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Wildlife tourism in Assam: Assessing environmental impact and governance for sustainable development

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Abstract
Wildlife tourism has become a crucial aspect of sustainable tourism, offering economic opportunities without compromising environmental integrity. In Assam, home to renowned national parks such as Kaziranga, Manas, and Nameri, local communities play a crucial role in the success of wildlife tourism. At the same time, the sector does raise concerns about environmental degradation and governance inefficiencies. This study examines the environmental impact and governance factors influencing wildlife tourism in Assam, with a focus on community perspectives. Primary data was collected using a structured questionnaire from local community being directly or indirectly related to wildlife tourism. Quantitative analysis (factor analysis, multiple regression) was conducted to assess perceptions of environmental challenges such as waste pollution, habitat disturbance, and human-wildlife conflict. The study also explores governance-related aspects, including policy satisfaction, revenue-sharing transparency, and local community participation in decision-making. Findings highlight key governance gaps, such as limited community involvement and inadequate policy implementation, which hinder the long-term sustainability of wildlife tourism. Tourism, while a source of livelihood, impacts the environment, threatening the very ecosystems on which it is dependent. Assam can improve its wildlife tourism sector by encompassing environmental responsibility with participatory governance, leading to conservation and community empowerment. The information contained in this study contributes to the discourse of sustainable tourism as a keyword highlighting the need for policy reforms and collective efforts to achieve a balance between tourism growth and environmental resilience.

Keywords: Wildlife tourism, environmental impact, governance, sustainable tourism, community participation

1. Introduction
Tourism is one of the most accelerated industries globally and serves as a key source of foreign exchange earnings and employment, particularly for developing countries. Increasingly, tourism is centred around natural environments, offering significant opportunities for socio-economic development. However, tourism presents a dual challenge. While it can positively contribute to economic growth, job creation, and cultural exchange, its rapid and often unregulated expansion can expedite environmental degradation, diminution of biodiversity, and the erosion of local identity and traditional cultures. Over time, economic development has become closely linked to increased exploitation of natural resources and environmental degradation, resulting in significant biodiversity loss. The Convention on Biological Diversity defines a PA as a "geographically defined area which is designated or regulated and managed to achieve specific conservation objectives," such as preserving biological diversity, maintaining natural ecological processes, and promoting the sustainable utility of biological resources within and around the area. These conservation efforts are designed not only to protect ecosystems but also to augment the well-being of local communities (Corson *et al*., 2014; Franks & Small, 2016) [34, 35].
Environmental impacts are inherently complex, often exhibiting non-linear patterns (Mieczkowski, 1995; Holden, 2000) [38, 37]. Some impacts accumulate gradually over time, leading to significant long-term changes that may only become apparent when mitigation is difficult. Others trigger rapid initial changes before stabilizing. Additionally, environmental effects can be spatially and temporally discontinuous, meaning their consequences may arise in different locations or at later stages. While tourism activities are typically concentrated in specific areas, their environmental effects—such as air, water, and noise pollution—can

extend far beyond the immediate site, affecting even pristine natural reserves. Cohen (1978) [36] identified four key factors influencing environmental impacts: (1) the severity of tourist destination utilization and infrastructure development, (2) the buoyancy of the ecosystem, (3) the time horizon of tourism developers, and (4) the degree to which tourism transforms the environment. Sustainable tourism development must prioritize environmental preservation and adhere to established principles of sustainability. Effective planning is essential to ensure a balanced use of resources, preventing negative impacts on the environment, visitor experiences, and fringe communities, including their economy and culture. While defining clear limits can be challenging, they are crucial for maintaining sustainability. To preserve the very resources that tourism depends on, the sector must invest in conserving and protecting natural environments. When properly managed, tourism has the prospective to contribute positively to environmental conservation and economic development, fostering a mutually beneficial relationship between tourism and sustainability.

2. Literature Review

Tourism is a significant driver of economic development, but its environmental consequences have been widely debated. While tourism can contribute to conservation and awareness, it also exerts pressure on natural ecospheres, influencing to various categories of environmental degradation. One of the most critical environmental concerns associated with tourism is habitat destruction. The expansion of tourism framework often leads to deforestation, wetland drainage, and land conversion, disrupting natural habitats (Buckley, 2011) [18]. Increased foot traffic and off-road vehicle use in ecologically sensitive areas contribute to soil erosion and habitat fragmentation, affecting biodiversity (Newsome, Moore, & Dowling, 2012) [26]. Additionally, wildlife disturbance due to tourism activities alters animal behavior, breeding patterns, and survival rates (Steven, Morrison, & Castley, 2015) [30].

Tourism generates significant pollution, including air, water, and noise pollution. Air pollution results from transportation emissions, particularly in destinations that rely on air travel and vehicular transport (Gössling, 2013) [21]. Water pollution arises from improper waste disposal, sewage runoff, and chemical contamination from tourism facilities, impacting freshwater ecosystems and marine biodiversity (Holden, 2016) [24]. Noise pollution from recreational activities such as motorized boat tours, safari vehicles, and loud tourist gatherings disturbs wildlife and affects local communities (Sunlu, 2003) [8]. The challenge of managing solid waste in tourism hotspots further exacerbates environmental issues with inadequate waste disposal infrastructure (Sharpley, 2009) [29].

Tourism often paramount to the wearing out of natural resources such as water, energy, and land. Water-intensive tourism activities, including swimming pools, golf courses, and luxury resorts, contribute to water scarcity, particularly in arid regions (Gössling *et al*., 2012) [22]. The demand for fuel and construction materials for tourism infrastructure accelerates deforestation and carbon emissions (Cole, 2012) [19]. In many coastal destinations, unregulated tourism development leads to coral reef degradation due to activities such as snorkeling, diving, and anchoring (Hall, 2010) [23].

Tourism significantly contributes to global greenhouse gas emissions, primarily through transportation and energy-intensive accommodation facilities (Peeters & Dubois, 2010) [27]. Aviation accounts for a major share of tourism-related carbon emissions, posing challenges for sustainable tourism development (Lenzen *et al*., 2018) [25]. Furthermore, climate change exacerbates the vulnerability of many tourist destinations, including coastal and mountainous regions, where rising sea levels, glacial retreat, threaten both ecological system and tourism frameworks (Scott, Hall, & Gössling, 2012) [22].

Despite these challenges, sustainable tourism practices can help mitigate environmental degradation. Ecotourism initiatives promote responsible travel, conservation, and local community engagement (Weaver, 2006) [33]. Strategies such as carrying capacity assessments, eco-certifications, and sustainable infrastructure development help minimize tourism's ecological footprint (Dodds & Butler, 2010) [20]. Policymakers and tourism stakeholders must collaborate to implement regulations that balance tourism growth with environmental protection (UNWTO, 2018) [32].

While tourism can be a tool for conservation, unsustainable practices pose significant threats to natural environments. Effective management strategies, including sustainable tourism policies and responsible traveller behaviour and community participation, are essential for minimizing negative environmental consequences and ensuring the long-term viability of tourism destinations. The rapid rise in tourist numbers, especially in the post-pandemic period, raises concerns about Kaziranga's carrying capacity and sustainable visitor management. However, there is a lack of empirical studies assessing how increasing tourism impacts ecological balance and understand local stakeholder perspectives on tourism-related challenges and opportunities.

3. Study area

Kaziranga National Park (KNP) situated in the north-eastern state of Assam, is a UNESCO World Heritage Site and one of the most famous protected areas of India. KNP, which spans around 1,090 square kilometers, is internationally famous for its impressive biodiversity, especially its population of the endangered one-horned rhinoceros, which is the highest density in the world. The park also hosts large populations of Bengal tigers, Asian elephants, swamp deer, and wild water buffalo, which makes it an important conservation area under the Indian government's Project Tiger and Project Elephant programs.

Table 1: Tourist Inflow at Kaziranga National Park (KNP)

Financial Year	Indian Visitors	Foreign Visitors	Total Visitors
2014-15	123,360	7,994	131,354
2015-16	162,799	7,055	169,854
2016-17	148,170	6,682	154,852
2017-18	179,173	8,537	187,710
2018-19	168,738	7,443	176,181
2019-20	153,818	11,006	164,824
2020-21	157,952	443	158,395
2021-22	218,517	910	219,427
2022-23	305,560	9,236	314,796
2023-24	313,574	13,919	327,493

Source: Official website of KNP (http://kaziranga.nptr.in/)

Kaziranga tourism supports local livelihoods, as well as revenue to fund conservation initiatives, and this balance must remain between sustainable and economic measures. Kaziranga National Park, Assam (KNP) forms the study area owing to the highest tourist footfall of any protected area in Assam (Table 1), and hence it is an ideal area to study the environmental consequences of wildlife tourism. It has been the most well spread of the year, and now, tourists in the national park have not only been on the rise in Bainiguifang, but also in foreigners.

4. Objective of the study

The study proposes to assess the perceived environmental impacts of wildlife tourism and their influence on sustainable tourism support among stakeholders in Kaziranga National Park, Assam. The specific objectives are:

1. To examine stakeholders' perceptions of the environmental impacts of wildlife tourism in. Assam.
2. To analyse the relationship between perceived environmental impacts and stakeholders' support for sustainable tourism.
3. To provide policy recommendations for promoting environmentally responsible tourism practices that balance conservation and local community benefits.

5. Research Methodology

This study focuses on wildlife tourism in Assam, with a particular emphasis on Kaziranga National Park. As the most visited wildlife tourism destination in the state, Kaziranga National Park attracts a significant number of tourists annually, making it an ideal location for assessing the perceived environmental effects of tourism and the level of support for sustainable tourism practices among stakeholders.

Since the total population of stakeholders involved in wildlife tourism in Kaziranga National Park is not precisely countable, Cochran's formula was employed to discover the appropriate sample size. Based on this formula, the required sample size for the study was calculated to be 385 respondents. The respondents include various stakeholders such as local community members, tourism service providers, and others directly or indirectly involved in the tourism sector.

The study employs structured survey statements to assess perceived environmental impacts and sustainable tourism support. The statements related to perceived environmental impact were adapted from existing literature, including Hunter (1997) [4], Gossling (2002) [2], Liu (2003) [5], Becken (2006) [1], Hall (2009) [3], and Weaver (2011) [10]. These statements capture various aspects of tourism's impact on the natural environment, resource utilization, waste management, and conservation efforts.

Similarly, statements measuring sustainable tourism support were adapted from Gursoy (2002) [14], Choi (2005) [13], and Zhang (2012) [12]. These statements assess stakeholders' willingness to support sustainable tourism initiatives, their perception of tourism's long-term viability, and their involvement in tourism-related decision-making processes.

The study employed factor analysis to identify and group related variables under meaningful dimensions of perceived environmental impact. Following factor extraction, multiple regression analysis was executed to examine the relationship between perceived environmental impact factors and sustainable tourism support. The extracted environmental impact factors were used as independent variables, while sustainable tourism support served as the dependent variable. This analysis helped determine the extent to which different environmental perceptions influence stakeholders' support for sustainable tourism practices.

6. Data Analysis and Findings

Table 2: Mean and standard deviation

Codes	Statements	Mean	Std. Deviation
	Perceived Environmental Impact		
PEV1	Tourism preserves the physical environment and improves the image of the destination	3.65	1.018
PEV2	Tourism helps to spread environmental consciousness among local residents	3.82	.972
PEV3	Tourism helps to protect and conserve the natural areas and wildlife	3.79	1.119
PEV4	Overuse of water resources by tourism industry result in water scarcity and degradation of water supply	3.52	1.031
PEV5	Waste management and recycling activities are properly maintained in my area	2.66	1.362
PEV6	The infrastructure facilities are built in harmony with the natural environment	3.85	1.033
PEV7	Tourism encourages awareness and appreciation by the community of natural assets	4.03	1.071
PEV8	Tourism is promoting sustainable tourism business by preferring eco-tourism	3.65	1.129
PEV9	Tourism causes undesirable air and noise pollution	2.31	1.046
PEV10	Economic gains are less important than the natural environment	3.71	1.120
	Sustainability and Tourism Support		
STS1	Tourism development should be actively continued in my region	3.55	1.096
STS2	The future of my region will be more sustainable with wildlife tourism	4.09	.800
STS3	Representatives of locals are getting involved in decision making process related to tourism	1.94	.562

Source: Hunter (1997) [4]; Gossling (2002) [2]; Liu (2003) [5]; Becken (2006) [1]; Hall (2009) [3]; Weaver (2011) [10]; Gursoy (2002) [14]; Choi (2005) [13]; Zhang (2012) [12]; and mean and std. deviation is author's work

Table 2 presents descriptive statistics on various perceptions of environmental and sustainability aspects of tourism, as well as the level of tourism support among respondents. The mean scores and standard deviations furnishes glimpses into the overall agreement and variability of responses. Several statements highlight the positive contributions of tourism to environmental conservation. Respondents generally agreed that tourism helps spread environmental consciousness among local residents (Mean = 3.82, SD = 0.972) and plays a role in protecting and conserving natural areas and wildlife (Mean = 3.79, SD = 1.119). Furthermore, the highest-rated statement, "Tourism encourages awareness and appreciation

by the community of natural assets" (Mean = 4.03, SD = 1.071), indicates strong acknowledgment of tourism's role in fostering environmental awareness. Similarly, respondents felt that tourism infrastructure is developed in harmony with the natural environment (Mean = 3.85, SD = 1.033). However, there are concerns regarding the environmental downsides of tourism. The statement "Overuse of water resources by the tourism industry results in water scarcity and degradation of water supply" received a moderate agreement (Mean = 3.52, SD = 1.031). Additionally, waste management and recycling activities were rated relatively low (Mean = 2.66, SD = 1.362), suggesting dissatisfaction with current waste management practices. Another major concern is tourism-induced pollution, as "Tourism causes undesirable air and noise pollution" received the lowest mean score (Mean = 2.31, SD = 1.046), indicating disagreement or minimal perceived impact.

Respondents exhibited a positive outlook on sustainable tourism, with a strong belief that "The future of my region will be more sustainable with wildlife tourism" (Mean = 4.09, SD = 0.800), the highest-rated statement in this section. Furthermore, there was general agreement that "Tourism development should be actively continued in my region" (Mean = 3.55, SD = 1.096), showing moderate support for ongoing tourism initiatives. However, a significant gap exists in local community participation in decision-making. The statement "Representatives of locals are getting involved in the decision-making process related to tourism" received the lowest score (Mean = 1.94, SD = 0.562), indicating strong disagreement and suggesting that local voices are largely excluded from tourism-related policy and planning decisions.

Factor analysis is essential in examining the perceived environmental impact of tourism as it helps identify underlying patterns within a set of interrelated variables. Given that environmental perceptions can be influenced by multiple factors—such as conservation efforts, pollution concerns, and sustainable infrastructure—factor analysis enables researchers to group related perceptions into meaningful constructs. This statistical approach reduces data complexity and provides a clearer understanding of how different environmental aspects of tourism are perceived by stakeholders. By extracting key factors, policymakers and tourism planners can focus on the most influential dimensions to enhance sustainability efforts and mitigate negative impacts.

Table 3: KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.788
Bartlett's Test of Sphericity	Approx. Chi-Square	1165.816
	df	45
	Sig.	.000

Source: Author's work

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy is reported as 0.788 (see Table 3), which indicates a moderate to high suitability of the data for factor analysis. KMO with values above 0.7 are considered acceptable, suggesting that the dataset is well-structured for identifying latent factors. Bartlett's Test of Sphericity yielded a Chi-Square value of 1165.816 (df = 45, $p < 0.001$). This recommends that there are enough correlations between variables to justify the application of factor analysis. These results collectively support the appropriateness of proceeding with factor analysis to uncover key dimensions influencing perceived environmental impacts of tourism.

Table 4: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.324	33.240	33.240	3.324	33.240	33.240	2.839	28.390	28.390
2	1.556	15.561	48.801	1.556	15.561	48.801	1.633	16.328	44.718
3	1.220	12.201	61.002	1.220	12.201	61.002	1.628	16.284	61.002
4	.965	10.645	71.647						
5	.824	8.243	79.890						
6	.623	6.232	86.123						
7	.458	4.577	90.700						
8	.338	3.378	94.078						
9	.321	3.211	97.289						
10	.271	2.711	100.000						

Source: Author's work

The Principal Component Analysis (PCA) was conducted to recognize the key dimensions fundamental perceptions of environmental impact. The Initial Eigenvalues indicate how much variance each component explains. Using Kaiser's criterion (Eigenvalue > 1), three factors were extracted, together cumulating to 61.00% of the total variance in the dataset (see Table 4). The Rotation Sums of Squared Loadings refine the interpretation by redistributing variance among the factors. After rotation, the variance explained by Factor 1 decreased to 28.39%, while Factor 2 and Factor 3 increased to 16.33% and 16.28%, respectively. This indicates that after rotation, the factors have become more balanced, making them easier to interpret. Rotating the factors allows each variable to load more distinctly onto a specific factor, which helps clarify the underlying environmental dimensions being measured.

Table 5: Rotated Component Matrix

Codes	Statements	Component		
		1	2	3
PEV7	Tourism encourages awareness and appreciation by the community of natural assets	.861		
PEV6	The infrastructure facilities are built in harmony with the natural environment	.825		
PEV8	Tourism is promoting sustainable tourism business by preferring eco-tourism	.729		
PEV3	Tourism helps to protect and conserve the natural areas and wildlife	.778		
PEV10	Economic gains are less important than the natural environment		.770	
PEV5	Waste management and recycling activities are properly maintained in my area		.759	
PEV4	Overuse of water resources by tourism industry result in water scarcity and degradation of water supply		.730	
PEV9	Tourism causes undesirable air and noise pollution		.711	
PEV1	Tourism preserves the physical environment and improves the image of the destination			.835
PEV2	Tourism helps to spread environmental consciousness among local residents			.790

Source: Author's work

The rotated factor matrix reveals three distinct factors based on the grouping of related statements. Each factor represents a unique aspect of how tourism influences the environment.

The first factor comprises statements related to tourism's role in fostering environmental awareness and conservation efforts (see table 5). Statements with high loadings include "Tourism encourages awareness and appreciation by the community of natural assets" (0.861), "The infrastructure facilities are built in harmony with the natural environment" (0.825), and "Tourism is promoting sustainable tourism business by preferring eco-tourism" (0.729). These findings suggest that this factor reflects the perception that tourism contributes to environmental sustainability through conservation, eco-friendly infrastructure, and awareness-building. This factor can be named "Sustainable Tourism and Environmental Conservation."

The second factor captures negative environmental impacts and waste management concerns associated with tourism. Statements such as "Economic gains are less important than the natural environment" (0.770), "Waste management and recycling activities are properly maintained in my area" (0.759), and "Overuse of water resources by the tourism industry results in water scarcity and degradation of water supply" (0.730) load highly on this factor. Additionally, the perception that "Tourism causes undesirable air and noise pollution" (0.711) indicates concerns regarding environmental degradation. This factor can be interpreted as "Environmental Challenges and Management Issues."

The third factor consists of statements that highlight tourism's contribution to environmental consciousness and the overall image of the destination. High-loading statements include "Tourism preserves the physical environment and improves the image of the destination" (0.835) and "Tourism helps to spread environmental consciousness among local residents" (0.790). This suggests that tourism is perceived as a driving force in raising awareness about environmental preservation and enhancing the destination's reputation. This factor can be named "Tourism's Role in Environmental Awareness and Image Building."

Multiple regression analysis is an important statistical technique that allows the understanding of the influence of various independent variables on a dependent variable. The dependent variable is Sustainable Tourism Support, and independent variables comprise three crucial aspects of environmental perception. The identified factors are dimensions of the way in which particular stakeholders interpret the tourism industry product for the local area and its impact on the environment (as resulted from the factor analysis).

The first independent variable, Sustainable Tourism and Environmental Conservation, reflects tourism effect itself in a positive light enhancing the scope of eco-friendly practices, conservation efforts, and environmental sustainability. It embodies the idea that tourism is a vehicle for natural resources as well the development of eco-tourism and creating sustainable infrastructure. The other independent variable that emerged from the data is Environmental Challenges and Management Issues, pointing towards issues of pollution, waste management and resource depletion resulting from tourism. The last variable indicates the consideration that tourism, as an economic activity, is not positive in the long run because contributes to air and noise pollution, depletion of natural resources (water), and poor waste disposal techniques. Tourism's Role in Environmental Awareness and Image Building is the third independent variable, and it reflects the notion that tourism significantly contributes to mobilising environmental consciousness within society and improving the destination's overall reputation. This hypothesis reflects the idea that tourism strengthens the protection of the physical environment and helps create a sense of environmental responsibility among local communities.

Using multiple regression analysis, this study aims to assess how various environmental perception factors impact local stakeholders' support towards sustainable tourism. The results will furnish a better comprehension of the main factors influencing out where sustainable tourism support and we hope this research will inform and assist policymakers and tourism planners across the world in the quest for sustainable tourism development in line with environmental objectives and local interests.

Based on the multiple regression analysis framework, the study proposes to examine the effect impact of three key environmental perception factors on Sustainable Tourism Support. The following hypothesis is formulated:

Hypothesis: There is a significant relationship between the perceived environmental impact and sustainable tourism support.

The sub-hypothesis can be

H_1: Sustainable Tourism and Environmental Conservation has a significant impact on sustainable tourism support.

H_2: Environmental Challenges and Management Issues has a significant impact on sustainable tourism support.

H_3: Tourism's Role in Environmental Awareness and Image Building has a significant impact on sustainable tourism support.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.574[a]	.329	.324	1.30207
a. Predictors: (Constant), PEV_ F3, PEV_ F2, PEV_ F1				

Source: Author's work

An overview of how effectively the independent variables account for the variation in the dependent variable, Sustainable Tourism Support (STS_SUM), is given in the model summary. The independent variables (Sustainable Tourism and Environmental Conservation, Environmental Challenges and Management Issues, and Tourism's Role in Environmental Awareness and Image Building) and sustainable tourism support have a moderately positive correlation, as indicated by the R-value of 0.574 (see Table 6). According to the R-Square (0.329), the three independent variables account for about 32.9% of the variance in Sustainable Tourism Support. The model's dependability is confirmed by the Adjusted R-Square (0.324), which takes into consideration the number of predictors in the model and stays near the R-Square value. The average difference between the actual and anticipated values is shown by the standard error of the estimate (1.30207).

Table 7: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	44.874	3	14.958	8.823	**.000[b]**
	Residual	645.942	381	1.695		
	Total	690.816	384			
a. Dependent Variable: STS_SUM						
b. Predictors: (Constant), PEV_ F3, PEV_ F2, PEV_ F1						

Source: Author's work

The overall significance of the regression model is evaluated using the ANOVA table (see table 7). The model is statistically significant, according to the F-statistic (8.823) and the significance value (p = 0.000). This indicates that at least one independent variable has a major impact on support for sustainable tourism. Although the model explains a respectable amount of the variance, there are still additional factors impacting support for sustainable tourism that cannot be explained, as indicated by the regression sum of squares (44.874) being rather small in comparison to the residual sum of squares (645.942).

Table 8: Co-efficients Table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5.772	.474		12.184	.000
	PEV_ F1	.076	.021	.191	3.560	.000
	PEV_ F2	.005	.026	.010	.195	.845
	PEV_ F3	.086	.042	.109	2.031	.043
a. Dependent Variable: STS_SUM						

Source: Author's work

The coefficients table (see table 8) provides insights into the individual contribution of each independent variable:

- The constant (B = 5.772, p = 0.000) represents the predicted value of Sustainable Tourism Support when all independent variables are zero.
- Sustainable Tourism and Environmental Conservation (PEV_F1) has a positive and statistically significant impact on Sustainable Tourism Support (B = 0.076, p = 0.000). This suggests that as perceptions of tourism's role in conservation and sustainability improve, support for sustainable tourism also increases. Hence Hypothesis 1 is accepted.
- Environmental Challenges and Management Issues (PEV_F2) does not show a significant effect on Sustainable Tourism Support (B = 0.005, p = 0.845). This implies that concerns related to waste management, pollution, and resource depletion may not directly influence stakeholders' support for sustainable tourism. Hence Hypothesis 2 is rejected.
- Tourism's Role in Environmental Awareness and Image Building (PEV_F3) has a significant positive impact on Sustainable Tourism Support (B = 0.086, p = 0.043). This indicates that when tourism is perceived as contributing to environmental awareness and improving the destination's image, support for sustainable tourism increases. Hence Hypothesis 3 is accepted.

Overall, the regression results indicate that Sustainable Tourism and Environmental Conservation and Tourism's Role in Environmental Awareness and Image Building significantly influence Sustainable Tourism Support, while Environmental Challenges and Management Issues do not have a meaningful impact. This suggests that local stakeholders are more likely to support sustainable tourism when they perceive its positive contributions rather than its environmental drawbacks. These findings highlight the importance of promoting conservation efforts and raising environmental awareness to enhance community support for sustainable tourism initiatives

7. Discussion

The results from this study offer important perspectives for understanding local perceptions of the environmental impacts of wildlife tourism in Assam and how these perceptions are positively correlated to their support for tourism sustainability efforts. The factor analysis illustrates that individuals' perceptions of the environmental impact of tourism are determined by three major components, namely (1) Sustainable tourism and and conservation; (2) Environmental challenges and management; (3) Environmental awareness and image. These insights can help policymakers and other tourism sector stakeholders develop policies and strategies that contain tourism's positive environmental effect and reduce its negative impact.

Multiple regression analysis is performed on only two of the environmental perception factors significantly contribute to Sustainable Tourism Support. The strongest predictor is Sustainable Tourism and Environmental Conservation, second is Tourism's Role in Environmental Awareness and Image Building. On the contrary, Environmental Challenges and Management Issues statistically insignificant for the support of sustainable tourism. By presenting the positive environmental benefits of sustainable tourism instead of promoting its negative environmental consequences, stakeholders seem more

willing to endorse sustainable tourism when it means helping to promote conservation and environmental awareness. This knowledge can also help policymakers and tourism planners create eco-friendly strategies and awareness campaigns to consolidate local community support for sustainable tourism.

The findings indicate that respondents from Assam, especially those residing in close proximity to tourism zones such as Manas and Kaziranga National Parks, are more willing to embrace sustainable tourism practices if they believe these practices contribute to enhanced conservation initiatives and environmental awareness. These relationships are positive (Sustainable Tourism to Environmental Conservation), suggesting that stakeholders appreciate the importance of tourism in encouraging eco-friendly practices, wildlife conservation, and sustainable infrastructure (Sustainable Tourism Support). However, consistent with global tendencies that view nature-based visitation as a mechanism for conservation and local development, this is also the case in many destinations.

On the other hand, the insignificant impact of Environmental Challenges and Management Issues suggests that while concerns about pollution, waste management, and water scarcity exist, they do not strongly influence the willingness of locals to support sustainable tourism. This could be due to the economic dependence of communities on tourism-related activities, which may overshadow environmental concerns. Alternatively, it could indicate that existing environmental management efforts, though insufficient, have not reached a crisis level that significantly affects stakeholder perceptions.

The significant role of Tourism's Role in Environmental Awareness and Image Building highlights that stakeholders appreciate the role of tourism in enhancing environmental consciousness and improving the destination's reputation. This finding suggests that community members may be more engaged in conservation efforts if they see tangible benefits in terms of improved environmental awareness and destination branding.

8. Recommendations and Conclusion

To strengthen sustainable wildlife tourism in Assam, it is essential to adopt a community-centric and environmentally responsible approach. One of the most effective strategies is to enhance community involvement in conservation efforts. Stakeholders from local areas should be involved in eco-tourism projects, wildlife conservation programs, and sustainable tourism development. By creating community-based conservation projects that allow locals to receive a direct financial reward from tourism income, a sense of ownership and accountability to preserve the environment can catalyse as a result. Training locals in eco-tourism and conservation activities will also help create more jobs while promoting sustainable practices in all three nations.

Environmental education needs to be provided to local communities and tourists alike if we are to encourage responsible tourist behaviour. There should be awareness campaigns on sustainable tourism practices, waste management, and the need to conserve wildlife, for example. Through activities such as organizing educational nature trails eco-tours and interactive workshops visitors and locals can understand the importance of sustaining Assam's wealth of biodiversity. Resorts and safari operators, along with the many other businesses that cater to tourists, should also be encouraged to adopt environmentally responsible practices and to inform their guests about conservation ethics.

Infrastructure development should be sustainable so that while tourism expands, it does not lead to environmental hazard. Projects like infrastructure, such as hotels, lodges and tourism facilities, should be eco-friendly, with the possibility of using renewable energy resources (such as solar energy), sustainable construction building materials and effective water conservation methods. Furthermore, infrastructure of public transport within wildlife tourism regions should be developed in order to promote mitigation of carbon emissions and curb environmental impacts of tourism.

Waste management and pollution control is a major challenge for wildlife tourism destinations. Strict waste disposal is a must, especially in tourism-dense areas right outside of national parks. Park entrances should be managed effectively and local tourist operators, authorities, hotels, and restaurants should work together to create disposal systems for waste in the most effective way, including recycling and biodegradable waste. It is constantly an excellent idea to discover local entrepreneurs, business owners, hoteliers, and restaurant owners and encourage them to participate in a sustainable waste management process like going plastic-free or seeking eco-friendly options.

One also has to step back and consider from a policy angle, where line should be drawn on the current facet without depriving one where guidelines are needed in order to expand tourism without causing environmental or climate cataclysm. It is expected that tourism, forest and environmental departments will work in coordination so that policies will be prepared to provide economic benefit to tourism without harming ecology. Moreover, incentives should be offered to businesses that engage in responsible tourism practices, such as through eco-certifications or tax breaks for limited environmental impact.

Finally, eco-tourism, and sustainable wildlife tourism practices would help with branding Assam as a safe and responsible destination for wildlife enthusiasts. Encouragement should be given to eco-tourism ventures that contribute to biodiversity conservation and deliver direct economic benefits to local communities. In 2023, responsible tourism certification programs will also be gradually introduced to ensure that tourism businesses engage in ethical practices when offering their services, such as capping visitor numbers in ecologically delicate areas and promoting ethical wildlife interactions.

Assam will be able to achieve long-term sustainability for both local populations and the environment by balancing tourism development with conservation objectives thanks to these efforts. Sustainable wildlife tourism has the potential to spur economic expansion while protecting the area's rich biodiversity and cultural legacy for future generations.

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