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Ecotourism Challenges and Opportunities for Biodiversity Conservation and Local Empowerment in Dumangas Coastal Areas

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Abstract

This study examined the current practices, challenges, and strategic interventions for ecotourism implementation in the Dumangas Coastal Areas. A total of 300 respondents, comprising fisherfolk, tourism workers, and community leaders, participated in the study. Most stakeholders were within the economically active age groups, predominantly male, and possessed varying educational backgrounds, which influenced their engagement and capacity in ecotourism initiatives. Results revealed that ecotourism practices were implemented at a high level, particularly in environmental conservation and community participation, while tourism services and governance support were rated moderate to moderately high, indicating opportunities for improvement. Environmental conservation activities, including protected area establishment, mangrove reforestation, and waste management, were strongly practiced, reflecting stakeholder awareness of ecosystem protection. Challenges encountered were generally moderate, with environmental issues such as coastal degradation being most prominent, followed by economic, socio-cultural, and institutional constraints. Statistical analysis indicated a significant moderate negative correlation ($r = -0.462$, $p < 0.05$) between the level of ecotourism practices and the extent of challenges encountered, suggesting that higher implementation of sustainable practices mitigates perceived obstacles. Based on these findings, a strategic framework was proposed, emphasizing environmental sustainability, community empowerment, institutional support, and enhancement of tourism services to strengthen ecotourism implementation. The study concludes that while ecotourism in Dumangas shows strong potential for biodiversity conservation and local empowerment, addressing existing challenges through structured interventions is essential for sustainable development and community resilience.

Keywords: Ecotourism, Dumangas Coastal Areas, environmental conservation, community participation, sustainable tourism, local empowerment, strategic framework

INTRODUCTION

Ecotourism has gained global recognition as a sustainable development approach that integrates environmental conservation, economic growth, and social empowerment, particularly in ecologically sensitive areas such as coastal communities. It is commonly defined as responsible travel to natural areas that conserves the environment, sustains the well-being of local people, and involves interpretation and education (The International Ecotourism Society [TIES], 2015). When effectively managed, ecotourism can serve as a powerful tool for biodiversity conservation while providing alternative livelihood opportunities for local populations.

The Philippines is considered one of the world's biodiversity hotspots, endowed with extensive coastlines, rich marine ecosystems, mangrove forests, and coral reefs that are vital for ecological balance and food security (Department of Tourism [DOT], 2022). These natural assets position the country as a prime destination for ecotourism. However, despite its

high potential, ecotourism development in the Philippines faces persistent challenges, including weak policy enforcement, inadequate infrastructure, limited community participation, and environmental degradation caused by unsustainable tourism practices (TIES, 2020). In coastal areas, these challenges are intensified due to overfishing, coastal pollution, mangrove deforestation, and climate-related risks such as sea-level rise and coastal erosion.

Several studies emphasize that community-based ecotourism plays a crucial role in addressing these challenges by fostering local stewardship over natural resources. Ballad et al. (2021) found that ecotourism initiatives linked to marine protected areas in the Philippines enhanced community participation in coastal resource management while providing economic incentives aligned with conservation goals. Similarly, sustainable ecotourism has been shown to improve environmental awareness, strengthen local governance, and promote equitable benefit-sharing when communities are actively involved in planning and decision-making processes (UNWTO, 2021).

Despite these positive outcomes, ecotourism remains at a crossroads. Poorly planned tourism development can lead to habitat destruction, cultural commodification, and unequal distribution of benefits, undermining both biodiversity conservation and local empowerment (Buckley, 2019). Scholars argue that without proper governance frameworks, capacity building, and community ownership, ecotourism risks becoming exploitative rather than transformative (Weaver, 2018). This tension highlights the need for localized studies that examine how ecotourism operates within specific socio-ecological contexts.

In the Dumangas Coastal Areas of Iloilo, coastal and marine ecosystems such as mangrove forests, fishing grounds, and near-shore habitats serve as primary sources of livelihood, food security, and ecological protection for local communities. These areas are increasingly exposed to environmental pressures and economic vulnerability, making sustainable coastal management a pressing concern. Ecotourism presents an opportunity to balance conservation and development by promoting biodiversity protection while empowering local communities through alternative income sources, skills development, and participatory governance. However, limited empirical research exists on how ecotourism initiatives in Dumangas address existing challenges and harness opportunities for long-term sustainability.

Research Objective. Given these conditions, this study seeks to examine ecotourism at the crossroads in the Dumangas Coastal Areas by identifying key challenges and opportunities in advancing biodiversity conservation and local empowerment. The findings of this research are expected to contribute to evidence-based policy formulation, community-centered tourism planning, and sustainable coastal development initiatives that align ecological integrity with socio-economic resilience. To achieve the above objective, the study is guided by the following research questions:

1. What is the profile of the respondents in terms of:
   1.1 age;
   1.2 sex;
   1.3 educational attainment; and,
   1.4 role in ecotourism activities (fisherfolk, tourism workers, community leaders)?

2. What ecotourism practices are currently implemented in the Dumangas Coastal Areas in terms of:
   2.1 environmental conservation measures;
   2.2 community participation;
   2.3 tourism services and facilities; and
   2.4 local governance and policy support?

3. What challenges are encountered in the implementation of ecotourism in the Dumangas Coastal Areas in terms of:
   3.1 environmental challenges;
   3.2 economic challenges;
   3.3 socio-cultural challenges; and
   3.4 institutional and governance challenges?

4. Is there a significant relationship between ecotourism practices and challenges encountered in the implementation of ecotourism in the Dumangas Coastal Areas?

5. What strategic framework/action plan can be proposed to strengthen ecotourism implementation for biodiversity conservation and local empowerment in the Dumangas Coastal Areas?

Conceptual framework. As illustrated in Figure 1, this study examined how respondents' profiles, such as age, sex, educational attainment, and roles in ecotourism activities, including fisherfolk, tourism workers, and community leaders, influence the implementation of ecotourism practices and the challenges encountered in the Dumangas Coastal Areas (DCA).

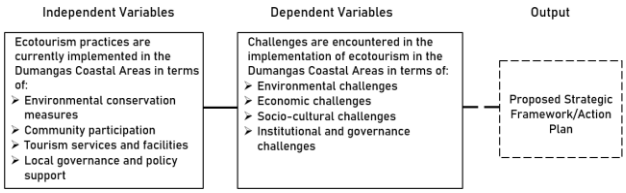

Figure 1
The Conceptual Design Depicting the Relationship Between Variables

The study focused on ecotourism practices as the independent variables, specifically environmental conservation measures, community participation, tourism services and facilities, and local governance and policy support. The dependent variables comprised the challenges faced in implementing these practices, which were categorized as environmental, economic, socio-cultural, and institutional and governance challenges. The interaction between respondents' characteristics and challenges was analyzed to understand how they affected the effectiveness of ecotourism initiatives in promoting biodiversity conservation and community empowerment. Based on the findings, a proposed strategic framework or action plan was developed to enhance the implementation of ecotourism practices and support sustainable development in DCA.

LITERATURE REVIEW

Ecotourism has emerged as a vital strategy that links biodiversity conservation with socio-economic development in local communities. It is broadly defined as responsible travel to natural areas that conserves the environment while improving the well-being of local populations (The International Ecotourism Society, 2021). Recent studies highlight that ecotourism supports conservation by generating funding for protected areas, raising environmental awareness, and providing alternative livelihoods for communities dependent on natural resources (Goodwin, 2017; Buckley, 2020). Consequently, ecotourism has become a widely promoted development approach, especially in biodiversity-rich coastal and rural regions where conservation and livelihood objectives must be balanced.

Research indicates that the success of ecotourism largely depends on sustainable management practices and active stakeholder collaboration. Buckley (2020) argues that initiatives are most effective when environmental protection is integrated with community participation and responsible tourism management. Similarly, Goodwin (2017) emphasizes that sustainable tourism requires cooperation among governments, local communities, and private stakeholders to ensure equitable benefit sharing and environmental protection. These studies underscore the need for careful planning to prevent tourism activities from compromising ecological integrity or community welfare.

In the Philippine context, ecotourism offers significant opportunities due to the country's rich biodiversity, extensive coastlines, and cultural heritage. Yet, challenges persist, including fragmented planning, limited institutional coordination, and inadequate infrastructure (Department of Tourism Philippines, 2021; Department of Environment and Natural Resources Philippines, 2020). Such challenges often reflect broader governance issues within decentralized tourism systems, where national agencies, local governments,

and community stakeholders may operate with limited integration.

Despite these obstacles, empirical studies demonstrate the positive impact of ecotourism on community engagement in conservation. For example, Ballad, Morooka, and Shinbo (2021) found that ecotourism development in the Palaui Island Protected Landscape and Seascape enhanced local support for marine protected area management. Reliable income from ecotourism encouraged community members to participate actively in conservation efforts, suggesting that ecotourism can shift coastal communities toward sustainable resource use.

Beyond environmental outcomes, ecotourism can empower communities and foster socio-economic development. Community-based models emphasize the involvement of local residents in planning, management, and decision-making, ensuring that tourism benefits are more equitably distributed (Spenceley, 2019). Regional studies in Southeast Asia further highlight that community participation improves livelihoods, strengthens social cohesion, and supports environmental conservation. However, limited training, unequal access to benefits, and insufficient local capacity can constrain the effectiveness of such initiatives.

Additional challenges include environmental threats like habitat degradation, coastal pollution, and climate-related impacts (Buckley, 2020), as well as economic and socio-cultural issues such as unequal income distribution, limited market access, cultural commodification, and lifestyle changes. Institutional and governance shortcomings, including weak policy enforcement and insufficient coordination among agencies, further complicate ecotourism implementation (Department of Tourism Philippines, 2021). These challenges underscore the importance of integrated planning, collaborative management, and supportive policy frameworks to ensure sustainable outcomes.

Overall, the literature suggests that ecotourism can significantly contribute to biodiversity conservation and community empowerment when implemented effectively. Its success depends on strong governance, inclusive community participation, and careful management of environmental, economic, and socio-cultural challenges. These provide a solid foundation for examining ecotourism practices and challenges in the Dumangas Coastal Areas and for developing strategies that promote sustainable ecotourism development.

METHODOLOGY

Research Design. This study employed a descriptive survey research design to examine the role, challenges, and opportunities of ecotourism in advancing biodiversity conservation and local empowerment in the Dumangas Coastal Areas. The design enabled the researchers to systematically gather and analyze data regarding existing e cotourism practices, community participation, and challenges encountered in the implementation of ecotourism initiatives within the study area.

Respondents of the Study. The respondents of the study consisted of individuals involved in ecotourism-related activities in the Dumangas Coastal Areas. These included fisherfolk, tourism workers, and community leaders, representing participants with varying ages, sexes, and educational backgrounds. These groups were selected because of their direct involvement in coastal resource utilization, tourism services, environmental conservation efforts, and local governance, making them highly relevant to the objectives of the study.

Sampling Technique and Sample Size Determination. The respondents were selected using purposive sampling, which allowed the researchers to identify individuals who were directly involved in or affected by ecotourism activities. This approach ensured that the participants possessed sufficient knowledge and experience related to the implementation of ecotourism in the community.

Instrumentation. Data were collected using a researcher-developed questionnaire designed to obtain information on the respondents' profile, ecotourism practices, and challenges encountered in the implementation of ecotourism initiatives. The responses were interpreted using the scale in Table 1.

Table1
Scale of Extent and Challenge with Interpretation

Scale	Range	Interpretation
5	4.21 – 5.00	Very High Extent / Very High Challenge
4	3.41 – 4.20	High Extent / High Challenge
3	2.61 – 3.40	Moderate Extent / Moderate Challenge
2	1.81 – 2.60	Low Extent / Low Challenge
1	1.00 – 1.80	Very Low Extent / Very Low Challenge

To ensure content validity, the questionnaire was reviewed by a panel of experts in tourism management, environmental studies, and research methodology. Their comments and suggestions on the clarity, relevance, and alignment of items to the objectives were incorporated in the revision of the instrument.

To establish reliability, the questionnaire underwent pilot testing among 20 respondents who were not included in the final sample. The internal consistency of the instrument was measured using Cronbach's Alpha, which yielded a .995 coefficient indicating an excellent level of reliability. This confirms that the items consistently measured the constructs related to ecotourism practices and implementation challenges.

Ethical Considerations. Ethical standards were strictly observed throughout the conduct of the study. Prior to data collection, the researchers secured approval from the appropriate institutional authorities. Participants were informed about the purpose of the research and were asked to provide informed consent before answering the questionnaire.

The respondents were assured that their participation was voluntary, and they were free to withdraw from the study at any time without any negative consequences. The confidentiality and anonymity of all respondents were also ensured by not collecting personally identifiable information and by using the data solely for academic research purposes.

Data Analysis. The collected data were tabulated, analyzed, and interpreted using the Statistical Package for the Social Sciences (SPSS) to ensure accuracy and consistency in the computation of results. Weighted mean was used to determine the extent of ecotourism practices implemented in the Dumangas Coastal Areas in terms of environmental conservation measures, community participation, tourism services and facilities, and local governance and policy support. The same statistical tool was also utilized to determine the level of challenges encountered in the implementation of ecotourism in terms of environmental, economic, socio-cultural, and institutional and governance challenges. On the other hand, to determine whether a significant relationship exists between ecotourism practices and the challenges encountered in the implementation of ecotourism, the Pearson Product–Moment Correlation Coefficient (r) was applied. However, in cases where the data did not meet the assumptions of normality or were treated as ordinal data, the Spearman Rank Correlation Coefficient was used as an alternative statistical test.

All statistical analyses were interpreted at a 0.05 level of significance. The results of the analysis served as the basis in determining the level of ecotourism practices, identifying the challenges encountered, and examining the relationship between these variables. The findings further provided empirical support for the development of a strategic framework/ action plan aimed at strengthening sustainable ecotourism implementation in the Dumangas Coastal Areas.

RESULTS AND DISCUSSIONS

Demographic Profile of the Respondents. Table 2 presents the profile of respondents in terms of age, sex, educational attainment, and roles in ecotourism activities in the Dumangas Coastal Areas.

Table 2
Profile of Respondents

Profile Variable	Category	Frequency	Percentage (%)
Age	18–29 years	78	26.00
	30–39 years	92	30.67
	40–49 years	71	23.67
	50 years and above	59	19.66
	Total	**300**	**100.00**
Sex	Male	176	58.67
	Female	124	41.33
	Total	**300**	**100.00**
Educational Attainment	Elementary Level/Graduate	82	27.33
	High School Level/Graduate	129	43.00
	College Level/Graduate	74	24.67
	Postgraduate	15	5.00
	Total	**300**	**100.00**
Role in Ecotourism Activities	Fisherfolk	138	46.00
	Tourism Workers	97	32.33
	Community Leaders	65	21.67
	Total	**300**	**100.00**

In terms of age, most respondents were 30–39 years old (30.67%), followed by 18–29 years (26.00%), 40–49 years (23.67%), and 50 years and above (19.66%). This indicates that the majority belong to economically active age groups likely engaged in ecotourism-related livelihoods and conservation activities. This finding aligns with studies suggesting that younger and middle-aged adults are more involved in ecotourism initiatives due to their physical capacity, familiarity with tourism operations, and openness to sustainable practices (Spenceley, 2019; Buckley, 2020).

Regarding sex, males comprised 58.67% of respondents, while females accounted for 41.33%. The predominance of male respondents reflects the traditional role of men in coastal resource-related activities, such as fishing, whereas women's participation in tourism services, community programs, and local governance has been increasing. This pattern resonates with the literature emphasizing that inclusive community participation, including both men and women, strengthens the effectiveness and sustainability of ecotourism initiatives (Goodwin, 2017; Spenceley, 2019).

Educational attainment showed that most respondents were high school graduates (43.00%), followed by those with elementary education (27.33%), college-level education (24.67%), and postgraduate education (5.00%). These differences suggest varying levels of awareness and capacity to engage in ecotourism and environmental conservation activities. Previous studies indicate that higher education levels are positively associated with understanding sustainable tourism principles and active participation in conservation efforts (Buckley, 2020). However, moderate governance challenges observed in this study, despite reasonable community participation, may be influenced by the relatively lower proportion of highly educated stakeholders, underscoring the need for continuous capacity-building and training programs.

With regard to roles in ecotourism activities, nearly half of the respondents were fisherfolk (46.00%), followed by tourism workers (32.33%) and community leaders (21.67%). This distribution captures perspectives of key stakeholders involved in coastal resource use, tourism services, and local governance. The findings support prior research highlighting that community engagement, especially of resource-dependent groups like fisherfolk, is critical to achieving both biodiversity conservation and sustainable livelihoods (Ballad et al., 2021; Goodwin, 2017). Yet, the moderate governance challenges observed suggest that while participation is present, effective coordination and policy support remain essential to maximize ecotourism outcomes, consistent with reports of fragmented institutional management in Philippine coastal areas (Department of Tourism Philippines, 2021; Department of Environment and Natural Resources Philippines, 2020).

Overall, the respondents' profile provides a nuanced understanding of the stakeholders

involved in Dumangas Coastal Areas' ecotourism activities. Linking these characteristics to previous studies underscores that age, sex, educational attainment, and stakeholder role collectively influence participation, awareness, and the effectiveness of ecotourism initiatives, highlighting both opportunities and areas for improvement in sustainable implementation.

Current Practices in Ecotourism Implemented in the Dumangas Coastal Areas. Table 3 presents the level of implementation of ecotourism practices in the Dumangas Coastal Areas based on the responses of 300 respondents. The results indicate that ecotourism practices are implemented at a high level overall (WM = 3.88), suggesting that local stakeholders are actively engaged in promoting sustainable tourism and biodiversity conservation.

Table 3
Level of Implementation of Ecotourism Practices in the Dumangas Coastal Areas

Ecotourism Practices	Weighted Mean (WM)	Interpretation
Environmental Conservation Measures	**4.12**	High
Establishment of protected coastal/marine areas	**4.25**	High
Mangrove reforestation and habitat restoration	**4.05**	High
Waste management and beach cleanup activities	**4.10**	High
Community Participation	**3.95**	High
Involvement of local residents in tourism planning	**3.90**	High
Community-led environmental awareness programs	**3.97**	High
Participation in tourism decision-making and committees	**3.98**	High
Tourism Services and Facilities	**3.78**	Moderate-High
Development of eco-friendly tourism facilities	**3.82**	Moderate-High
Availability of guided tours and educational programs	**3.74**	Moderate-High
Local cultural and heritage promotion in tourism	**3.78**	Moderate-High
Local Governance and Policy Support	**3.66**	Moderate
Enforcement of environmental regulations	**3.60**	Moderate
Policy support for sustainable tourism initiatives	**3.70**	Moderate
Capacity-building programs for community members	**3.68**	Moderate
Overall Weighted Mean	**3.88**	High

In terms of environmental conservation measures, respondents reported a high level of implementation (WM = 4.12). Practices such as the establishment of protected coastal and marine areas (WM = 4.25), mangrove reforestation and habitat restoration (WM = 4.05), and waste management and beach cleanup activities (WM = 4.10) reflect strong ecological protection efforts within the community. These findings are consistent with Buckley (2020), who emphasizes that environmental conservation is central to ecotourism, as protecting natural resources enhances both ecological sustainability and tourism attractiveness. Similarly, studies on coastal ecotourism underscore that mangrove restoration and marine conservation programs are critical for maintaining biodiversity while supporting sustainable tourism development.

Regarding community participation, the study also found a high level of engagement (WM = 3.95). Respondents reported involvement in tourism planning (WM = 3.90), community-led environmental awareness programs (WM = 3.97), and participation in decision-making committees (WM = 3.98). These results align with Spenceley (2019), who notes that active community involvement strengthens local empowerment and ensures more equitable distribution of tourism benefits. This finding is particularly significant in light of moderate governance challenges observed in the study, suggesting that community participation can partially offset institutional limitations, echoing Goodwin's (2017) emphasis on stakeholder collaboration for sustainable outcomes.

The dimension of tourism services and facilities received a moderate to high rating (WM = 3.78). Respondents noted moderate to high implementation in eco-friendly facilities (WM = 3.82), guided tours and educational programs (WM = 3.74), and promotion of local culture and heritage (WM = 3.78). While these services contribute to enriching ecotourism experiences, the results suggest that improvements in infrastructure, interpretive programs, and promotion strategies may enhance visitor satisfaction and destination competitiveness. Goodwin (2017) similarly highlights that quality tourism facilities and services are key to attracting visitors and sustaining ecotourism destinations.

Finally, local governance and policy support received a moderate rating (WM = 3.66). Measures such as enforcement of environmental regulations (WM = 3.60), policy support for sustainable tourism initiatives (WM = 3.70), and capacity-building programs for community members (WM = 3.68) indicate that governance structures exist but require further strengthening. As noted in Buckley (2020) and the Department of Tourism Philippines (2021), effective governance, strong policy support, and institutional coordination are crucial to ensuring that tourism activities remain sustainable and beneficial to local communities. The moderate rating here may explain some gaps in implementation of tourism services despite high community engagement, highlighting areas for targeted policy and institutional interventions.

Overall, the findings suggest that ecotourism practices in the Dumangas Coastal Areas are actively implemented, particularly in environmental conservation and community participation. However, tourism services and governance mechanisms may benefit from further enhancement to strengthen sustainability and long-term impact. Linking these findings with prior research emphasizes that while local engagement drives success, institutional support, capacity-building, and improved infrastructure remain critical to fully realize biodiversity conservation and community empowerment goals.

Challenges Encountered in the Implementation of Ecotourism in the Dumangas Coastal Areas. Table 4 presents the challenges encountered in implementing ecotourism in the Dumangas Coastal Areas, as reported by 300 respondents. The overall weighted mean of 3.65 indicates that challenges are generally moderate, suggesting that while ecotourism initiatives are progressing, stakeholders face constraints that may affect sustainability.

Environmental challenges were reported at a Moderate-High level (WM = 3.82). Key issues include coastal erosion, habitat degradation, pollution, improper waste disposal, and decline in marine biodiversity. These findings emphasize the need for continuous conservation and environmental management strategies to sustain healthy ecosystems, which are essential for ecotourism development. This aligns with Buckley (2020), who notes that degradation of coastal and marine ecosystems can undermine biodiversity conservation and the long-term viability of ecotourism initiatives.

Table 4
Challenges Encountered in the Implementation of Ecotourism in the Dumangas Coastal Areas

Challenges	Weighted Mean (WM)	Interpretation
Environmental Challenges	**3.82**	Moderate-High
Coastal erosion and habitat degradation	**3.88**	Moderate-High
Pollution and improper waste disposal	**3.79**	Moderate-High
Decline in marine biodiversity	**3.79**	Moderate-High
Economic Challenges	**3.69**	Moderate
Limited financial resources for ecotourism projects	**3.72**	Moderate
Seasonal fluctuations in tourism income	**3.65**	Moderate
Lack of livelihood alternatives for coastal communities	**3.70**	Moderate
Socio-Cultural Challenges	**3.57**	Moderate
Low community awareness and environmental education	**3.60**	Moderate
Conflicts between tourism development and traditional practices	**3.55**	Moderate
Resistance to change or new ecotourism initiatives	**3.55**	Moderate
Institutional and Governance Challenges	**3.50**	Moderate
Weak enforcement of environmental regulations	**3.48**	Moderate
Limited government support and policy implementation	**3.52**	Moderate
Lack of capacity-building programs for local stakeholders	**3.50**	Moderate
Overall Weighted Mean	**3.65**	Moderate

Economic challenges received a moderate rating (WM = 3.69). Respondents identified limited financial resources, seasonal fluctuations in tourism income, and a lack of alternative livelihoods as constraints. These results are consistent with Spenceley (2019), who found that community-based ecotourism often faces income instability and insufficient financial support, which can limit equitable benefit sharing and reduce sustainability. Such economic limitations highlight the importance

of diversifying livelihood opportunities and establishing financial support mechanisms for local stakeholders.

Socio-cultural challenges were also moderate (WM = 3.57). Issues included low community awareness, conflicts with traditional practices, and resistance to new ecotourism initiatives. Despite high levels of community participation reported in Table 2, these findings suggest that cultural norms, social dynamics, and limited environmental education can moderate the effectiveness of engagement. This is supported by Scheyvens (1999) and Goodwin (2017), who argue that even with active participation, socio-cultural barriers may persist if capacity-building, awareness programs, and culturally sensitive approaches are not adequately implemented.

Institutional and governance challenges received a moderate rating (WM = 3.50). Weak enforcement of environmental regulations, limited government support, and insufficient capacity-building programs were highlighted as key constraints. These findings suggest that effective governance and institutional coordination remain critical, even in contexts where local stakeholders are actively engaged. Similar studies indicate that moderate governance challenges are common in decentralized ecotourism systems, where coordination among national agencies, local government units, and communities is often limited (Buckley, 2020; Spenceley, 2019).

In summary, the findings indicate that environmental, economic, socio-cultural, and institutional challenges are present at moderate levels, with environmental issues slightly more pronounced. The persistence of moderate governance and socio-cultural challenges, despite active community participation, underscores the complex interplay of institutional capacity, cultural norms, and resource limitations in ecotourism implementation. Addressing these constraints is critical for enhancing the effectiveness of ecotourism initiatives, supporting biodiversity conservation, and strengthening local empowerment in the Dumangas Coastal Areas, consistent with findings from both local and international studies.

Significant Relationship Between Ecotourism Practices and Challenges Encountered in the Implementation of Ecotourism in the Dumangas Coastal Areas. Table 5 presents the relationship between ecotourism practices and the challenges encountered in the Dumangas Coastal Areas. The analysis revealed a moderate negative correlation ($r = -0.462$, $p < 0.05$), indicating that as the level of ecotourism practices increases, the perceived challenges in implementation tend to decrease. This suggests that communities and stakeholders who actively engage in ecotourism initiatives, through environmental conservation measures, community participation, tourism services, and governance support, are better able to manage or mitigate challenges related to environmental degradation, economic limitations, socio-cultural conflicts, and the governance constraints.

Table 5
Relationship Between Ecotourism Practices and Challenges Encountered in the Dumangas Coastal Areas

Variables	Correlation Coefficient (r)	p-value	Interpretation
Ecotourism Practices vs. Challenges Encountered	-0.462	0.001	Significant, Moderate Negative Relationship

This negative relationship is consistent with previous studies highlighting that effective implementation of ecotourism practices enhances resilience to challenges. Buckley (2020) emphasizes that well-structured environmental management and conservation programs reduce ecological risks and improve community adherence to sustainable practices. Similarly, Spenceley (2019) and Goodwin (2017) argue that active community participation and stakeholder collaboration help overcome socio-cultural and institutional challenges by fostering local ownership, strengthening social cohesion, and improving compliance with regulations. Research in Philippine coastal ecotourism contexts further supports this view,

indicating that communities with higher engagement in conservation and tourism activities experience fewer implementation barriers and greater success in achieving both ecological and socio-economic objectives (Ballad, Morooka, & Shinbo, 2021).

The statistical significance of the relationship ($p = 0.001 < 0.05$) confirms that the level of ecotourism practices is meaningfully associated with the challenges encountered. This finding underscores the importance of strengthening and systematizing ecotourism practices as a strategic approach to reduce implementation obstacles. In practice, this means that enhancing environmental conservation programs, promoting active community involvement, improving tourism services, and reinforcing governance mechanisms can collectively mitigate challenges, thereby supporting and cooperating in biodiversity conservation and empowering local communities in Dumangas Coastal Areas.

Proposed strategic framework/action plan to strengthen ecotourism implementation for biodiversity conservation and local empowerment in the Dumangas Coastal Areas.
The study proposes the following strategic framework/action plan to strengthen ecotourism implementation, integrating the key findings into actionable recommendations:

1. ***Environmental Sustainability***
   - 1.1 Expand protected coastal and marine areas.
   - 1.2 Conduct mangrove reforestation and habitat restoration.
   - 1.3 Implement systematic waste management and beach cleanup programs.

Expected outcomes: Improved biodiversity conservation, healthier ecosystems, and reduced environmental degradation.

2. ***Community Empowerment***
   - 2.1 Increase participation in tourism planning and decision-making.
   - 2.2 Provide training on sustainable tourism, environmental stewardship, and conservation practices.
   - 2.3 Promote cultural and heritage-based tourism initiatives.

Expected outcomes: Enhanced local engagement, preservation of cultural heritage, and strengthened skills and knowledge among residents.

3. ***Institutional Support and Governance***
   - 3.1 Strengthen enforcement of environmental regulations.
   - 3.2 Improve policy support for sustainable tourism initiatives.
   - 3.3 Establish capacity-building programs and improve coordination among stakeholders.

Expected outcomes: Effective governance, increased compliance with conservation measures, and more coordinated ecotourism development.

4. ***Tourism Services and Facilities***
   - 4.1 Develop eco-friendly tourism infrastructure.
   - 4.2 Expand guided tours, educational programs, and visitor engagement activities.
   - 4.3 Promote community-based tourism packages.

Expected outcomes: Improved visitor experiences, increased tourism income, and sustainable growth of the ecotourism sector.

5. ***Policy Recommendations***
   - 5.1 Implement governance reforms that ensure stronger regulatory enforcement and accountability at both local and national levels.
   - 5.2 Prioritize capacity-building programs targeting all stakeholder groups, especially those with lower educational attainment, to enhance community participation and environmental stewardship.

5.3 Establish long-term funding mechanisms and support for alternative livelihoods to address economic vulnerabilities.
5.4 Promote culturally sensitive, inclusive approaches to community engagement to overcome socio-cultural resistance.

6. Future Research Priorities

6.1 Long-term evaluation of ecotourism impacts on biodiversity, livelihoods, and ecosystem health.
6.2 Assessment of governance effectiveness and policy implementation in local ecotourism contexts.
6.3 Exploration of socio-cultural and gender-specific dynamics in community participation and benefit-sharing.

Conclusion. Based on the study, the respondents were a diverse group of stakeholders involved in ecotourism in the Dumangas Coastal Areas, including fisherfolk, tourism workers, and community leaders. They represented a wide range of ages, educational backgrounds, and roles in ecotourism activities, providing a comprehensive perspective on both the implementation of ecotourism practices and the challenges encountered. This diversity reflects a population directly dependent on coastal resources while actively engaged in promoting sustainable tourism initiatives.

The study revealed that ecotourism practices are generally implemented at a high level, particularly environmental conservation measures (WM = 4.12) and community participation (WM = 3.95). Tourism services and facilities were moderately high (WM = 3.78), while governance and policy support were moderate (WM = 3.66), indicating opportunities to improve infrastructure, regulatory enforcement, and institutional capacity.

Challenges encountered were generally moderate (WM = 3.65), with environmental challenges being the most pronounced (WM = 3.82), followed by economic (WM = 3.69), socio-cultural (WM = 3.57), and institutional/governance challenges (WM = 3.50). Key constraints include coastal degradation, limited financial resources, socio-cultural resistance, and weak policy enforcement. Addressing these challenges is essential to maximize the ecological and socio-economic benefits of ecotourism.

The analysis further established a significant negative relationship between ecotourism practices and challenges ($r = -0.462$, $p = 0.001$), indicating that higher implementation of ecotourism practices is associated with lower perceived challenges. This highlights the importance of strengthening and expanding ecotourism initiatives to mitigate environmental, economic, socio-cultural, and governance-related constraints.

Overall, the study highlights that ecotourism in the Dumangas Coastal Areas is a promising strategy for biodiversity conservation and local empowerment. Its long-term success depends on systematically addressing environmental, economic, socio-cultural, and institutional challenges. The proposed strategic framework provides a roadmap for sustainable ecotourism development, guiding policymakers, community leaders, and stakeholders to strengthen practices, enhance resilience, and ensure equitable benefits for both the environment and local communities.

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Data availability statement. All data supporting the findings of this study are included within the manuscript and its supplementary materials.

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