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SUSTAINABLE TOURISM PRACTICES IN KARBI ANGLONG DISTRICT, ASSAM: A STUDY OF ECOTOURISM, CULTURAL HERITAGE AND COMMUNITY PARTICIPATION

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Abstract

Sustainable tourism is a strategy that strikes a balance between sociocultural and environmental preservation and economic growth. There are many eco-cultural tourism opportunities to be found in the prosperous, biodiverse areas like the Karbi Anglong District in Assam. Studies on sustainable tourism in the district are still scarce. The viewpoints of both visitors and locals regarding ecotourism, the cultural influence of ecotourism, community ownership, rural and adventure tourism, and green eco-tourism are used in this paper to evaluate sustainable tourism methods. 200 respondents—100 tourists and 100 locals—in the Karbi Anglong District's major tourist destinations provided primary data for quantitative, cross-sectional, comparative survey research design. A questionnaire was used to collect data. A five-point Likert scale served as the basis for the questionnaire. Data collected were coded and analyzed using Microsoft Excel. Perceptions of the respondents were analyzed using descriptive statistics (percentages, means, an independent t-test, and construct-wise analysis). There are positive views towards environmental and cultural conservation as well as practices for community engagement. Respondents indicated the highest levels of support for ecotourism and sustainability. The management of trash and overcrowding, eco-friendly lodging, rural and agrotourism, and public awareness of the Sustainable Development Goals (SDGs) and the Assam Tourism Policy were found to be perceived in the opposite order of significance. These findings corroborate that although the potential for sustainable and responsible tourism development in Karbi Anglong is significant, the long-term sustainability of such development hinges on the government's ability to develop effective environmental policies alongside community engagement. The present study provides policy suggestions for community-based tourism, environmental preservation, sustainable development, and responsible tourism practices. These results guide policy development in Northeast India, especially for vulnerable and fragile ecosystems.

Keywords: Sustainable Tourism, Ecotourism, Community-Based Tourism, Cultural Heritage, Karbi Anglong, Assam, Sustainable Development Goals

Vol. 12 Issue 5s September, 2026
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INTRODUCTION

The region's economy benefits greatly from tourism, which creates jobs, supports small enterprises, expands infrastructure, and improves cultural opportunities. Meanwhile, irresponsible and fast-growing tourism can lead to deterioration of the environment, strain on natural resources, overcrowding, waste production, and cultural system disruptions. These challenges have increased the importance of sustainable tourism as a substitute that seeks to strike a balance between community welfare, environmental preservation, and economic growth. Sustainable tourism is thus a matter of destinations regulating tourism development in a way that will safeguard ecological resources, share the advantages of tourism with the host communities in addition to cultural heritage. Butler (1999) went on to stress that sustainability in tourism implies long-term management of the resources of a tourist destination rather than short-term development with emphasis on growth. In destinations with delicate environmental situations, where tourism is closely linked to the forests, wildlife, landscapes, and other natural resources, environmental sustainability has taken on added significance. Developing country experiences suggest that ecotourism can play a role in making tourism more environmentally sustainable with the assistance of good environmental policies and ecologically oriented tourism management (Shang et al., 2023). Likewise, Baloch et al. (2023) stated the need for sustainable management of tourism development to reduce the environmental effects of tourism without losing its economic and social benefits. From these perspectives, it can be inferred that sustainable tourism is not just about the expansion of tourism. It needs the responsible management of natural resources, environmentally appropriate infrastructure, effective waste management, and regular participation of destination stakeholders.

A significant component of the growth of sustainable tourism is community involvement. Since tourism is a local phenomena, local communities must be involved in its planning, resource management, cultural heritage conservation, and benefit sharing. Scheyvens (1999) said that when communities can be meaningfully involved in the tourism development process, ecotourism can help in the empowerment of local communities as the beneficiaries of the process. Recent studies have also highlighted the importance of community empowerment in the development of sustainable destinations, as it helps in involving local people in planning, decision-making, and tourism-related activities (Ginanjar, 2023). Community-based ecotourism can also help to improve the livelihoods of people in rural areas while promoting sustainable use of environmental resources in that area (Demkova et al., 2022). Cultural heritage is closely linked to sustainable tourism, especially for places with indigenous and tribal people. Tourism offers opportunities to promote the festivity, customs, handicraft, architecture, culture, etc. of the local area. But uncontrolled tourism development can also put pressure on traditional cultural systems. Bhatta (2023) has shown that tourism could be economically and infrastructurally beneficial as well as problematic in terms of local culture and heritage. For sustainable heritage management to be possible, the local community must be involved, and public institutions, tourism, and other stakeholders must cooperate. Additionally, Liorančaitė-Şukienė and Jurėnienė (2025) emphasized the significance of heritage management approaches in promoting communities' sustainable tourist growth. The increased development of tourism in Northeast India is also linked to biodiversity, tribal culture, rural livelihoods, and ecologically sensitive landscapes, making those factors especially relevant. The possibility of supporting the

Vol. 12 Issue 5s September, 2026
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process of destination development for tribal tourism lies in the involvement of local communities and protection of the environment and the culture (Dkhar & Biswas, 2025).

Sustainable tourism has also been associated with inclusive development and Sustainable Development Goals in the Northeast region of India, with respect to the creation of jobs, the preservation of culture, environmental care, and involvement of the local communities (Bharali & Sinha, 2026). The Karbi Anglong District of Assam has a lot of potential for ecotourism, cultural tourism, rural tourism, nature-based tourism, and adventure tourism because of its forests, waterfalls, animals, landscapes, indigenous communities, festivals, and traditional cultural resources. Infrastructure, waste management, community involvement, rural tourism development, visitor awareness, and sustainable destination planning are all issues that the district's tourism industry is now dealing with. Though there has been growing academic interest in sustainable tourism in Northeast India, there has been little empirical attention in this specific case of Karbi Anglong District from the perspectives of both the tourists and the local residents. The present study thus investigated the sustainable tourism practices in Karbi Anglong District by evaluating the perceptions of the participants in sustainable tourism ideas, including “ecotourism” & “environmental practices”; “cultural impacts of tourism”; “community-based tourism”; “adventure and rural tourism”; and “green and responsible tourism”. The study aims to explore the current strengths and weaknesses and to make practical suggestions for sustainable destination planning, community involvement, environmental protection, and tourism management in an ecologically and culturally sensitive area.

Research Objectives

- To determine the major sustainable tourism practices in the Karbi Anglong District.
- To determine stakeholder views on ecotourism and environmental sustainability.
- To determine the role of tourism in protecting and sustaining local culture.
- To determine the level of community and livelihood tourism involvement.
- To identify major gaps in sustainable tourism practices and suggest policies to address them.

LITERATURE REVIEW

2.1 Sustainable Tourism and Theoretical Foundation

Sustainable tourism has grown from the more comprehensive concept of sustainable development, which focuses on development's needs of the present without compromising the needs of future generations (Brundtland & Khalid, 1987Sustainability in tourism must be viewed holistically, taking into account environmental preservation, economic sustainability, and human well-being. The Triple Bottom Line approach also highlights the interdependency of the economic, environmental, and social benefits and a good measure of sustainable destination development (Elkington & Rowlands, 1999). International policy documents have also linked tourism sustainability to responsible production, protection of the environment, inclusive development, and promotion of community well-being, and global tourism trends have reinforced the importance of resilient and sustainable destination management (World Tourism Organization, 2021). The World Tourism Organization (2021) has emphasized the continued economic significance of tourism and the necessity of managing tourist destinations in a resilient and sustainable manner. The United Nations General Assembly (2015) identified these priorities in the Sustainable Development Goals.

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

2.2 Ecotourism and Environmental Sustainability

Ecotourism is an important component of sustainable tourism since it supports local people while simultaneously emphasizing natural experiences and conservation. It is not sufficient to just have more tourists visiting natural sites, but to have the right kind of planning, management, environmental regulation, and stakeholders involved in effective ecotourism (Dowling & Fennell, 2003). Weaver (2006) also categorised various types of ecotourism based on the level of environmental commitment and the intensity of tourism activity, and found that the sustainability outcomes are very dependent on the way in which the tourism is managed. Burman et al. (2007) discovered that because of its biodiversity, North East India has a great deal of potential for developing cultural and ecological tourism, traditional knowledge and indigenous cultural resources. They noted that local involvement in conservation is essential, as is local involvement in economic development. Additionally, eco-cultural tourism could support livelihood development and environmental conservation in rural communities. In the case of tourism in Sikkim, Cajee (2014) showed that eco-cultural tourism can serve not only to protect biodiversity, preserve culture and heritage, but also to maintain the economic sustainability of the local economy. In the same way, Rynjah and Sailo (2021) found that ecotourism can provide livelihood opportunities in rural areas in Meghalaya. These studies collectively highlight the relevance of ecotourism to Northeast India, where there is a close linkage between natural resources and livelihoods.

2.3 Cultural Heritage, Green Tourism, and Responsible Tourism

Cultural heritage is also a major aspect of sustainable tourism. Perceptions of authenticity also affect the tourism experiences, as local culture and heritage are offered to tourists (Wang, 1999). Ensuring the continued protection and interpretation of cultural resources (as well as the non-deterioration of local identity and authenticity) is the foundation of heritage tourism (Timothy & Boyd, 2003). Responsibility for the environment is also a consideration since the increased numbers of visitors can mean higher waste production, carbon emissions, pressures on natural resources, and infrastructure needs. Daneshwar and Revaty (2024) highlighted sustainable transport, effective waste management, environmental protection, and community involvement as key factors in green tourism. Coordinated action is therefore needed from the part of the tourists, the community, the businesses, and the government institutions for responsible tourism. Responsible destination management was also highlighted by Liu and Kou (2024) as a key aspect of ensuring environmental and cultural protection and economic development. Governance arrangements are also important for environmental sustainability in the environment. Matović et al. (2025) found that the governance structures, institutional coordination, and involvement of stakeholders affect the sustainability outcomes of protected areas. The latter is particularly true of destinations whose ecological systems are fragile and where tourism development can be detrimental to the resources that tourism relies upon if not managed appropriately.

2.4 Sustainable Tourism in the Indian Context

In India, sustainable tourism currently focuses more on how the economics, conservation, responsible travel, and community benefits work together. Sustainable tourism can play a role in economic development if tourism development involves the conservation of the environment and social responsibility, according to Lal (2024). The certification and environmental labelling may also

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

disincentivise and help inform tourists to consider more sustainable tourism management and allow them to understand what services are environmentally responsible (Font & Buckley, 2001). There is therefore already some literature that clearly shows that sustainable tourism is multifaceted. The issues of environment, cultural heritage, community livelihood, responsible tourism, governance, and benefits must be looked at jointly and not in isolation. The present literature is, however, largely limited for the tribal and ecologically sensitive districts like Karbi Anglong. The current review also reveals the lack of studies that look at the intersections of environmental practices, cultural impacts, community involvement, rural tourism, and responsible tourism from the tourist and resident points of view. This gap offers a platform for exploring sustainable tourism in Karbi Anglong from a multi-stakeholder approach.

2.5 Conceptual Framework

Five factors of sustainable tourism development are included in the conceptual framework: the ecological aspects of tourism and the environment, the cultural aspect of tourism and the environment, community-based tourism, adventure, nature and rural tourism, and green and responsible tourism as depicted in the figure below (Figure 1). Altogether, these dimensions highlight the concepts of conservation, cultural preservation, local participation, livelihood generation, responsible tourism behaviour, sustainable infrastructure and equitable benefit sharing. Their collective impact has led to various wider effects including environmental protection, socio-cultural protection, economic advantage, community welfare and long-term viability in the Karbi Anglong District.

Figure 1. Conceptual Framework for Sustainable Tourism Development in Karbi Anglong District

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

3. RESEARCH METHODOLOGY

3.1 Research Design and Research Questions

The current study examines sustainable tourism practices in the Karbi Anglong District of Assam using a quantitative comparative cross-sectional survey design. The comparative descriptive design was employed in describing and analysing the perceptions of tourists and the local people. The study aimed at answering various questions regarding Sustainable tourism practices, Ecotourism and Environmental practices, Preservation of cultural heritage, Community involvement and benefits, The policy adjustments required for the growth of sustainable tourism. The cross-sectional strategy was utilized since the data were collected all at once at the start of the study period. The methodology was developed to capture the attitudes of the tourists and residents of the area towards sustainable tourism.

3.2 Research Hypotheses

The study formulated four hypotheses to examine differences in stakeholder perceptions of sustainable tourism practices in Karbi Anglong District. These hypotheses focused on environmental practices, community-based tourism benefits, sustainability dimensions, and policy awareness.

H1: *Tourists and local residents differ in their perceptions of ecotourism and environmental practices.*
H2: *Local residents perceive the benefits of community-based tourism differently from tourists.*
H3: *Sustainable tourism practices in Karbi Anglong are more developed in environmental and cultural dimensions than in green infrastructure and rural tourism dimensions.*
H4: *Both visitors and locals have little knowledge of the Assam Tourism Policy and the Sustainable Development Goals (SDGs).*

3.3 Study Area and Research Population

The study was conducted in Assam, India's Karbi Anglong District. The district boasts of its high forest density, wildlife habitat, waterfalls, rivers, hills, indigenous tribal communities, traditional customs, festivals, and bamboo handicrafts. The district's characteristics make it appealing for ecotourism, adventure tourism, rural tourism, nature-based tourism, and cultural tourism. There are two stakeholder groups targeted. During the study period, the major tourism spots in Karbi Anglong were included among the tourists visited. The local community comprised residents of villages and communities surrounding the tourist destinations. Both these groups were on the demand and host-community end of tourism development.

3.4 Sampling Technique, Sample Size and Locations

Non-probability purposive sampling was used because the study was focused on participants who are engaged in or knowledgeable about Karbi Anglong's tourism industry. A total of 200 respondents (100 tourists and 100 local residents) were included in the final sample. Ten important tourist places were selected, and respondents were sampled from Langvoku, Longsokangthu, Taralangso, Recreation Park, Arlong Rupat, Langherang Waterfalls, Dikrutpi, Kangthilangso, Kaipholangso, and Deopani Mandir. These sites have been chosen because they are the ones where tourism activity is carried out in the district. The study only included respondents who were willing and able to take part in the field trips.

3.5 Research Instrument and Questionnaire Development

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

A structured questionnaire with two sections was used to gather primary data. Demographic information was acquired in the first phase, including age, gender, occupation, level of education, awareness of the SDGs, and knowledge of the Assam Tourism Policy. A five-point Likert scale ranging from Strongly Disagree to Strongly Agree was used to score 16 statements in the second portion. Five constructions were used to group the statements: 1) Ecotourism and environmental practices; 2) Ecotourism's cultural impact; 3) Community-Based Tourism; 4) Adventure; 5) Nature and Rural Tourism; and 6) Green and Responsible Tourism. The UNWTO, GSTC, the Indian government, and the Assamese government's publications and material were used to create the questionnaire.

3.6 Data Collection, Validity and Ethical Considerations

The data collected in the field during the visits were collected using questionnaires which were given to tourists and local residents. The questionnaires were completed manually by the respondents, and the completed questionnaires were collected and then coded, tabulated, and analyzed in Microsoft Excel. Examining the questionnaire items to see if they represented pertinent facets of sustainable tourism allowed for the determination of content validity. Final edits were made prior to administration for clarity and relevance. All procedures used were ethical. Participants were informed of the study's objectives, that participation was entirely voluntary, that confidentiality was guaranteed, that withdrawal was permitted, and that no personally identifiable information was gathered.

3.7 Reliability of the Research Instrument

Cronbach's alpha was used to evaluate the questionnaire's internal consistency reliability. A five-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree," was used to measure the items.

Cronbach’s alpha	interpretation
Below 0.60	Poor reliability
0.60–0.69	Questionable reliability
0.70–0.79	Acceptable reliability
0.80–0.89	Good reliability
0.90 and above	Excellent reliability

3.8 Data Processing and Analysis

Questionnaires completed were then manually coded and entered into Microsoft Excel. We employed both inferential and descriptive statistics. The demographic characteristics were analyzed using frequency and percentage. The item-level impressions were analyzed using the mean and standard deviation. Construct-wise means were computed and ranked to determine the more and less sustainable aspects of sustainable tourism. The perceptions of tourists and locals were compared using independent-samples t-tests. The mean ratings were interpreted as follows: highly disagree (1.00–1.80), disagree (1.81–2.60), neutral (2.61–3.40), agree (3.41–4.20), and strongly agree (4.21–5.00). Statistical significance was defined as P values less than 0.05.

4. RESULTS AND DISCUSSION

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

4.1 Demographic Profile of Respondents

According to the research, there was adequate representation of participants in the age categories assessed. The age group of 41 and older had the largest percentage of tourists (30%), while the age range of 36 to 40 years old had the second-highest percentage (27%). The age group of 41 and older had the largest percentage of engagement among the locals, at 34%. This suggests that most of the participants were of a sufficient age and level of participation to be able to analyse and critique tourism and the practices and principles of sustainable tourism. The respondents' age distribution is displayed in Table 1.

Table 1. Age Distribution of Respondents

Age Group	Tourist	Percentage (%)	Local Residents	Percentage (%)
20–25 Years	12	12	18	18
26–30 Years	20	20	25	25
31–35 Years	11	11	10	10
36-40 years	27	27	13	13
41 Years and Above	30	30	34	34
Total	100	100	100	100

Source: Based on Survey data

According to Table 2, 63% of visitors and 57% of locals were male respondents, whereas 37% and 43% of tourists and locals, respectively, were female respondents. Although there was a slight male bias in tourist participation, the female participants made up a significant proportion of the surveyed stakeholders. During the data collection, no respondents in either of the groups identified as 'Others'.

Table 2 Gender Distribution of Respondents

Gender	Tourist	Percentage (%)	Local Residents	Percentage (%)
Male	63	63	57	57
Female	37	37	43	43
Others	0	0	0	0
Total	100	100	100	100

Source: Based on Survey data

As indicated in Table 3, there was a noticeable disparity in the respondents' educational attainment between visitors and locals. The majority of visitors had post-secondary and tertiary education, while the majority of locals had only secondary education.

Table 3. Educational Qualification of Respondents

Education Level	Tourist	Percentage (%)	Local Residents	Percentage (%)
Primary	12	12	20	20
Secondary	26	26	48	48
Higher Secondary	22	22	16	16
Graduate	25	25	4	4
Post Graduate	15	15	0	0

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

No Formal Education	0	0	12	12
Total	100	100	100	100

Source: Based on Survey data

The majority of the respondents were day trippers. It was reported that 94% of the respondents stayed for a single day. The selected tourist destinations are characterized by a short length of stay. Very few tourists opt for overnight and extended stays, as shown in Table 4.

Table 4. Duration of Stay by the Tourist

Duration of Stay	Tourist	Percentage (%)
Day Trip	94	94
1-2 days	4	4
3-5 days	2	2
More	0	0
Total	100	100

Source: Based on Survey data

The occupational profile indicates the predominance of salaried employment among tourists and a greater prevalence of self-employment and unemployment among locals. The results indicate that tourism has not yet been an important source of employment for local communities, as shown in Table 5.

Table 5. Occupation profile of the sample

Employment/ Occupation	Tourist	Percentage (%)	Local Residents	Percentage (%)
Salaried	40	40	12	12
Unemployed	24	24	44	44
Student	11	11	14	14
Self-employed	22	22	30	30
Total	100	100	100	100

Source: Based on Survey data

4.2 Awareness of Sustainable Development Goals (SDGs)

The findings indicate that both parties had a considerable lack of knowledge of the Assam Tourism Policy and the Sustainable Development Goals (SDGs). In the tourist population, only 32% knew, with 68% unaware. The awareness among the local population was even lower, with only 18% of them reporting to be aware of the SDGs and Assam Tourism Policy, while 82% reported that they were not aware. The results indicate that there is a lack of policy-related knowledge, especially at the local level. The low awareness can limit engagement in sustainable tourism measures, as stakeholders may not be as familiar with the goals of sustainable tourism, sustainable tourism practices, and ongoing policy support. It is thus recommended that there is a need for the need to conduct awareness programmes, community education, destination-level information campaigns, and good

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40
communication from the tourism authorities. Enhancing awareness about the SDGs and Assam The Karbi Anglong District's sustainable tourism planning and implementation process can be enhanced and stakeholder participation raised with the aid of tourism policy. As shown in Table 6, there is a significant policy awareness gap, particularly among local residents.

Table 6. Awareness of Sustainable Development Goals (SDGs) and Assam Tourism Policy Among Respondents

Awareness of SDGs & Assam Tourism Policy	Tourist	Percentage (%)	Local Residents	Percentage (%)
Yes	32	32	18	18
No	68	68	82	82
Total	100	100	100	100

Source: Based on Survey data

4.3 Internal consistency reliability by respondents' group

Cronbach's alpha values of reliability analysis found that 0.452 for tourists and 0.330 for local residents for the 16 statements. As both values were below the 0.70 benchmark, the items were not aggregated into a single composite score. The subsequent analysis therefore examined individual statements and organised the results under five thematic dimensions of sustainable tourism.

Table 7. Internal consistency reliability of Sustainable Tourism Practices items

Respondent group	n	Items	Number of items	Cronbach's alpha	Interpretation
Tourists	100	Q11–Q26	16	0.452	Low internal consistency
Local residents	100	Q11–Q26	16	0.330	Low internal consistency
Combined sample	200	Q11–Q26	16	0.406	Low internal consistency

Source: Based on Survey data

4.4 Ecotourism and Environmental Practices (Q11–Q14)

Table 8 shows the distribution of responses to 4 statements on ecotourism and environmental practices among tourists and local residents. In general, both groups had positive attitudes. Regarding the promotion of tourism in an ecologically friendly way, 76% of tourists and 62% of local residents chose to mark Agree or Strongly Agree. There were also positive responses with respect to waste disposal, protecting natural resources, and reducing environmental damage. There was greater consensus among local people on the need for protecting natural resources and minimising environmental damage.

Table 8. Response Distribution for Ecotourism and Environmental Practices

Q.	Statement	Category	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Total
11		Tourist	0	0	24	48	28	100

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

	Destination promotes eco-friendly tourism	Local Residents	0	6	32	40	22	100
12	Waste disposal is managed properly	Tourist	0	4	32	42	22	100
		Local Residents	0	13	31	31	25	100
13	Natural resources are well protected	Tourist	0	8	30	34	28	100
		Local Residents	0	6	31	21	42	100
14	Tourism activities minimise environmental damage	Tourist	0	2	34	40	22	100
		Local Residents	0	8	19	46	27	100

Source: Based on Survey data

The positive perceptions are also summarized in the mean comparison in Table 9. For destination promotion of eco-friendly tourism, the mean scores for visitors and locals were greatest at M = 4.04 (SD = 0.72) and M = 3.78 (SD = 0.86), respectively. There was a statistically significant difference (t = 2.31, p = 0.022). With all p values greater than 0.05, there was no discernible difference between visitors and locals in terms of trash disposal, protecting natural resources, and minimizing environmental harm. The scores for natural resource protection (M = 3.99) and minimization of environmental damage (M = 3.92) were slightly higher for the local residents. In general, positive perceptions of environmental sustainability are revealed, but there is still room for improvement in waste management and environmental practices.

Table 9. Mean, Standard Deviation, and Independent-Samples t-Test for Ecotourism and Environmental Practices

Q	Statement	Tourist Mean	Tourist SD	Local residents Mean	Local residents SD	t-value	p-value
11	Destination promotes eco-friendly tourism	4.04	0.72	3.78	0.86	2.31	0.022
12	Waste disposal is managed properly	3.82	0.82	3.68	0.99	1.09	0.279
13	Natural resources are well protected	3.82	0.93	3.99	0.98	-1.25	0.214

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

14	Tourism activities minimise environmental damage	3.84	0.79	3.92	0.88	-0.70	0.487

Note: SD = standard deviation. The independent-samples t-test compares tourists and local residents on each statement.

4.5 Eco-tourism and Cultural Impact (Q15-Q17)

Table 10 shows the distribution of the responses of tourists and local residents about cultural impacts of ecotourism. The overall attitudes of both groups were positive, with significant differences in attitudes among local residents on most of the statements. 52% of tourists and 65% of locals chose Agree or Strongly Agree for the question of exhibiting the local culture and traditions. 44% of visitors expressed support for the upkeep and preservation of cultural heritage sites, while 67% of locals said the same. Likewise, 42% of tourists and 65% of locals said that cultural performances and local handicrafts were encouraged for tourists.

Table 10. Response Distribution for Eco-tourism and Cultural Impact

Q.	Statement	Category	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Total
15	Local culture and traditions are showcased to tourists.	Tourist	2	6	40	40	12	100
		Local Residents	2	12	21	44	21	100
16	Cultural heritage sites are preserved and well maintained.	Tourist	0	6	50	36	8	100
		Local Residents	0	12	21	40	27	100
17	Cultural performances or local handicrafts are promoted to visitors.	Tourist	2	10	46	34	8	100
		Local Residents	6	4	25	33	32	100

Source: Based on Survey data

The mean scores from Table 11 indicate a higher score for the local population than the tourists for all three cultural-impact statements. However, it was not a significant difference when looking at local culture and traditions ($t = -1.21$, $p = 0.226$). There were, however, significant differences for preservation of cultural heritage sites ($t = -2.97$, $p = 0.003$) and promotion of cultural performances and handicrafts ($t = -3.21$, $p = 0.002$). The scores on both heritage preservation ($M = 3.82$, $SD = 0.97$) and promoting cultural performances and handicrafts ($M = 3.81$, $SD = 1.12$) were higher among local

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40
residents. According to the findings, locals had a more favorable opinion of tourism's cultural worth than did visitors, particularly when it came to heritage preservation and cultural promotion.

Table 11. Mean, Standard Deviation, and Independent-Samples t-Test for Eco-tourism and Cultural Impact

Q	Statement	Tourist Mean	Tourist SD	Local Residents Mean	Local Residents SD	t-value	p-value
15	Local culture and traditions are showcased to tourists.	3.54	0.86	3.70	1.00	-1.21	0.226
16	Cultural heritage sites are preserved and well maintained.	3.46	0.73	3.82	0.97	-2.97	0.003
17	Cultural performances or local handicrafts are promoted to visitors.	3.36	0.85	3.81	1.12	-3.21	0.002

4.6 Community-Based Tourism Practices (Q18-Q20)

The distribution of answers on community-based tourism is displayed in Table 12. The general public, both the tourists and residents, generally spoke positively about the perceived attitudes. Most visitors (66%) and locals (69%) agreed or strongly agreed that they engage in local tourism activities. In relation to tourism benefits received by local households, positive answers were more prevalent among tourists, with 74% as opposed to 53% among local residents. On the issue of community management of tourism services, 58% of the tourists and 48% of the inhabitants chose Agree or Strongly Agree.

Table 12. Response Distribution for Community-Based Tourism Practices

Q.	Statement		1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Total
18	Local people participate in tourism activities	Tourist	0	8	26	46	20	100
		Local Residents	0	6	25	42	27	100
19	Tourism benefits (income, jobs) reach local households	Tourist	2	2	22	46	28	100
		Local Residents	0	6	41	34	19	100

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

20	Community members manage/operate tourism services (guides, homestays, etc.)	Tourist	2	8	32	48	10	100
		Local Residents	0	14	38	35	13	100

Source: Based on Survey data

However, there was no difference between the community administration of tourist services and local participation in tourism activities (Table 12, t = -0.98, p = 0.328; t = 0.73, p = 0.468). A significant difference was found for the tourism benefits to local households (t = 2.45; p = 0.015), with a higher mean value for tourists (M = 3.96) compared to local residents (M = 3.66). This indicates that visitors viewed tourism's economic advantages more favorably than residents did.

Table 13. Mean, Standard Deviation, and Independent-Samples t-Test for Community-Based Tourism Practices

Q	Statement	Tourist Mean	Tourist SD	Local Residents Mean	Local Residents SD	t-value	p-value
18	Local people participate in tourism activities	3.78	0.86	3.90	0.87	-0.98	0.328
19	Tourism benefits (income, jobs) reach local households	3.96	0.88	3.66	0.86	2.45	0.015
20	Community members manage/operate tourism services (guides, homestays, etc.)	3.56	0.86	3.47	0.89	0.73	0.468

4.7 Adventure, Nature and Rural Tourism

Table 14 shows the responses to questions in relation to adventure, nature and rural tourism. Overall, there were higher positive perceptions among the local residents towards responsible nature-based tourism and rural/agro-tourism. The local residents were more positive (80%) towards responsible tourism promotion in nature than the tourists (58%). For rural/agro-tourism, the positive answers were 69% for the local residents and 40% for the tourists. The two groups had similar perceptions of safety and environmental recommendations in the adventurous tourism context.

Table 14. Response Distribution for Adventure, Nature and Rural Tourism

Q.	Statement		1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Total
21		Tourist	2	12	28	52	6	

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

	Nature-based tourism (trekking, wildlife, waterfalls) is encouraged responsibly.							100
		Local Residents	0	10	10	32	48	100
22	Rural/agro-tourism activities are available and promoted.	Tourist	4	12	44	28	12	100
		Local Residents	0	11	20	47	22	100
23	Adventure tourism activities follow safety and environmental guidelines.	Tourist	2	6	32	48	12	100
		Local Residents	0	14	27	43	16	100

Source: Based on Survey data

Table 15 reveals statistically significant variations in the availability and promotion of rural/agrotourism ($t = -3.60$, $p < 0.001$) and the responsible promotion of nature-based tourism ($t = -5.38$, $p < 0.001$). The scores of local residents were higher than those of the mean scores for both items. The results show that there is no significant difference in adventure tourism safety and environmental guidelines ($t = 0.08$, $p = 0.936$). The overall scores were higher for the local population's attitudes towards nature-based and rural tourism development.

Table 15. Mean, Standard Deviation, and Independent-Samples t-Test for Adventure, Nature and Rural Tourism

Q	Statement	Tourist Mean	Tourist SD	Local Residents Mean	Local Residents SD	t-value	p-value
21	Nature-based tourism (trekking, wildlife, waterfalls) is encouraged responsibly.	3.48	0.86	4.18	0.98	-5.38	< 0.001
22	Rural/agro-tourism activities are available and promoted.	3.32	0.97	3.80	0.91	-3.60	< 0.001
23	Adventure tourism activities follow safety and environmental guidelines.	3.62	0.85	3.61	0.92	0.08	0.936

4.8 Green and Responsible Tourism

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

Table 16 shows the results of the questions on green and responsible tourism. The perceptions of tourists and local residents were slightly positive. 38% of the tourists and 40% of the residents marked Agree or Strongly Agree on the question of sustainable accommodation. Responsible behaviour guidelines were found to have a greater positive support rate among local residents (72% Agree/Strongly Agree) than among tourists (48% Agree/Strongly Agree). Comments on overcrowding control were more varied in both groups.

Table 16. Response Distribution for Green and Responsible Tourism

Q.	Statement	Category	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree	Total
24	Sustainable accommodation options (e.g., eco-lodges) are available.	Tourist	2	14	46	30	8	100
		Local Residents	0	9	51	24	16	100
25	Tourists are made aware of responsible behaviour guidelines.	Tourist	0	4	48	30	18	100
		Local Residents	0	10	18	46	26	100
26	The destination limits overcrowding to protect nature.	Tourist	1	1	52	44	2	100
		Local Residents	2	16	38	29	15	100

Source: Based on Survey data

The results indicate that there is no significant difference between the tourists and the local residents for sustainable accommodation ($t = -1.54$, $p = 0.126$) or overcrowding control ($t = 0.51$, $p = 0.607$), as can be seen in Table 16. The mean scores were significantly different for the responsible behaviour guidelines ($t = -2.11$, $p = 0.036$), with local residents having the higher score. The results of this study suggest that green tourism practices are being followed but need to be more strongly implemented, especially in the areas of visitor awareness and sustainable accommodation and crowd management.

Table 17. Mean, Standard Deviation, and Independent-Samples t-Test for Green and Responsible Tourism

Q	Category	Tourist Mean	Tourist SD	Local Residents Mean	Local Residents SD	t-value	p-value

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40

24	Sustainable accommodation options (e.g., eco-lodges) are available.	3.28	0.88	3.47	0.87	-1.54	0.126
25	Tourists are made aware of responsible behaviour guidelines.	3.62	0.83	3.88	0.91	-2.11	0.036
26	The destination limits overcrowding to protect nature.	3.45	0.61	3.39	0.99	0.51	0.607

4.9 Construct-wise Mean Scores

Mean values were compared for the different constructs to obtain an overall understanding of sustainable tourism practices. The mean scores of the five constructs of sustainable tourism are compared in Table 18. The highest mean was for Ecotourism and Environmental Practices (M = 3.88), followed by Community-Based Tourism Practices (M = 3.77). The highest mean was for Adventure, Nature and Rural Tourism (M = 3.86) followed by Ecotourism and Environmental Practices (M = 3.84), and then by Eco-tourism and Cultural Impact (M = 3.78) for local residents. The mean scores of the two groups were significantly lower for Green and Responsible Tourism. The pattern shows that tourists and local residents do not agree in terms of their priorities of individual aspects of sustainable tourism, but their perceptions were generally positive for all five constructs.

Table 18. Construct-Wise Mean Scores of Sustainable Tourism Practices Among Tourists and Local Residents

Rank	Construct	Tourist Mean	Local Residents Mean
1	Ecotourism and Environmental Practices	3.88	3.84
2	Community-Based Tourism Practices	3.77	3.68
3	Eco-tourism and Cultural Impact	3.45	3.78
4	Adventure, Nature & Rural Tourism	3.47	3.86
5	Green and Responsible Tourism	3.45	3.58

5. Discussion

The results revealed that the local people and the tourists have positive perceptions towards sustainable tourism development in Karbi Anglong with different degrees of strength along various dimensions. In this sense, the scores attributed to ecotourism and environmental practices were relatively satisfactory, indicating that the respondents have an appreciation of the value of safeguarding the situation and nature-based tourism. Cultural tourism was also viewed as positive by locals, pointing towards an increased presence and preservation of local culture, handicraft, and heritage through tourism. Community-based tourism had moderate strength; however, the distribution of benefits from tourism has caused some differences in perceptions, meaning that economic benefits may not be realised equally. Adventure, nature and rural tourism were a very good opportunity, while rural and agro tourism was comparatively underdeveloped. There were also weaknesses regarding sustainable accommodation, the awareness of the visitor and management of overcrowding, which were found in

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40
the field of green and responsible tourism. The results show significant destination potential and also significant gaps in environmental, infrastructural, community, and policy awareness.
The current results support earlier research showing that environmental preservation, community involvement, cultural preservation, and effective destination management are essential for sustainable tourism in the Northeastern region. Additionally, community and local economic involvement in sustainable tourist development is important. Community participation and benefits are key components of sustainable tourism, consistent with Sangma and Akoijam (2026), who noted the contribution of 'homestay' tourism in the economic empowerment of rural communities. Coordinated action between governments, businesses, local communities, and tourists is also essential for responsible tourism if environmental and socio-cultural resources are to be protected (United Nations Environment Programme & World Tourism Organization, 2005). Cultural sustainability is also vital, as the authenticity and representation of local traditions and cultural identity are crucial to tourism experiences (Wang, 1999). In line with the above, the importance of heritage preservation in tourism development was also highlighted by Timothy and Boyd (2003), which corroborates the current finding that local residents were positive about the preservation and promotion of cultural heritage. In turn, policy support is needed to achieve environmental sustainability, as in climate- and ecologically sensitive ecotourism destinations (Shang et al., 2023). Overall, these comparisons suggest that the difficulties found in Karbi Anglong are mirrored in the sustainability challenges that are experienced in other tourism hotspots in India.

The study adopted purposive sampling techniques in the selection of tourists and residents, the total population of which is 200, in the selected tourism locations. Therefore, the results drawn are not representative of all stakeholders and destinations of Assam. The cross-sectional, perception-based design also made for a limited temporal interpretation, and no government officials, tourism operators, or community leaders were directly surveyed. The present study can be expanded to include more and diverse stakeholders, especially government officials, tourism entrepreneurs, tour operators, homestay providers, community leaders, and conservation organizations in future studies. A more representative sample can be achieved by sampling at a greater number of locations, providing cross-regional comparisons to be made. Future research might examine how the region's changing tourism infrastructure and policies have affected stakeholders' attitudes and behaviors regarding sustainability throughout time. There is also a need to focus more on climate resilience, conservation of biodiversity, carrying capacity, and destination-level sustainability indicators. International sustainability frameworks can also be used to compare Karbi Anglong with other ecologically sensitive destinations, and to monitor and plan the tourism industry more effectively in the long term.

6. Policy Implications

The study intends to provide empirical data regarding how visitors and locals see sustainable tourism practices in the Karbi Anglong District. The findings will allow for a more comprehensive picture of destination sustainability through analyzing them within one framework, that of environmental practice, cultural impacts, community-based tourism, adventure and rural tourism, and green tourism. Differences were also found between tourists and residents, which indicate that the perceptions of stakeholder groups are not the same when they assess tourism development. The findings in this study are in support of the value of stakeholder-based assessment in identifying sustainable tourism strengths

Vol. 12 Issue 5s September, 2026
ISSN: 2208-2190 Pages- 93-113
DOI: 10.69980/yqmfkf40
and gaps in implementation. The empirical results can also serve as a reference for other districts in Assam and Northeast India in the future for comparison. Tourism authorities, local governments, destination managers, community organizations, and tourism businesses can all benefit from the findings. More effort is needed in relation to waste disposal, eco-friendly accommodation, responsible visitor behaviour, rural tourism development and public awareness of sustainability policies. Local communities need to be more directly involved in tourism planning, homestays, handicrafts, tourism guiding services, tourism festivals and other tourism businesses. Participation can enhance benefits to the local community and help to reinforce conservation and cultural preservation. The study suggests that Karbi Anglong is an emerging region in Northeast India for tourismGiven its biodiversity, tribal culture, natural features, and rural scenery, it presents promising opportunities for the expansion of sustainable tourism. The results suggest that the district would benefit from improving its infrastructure, coordination among stakeholders, policy awareness, and the engagement of the local community to make the district more robust in the Northeast tourism circuit. The study can consequently help regional planners to formulate a tourism plan that can be used to achieve both economic development and conservation of the environment and culture

7. Conclusion

The study concentrated on sustainable tourism practices in Karbi Anglong District from the perspectives of visitors and locals, particularly on environmental practices, cultural impacts, community involvement, adventure tourism, rural tourism, and green and responsible tourism. The result suggests that the district has good prospects for sustainable tourism development due to its biodiversity, natural resources, culture, and community resources. Favorable attitudes were found with regard to ecotourism, environmental protection, cultural heritage preservation, and participation in the community. But some shortcomings were also found, especially concerning waste management, eco-friendly accommodation, agro-tourism and rural development, overcrowding control, and awareness of sustainable tourism policies. The results also indicate that there is a need to improve coordination among the stakeholders, entrepreneurs, local communities, tourism authorities, and government agencies to develop sustainable tourism in Karbi Anglong. There is a need to invest more in environmental infrastructure, community-based enterprises, education of visitors, and responsible tourism practices. The study also demonstrates the necessity of considering the perspectives of both visitors and locals when evaluating a destination's sustainability. Overall, Karbi Anglong can enhance its sustainable tourism potential in Northeast India through an all-integrated approach, involvement of local communities, preservation of its cultural values, conservation of its ecological values, and appropriate implementation of the tourism policies.

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Vol. 12 Issue 5s September, 2026
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