

Operational Challenges and Conservation Practices of Island Ecotourism: Evidence from Eastern Philippines

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Abstract

Ecotourism is playing an important role in sustaining biodiversity and community development. This study focused on determining the operational challenges and conservation practices of ecotourism sites in the island of Guiuan, Eastern Samar. A total of 245 respondents, including ecotourism operators and staff at the ecotourism sites, participated in the study. The study used a self-made survey instrument that underwent confirmatory factor analysis, reliability testing and validation of model fit to ensure its appropriateness and applicability. The results emphasized that conservation practices are implemented at a practical level, with waste management and community involvement ranking highest. The operational challenges commonly faced by ecotourism sites include resource allocation. Pearson's correlation indicated a significant positive association between operational challenges and conservation practices. Structural path analysis further showed that resource allocation predicted community involvement ($\beta = 0.354$, $p < 0.01$) and biodiversity ($\beta = 0.313$, $p < 0.01$), underscoring the importance of financial and material support in the attainment of conservation practices. However, visitor management, environmental degradation and climate change have no significant relationship with conservation practices, suggesting no direct effect. The findings emphasize the proper use and optimization of resources to protect biodiversity and to ensure community participation and involvement. In terms of policy implications, the results emphasized the need for strategic resource allocation, standardized conservation guidelines and adaptive contingency planning to ensure ecological sustainability in ecotourism destinations.

Keywords: Community Empowerment, Conservation Challenges, Ecotourism, Environmental Preservation, Resource Allocation.

Introduction

Globally, ecotourism serves as an alternative to mass tourism to reduce its environmental impact (1). It plays a significant role in empowering the community through direct and indirect economic benefits (2, 3). It directly provides communities with employment and other economic benefits (4-6). The Philippine tourism industry has become increasingly aware of the adverse environmental and social impacts of tourism development. Therefore, the country began to recognize the need to adopt new development approaches, such as ecotourism, to create tourist products that are environmentally sensitive and economically viable (7, 8). Natural environment conservation is seen to address livelihood improvement and biodiversity conservation (9). Plant and animal diversity has attracted more visitors and encouraged them to stay at the destination. Community empowerment, conservation challenges, ecotourism, environmental preservation and resource allocation are

destination-related (10, 11). Biodiversity and waste management are considered crucial to environmental conservation and sustainability (12, 13). Accordingly, conservation and waste-reduction management significantly increased environmental value and tourists' pro-environmental intentions (14, 15). Likewise, community knowledge is crucial for effective environmental conservation and management (16-18). Significantly, developing policies for biodiversity protection and enhancement will help evaluate conservation for community benefit (12, 19, 20). Past studies suggested more inclusive structural management for conservation efforts, where locals and other stakeholders participate (3, 20). Biodiversity is vital to environmental conservation and to the sustainability of the tourism industry. It is vital for life on Earth, but it is rapidly degrading due to unsustainable practices and climate change (21). Enhancing conservation requires a focus on

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community engagement and effective leadership. It also requires developing new methods, providing resources, communicating successful initiatives, conducting research, establishing new structures and forming partnerships (22, 23). Several studies show that effective resource allocation is crucial to ecotourism success and that unclear regulations, misallocation and insufficient resources significantly damage ecosystems (24). Accordingly, community participation is closely connected to resource allocation, empowering local communities to manage resources and earning profit encourages them to be more participative and even committed to conservation (25, 26). Beyond ensuring sufficient resource allocation, it is essential to manage increasing visitor numbers to maintain environmental integrity and ensure a positive tourist experience across all ecotourism sites because uncontrolled visitors can cause habitat destruction, soil erosion, wildlife disturbance and other environmental impacts when carrying capacity is not considered (27, 28). Ecotourism is a multifaceted concept that requires balancing environmental, social and economic considerations (29). A lack of clear guidelines and inconsistencies in how ecotourism is implemented globally diminish the credibility of ecotourism as a sustainable practice because of ineffective conservation efforts (26, 29, 30).

This study is anchored in the Community-Based Natural Resource Management (CBNRM). This theory is centered on the principle that local communities, as the primary beneficiaries of the environment and stewards of its wealth, can manage biodiversity in ways that balance conservation with meeting needs (31, 32). However, CBNRM may be limited when communities face external pressures such as climate change that are beyond their immediate control. This study therefore extends the CBNRM perspective by examining how local operational challenges interact with broader ecological pressures in vulnerable small-island tourism economies.

In this context, the islands of Homonhon and Calico-an in Guiuan, Eastern Samar, directly emphasize the role of ecotourism operators, their staff and the surrounding community that relies heavily on local tourism as a primary source of livelihood, where they have to form rules and regulations that they will implement for the

conservation of the environment and its resources (33, 34). Climate change poses a significant threat to the ecological integrity and tourism viability of vulnerable destinations (35). Furthermore, as ecosystems degrade, natural attractions will diminish, affecting tourist arrivals and communities' economic viability. Many regions lack a strong regulatory framework to address climate change impacts on ecotourism sites. Clear guidelines and certification standards could help ecotourism operators ensure activities align with conservation goals (29). The literature also lacks discussion of the role of government and policymakers in conservation and in addressing climate change issues (9). Ecotourism also receives insufficient focus in biodiversity conservation studies (36).

Guiuan, Eastern Samar, particularly the islands of Homonhon and Calico-an, is an ecotourism destination known for its marine resources, surfing and coastal ecosystems. However, empirical research specifically examining conservation practices and operational challenges in the small-island ecotourism context of Calicoan and Homonhon remains limited. Existing literature has largely examined sustainable tourism from broader perspectives, with limited attention to the operational mechanisms of small-island ecotourism economies (37).

To address this gap, this study identified the operational challenges and conservation practices of ecotourism sites in Guiuan, Eastern Samar. It focuses on waste management, community involvement and biodiversity, as well as on challenges related to resource allocation, visitor management, environmental degradation and climate change. Specifically, the study seeks to

- (a) assess the level of conservation practices implemented,
- (b) identify the perceived challenges in conservation management,
- (c) determine whether significant relationships exist between conservation practices and identified operational challenges and
- (d) determine which operational challenge indicator serves as a structural driver that predicts the success of conservation practices.

The study's originality lies in its empirical, quantitative examination of the structural relationships between operational challenges and conservation practices in localized conservation

efforts on vulnerable small islands that rely on ecotourism. Most literature focuses on descriptive and qualitative assessments of sustainable tourism. The study further develops a structural path model to examine the relationships among resource allocation, community engagement, biodiversity conservation and other conservation practices in small-island ecotourism sites. It also contributes empirically to the literature by applying the CBNRM framework to small-island tourism-developing contexts and examining drivers of community engagement for ecotourism conservation. It also offers evidence-based insights for policy formulation in small-island ecotourism management.

Methodology

Research Design

In this study, the researchers used the descriptive correlational design as the most appropriate research design. This research design aims to describe the relationship between two or more variables without considering cause and effect. Furthermore, it involves collecting and analyzing data on at least two variables to determine whether an association exists between them. This design suits the study because it allows a detailed description of existing conservation practices and challenges across different ecotourism sites, while also examining the relationship between the variables. Moreover, it provides a comprehensive understanding of the current situation, which is significant for developing effective strategies for sustainable ecotourism development.

Research Locale

This study was conducted on two ecological islands in the province of Eastern Samar, Calico-an and Homonhon, located in the municipality of Guiuan. Most of the ecotourism attractions in the municipality are to be found on these two islands, such as the beaches, historical landmarks and protected marine areas. Calicoan and Homonhon Islands are home to several barangays, including Pagnamitan, Baras, Ngoelos, Converse and Sulangan on Calicoan and Bitaugan, Cagusu-an, Canawayon, Casuguran, Culasi, Habag, Inapulangan and Pagbabangnan on Homonhon. The municipality has a total land area of approximately 175.49 km² and has an estimated population of 53,302. Calico Island has a total area of roughly 1,600 hectares, while Homonhon Island has a total land area of 10,500 hectares. According to the Municipal Tourism Office, Guiuan, Eastern Samar, receives an average of 45,000 to 60,000 tourist arrivals annually. The area encompasses key marine protected areas (MPAs) under the Guiuan Marine Reserve, established under Proclamation No. 469, encompasses extensive coral reef systems, seagrass meadows and primary mangrove forests. The marine ecosystems support high levels of marine biodiversity, serving as critical habitats for threatened species such as the green sea turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), giant clam (*Tridacna gigas*) and dugong (*Dugong dugon*), covering marine ecosystems with varying conservation statuses, from locally managed fish sanctuaries to vulnerable coral reef and mangrove habitats (38).

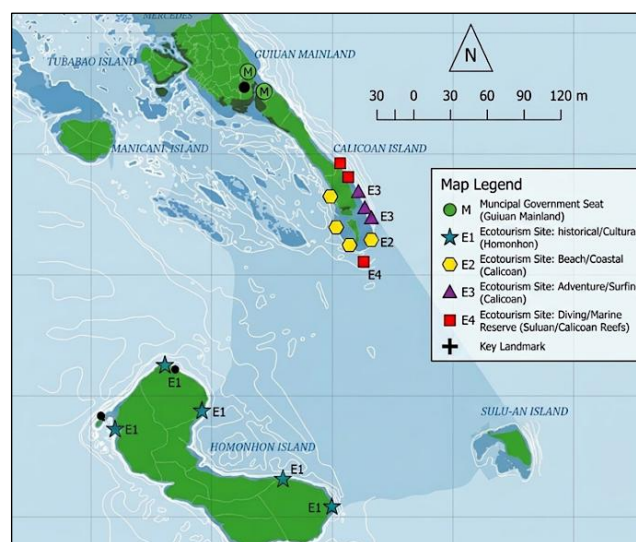


Figure 1: The Map of the Setting of the Study

Figure 1 displays the map of the municipality of Guiuan in Eastern Samar, Philippines, centered near coordinates 11.0300° N, 125.7300° E for its mainland, while its featured island of Calicoan in the West (10.9839° N, 125.8069° E), Homonhon (10.7556° N, 125.6900° E) and Suluan (10.7614° N, 125.9578° E) across the south and east. Calicoan Island is surrounded by coastal areas used for tourism and marine-based activities. It has white beaches, tidal lagoons, limestone formations and extensive reef flats. Homonhon Island, on the other hand, has a significant historical background, as well as terrestrial and mineral reserves. The marine environment surrounding both islands support diverse aquatic resources and serves as

the main location for fishing and eco-guided marine activities.

Respondents

Ecotourism operators and staff living on Calicoan and Homonhon islands are the respondents of the study. The total population of the respondents is 252. The researchers used total enumeration because the population is manageable. The inclusion criteria for selecting respondents included at least one [1] year of service, residence on Calicoan and Homonhon islands and permanent employment. However, respondents with less than one [1] year of employment, non-permanent status, or residence outside the islands were excluded. A total of 245 respondents participated in the study.

Table 1: Socio-Demographic of the Respondents

Characteristic	Category	Frequency (f)	Percentage (%)
Age	18–29 years	62	25.31
	30–41 years	108	44.08
	42–53 years	56	22.86
	54 years and above	19	7.75
Sex	Male	131	53.47
	Female	114	46.53
Educational Attainment	Secondary Education	73	29.80
	Technical / Vocational	48	19.59
	Bachelor's Degree	111	45.31
	Postgraduate Studies	13	5.30
Years of Service in Ecotourism	1–3 years	68	27.76
	4–7 years	115	46.94
	8–11 years	42	17.14
	12 years and above	20	8.16
Job Role / Title	Site Manager / Ecotourism Operator	38	15.51
	Frontline Service & Hospitality Staff	94	38.37
	Conservation & Maintenance Personnel	67	27.35
	Eco-Guide	46	18.77

Note: N = 245.

Table 1 shows the socio-demographic characteristics of the respondents. The age distribution is predominantly in the largest group aged 30–41 years (44.08%), followed by young adults aged 18–29 years (25.31%), mature adults aged 42–53 years (22.86%) and individuals aged 54 and above (7.75%). In terms of gender representation, males account for 53.47% compared to 46.53% female respondents. Furthermore, educational attainment is notably high, as nearly half hold a Bachelor's degree (45.31%), while the remainder completed

secondary education (29.80%), technical or vocational training (19.59%), or postgraduate studies (5.30%). It is noted that respondents possess extensive tenure in the local ecotourism sector, with nearly 4–7 years of service (46.94%), alongside substantial representation from those with 1–3 years (27.76%), 8–11 years (17.14%) and 12 or more years of experience (8.16%). Frontline service and hospitality staff make up the largest segment (38.37%), followed by conservation and maintenance personnel (27.35%), eco-guides and

activity coordinators (18.77%) and site managers or operators (15.51%).

Research Instrument

To obtain the necessary data for the study, the researchers used a researcher-made survey instrument, rigorously reviewing relevant studies, books and articles to ensure the instrument was well-structured and aligned with the study's objective. To ensure validity, the researchers submitted the instrument to experts in the field, including the tourism officer of the Municipality of Guiuan, tourism faculty members and research experts in tourism and hospitality. The researchers further validated the instrument by administering

it randomly to thirty tourism students who were non-respondents. The researcher collected feedback from these non-respondents and used it to enhance the questionnaire's validity and reliability. To ensure the appropriateness of all indicators used across the instrument, the researcher conducted a Confirmatory Factor Analysis (CFA) utilizing IBM SPSS AMOS. The results showed that all items were effective and appropriate for each construct measured and met the standard estimate of at least 0.50, as indicated by the p-values. The reliability test was also conducted to ensure the instrument's consistency. The table below shows the results of the instrument's validity and reliability.

Table 2: Reliability Results of the Research Instrument

Construct	Cronbach	CR	AVE
Conservation Practices			
Waste Management	0.880	0.762	0.552
Community Involvement	0.896	0.850	0.781
Biodiversity	0.896	0.663	0.804
Challenges in Conservation			
Resource Allocation	0.911	0.774	0.607
Visitor Management	0.906	0.809	0.779
Environmental Degradation	0.904	0.788	0.703
Climate Change	0.925	0.893	0.656

Note: CR = Composite Reliability, AVE = Average Variance Extracted.

As shown in Table 2, the reliability and validity results for all constructs related to operational challenges and conservation practices are strong. All constructs show strong internal consistency, with Cronbach's alpha ranging from 0.880 to 0.925, indicating that the items in each construct effectively measure what they intend to measure. Confirmatory Reliability (CR) is above the

recommended threshold of 0.7. Visitor management (0.809), Climate Change (0.893) and Biodiversity (0.763) signal strong reliability. Moreover, the Average Variance Extracted (AVE) supports construct validity, with most constructs showing strong validity. Generally, all the constructs are reliable and valid.

Table 3: Model Fit of the Survey Instrument

	χ^2	df	P-value	χ^2/df	TLI	GFI	RMSEA
Conservation Practices	244	164	<0.001	1.487	0.979	0.939	0.038
Challenges in Conservation	322	164	<0.001	1.963	0.907	0.847	0.059

Note: χ^2 = Chi-square Test, df = Degrees of Freedom, TLI = Tucker-Lewis's Index, GFI = Goodness of Fit Index, RMSEA = Root Mean Square Error of Approximation.

The model fit statistics for operational challenges and conservation practices, as shown in Table 3, show that the model fits the data well. The model for Conservation Practices indicates a strong fit, with a chi-square-to-degree-of-freedom ratio (χ^2/df) of 1.487, a high Tuckman-Lewis Index (TLI) of 0.979 and a Goodness-of-Fit Index (GFI) of 0.939. Importantly, the Root Mean Square Error of Approximation (RMSEA) of 0.038 indicates a close fit, suggesting the model aligns well with the data.

In contrast, the Operational Challenges model shows a weak but acceptable fit. It has a χ^2/df ratio of 1.963 and a GFI of 0.847, both lower than those of the Conservation Practices model. However, its RMSEA of 0.059 is within the acceptable range, indicating a reasonable fit.

Data Gathering Procedure

Before the researchers conducted the survey, they first asked permission from the Barangay officials covering the islands of Homonhon and Calico-an.

Upon approval, the survey questionnaire was handed out personally to the respondents and they were asked to answer each item at their convenience. An explanation was provided to them on how to complete the survey instrument to ensure the completion is correct. Furthermore, participation in the study is voluntary; there is no threat or coercion to respondents and they are free to withdraw at any time without penalty or fear. All gathered data are treated with the utmost confidentiality and respondents' privacy and identity are protected. The files are secured in a cabinet where the researchers are authorized to access them. The researchers ensure that all data that were collected and not considered due to incompleteness remain confidential and are used solely for the purpose of the study. Generally, the study adheres to ethical considerations, emphasizing respect for participant autonomy, privacy and data security.

Data Analysis

After collecting the data from the respondents, the researcher tallied it in preparation for analysis. The researcher analyzed the data using IBM SPSS Statistics Version 28.0 (IBM Corp., Armonk, NY, USA). The study used mean, standard deviation and mean rank to analyze the descriptive results. To test the hypothesis, Pearson's correlation was

used in IBM SPSS Statistics (Version 28.0) to measure the degree of the relationship between the variables and Path Model Analysis in IBM SPSS AMOS (Version 28.0) to determine which indicators of operational challenges significantly predict the success of conservation practices.

Results

Operational Challenges: Table 4 presents the results of the challenges to the ecotourism sites. As shown in Table 4, all identified challenges are perceived as "Challenging," with mean scores ranging from 3.41 to 4.20. The indicator with the highest rank is Resource Allocation ($\bar{x}$ = 3.70, SD = 0.88), indicating that effective resource distribution is a significant concern in conservation efforts. Next is Climate Change ($\bar{x}$ = 3.67, SD = 0.97), which shows a wide range of effects due to drastic climate changes in the quest for conservation. Environmental Degradation ($\bar{x}$ = 3.59, SD = 1.04) ranks second, reflecting the ongoing threat to the ecosystem. Visitor Management ($\bar{x}$ = 3.54, SD = 0.94) is also viewed as a challenge, signaling the need to maintain action in managing tourist activities to avoid harming the environment and to be an advocate for conservation.

Table 4: Operational Challenges of Island Ecotourism

Indicators	$\bar{x}$	SD	Interpretation	Rank
Resource Allocation	3.70	0.88	Challenging	1
Visitor Management	3.54	0.94	Challenging	4
Environmental Degradation	3.59	1.04	Challenging	3
Climate Change	3.67	0.97	Challenging	2
Grand Mean	3.63	0.96	Very Challenging	

Note: $\bar{x}$ = Mean Score, SD = Standard Deviation, 4.21-5.00 = Very Challenging, 3.41-4.20 = Challenging, 2.61-3.40 = Moderately Challenging, 1.81-2.60 = Slightly Challenging, 1.00-1.80 = Not at all Challenging

The grand mean of 3.63 (SD=0.96) indicates that the surveyed challenges are perceived as challenging, highlighting the need to prioritize substantial attention and resources to address them effectively. The highest standard deviation for Environmental Degradation and Climate

Change simply indicates that respondents have varying opinions, perhaps because they have different experiences in the context. The variation further underscores the need to develop conservation strategies tailored to specific situations.

Table 5: Conservation Practices of Island Ecotourism

Indicators	$\bar{x}$	SD	Interpretation	Rank
Waste Management	4.13	0.70	Practiced	1
Community Involvement	4.13	0.71	Practiced	1
Biodiversity Preservation	4.12	0.70	Practiced	3
Grand Mean	4.13	0.70	Practiced	

Note: $\bar{x}$ = Mean Score, SD = Standard Deviation, 4.21-5.00 = Highly Practiced, 3.41-4.20 = Practiced, 2.61-3.40 = Moderately Practiced, 1.81-2.60 = Slightly Practiced, 1.00-1.80 = Not Practiced.

Conservation Practices: Table 5 presents the results of conservation practices at ecotourism sites in Guiuan, Eastern Samar, focusing on three key indicators: Waste Management, Community Involvement and Biodiversity Preservation. Each of the indicators was assessed with a mean score ($\bar{x}$), standard deviation (SD) and ranked according to its importance, together with the overall mean.

The grand mean score of 4.13 indicates that conservation practices are generally "Practiced" across the ecotourism sites. This score falls within the mean range of 3.41-4.20, indicating that while these practices are implemented, they are not highly used. The Standard Deviation (SD) of 0.70 indicates some variability in practice implementation across the different ecotourism sites, meaning that, despite standard practices, there are still inconsistencies in commitment or effectiveness. Based on the individual results, the waste management indicator received a mean

score of 4.13 (SD = 0.70), which is interpreted as "Practiced" and ranked first. This means that waste management is the key priority for ecotourism sites.

Similarly, Community Involvement shares the same mean score of 4.13 and an SD of 0.71. The slightly higher SD for Community Involvement indicates some variability in how different sites engage with local communities, but it remains a consistently practiced aspect of ecotourism conservation efforts.

On the other hand, Biodiversity preservation has a mean score of 4.12 and an SD of 0.70, ranking last. Although its score is slightly lower than the other two indicators, it remains within the "Practiced" category, indicating that preserving biodiversity is also a key focus. The mean score is close to the other indicators, suggesting that biodiversity preservation is nearly as important but may not be emphasized to the same extent.

Table 6: Relationship between Operational Challenges and Conservation Practices

Variable 1	Variable 2	r-value	Interpretation	p-value	Interpretation
Operational Challenges	Conservation Practices	0.531	Moderate Correlation	0.001	Significant

Note: N = 245, $p < 0.05$.

Relationship between Operational Challenges and Conservation Practices: Table 6 presents the relationship between the variables. As shown in Table 6, operational challenges and conservation practices are moderately correlated ($r=0.531$). This suggests that as operational challenges increase, the implementation of conservation practices also increases. The positive results suggest that higher perceived operational challenges were accompanied by higher reported

levels of conservation practices. However, because the research used a cross-sectional correlational design, this relationship should not be interpreted as evidence that operational challenges cause or motivate conservation practices. The p-value of 0.001 is below the 0.05 threshold, so the result is statistically significant. In short, the observed correlation is unlikely to be due to chance and the evidence supports it in the context of the study.

Table 7: Structural Relationship between Operational Challenges and Ecotourism Conservation Practices

	Waste Management (β)	Community Involvement (β)	Biodiversity (β)
Resource Allocation	0.195 (0.094)	0.354 (0.001)**	0.313 (0.001)**
Visitor Management	0.042 (0.721)	0.044 (0.707)	0.008 (0.944)
Environmental Degradation	0.099 (0.399)	-0.023 (0.844)	0.005 (0.966)
Climate Change	0.051 (0.665)	-0.001 (0.995)	0.027 (0.820)

Note: N = 245, ** $p < 0.01$, $X^2 / df = 1.963$, GFI = 0.847, RMSEA = 0.059, β -beta.

Table 7 presents the results of hypothesis testing, which analyzes the relationships between several independent variables (Resource Allocation, Visitor Management, Environmental Degradation and Climate Change) and three dependent variables (Waste Management, Community Involvement and Biodiversity). The Table reports

standardized coefficients (likely beta coefficients) along with their corresponding p-values in parentheses, enabling the interpretation of the strength and significance of these relationships and to determine which among the indicators of the operational challenges predicts the conservation practices.

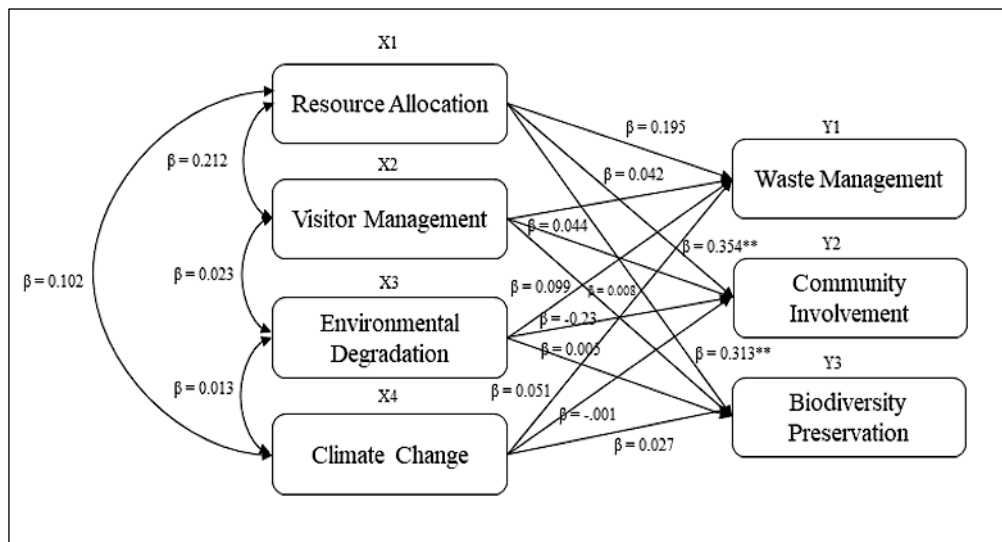


Figure 2: The Path Model Analysis of the Study

In Figure 2, the results indicate that Resource Allocation is the most influential independent variable, significantly affecting both Community Involvement ($\beta = 0.354$, $p = 0.001$) and Biodiversity ($\beta = 0.313$, $p = 0.001$). This suggests that effective resource management plays a crucial role in fostering local community participation in conservation efforts and preserving biodiversity. However, indicators such as Visitor Management, Environmental Degradation and Climate Change do not show a significant relationship with Waste Management, Community Involvement and Biodiversity, as evidenced by their high p-values.

Discussion

The findings indicate that waste management is a key priority for ecotourism sites. This emphasizes the need for everyone to maintain environmental integrity and reduce negative impacts. As concluded, waste management is critical to ecotourism because it directly affects environmental integrity and the sustainability of ecotourism sites (39, 40). It is suggested that engagement of the local community is crucial for managing waste and ensuring that ecotourism activities benefit local residents and foster support for conservation efforts (41). Furthermore, community engagement in sustainable ecotourism can promote local economic development and nurture community ownership, leading to positive outcomes such as income linked to conservation, empowerment and improved community hospitality. From the literature, ecotourism attracts many tourists while implementing actions to protect and conserve the environment. Active

participation by the local community ensures that their basic needs are met.

Accordingly, managing biodiversity and natural resources is an important part of implementing sustainable ecotourism. The goal is to transform the use of natural resources and biodiversity from simple consumption to conservation, thereby increasing their intrinsic and economic value (42). Overall, the study concludes that balancing waste management with community involvement and biodiversity conservation is essential for sustainable ecotourism. However, none were rated "Highly Practiced," indicating room for improvement and further research. While all are practiced, the level of rigor and effectiveness varies across sites. This means that ecotourism sites can benefit from enhancing their conservation efforts. The nearly identical means indicate the interconnectedness of these practices, emphasizing that weaknesses in one area could undermine the effectiveness of the others. Therefore, while current practices are solid, there is potential to further strengthen ecotourism sustainability.

In addressing threats brought by habitat loss, biodiversity deterioration and limited financial resources, effective resource allocation is the key. Studies show that optimizing resource allocation ensures conservation goals are met efficiently and allows prioritization based on potential benefits, which is crucial for maximizing the impact of available conservation resources. Human activities such as industrialization and urbanization have led to habitat destruction and increased extinction rates (43, 44). This case not only affects wildlife but

also disrupts ecosystem services. These services are essential for human survival, including clean air, water, pollination and climate change regulation. Furthermore, the results suggest that focusing on resource allocation and addressing the adverse effects of climate change is key to improving conservation efforts.

This finding on the relationship between operational challenges and conservation practices suggests that operational challenges may push stakeholders to adopt more effective conservation strategies as a coping mechanism. Second, the moderate correlation strength suggests that while operational challenges influence conservation practices, other factors such as awareness, policy support, or community engagement may also play important roles in shaping these practices.

The structural path model highlighted an important theoretical finding that can be utilized to understand how island ecotourism operators can manage ecotourism sites and activities. As reflected in the results, Resource Allocation significantly influenced both Community Involvement ($\beta = 0.354$, $p < 0.01$) and Biodiversity Preservation ($\beta = 0.313$, $p < 0.01$). However, broader environmental challenges such as Climate Change and Environmental Degradation showed no significant relationship with conservation practices. From a Community-Based Natural Resource Management (CBNRM) perspective, this result highlights a weakness in decentralized resource governance. Traditional CBNRM systems work effectively when communities can directly observe environmental problems and respond immediately. For instance, local stakeholders actively manage visible issues such as solid waste accumulation, which helps explain why Waste Management was identified as one of the most widely implemented practices ($M = 4.13$).

In contrast, climate change and environmental degradation are large-scale problems. Small-island ecotourism communities often lack the technical knowledge, adaptive infrastructure and financial resources needed to address these challenges effectively. As a result, ecotourism operators tend to focus on immediate operational concerns rather than long-term environmental resilience. This is reflected in the high level of concern about resource allocation constraints ($M = 3.70$).

These findings suggest that while CBNRM is

effective for managing localized and day-to-day environmental concerns, it becomes less effective when communities face broader environmental pressures without external support. Therefore, sustaining island ecotourism requires strengthening the CBNRM approach by integrating centralized, climate-resilient institutional support with community-led conservation practices. As emphasized, coastal communities often prioritize local aesthetics over long-term ecological resilience because they lack climate-specific technical resources and adaptive frameworks (17). Moreover, as also indicated in the path model analysis, while ecotourism operators acknowledge the severity of climate change, they likely feel unequipped to address it with their current financial and material support. This further suggests that the conservation paradigm in the Eastern Philippines lacks adaptive contingency planning to mitigate larger environmental shocks, as the relationship between resource allocation and conservation practices is evident, with no significant consideration of climate change. Past studies also suggest that regenerative governance is essential. For ecotourism in Guiuan, Eastern Samar, policy interventions should not only optimize resources for daily operations but also bridge the gap by integrating climate-resilient infrastructure and disaster-risk reduction directly into ecotourism operational policies and manuals (3).

Because resource allocation is a key component of successful conservation efforts, other factors such as visitor management, environmental degradation and climate change require further investigation to understand the indirect approaches that influence conservation. The findings also underscore the need to develop strategies to optimize resource distribution among ecotourism site operators so they can implement conservation initiatives successfully. Moreover, the results highlight those other factors, such as visitor management, environmental degradation and climate change, may require further exploration to determine their indirect influence on conservation. As such, the study further underscores the importance of prioritizing resource allocation to achieve positive conservation outcomes, especially in community engagement and biodiversity protection. Moreover, it highlights the need for targeted strategies that optimize outcomes.

Conclusion

The results concluded that conservation practices, such as waste management, community involvement and biodiversity conservation, are implemented at ecotourism sites in Calico-an and Homonhin Island, Guiuan, Eastern Samar. However, some areas need to be focused on for improvement. Resource allocation is critical to successful conservation in ecotourism sites, as it directly affects community involvement and biodiversity preservation. With that in mind, it is highly recommended to improve resource allocation to ensure that all conservation efforts, plans and projects are implemented and that resources are distributed equally across different ecotourism sites. Further recommendations include strengthening community involvement in decision-making, providing capability-building activities such as conservation-related education and training so communities can benefit directly from ecotourism and implementing stricter waste management protocols at every ecotourism site through regular monitoring and evaluation. Also, adopting innovative waste-reduction and recycling methods.

Biodiversity was slightly less emphasized in the results compared to waste management and community involvement. A targeted effort could elevate the focus on preserving biodiversity by increasing awareness among communities, tourists and other stakeholders of the importance of protecting natural habitats, flora and fauna within ecotourism sites. Likewise, developing and enforcing standardized guidelines across all ecotourism sites can ensure uniform processes and lead to more sustainable outcomes.

Visitor Management, Environmental Degradation and Climate Change did not show a direct significant relationship with conservation practices, suggesting they may influence conservation efforts indirectly. Thus, further investigation and exploration may be conducted into how these factors might indirectly influence conservation and into developing strategies to mitigate potential negative impacts. This study contributes to the ecotourism literature by empirically demonstrating the central role of resource allocation in shaping biodiversity outcomes through community engagement in small-island ecotourism systems, thereby

extending existing frameworks on community-based conservation.

However, the study notes several limitations. First, the study used a cross-sectional descriptive correlational design, which identifies relationships at a single point in time and does not support definitive causal claims. Second, reliance on self-reported responses from ecotourism operators and staff may introduce bias in perceptions of conservation implementation. Third, the study's geographical scope is confined to a municipality and two islands, which may limit generalizability to larger islands and other ecotourism destinations. Finally, the study focused only on the operational challenges variable and did not examine other factors that may influence conservation practices. Further research is recommended to be conducted especially on climate change adaptation and resilience strategies of ecotourism sites by considering availability of climate-resilient infrastructure, technical expertise and financial resources. Researchers may also consider of having a comparative study involving other ecotourism destinations in the Philippines for generalizability of the current findings.

Abbreviations

AVE: Average Variance Extracted, CFA: Confirmatory Factor Analysis, CR: Composite Reliability, GFI: Goodness of Fit Index, RMSEA: Root Mean Square Error of Approximation, TLI: Tuckman-Lewis Index.

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Author Contributions

Jordan M Cabaguig: Manuscript Preparation, Statistical Analysis, Review, Editing, Teresita Villa G Lacaba: Data Collection, Discussion, Interpretation of the Results. Both authors reviewed the entire manuscript and attest to its accuracy and transparency. The study followed all writing ethics.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Data Availability

The data are available from the corresponding author upon request.

Declaration of Artificial Intelligence (AI) Assistance

During the preparation of this work, the author used Grammarly to improve the flow of communication in the discussion of the findings. ChatGPT was also used for the recommendation of the best theory that the study can anchor and Gemini AI for the enhancement of images, specifically the geographical map. After running the manuscript through the tool, the authors carefully reviewed and edited the content as needed and took full accountability for the content of the publication. Likewise, Turnitin was also used to determine the plagiarism percentage of the paper.

Ethics Approval

Throughout the study, the researchers adhered to the ethical guidelines, considering the confidentiality of the respondents, voluntary participation, risks and benefits and the information provided. The paper has been reviewed by the university ethics committee with protocol No. ESSUG-0010-2025.

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