared test p-value was 0.3341, indicating no significant difference based on caste **(Table 5)**.

Male respondents included 21 who believed in the price increase due to ecotourism, 26 who did not, and 4 who were

unsure. Among females, 25 agreed, 6 disagreed, and 10 were unsure. No transgender individuals were included in the sample. The chi-squared test p-value was 0.6540, indicating no significant difference based on gender.

Table 5. Table showing the association between different socio-demographic characteristics and ecotourism as the reason for the increase in commodity price

Socio-demographic Characteristics	Category	Agree (n)	Disagree (n)	Not Sure (n)	Chi-squared (χ^2) test (p-value)
Caste	General	22	18	4	0.3341
	SC	8	4	3	
	ST	7	0	2	
	OBC-B	9	10	5	
Gender	Male	21	26	4	0.6540
	Female	25	6	10	
Education	Primary	5	5	1	0.0875
	Secondary	4	4	0	
	Higher Secondary	15	10	2	
	Graduate	19	11	9	
	Postgraduate	3	2	2	
Income	0–5,000	10	4	4	0.9018
	5,001–10,000	11	7	4	
	10,001–15,000	4	5	3	
	15,001–20,000	16	8	2	
	>20,000	5	8	1	
Occupation	Agriculture	1	0	0	0.4488
	Student	23	5	11	
	Employment	3	5	0	
	Business	14	15	2	
	Self-employment	5	7	1	
Age	18–24	28	6	12	0.4009
	25–34	9	8	1	
	35–44	2	11	0	
	45–54	5	4	1	
	55–64	1	3	0	
	>65	1	0	0	

Respondents with primary education included 5 who agreed, 5 who disagreed, and 1 who was unsure. Secondary education had 4 agreeing, 4 disagreeing, and none unsure. Higher secondary education respondents included 15 who agreed, 10 who disagreed, and 2 unsure. Graduates had 19 agreeing, 11 disagreeing, and 9 unsure. Postgraduates included 3 who agreed, 2 who disagreed, and 2 unsure. The chi-squared test p-value was 0.0875, indicating no significant difference based on education.

For respondents earning 0-5,000 thousand rupees, 10 agreed, 4 disagreed, and 4 were unsure. In the 5,001-10,000 range, 11 agreed, 7 disagreed, and 4 were unsure. For the 10,001-15,000 range, 4 agreed, 5 disagreed, and 3 were unsure. In the 15,001-20,000 range, 16 agreed, 8 disagreed, and 2 were unsure. Respondents earning more than 20,000 had 5 agreeing, 8 disagreeing, and 1 unsure. The chi-squared test p-value was 0.9018, indicating no significant difference based on income.

In the agriculture category, 1 respondent agreed, none disagreed, and none were unsure. Among students, 23 agreed, 5 disagreed, and 11 were unsure. In employment, 3 agreed, 5 disagreed, and none were unsure. Business respondents included 14 agreeing, 15 disagreeing, and 2 unsure. In self-employment, 5 agreed, 7 disagreed, and 1 was unsure. The chi-squared test p-value was 0.4488, indicating no significant difference based on occupation **(Table 5)**.

Respondents aged 18-24 years included 28 who agreed, 6 who disagreed, and 12 unsure. In the 25-34 years category, 9 agreed, 8 disagreed, and 1 was unsure. For the 35-44 years category, 2 agreed, 11 disagreed, and none were unsure. In the 45-54 years category, 5 agreed, 4 disagreed, and 1 was unsure. Those aged 55-64 years included 1 agreeing, 3 disagreeing, and none unsure. Respondents over 65 had 1 agreeing, none disagreeing, and none unsure. The chi-squared test p-value was 0.4009, indicating no significant difference based on age **(Table 5)**.

Overall, the results indicate that most socio-demographic factors such as caste, gender, education, income, occupation, and age do not significantly influence perceptions of ecotourism causing an increase in commodity prices. This is reflected in the chi-squared p-values, none of which indicate a statistically significant association.

Association between socio-demographic characteristics and perceptions of ecotourism's impact on nature and biodiversity

The study reveals that the majority of residents, approximately 67.5%, perceive ecotourism as having a positive impact on nature and biodiversity. This suggests a consensus among the community that ecotourism contributes positively to environmental conservation. However, a notable minority, about 32.5%, believe that ecotourism has a negative impact, indicating that while the overall sentiment is favorable, there are significant concerns that need to be addressed to ensure sustainable and beneficial ecotourism practices **(Figure 1)**.

Detailed analysis of socio-demographic characteristics and their association with perceptions of ecotourism's impact on nature and biodiversity revealed several important insights. Chi-squared tests were employed to evaluate the statistical significance of these associations.

The perception of ecotourism's impact did not show significant differences across caste categories. Respondents in the General category had a nearly even split, with 26 perceiving a positive impact and 16 perceiving a negative impact. SC respondents were similarly divided (8 positive, 7 negative), as were ST respondents (6 positive, 3 negative) and OBC-B respondents (21 positive, 3 negative). The chi-squared test resulted in a p-value of 0.3841, indicating no significant association between caste and perceptions of ecotourism's impact **(Table 6)**.

Gender did not significantly influence perceptions of ecotourism's impact. Among male respondents, 36 perceived a positive impact while 15 perceived a negative impact. Female respondents showed similar patterns, with 25 perceiving a positive impact and 14 a negative one. The absence of transgender respondents in the sample limited further analysis. The chi-squared test p-value of 0.1548 suggests no significant gender-based differences (Leyte-Marique *et al*., 2022).

Educational attainment did not significantly affect perceptions of ecotourism's impact. Primary-educated respondents mostly perceived a positive impact (10 positive, 1 negative), while secondary-educated respondents were evenly split (4 positive, 4 negative). Respondents with higher secondary education showed a larger disparity (16 positive, 11 negative). Graduates and postgraduates predominantly perceived positive impacts (25 positive, 13 negative, and 6 positive, 0 negative, respectively). The chi-squared test p-value of 0.0583 indicates no significant educational influence (Dongmo & Tamesse, 2021; Di Spirito *et al*., 2022; López-Martínez *et al*., 2022; Domatskiy & Sivkova, 2023).

Income levels did not significantly affect perceptions of ecotourism's impact. Respondents earning 0-5,000 rupees largely perceived a positive impact (14 positive, 4 negative). Similar trends were observed in other income brackets: 5,001-10,000 rupees (14 positive, 7 negative), 10,001-15,000 rupees (9 positive, 2 negative), 15,001-20,000 rupees (15 positive, 11 negative), and above 20,000 rupees (9 positive, 5 negative). The chi-squared test p-value of 0.1892 indicates no significant income-based differences (Saravanakumar *et al*., 2022; Uzun & Karataş, 2022; Zhang *et al*., 2022; García & Jaramillo, 2023; Graefen *et al*., 2023; Grin *et al*., 2023; Kulkarni *et al*., 2023; Malcangi *et al*., 2023; Mustafa *et al*., 2023; Savva *et al*., 2023; Vogel *et al*., 2023; AlShammasi et al., 2024; Avramova & Vasileva, 2024; Li *et al*., 2024; Ravoori *et al*., 2024).

Significant differences were observed based on occupation. Agricultural respondents were minimal, with only one perceiving a negative impact. Students mostly perceived a positive impact (25 positive, 13 negative), as did those employed (6 positive, 2 negative), in business (22 positive, 9 negative), and self-employed (8 positive, 4 negative). The chi-squared test p-value of 0.0046 indicates a significant association between occupation and perceptions of ecotourism's impact **(Table 6)**.

Age significantly influenced perceptions of ecotourism's impact. Younger respondents (18-24 years) showed a majority perceiving a positive impact (30 positive, 14 negative). Similar patterns were seen in other age groups: 25-34 years (14 positive, 4 negative), 35-44 years (7 positive, 6 negative), 45-54 years (6 positive, 4 negative), 55-64 years (3 positive, 1 negative), and above 65 years (1 positive, 0 negative). The chi-squared test p-value of 0.0058 indicates a significant age-based difference **(Table 6)**.

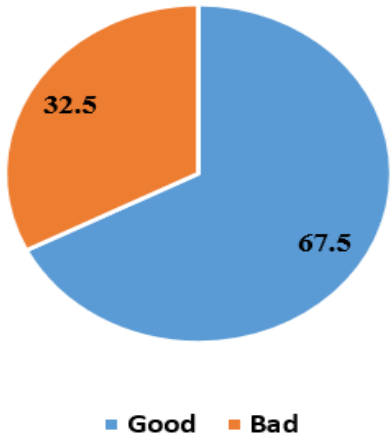

Figure 1. Perceptions of Ecotourism's Impact on Nature and Biodiversity Among Local Residents in Jhargram

Table 6. Table showing the association between different socio-demographic characteristics and ecotourism as an impact on nature and biodiversity in the area under study

Socio-demographic Characteristics	Category	Positive Perception (n)	Negative Perception (n)	Chi-squared (χ^2) test (p-value)
Caste	General	26	16	0.3841
	SC	8	7	
	ST	6	3	
	OBC-B	21	3	
Gender	Male	36	15	0.1548

	Female	25	14	
Education	Primary	10	1	0.0583
	Secondary	4	4	
	Higher Secondary	16	11	
	Graduate	25	13	
	Postgraduate	6	0	
Income	0–5,000	14	4	0.1892
	5,001–10,000	14	7	
	10,001–15,000	9	2	
	15,001–20,000	15	11	
	>20,000	9	5	
Occupation	Agriculture	0	1	0.0046*
	Student	25	13	
	Employment	6	2	
	Business	22	9	
	Self-employment	8	4	
Age	18–24	30	14	0.0058*
	25–34	14	4	
	35–44	7	6	
	45–54	6	4	
	55–64	3	1	
	>65	1	0	

Our study showed that local people from Jhargram have both positive and negative perceptions of the impacts of ecotourism. We found that people living around tourist places in Jhargram are interested in ecotourism. Local people's higher interest is evident in areas where the tourism industry is well established. Previous studies have shown that the higher interest of local people in ecotourism is directly influenced by multiple factors, including local organizations and groups involved in providing ecotourism services. Such associations or networking agencies encourage local people to engage in ecotourism activities.

Our results also showed that the demographics and socioeconomic status of the local people were associated with their interest in ecotourism activities. The study found that most residents were interested in ecotourism activities, and those interested residents were literate. This study revealed that most respondents recognized that their lifestyle has improved with the development of ecotourism activities.

Through this study, we found that ecotourism is not responsible for creating economic inequality among the local people, and previous studies are concordant with our findings (Upadhaya *et al*., 2022), although some studies found ecotourism to be a causal factor for economic inequality. We feel that this aspect should be explored in-depth in future research.

Local people's perception of the impacts of ecotourism creates many different economic dynamics in the Jhargram area. A previous study suggests that due to the influx of tourists in the area, local people suffer from an increase in the price of commodities (World Travel and Tourism Council, 2020). In our study, we also found that ecotourism significantly impacts commodity prices. People also perceived that ecotourism had played a vital role in biodiversity and nature conservation, and this study also highlights that the people of this region support any governmental or other initiative to protect nature and biodiversity, as this is one of the prime factors making this place an attractive ecotourism spot.

Limitation of this study

This study is constrained by its preliminary nature and the small scale of data collected. The limited sample size may affect the generalizability of the findings. Additionally, as this is the first time residents of the area have encountered such study questions, there may be misunderstandings or misinterpretations of the questions, which could impact the accuracy of the responses. The study does not explore the causal effects of these perceptions on various outcomes. Future research should involve larger-scale studies with more comprehensive and nuanced questions to provide a deeper understanding of these dynamics.

CONCLUSION

Understanding the perceived impacts of ecotourism is essential for fostering positive outcomes. This study investigates the relationship between residents' perceptions of ecotourism impacts and their socioeconomic and demographic characteristics. We examine how perceptions of ecotourism influence various socioeconomic factors, including lifestyle patterns, economic inequality, and the prices of daily commodities. Additionally, we analyze perceptions of ecotourism's effects on biodiversity and the environment.

This research addresses an often-overlooked aspect of ecotourism management. The findings will provide a foundational basis for local governments to make informed decisions regarding ecotourism expansion, as well as to develop policies for the protection of biodiversity and the environment. Further large-scale and in-depth research is needed to provide a more comprehensive understanding and a clearer picture of these impacts.

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ETHICS STATEMENT: The study was conducted in accordance with ethical guidelines. Informed consent was obtained from all participants before data collection. Participation was voluntary, and anonymity and confidentiality of responses were ensured. No sensitive personal information was collected, and no ethical approval was required as per institutional guidelines.

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