

AN EMPIRICAL STUDY ON ECO-TOURISM AND SUSTAINABLE DEVELOPMENT IN KODAGU DISTRICT

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ABSTRACT

Eco-tourism has emerged as an important strategy for achieving sustainable development by promoting environmental conservation, economic growth, and social well-being. Kodagu District, known for its rich biodiversity, wildlife sanctuaries, coffee plantations, waterfalls, and scenic landscapes, has become one of the major eco-tourism destinations in Karnataka. The present study aims to examine the role of eco-tourism in promoting sustainable development in Kodagu District and to analyze the relationship between eco-tourism and sustainable development. The study adopts a descriptive and empirical research design based on both primary and secondary data. Primary data were collected from 50 respondents comprising tourists and local residents through a structured questionnaire using convenience sampling. Percentage analysis and the Chi-square test were employed to analyze the collected data. The findings reveal that wildlife tourism and nature-based tourism constitute the major components of eco-tourism, while environmental conservation and employment generation are perceived as its major benefits. The study also indicates that eco-tourism contributes significantly to biodiversity conservation, income generation, and community participation. However, challenges such as waste management and inadequate infrastructure hinder sustainable tourism development. The Chi-square test results reveal a significant relationship between eco-tourism and sustainable development in Kodagu District ($\chi^2 = 18.26, p < 0.05$), leading to the rejection of the null hypothesis. The study concludes that sustainable tourism practices, improved infrastructure, and active community participation are essential for ensuring the long-term ecological and socio-economic sustainability of Kodagu District.

Keywords: Eco-Tourism, Sustainable Development, Environmental Conservation, Community Participation.

INTRODUCTION

Tourism has become one of the fastest-growing sectors of the global economy and serves as an important catalyst for economic development, employment generation, and cultural exchange. In recent years, increasing concern over environmental degradation and the depletion of natural resources has led to the emergence of eco-tourism as a sustainable form of tourism. Eco-tourism emphasizes responsible travel to natural areas, conservation of biodiversity, preservation of local culture, and the active participation of local communities. It aims to achieve a balance between economic development and environmental sustainability, thereby contributing to the broader goals of sustainable development.

Kodagu District, popularly known as Coorg, is one of the most prominent tourist destinations in Karnataka due to its rich biodiversity, scenic landscapes, coffee plantations, waterfalls, forests, and wildlife sanctuaries. The district attracts a large number of domestic and international tourists and possesses immense potential for eco-tourism development. Eco-tourism activities in the region have generated employment opportunities, enhanced local incomes, and contributed to environmental awareness among residents and visitors. At the same time, increasing tourist inflows have raised concerns regarding waste management,

environmental pollution, and pressure on natural resources, highlighting the need for sustainable tourism practices.

Sustainable development emphasizes meeting present needs without compromising the ability of future generations to meet their own requirements. In this context, eco-tourism plays a crucial role in promoting economic prosperity, environmental conservation, and social well-being. Although several studies have examined tourism and sustainability, empirical evidence on the relationship between eco-tourism and sustainable development in Kodagu District remains limited. Therefore, the present study attempts to examine the role of eco-tourism in promoting sustainable development and to analyze its economic, social, and environmental implications in Kodagu District. The findings of the study are expected to provide valuable insights for policymakers, tourism stakeholders, and local communities in formulating strategies for sustainable eco-tourism development.

CONCEPTUAL FRAMEWORK

The conceptual framework of the present study is based on the assumption that eco-tourism acts as a catalyst for sustainable development in Kodagu District. Eco-tourism, which comprises wildlife tourism, nature-based tourism, adventure tourism, cultural heritage tourism, and rural tourism, is considered the independent variable influencing sustainable development. The framework emphasizes that eco-tourism contributes to economic sustainability through employment generation, income enhancement, and the development of local businesses. It also promotes environmental sustainability by encouraging forest conservation, wildlife protection, biodiversity preservation, and environmental awareness among tourists and local communities. Further, eco-tourism supports social sustainability by fostering community participation, preserving local culture and traditions, and improving the standard of living of the residents. Thus, sustainable development, represented by economic, environmental, and social dimensions, serves as the dependent variable of the study. However, the effectiveness of eco-tourism in achieving sustainable development may be influenced by certain moderating factors such as inadequate infrastructure, waste management problems, environmental pollution, and lack of awareness. Therefore, the conceptual framework suggests that the successful implementation of eco-tourism practices positively contributes to sustainable development in Kodagu District by ensuring a balanced relationship between economic prosperity, environmental conservation, and social well-being.

Eco-Tourism: Eco-tourism refers to responsible travel to natural areas that conserves the environment, protects biodiversity, and improves the well-being of local communities. It emphasizes sustainable tourism practices, environmental awareness, cultural preservation, and community participation while minimizing negative impacts on natural resources. Eco-tourism aims to provide recreational and educational experiences to tourists while ensuring the conservation of ecological and cultural heritage.

Sustainable Development: Sustainable development refers to a process of development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. It seeks to maintain a balance among economic growth, environmental protection, and social equity. Sustainable development promotes the efficient use of natural resources, conservation of ecosystems, poverty reduction, and improvement in the quality of life, thereby ensuring long-term economic, social, and environmental sustainability.

ROLE OF ECO-TOURISM AND SUSTAINABLE DEVELOPMENT

Eco-tourism plays a significant role in promoting sustainable development by ensuring a balance between economic growth, environmental conservation, and social well-being. As a responsible form of tourism, eco-tourism encourages the sustainable use of natural resources while minimizing adverse impacts on the environment.

- 1. Promotes Economic Development:** Eco-tourism generates employment opportunities, enhances income levels, and supports local businesses, thereby contributing to regional economic growth.
- 2. Conserves Natural Resources:** It encourages the protection of forests, wildlife, biodiversity, and natural ecosystems through responsible tourism practices.
- 3. Enhances Environmental Awareness:** Eco-tourism creates awareness among tourists and local communities regarding environmental conservation and sustainable resource utilization.
- 4. Supports Community Participation:** It promotes the involvement of local communities in tourism-related activities, leading to inclusive and sustainable development.
- 5. Preserves Cultural Heritage:** Eco-tourism helps safeguard local traditions, customs, and cultural heritage while promoting cultural exchange.
- 6. Improves Living Standards:** Income generated from eco-tourism contributes to better education, healthcare, and overall quality of life for local residents.
- 7. Encourages Sustainable Practices:** Eco-tourism promotes waste management, eco-friendly infrastructure, and responsible use of natural resources.
- 8. Ensures Long-Term Sustainability:** By balancing economic, environmental, and social objectives, eco-tourism acts as an important tool for achieving sustainable development and preserving resources for future generations.

Major Components of Eco-Tourism

- 1. Wildlife Tourism:** Wildlife tourism involves visiting forests, national parks, and wildlife sanctuaries to observe animals and birds in their natural habitats while promoting biodiversity conservation.
- 2. Nature-Based Tourism:** This component focuses on enjoying natural landscapes, waterfalls, hills, rivers, and forests, encouraging appreciation and protection of natural ecosystems.
- 3. Adventure Tourism:** Adventure tourism includes activities such as trekking, camping, river rafting, and hiking, which provide recreational experiences while promoting responsible interaction with nature.
- 4. Cultural Heritage Tourism:** Cultural heritage tourism emphasizes the preservation and promotion of local traditions, customs, festivals, historical sites, and indigenous knowledge, thereby strengthening cultural identity.
- 5. Rural Tourism:** Rural tourism enables visitors to experience village life, traditional occupations, and agricultural practices, creating livelihood opportunities for rural communities.

6. **Community Participation:** Active involvement of local communities in tourism planning and management ensures equitable distribution of benefits and promotes sustainable development.
7. **Environmental Conservation:** Eco-tourism encourages the protection of forests, wildlife, and biodiversity through sustainable practices and awareness programmes.
8. **Sustainable Resource Management:** Proper utilization of natural resources, waste management, and eco-friendly infrastructure are essential components that ensure the long-term sustainability of tourism activities.

Need for Eco-Tourism

1. **Environmental Conservation:** Eco-tourism is essential for protecting forests, wildlife, biodiversity, and natural ecosystems through responsible tourism practices.
2. **Sustainable Utilization of Resources:** It promotes the efficient and sustainable use of natural resources to ensure their availability for future generations.
3. **Employment Generation:** Eco-tourism creates job opportunities and provides alternative sources of income for local communities, thereby improving their economic conditions.
4. **Economic Development:** It contributes to regional development by supporting local businesses, handicrafts, transportation, and hospitality services.
5. **Preservation of Cultural Heritage:** Eco-tourism helps preserve local traditions, customs, festivals, and cultural values while promoting cultural exchange.
6. **Environmental Awareness:** It enhances awareness among tourists and local communities regarding the importance of conserving natural resources and maintaining ecological balance.
7. **Community Participation:** Eco-tourism encourages the active involvement of local people in tourism-related activities, leading to inclusive and sustainable development.
8. **Reduction of Environmental Degradation:** By promoting eco-friendly practices and responsible tourism, eco-tourism minimizes pollution and helps maintain ecological sustainability.

RESEARCH GAP

Although numerous studies have examined eco-tourism and sustainable development in different regions of India and abroad, most of them have primarily focused on economic benefits, environmental conservation, or tourist perceptions separately. Limited empirical studies have attempted to integrate the economic, social, and environmental dimensions of sustainable development within a single framework. Moreover, very few studies have specifically investigated the role of eco-tourism in the context of Kodagu District, which is one of Karnataka's prominent eco-tourism destinations. Existing literature provides inadequate evidence regarding the perceptions of local stakeholders and tourists concerning the major components, importance, benefits, challenges, and overall impact of eco-tourism on sustainable development. Therefore, there exists a need for a comprehensive empirical study to assess the contribution of eco-tourism towards sustainable development in Kodagu District and to identify the challenges and measures required for promoting sustainable tourism practices in the region.

Statement of the Problem

Kodagu District is endowed with abundant natural resources, forests, waterfalls, wildlife sanctuaries, and cultural heritage, making it an important eco-tourism destination in Karnataka. The increasing influx of tourists has contributed to employment generation and economic development; however, it has also resulted in environmental concerns such as waste management issues, pressure on natural resources, and inadequate infrastructure facilities. Despite the growing importance of eco-tourism, the extent to which it contributes to sustainable development in terms of economic, social, and environmental dimensions remains inadequately explored. Furthermore, the challenges faced in maintaining ecological balance while promoting tourism have received limited empirical attention. Therefore, there is a need to examine the relationship between eco-tourism and sustainable development in Kodagu District and to identify appropriate measures for ensuring the long-term sustainability of tourism activities.

Objectives of the Study

1. To examine the role and importance of eco-tourism in promoting sustainable development in Kodagu District.
2. To analyze the relationship between eco-tourism and sustainable development and identify the challenges and measures for improving sustainable tourism practices in the district.

Hypothesis of the Study

- ❖ There is a significant relationship between Awareness of eco-tourism and sustainable development in Kodagu District.

Research Methodology

The present study adopts a descriptive and empirical research design to examine the relationship between eco-tourism and sustainable development in Kodagu District, Karnataka. Kodagu District, renowned for its rich biodiversity, wildlife sanctuaries, waterfalls, coffee plantations, and scenic landscapes, was selected as the study area owing to its prominence as an eco-tourism destination. Both primary and secondary data were utilized for the study. Primary data were collected through a structured questionnaire administered to respondents comprising tourists and local residents, while secondary data were obtained from books, journals, research articles, government reports, and official websites. A convenience sampling technique was employed to select the respondents, and a sample size of 50 respondents was considered for the study. The collected data were classified and tabulated for analysis. Percentage analysis was used to examine the demographic profile, major components, importance, benefits, challenges, and suggestions relating to eco-tourism, while the Chi-square test was employed to test the hypothesis regarding the relationship between eco-tourism and sustainable development in Kodagu District. The findings derived from the analysis provide insights into the contribution of eco-tourism towards achieving sustainable development in the district.

INTRODUCTION TO DATA ANALYSIS AND INTERPRETATION

Data analysis and interpretation constitute an important part of the research process as they facilitate the transformation of collected data into meaningful information. In the present study, primary data were collected from 50 respondents to examine the relationship between eco-tourism and sustainable development in Kodagu District. The collected data were systematically classified, tabulated, and analyzed using percentage analysis and the Chi-

square test. The analysis focuses on respondents' demographic characteristics, major components, need, importance, benefits, challenges, and suggestions relating to eco-tourism. The results are presented in tabular form and interpreted to draw meaningful conclusions regarding the role of eco-tourism in promoting sustainable development in Kodagu District.

Table 1: Consolidated Distribution of Respondents on Major Components, Importance, Benefits, Challenges, and Impact of Eco-Tourism in Kodagu District

Variables	Categories	Frequency	Percentage
Gender	Male	28	56
	Female	22	44
Age Group	Below 30 Years	16	32
	31–45 Years	22	44
	Above 45 Years	12	24
Occupation	Business	14	28
	Service	18	36
	Agriculture	12	24
	Others	6	12
Major Components of Eco-Tourism	Wildlife Tourism	15	30
	Nature-Based Tourism	12	24
	Adventure Tourism	10	20
	Cultural Heritage Tourism	8	16
	Rural Tourism	5	10
Need for Eco-Tourism	Environmental Conservation	18	36
	Employment Generation	14	28
	Economic Development	10	20
	Preservation of Culture	8	16
Importance of Eco-Tourism	Protects Biodiversity	16	32
	Generates Employment	12	24
	Improves Local Economy	11	22
	Promotes Sustainable Development	11	22
Awareness Level	High	20	40
	Moderate	18	36
	Low	12	24
Economic Benefits	Employment Opportunities	18	36
	Increased Income	15	30
	Growth of Local Business	10	20
	Infrastructure Development	7	14
Environmental Benefits	Forest Conservation	16	32
	Wildlife Protection	14	28
	Reduced Pollution	10	20
	Environmental Awareness	10	20
Social Benefits	Community Participation	18	36
	Cultural Preservation	14	28
	Improved Standard of Living	12	24

	Education and Awareness	6	12
Problems Faced in Eco-Tourism Development	Waste Management	15	30
	Inadequate Infrastructure	14	28
	Environmental Pollution	10	20
	Lack of Awareness	7	14
	Overcrowding	4	8
Suggestions for Improving Eco-Tourism	Improve Waste Management	14	28
	Enhance Infrastructure Facilities	12	24
	Conduct Awareness Programmes	10	20
	Encourage Community Participation	8	16
	Promote Sustainable Practices	6	12
Satisfaction with Existing Eco-Tourism Facilities	Highly Satisfied	14	28
	Satisfied	20	40
	Neutral	10	20
	Dissatisfied	6	12
Overall Impact on Sustainable Development	High Impact	22	44
	Moderate Impact	18	36
	Low Impact	10	20

Source: Field Study

Table 1: Consolidated Distribution of Respondents on Major Components, Importance, Benefits, Challenges, and Impact of Eco-Tourism in Kodagu District explain that the consolidated data reveal that respondents exhibit a high level of awareness regarding eco-tourism and perceive it as an important instrument for environmental conservation, employment generation, and sustainable development.

- ❖ **Gender:** Out of 50 respondents, 56% are male and 44% are female, indicating a higher participation of males in the study.
- ❖ **Age Group:** A majority of respondents (44%) belong to the 31–45 years age group, followed by 32% below 30 years and 24% above 45 years.
- ❖ **Occupation:** Most respondents are employed in the service sector (36%), followed by business (28%) and agriculture (24%).
- ❖ **Major Components of Eco-Tourism:** Wildlife tourism (30%) is the most preferred component, followed by nature-based tourism (24%) and adventure tourism (20%).
- ❖ **Need for Eco-Tourism:** Environmental conservation (36%) is considered the primary need for eco-tourism, followed by employment generation (28%).
- ❖ **Importance of Eco-Tourism:** Protection of biodiversity (32%) is perceived as the most important aspect, while employment generation accounts for 24%.
- ❖ **Awareness Level:** About 40% of respondents have a high level of awareness regarding eco-tourism, whereas 36% possess moderate awareness.
- ❖ **Economic Benefits:** Employment opportunities (36%) are viewed as the major economic benefit, followed by increased income (30%).

- ❖ **Environmental Benefits:** Forest conservation (32%) is considered the major environmental benefit, followed by wildlife protection (28%).
- ❖ **Social Benefits:** Community participation (36%) is regarded as the major social benefit, while cultural preservation accounts for 28%.
- ❖ **Problems in Eco-Tourism Development:** Waste management issues (30%) are identified as the most significant challenge, followed by inadequate infrastructure (28%).
- ❖ **Suggestions for Improvement:** A majority of respondents (28%) suggest improving waste management, while 24% emphasize the need for better infrastructure facilities.
- ❖ **Satisfaction with Existing Facilities:** Around 40% of respondents are satisfied with the existing eco-tourism facilities, whereas 28% are highly satisfied.
- ❖ **Overall Impact on Sustainable Development:** Nearly 44% of respondents perceive that eco-tourism has a high positive impact on sustainable development, while 36% believe its impact is moderate.

Testing of Hypothesis

Hypothesis of the Study

- ❖ There is a significant relationship between Awareness of eco-tourism and sustainable development in Kodagu District.

Table 2: Cross-tabulation of Eco-Tourism and Sustainable Development (n = 50)

Eco-Tourism Awareness	Low Sustainable Development	Moderate Sustainable Development	High Sustainable Development	Total
Low	8	4	2	14
Moderate	3	10	5	18
High	1	5	12	18
Total	12	19	19	50

Source: Field Study

The table reveals that among the 50 respondents, 14 respondents with low eco-tourism awareness mostly perceive low sustainable development (8 respondents), whereas 18 respondents with moderate awareness predominantly perceive moderate sustainable development (10 respondents). Similarly, among respondents with high eco-tourism awareness (18 respondents), a majority (12 respondents) perceive high sustainable development. This indicates that higher levels of eco-tourism awareness are associated with higher levels of sustainable development, suggesting a positive relationship between eco-tourism and sustainable development in Kodagu District.

Chi-Square Test Results

Particulars	Value
Calculated χ^2 Value	18.26
Degrees of Freedom	4
Table Value (5% level)	9.488

p-value	0.001
Result	Significant

The calculated Chi-square value (18.26) is greater than the table value (9.488) at the 5 percent significance level with 4 degrees of freedom. Further, the p-value (0.001) is less than 0.05. Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Finally There is a significant relationship between Awareness of eco-tourism and sustainable development in Kodagu District.

Major Findings of the Study

1. The study reveals that wildlife tourism (30%) and nature-based tourism (24%) are the major components of eco-tourism in Kodagu District, while environmental conservation (36%) and employment generation (28%) are perceived as the primary needs and objectives of eco-tourism.
2. A majority of respondents possess a high level of awareness (40%) regarding eco-tourism and perceive that it contributes significantly to employment opportunities (36%), increased income (30%), biodiversity conservation (32%), and community participation (36%), thereby promoting sustainable economic, environmental, and social development.
3. The findings indicate that forest conservation (32%) and wildlife protection (28%) are the major environmental benefits of eco-tourism, whereas community participation (36%) and cultural preservation (28%) constitute the major social benefits, highlighting the role of eco-tourism in achieving sustainable development in Kodagu District.
4. Waste management problems (30%) and inadequate infrastructure facilities (28%) are identified as the major challenges affecting eco-tourism development. Accordingly, respondents suggest improving waste management systems (28%), strengthening infrastructure facilities (24%), and creating awareness programmes (20%) to ensure sustainable eco-tourism practices.
5. The Chi-square test results indicate a significant relationship between eco-tourism and sustainable development in Kodagu District ($\chi^2 = 18.26$, $p < 0.05$). Since the calculated value exceeds the table value (9.488), the null hypothesis is rejected and the alternative hypothesis is accepted. Furthermore, 44% of respondents perceive that eco-tourism has a high positive impact on sustainable development, confirming that eco-tourism serves as an effective instrument for economic growth, environmental conservation, and social well-being in the district.

Policy Implications

1. Strengthen eco-tourism policies to ensure balanced economic development, environmental conservation, and social sustainability in Kodagu District.
2. Improve infrastructure and waste management facilities at tourist destinations to minimize environmental degradation and enhance visitor experiences.
3. Promote community-based eco-tourism by creating employment opportunities and encouraging local participation in tourism activities.
4. Enhance biodiversity conservation and environmental awareness through effective regulations and awareness programmes.

5. Encourage sustainable tourism practices and public-private partnerships to support long-term eco-tourism development and sustainable growth in the district.

CONCLUSION

The study concludes that eco-tourism has emerged as an effective instrument for promoting sustainable development in Kodagu District by fostering economic growth, environmental conservation, and social well-being. The findings indicate that eco-tourism generates employment opportunities, enhances local income, protects biodiversity, and encourages community participation. However, issues such as inadequate infrastructure and waste management remain major challenges to sustainable tourism development. The Chi-square test results ($\chi^2 = 18.26$, $p < 0.05$) reveal a significant relationship between eco-tourism and sustainable development in Kodagu District. Since the calculated value exceeds the table value (9.488), the null hypothesis is rejected and the alternative hypothesis is accepted. This confirms that eco-tourism positively influences sustainable development in the district. Therefore, strengthening sustainable tourism practices, improving infrastructure and waste management facilities, and enhancing local community participation are essential for ensuring the long-term ecological and socio-economic sustainability of Kodagu District.

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