



MOTIVATION, ENVIRONMENTAL AWARENESS, AND PRO-SUSTAINABLE TOURISM BEHAVIORS OF VISITORS IN A MANGROVE ECO-PARK

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Abstract

This study examined motivation, environmental awareness, and pro-sustainable tourism behavior among 168 adult visitors to Suyac Island Mangrove Eco-Park, Sagay City, Negros Occidental. A quantitative descriptive-comparative and correlational design used purposive sampling and an adapted 30-item questionnaire. Fifteen jurors reviewed 32 draft items; the mean content validity ratio across the draft items was .94, and two items below .60 were removed. Cronbach's alpha was .889 for motivation, .935 for environmental awareness, and .934 for behavior. Descriptive statistics, Mann-Whitney U tests, Kruskal-Wallis tests, Bonferroni-adjusted Dunn comparisons, and Spearman correlations were used. All dimensions had very high mean scores. Motivation showed omnibus differences by age and educational attainment; awareness and behavior differed by educational attainment. No age pair remained significant after adjustment. Supported education contrasts varied across outcomes. Purpose of visit differentiated motivation ($U = 2476$, $p < .001$, $r_{\text{pb}} = -.385$), awareness ($U = 2408$, $p = .001$, $r_{\text{pb}} = -.347$), and behavior ($U = 2323$, $p = .006$, $r_{\text{pb}} = -.300$). Sex, marital status, and visit frequency yielded no significant differences. Motivation correlated positively with awareness ($r_s = .648$) and behavior ($r_s = .633$), as did awareness with behavior ($r_s = .661$; all $p < .001$). These findings support accessible ecological interpretation and community-supportive visitor opportunities at the eco-park.

Keywords: *environmental awareness, mangrove ecotourism, pro-sustainable tourism behavior, push-pull motivation, Suyac Island*

Introduction

Tourism can advance economic opportunity and social development, but unmanaged growth can also intensify pressure on host communities and ecosystems (Jeyacheya & Hampton, 2022). Sustainable tourism therefore requires destinations to align visitor experience, conservation, and local benefit. This concern is especially important in mangrove ecotourism, where the attraction is simultaneously a habitat, coastal defense, carbon store, fisheries nursery, and source of community livelihood (Lhosupasirirat et al., 2023; Sanidad et al., 2022). Visitor conduct can either reinforce or weaken these functions, making motivation, environmental awareness, and pro-sustainable behavior central management concerns.

Ecotourism can provide educational, cultural, and livelihood benefits while supporting biodiversity protection. In community-managed destinations, visitor spending may sustain local employment and conservation, but long-term viability depends on balancing tourism demand with protection of fragile natural assets (Ioannides et al., 2021; Mate & Estores, 2020). Mangrove conservation is therefore not separate from destination management: environmental integrity, visitor learning, and community welfare must be pursued together.

Push factors are internal reasons for travel, such as escape, relaxation, novelty, or social connection, whereas pull factors are destination attributes that influence where visitors go (Duong et al., 2023; Hoang et al., 2022). Environmental awareness includes recognition of ecological conditions and of the consequences and benefits of individual action. Pro-sustainable tourism behavior translates such understanding into environmental practices, support for the local economy, and socially respectful conduct (Li et al., 2022; Raza et al., 2024). Examining these constructs together can show whether visitors attracted to an ecotourism site also report the awareness and conduct needed to sustain it.

Clear and credible sustainability information can strengthen awareness and reinforce responsible visitor habits (Gomes & Lopes, 2023). Motivation and environmental cues may work together: visitors who value an eco-destination and understand its ecological significance may be more willing to adopt low-impact and community-supportive practices (Khanh & Pham, 2024; Raza et al., 2024). The Philippine setting is particularly relevant because the Sagay Marine Reserve contains extensive mangrove resources that support biodiversity, coastal protection, ecotourism, and resident livelihoods (Albarico, 2022; Jalique & Postrero, 2023).



Suyac Island Mangrove Eco-Park is located in Barangay Taba-ao, Sagay City, Negros Occidental, about three kilometers and a short boat ride from Old Sagay Port. The 1.8-hectare inhabited island is surrounded by approximately 15.5 hectares of mangrove forest within the 32,000-hectare Sagay Marine Reserve; the two figures therefore refer to distinct land and mangrove areas (Green Destinations, 2022; Guadalquiver, 2023). Managed by the Suyac Island Eco-Tourist Attendants Association with government and partner support, the site links community livelihood with conservation. Its community-based protection initiative entered the 2022 Green Destinations Top 100, placed second in the Nature and Scenery category of the 2023 Green Destinations Story Awards, and received a 2025 ASEAN Community-Based Tourism Award (Green Destinations, 2022; Guadalquiver, 2025).

The study examined visitor motivation, environmental awareness, and pro-sustainable tourism behavior at Suyac Island to inform sustainable visitor management.

Specifically, the objectives were to (1) describe respondents by sex, age, marital status, educational attainment, visit frequency, and purpose; (2) determine the levels of push and pull motivation, awareness of consequences and benefits, environmental sustainability awareness, and environmental, economic, and social behavior; (3) compare the principal outcomes across visitor characteristics; and (4) examine associations among motivation, environmental awareness, and pro-sustainable tourism behavior.

Review of Related Literature

The study draws on complementary theories of travel motivation, environmental awareness, and sustainable behavior. Push–Pull Theory distinguishes internal travel motives from destination attributes (Duong et al., 2023). Norm Activation Theory explains how awareness of adverse consequences and personal responsibility can activate moral obligations toward protective action (Schwartz, 1977). Awareness of benefits represents an evaluative belief relevant to the attitudinal component of the Theory of Planned Behavior, in which intention also depends on subjective norms and perceived behavioral control (Ahmad et al., 2020). Value-Belief-Norm theory connects ecological beliefs, awareness of consequences, responsibility, and personal norms (Stern et al., 1999). The Triple Bottom Line organizes pro-sustainable behavior into environmental, economic, and social dimensions (Di Vaio et al., 2021; Li et al., 2022). Together, these perspectives explain the expected associations among motivation, awareness, and reported behavior.

The push–pull perspective is particularly useful in nature-based tourism because travel decisions emerge from the interaction of personal needs and destination attributes. Push factors include escape, relaxation, novelty, social interaction, and personal growth, while pull factors include scenery, biodiversity, accessibility, guided experiences, facilities, community activities, and the perceived environmental quality of a place (Duong et al., 2023; Valencia et al., 2022; Zhang & Walsh, 2020). Research on mangrove and other nature-based destinations likewise shows that natural beauty, ecological distinctiveness, educational opportunities, and credible conservation practices help convert a general desire to travel into an actual destination choice (Jones & Nguyen, 2021; Prasadja & Singgalen, 2022). Motivation also shapes what visitors notice, the activities in which they participate, and their receptiveness to environmental messages during the visit.

Motivational patterns may vary by life stage and social position even when overall interest in a destination is high. Younger adults may prioritize novelty, exploration, and visually distinctive experiences, whereas mature visitors may increasingly value restoration, health, accessibility, and structured activities in natural settings (Duong et al., 2023; Octaviany & Ervina, 2023). Educational attainment can also influence the depth with which visitors appreciate ecological interpretation, because education strengthens the capacity to connect site-level observations with broader environmental systems. Sex and marital status may shape particular preferences, but the literature does not consistently show that they create broad differences in overall motivation. This inconsistency makes site-specific testing necessary instead of treating demographic categories as fixed motivational profiles.

Environmental awareness involves knowledge of ecological conditions as well as recognition of the consequences and benefits associated with individual and collective action. In environmentally sensitive destinations, awareness must extend beyond knowing that mangroves are important. Visitors must understand how waste, habitat disturbance, resource use, and disregard for site rules affect biodiversity and community well-being; they must also recognize that conservation provides coastal protection, fisheries support, carbon storage, education, livelihood, and cultural continuity. Darvishmotevali and Altinay (2022) describe environmental awareness as a psychological condition that influences information, attitudes, intentions, and actions. Studies in marine and mangrove settings similarly indicate that awareness is strengthened when environmental information is locally grounded, credible, and connected with participatory activities rather than presented as an abstract warning (Inoco & Villegas, 2024; Lawasi et al., 2025).

Norm Activation Theory explains why awareness of adverse consequences can activate a personal moral obligation to prevent harm. When visitors recognize that careless conduct threatens other people, wildlife, and the destination itself, and when they accept some responsibility for those outcomes, personal norms are more likely to guide pro-environmental conduct (Confente & Scarpi, 2021; Setiawan et al., 2021). The Theory of Planned Behavior adds that



favorable attitudes, perceived social expectations, and perceived behavioral control shape intention and action. Thus, visitors may value conservation but still fail to act if appropriate behaviors are inconvenient, invisible, or unsupported by the setting. The Value-Belief-Norm perspective further situates environmental action within a causal sequence in which underlying values shape beliefs, awareness, personal norms, and ultimately behavior. Together, these perspectives explain why knowledge, moral responsibility, enabling conditions, and social reinforcement must operate jointly.

Pro-sustainable tourism behavior applies the sustainability principle to what visitors actually do. Its pro-environmental dimension includes waste reduction, proper disposal, compliance with site rules, avoidance of habitat disturbance, and participation in conservation. Its pro-economic dimension involves patronizing locally provided products and services and recognizing the livelihood value of community-based tourism. Its pro-social dimension includes respect for residents, traditions, and community authority, as well as support for locally led activities. The Triple Bottom Line organizes these dimensions as planet, prosperity, and people and emphasizes that destination success cannot be evaluated through revenue alone (Di Vaio et al., 2021; Li et al., 2022; Purwaningsih et al., 2020). A visitor may therefore appear environmentally responsible while making little contribution to local livelihoods, or may support community enterprises while neglecting low-waste conduct. Sustainable tourism requires attention to all three.

Mangrove ecotourism makes this relationship especially consequential because the attraction itself is also a protective ecosystem. Mangroves stabilize shorelines, moderate storm impacts, store carbon in vegetation and sediment, provide nursery habitat for fish, and support food and livelihood systems (Lhosupasirirat et al., 2023; Sanidad et al., 2022). Tourism can increase public recognition of these services and create revenue for conservation and community enterprises, but unmanaged visitation can also increase waste, disturb wildlife, damage vegetation, and place pressure on facilities. Visitor conduct is therefore an integral part of destination management. A mangrove park remains sustainable when the experience enables people to enjoy and learn from the ecosystem while protecting the ecological and social resources on which the experience depends.

Community-based governance adds another layer to sustainable visitor behavior. When residents serve as guides, boat operators, food providers, artisans, and site stewards, tourism expenditure circulates locally and conservation acquires a visible livelihood dimension. Pro-economic behavior therefore includes more than purchasing a souvenir; it reflects whether the visitor recognizes local ownership and chooses services that retain value within the community. Pro-social behavior likewise requires respect for local authority, everyday life, cultural practices, and community-defined limits on tourism. These forms of conduct are integral to environmental sustainability because communities that receive fair and meaningful benefits have stronger incentives and greater capacity to maintain conservation initiatives. The ecological, economic, and social dimensions should thus be interpreted as interdependent rather than as separate checklists.

Methodology

The study used a quantitative descriptive-comparative and correlational design. It described motivation, environmental awareness, and pro-sustainable tourism behavior; compared these outcomes across visitor characteristics; and tested associations among the principal variables. The cross-sectional design measured patterns and relationships at one point in time.

The research was conducted at Suyac Island Mangrove Eco-Park, a community-managed destination within the Sagay Marine Reserve in Negros Occidental. Its mature mangrove stands, guided low-impact activities, environmental interpretation, visitor services, and community livelihood functions made it appropriate for examining sustainable visitor conduct.

Respondents were 168 consenting visitors aged 18 years or older who had experienced the eco-park. An a priori G*Power 3.1.9.7 calculation used the Exact test family, a bivariate normal correlation model, an alternative correlation of .25, one-tailed alpha of .05, and power of .95 (actual power approximately .9502), producing a required sample of 168. Purposive sampling was used because the visitor population during fieldwork was not fixed. Persons below 18, those who did not consent, those who had not experienced the park, and the 30 pilot respondents were excluded. The resulting sample represents the participating visitors rather than the full visitor population.

Data were gathered using an adapted four-part Likert-type questionnaire. Part 1 recorded sex, age, marital status, educational attainment, visit frequency, and purpose. Part 2 contained eight motivation items, equally divided between push and pull factors, adapted from Zhang and Walsh (2020). Part 3 measured awareness of consequences (four items), awareness of benefits (three items), and environmental sustainability awareness (three items), drawing on Salinero et al. (2025), Üzülmöz et al. (2023), and Sharmin et al. (2020). Part 4 contained four items each for pro-environmental, pro-economic, and pro-social behavior, adapted from Salinero et al. (2025). Responses ranged from 1 to 4; means of 3.51–4.00 were interpreted as very high, 2.51–3.50 as high, 1.51–2.50 as low, and 1.00–1.50 as very low.



Fifteen jurors with graduate degrees or research expertise reviewed 32 draft questionnaire items. For each item, the content validity ratio was calculated as $CVR = [N_e - (N/2)] / (N/2)$, where N_e was the number of jurors who rated the item essential and $N = 15$. The study applied a retention criterion of .60. Thirty items met the criterion. AOB 4 and ESA 1 each obtained a CVR of .467 and were removed, producing the 30-item instrument used in the study. The mean CVR across the 32 draft items was .94. Pilot testing involved 30 adult visitors at Guang-guang Mangrove Park in Davao Oriental. The pilot site shares mangrove ecological features and community-based tourism practices with the research locale, and all pilot respondents were excluded from the final sample. Cronbach's alpha was .889 for motivation, .935 for environmental awareness, .934 for pro-sustainable behavior, and .968 overall, indicating high internal consistency.

The study received exempt-review ethics clearance from the La Consolacion College Bacolod Institutional Review Board (Ethics) under protocol APP 202526-092, issued November 15, 2025 and valid from November 16, 2025 to May 31, 2026. Fieldwork was conducted from March 21 to April 5, 2026. After coordination with site authorities, eligible visitors were recruited at designated contact points after experiencing the eco-park: the reception area and boardwalk exit following their guided tours and, in some cases, the departure point near the docking area before boarding boats to the mainland. They were informed of the study and invited to participate voluntarily. Written consent was obtained before questionnaire administration; refusal or withdrawal carried no penalty. Responses were anonymized, stored securely, and processed in accordance with Republic Act No. 10173.

Means and standard deviations summarized the four-point composite scores. Shapiro–Wilk tests showed departures from normality for all three outcomes in the two-group analyses (all $p < .001$); Brown–Forsythe tests also identified unequal variances for some comparisons. Mann–Whitney U tests compared sex, marital status, and purpose of visit, and Kruskal–Wallis H tests compared age, educational attainment, and visit frequency. These rank-based tests compared score distributions across groups. Dunn comparisons followed significant Kruskal–Wallis results, with Bonferroni adjustment within each outcome–factor family (10 age comparisons or six education comparisons). Rank-biserial correlations (r_{rb}) quantified the two-group contrasts; their signs follow the software group coding. Spearman's rho examined associations among the principal constructs. The significance criterion was .05; post hoc conclusions used adjusted p values.

Ethical safeguards included voluntary participation, informed consent, the right to decline or withdraw, minimization of burden, equitable eligibility, anonymity, confidentiality, and secure handling of records. Each respondent provided individual consent independently of the site authorization. Only aggregated results were reported.

Results

The 168 respondents represented varied demographic and visit profiles (Table 1).

Table 1
Respondent Profile

Characteristic	n	%
Sex: Female	103	61.3
Sex: Male	65	38.7
Age: 19–25	70	41.7
Age: 26–35	33	19.6
Age: 36–45	29	17.3
Age: 46–55	23	13.7
Age: 56 and above	13	7.7
Marital status: Married	69	41.1
Marital status: Single	99	58.9
Education: College graduate	65	38.7
Education: College undergraduate	58	34.5
Education: Postgraduate	16	9.5
Education: Senior high school	29	17.3
Visit frequency: First time	100	59.5
Visit frequency: Twice a year	46	27.4
Visit frequency: More than three times a year	22	13.1
Purpose: Business	25	14.9



Characteristic	n	%
Purpose: Relaxation	143	85.1

Note. N = 168. Percentages may differ slightly from 100% because of rounding.

Women comprised 61.3% of the sample, and visitors aged 19–25 formed the largest age group (41.7%). College graduates (38.7%) and college undergraduates (34.5%) accounted for most respondents. First-time visitors constituted 59.5%, and relaxation was the dominant reported purpose (85.1%). Business-related visits represented 14.9% and included conferences, seminars, training, education, meetings, and medical purposes. Subgroup sizes varied considerably, particularly across educational attainment and purpose-of-visit categories.



Table 2
Overall Descriptive Results

Construct	Dimension	n	M	SD	Interpretation
Motivation	Push	168	3.75	0.366	Very high
Motivation	Pull	168	3.77	0.361	Very high
Environmental awareness	Consequences	168	3.85	0.320	Very high
Environmental awareness	Benefits	168	3.84	0.350	Very high
Environmental awareness	Sustainability	168	3.85	0.340	Very high
Pro-sustainable behavior	Environmental	168	3.81	0.363	Very high
Pro-sustainable behavior	Economic	168	3.84	0.324	Very high
Pro-sustainable behavior	Social	168	3.87	0.312	Very high

Note. All dimensions were measured on a four-point scale; 3.51–4.00 was classified as very high.

Overall scores were uniformly very high. Pull motivation ($M = 3.77$, $SD = 0.361$) was .02 above push motivation ($M = 3.75$, $SD = 0.366$). Awareness of consequences and environmental sustainability awareness shared the highest awareness mean ($M = 3.85$), while awareness of benefits was nearly identical ($M = 3.84$). Pro-social behavior had the highest descriptive mean ($M = 3.87$), followed by pro-economic ($M = 3.84$) and pro-environmental behavior ($M = 3.81$). Differences among the dimension means ranged from .01 to .06; no within-person contrasts among these dimensions were performed.

Table 3
Motivation by Visitor Characteristics

Group	n	Push M	Push SD	Pull M	Pull SD
Female	103	3.78	0.325	3.82	0.318
Male	65	3.69	0.419	3.69	0.410
19–25	70	3.68	0.376	3.69	0.409
26–35	33	3.85	0.306	3.90	0.250
36–45	29	3.85	0.246	3.86	0.237
46–55	23	3.66	0.430	3.71	0.389
56 and above	13	3.77	0.473	3.79	0.406
Married	69	3.78	0.382	3.81	0.330
Single	99	3.73	0.354	3.74	0.380
College graduate	65	3.81	0.347	3.90	0.245
College undergraduate	58	3.69	0.404	3.64	0.409
Postgraduate	16	3.91	0.202	4.00	0.000
Senior high school	29	3.66	0.356	3.62	0.415
First time	100	3.79	0.327	3.79	0.352
Twice a year	46	3.66	0.433	3.73	0.389
More than three times a year	22	3.75	0.362	3.78	0.356
Business	25	3.90	0.260	3.95	0.204
Relaxation	143	3.72	0.375	3.74	0.374

Note. All subgroup scores were classified as very high.

Motivation remained very high in every subgroup. Visitors aged 26–35 had the highest pull mean ($M = 3.90$), while postgraduates recorded the highest push mean ($M = 3.91$) and the maximum pull mean ($M = 4.00$). Business



visitors also reported higher push and pull means than relaxation visitors. Differences by sex, marital status, and visit frequency were comparatively narrow. Inferential tests of the group contrasts are reported in Tables 6 and 7.

Table 4

Environmental Awareness by Visitor Characteristics

Group	n	Conseq. M	SD	Benefits M	SD	Sustain. M	SD
Female	103	3.87	0.280	3.87	0.292	3.86	0.312
Male	65	3.82	0.376	3.78	0.422	3.83	0.383
19–25	70	3.82	0.324	3.79	0.377	3.82	0.353
26–35	33	3.90	0.364	3.91	0.366	3.89	0.370
36–45	29	3.93	0.199	3.90	0.237	3.87	0.301
46–55	23	3.77	0.361	3.80	0.373	3.81	0.331
56 and above	13	3.85	0.315	3.85	0.323	3.87	0.321
Married	69	3.89	0.259	3.89	0.259	3.88	0.280
Single	99	3.82	0.355	3.80	0.398	3.82	0.376
College graduate	65	3.89	0.306	3.89	0.312	3.90	0.321
College undergraduate	58	3.83	0.315	3.76	0.390	3.81	0.348
Postgraduate	16	4.00	0.000	4.00	0.000	3.92	0.258
Senior high school	29	3.72	0.403	3.77	0.400	3.76	0.387
First time	100	3.86	0.289	3.85	0.333	3.88	0.278
Twice a year	46	3.82	0.390	3.82	0.390	3.77	0.438
More than three times a year	22	3.88	0.306	3.83	0.352	3.85	0.352
Business	25	3.99	0.050	3.99	0.066	3.99	0.066
Relaxation	143	3.83	0.341	3.81	0.373	3.82	0.362

Note. All subgroup scores were classified as very high. Conseq. = awareness of consequences; Sustain. = environmental sustainability awareness.

Environmental awareness was very high across all visitor groups. Postgraduates recorded maximum means for awareness of consequences and benefits (both $M = 4.00$), while business visitors reported $M = 3.99$ across all three awareness dimensions. The postgraduate and business categories were considerably smaller than their comparison groups, and zero or very small standard deviations in some cells indicated restricted variability. Inferential tests of these group contrasts are reported in Tables 6 and 7.

Table 5

Pro-Sustainable Tourism Behavior by Visitor Characteristics

Group	n	Environ. M	SD	Economic M	SD	Social M	SD
Female	103	3.84	0.313	3.84	0.317	3.89	0.302
Male	65	3.78	0.431	3.83	0.336	3.83	0.325
19–25	70	3.78	0.380	3.80	0.345	3.81	0.383
26–35	33	3.86	0.354	3.92	0.213	3.93	0.219
36–45	29	3.88	0.272	3.89	0.288	3.94	0.197
46–55	23	3.80	0.292	3.79	0.326	3.83	0.349
56 and above	13	3.75	0.559	3.77	0.473	3.96	0.094
Married	69	3.83	0.345	3.84	0.321	3.92	0.220
Single	99	3.80	0.376	3.83	0.327	3.83	0.359
College graduate	65	3.86	0.365	3.90	0.292	3.95	0.168
College undergraduate	58	3.77	0.364	3.78	0.349	3.78	0.426
Postgraduate	16	3.92	0.198	3.97	0.125	4.00	0.000
Senior high school	29	3.73	0.412	3.72	0.364	3.81	0.318



Group	n	Environ. M	SD	Economic M	SD	Social M	SD
First time	100	3.84	0.313	3.84	0.324	3.87	0.315
Twice a year	46	3.76	0.456	3.82	0.344	3.89	0.262
More than three times a year	22	3.81	0.361	3.85	0.285	3.81	0.393
Business	25	3.94	0.166	3.98	0.100	4.00	0.000
Relaxation	143	3.79	0.383	3.81	0.342	3.85	0.333

Note. All subgroup scores were classified as very high. Environ. = pro-environmental behavior.

Pro-sustainable behavior was very high throughout the sample. Pro-social behavior reached M = 4.00 among postgraduates and business visitors, while business visitors also reported high pro-environmental (M = 3.94) and pro-economic behavior (M = 3.98). Patterns by age and visit frequency varied across the three behavioral dimensions. The corresponding group tests are reported in Table 6.

Table 6 summarizes the Mann–Whitney U and Kruskal–Wallis H tests of the principal composite outcomes, with rank-biserial correlations for the two-group comparisons.

Table 6
Group-Comparison Tests

Outcome	Factor	Test	Statistic	df	p	r_{pb}
Motivation	Sex	U	3826	—	.093	-.143
Motivation	Marital status	U	3772	—	.215	-.104
Motivation	Purpose of visit	U	2476	—	< .001	-.385
Motivation	Age	H	10.81	4	.029	—
Motivation	Education	H	20.56	3	< .001	—
Motivation	Visit frequency	H	2.151	2	.341	—
Environmental awareness	Sex	U	3656	—	.242	-.092
Environmental awareness	Marital status	U	3738	—	.225	-.094
Environmental awareness	Purpose of visit	U	2408	—	.001	-.347
Environmental awareness	Age	H	6.565	4	.161	—
Environmental awareness	Education	H	13.67	3	.003	—
Environmental awareness	Visit frequency	H	2.308	2	.315	—
Pro-sustainable behavior	Sex	U	3586	—	.375	-.071
Pro-sustainable behavior	Marital status	U	3547	—	.628	-.039
Pro-sustainable behavior	Purpose of visit	U	2323	—	.006	-.300
Pro-sustainable behavior	Age	H	5.173	4	.270	—
Pro-sustainable behavior	Education	H	14.78	3	.002	—
Pro-sustainable behavior	Visit frequency	H	0.518	2	.772	—



Note. U = Mann–Whitney statistic; H = Kruskal–Wallis statistic; r_{fb} = rank-biserial correlation for two-group tests. Dashes indicate that df or r_{fb} is not applicable. Effect-size signs follow the software coding; absolute values summarize contrast magnitude. These are distributional comparisons, not direct tests of the dimensional means.

Motivation differed by age, $H(4) = 10.81$, $p = .029$, and educational attainment, $H(3) = 20.56$, $p < .001$. Educational differences also occurred in environmental awareness, $H(3) = 13.67$, $p = .003$, and pro-sustainable behavior, $H(3) = 14.78$, $p = .002$. Purpose of visit differentiated motivation ($U = 2476$, $p < .001$, $r_{\text{fb}} = -.385$), environmental awareness ($U = 2408$, $p = .001$, $r_{\text{fb}} = -.347$), and behavior ($U = 2323$, $p = .006$, $r_{\text{fb}} = -.300$). Business visitors reported higher descriptive scores than relaxation visitors. Sex, marital status, and visit frequency did not yield significant differences for any outcome. Age differences were nonsignificant for awareness and behavior.

Dunn comparisons followed the significant omnibus tests (Table 7). Statistical significance was determined from the Bonferroni-adjusted p values.

Table 7
Dunn Pairwise Comparisons With Bonferroni Adjustment

Outcome/factor	Group 1	Group 2	z	r_{fb}	Adjusted p
Motivation—age	19-25	26-35	-2.801	0.313	.051
Motivation—age	19-25	36-45	-1.596	0.212	1.000
Motivation—age	19-25	46-55	-0.005	0.000	1.000
Motivation—age	19-25	56 and above	-1.757	0.245	.789
Motivation—age	26-35	36-45	0.939	-	1.000
				0.166	
Motivation—age	26-35	46-55	2.173	-	.298
				0.307	
Motivation—age	26-35	56 and above	0.186	0.014	1.000
Motivation—age	36-45	46-55	1.258	-	1.000
				0.217	
Motivation—age	36-45	56 and above	-0.534	0.172	1.000
Motivation—age	46-55	56 and above	-1.526	0.241	1.000
Motivation—education	College graduate	College undergraduate	3.177	-	.009
				0.307	
Motivation—education	College graduate	Postgraduate	-1.205	0.185	1.000
Motivation—education	College graduate	Senior high school	2.994	-	.017
				0.363	
Motivation—education	College undergraduate	Postgraduate	-3.223	0.487	.008
Motivation—education	College undergraduate	Senior high school	0.417	-	1.000
				0.048	
Motivation—education	Postgraduate	Senior high school	3.227	-	.007
				0.532	
Environmental awareness—education	College graduate	College undergraduate	2.481	-	.079
				0.227	
Environmental awareness—education	College graduate	Postgraduate	-1.026	0.145	1.000
Environmental awareness—education	College graduate	Senior high school	2.520	-	.070
				0.272	
Environmental awareness—education	College undergraduate	Postgraduate	-2.601	0.369	.056
Environmental awareness—education	College undergraduate	Senior high school	0.504	-	1.000
				0.070	
Environmental awareness—education	Postgraduate	Senior high school	2.727	-	.038
				0.405	
Pro-sustainable behavior—education	College graduate	College undergraduate	2.743	-	.036
				0.248	
Pro-sustainable behavior—education	College graduate	Postgraduate	-0.670	0.090	1.000
Pro-sustainable behavior—education	College graduate	Senior high school	2.821	-	.029
				0.320	



Outcome/factor	Group 1	Group 2	z	r_{β}	Adjusted p
Pro-sustainable behavior—education	College undergraduate	Postgraduate	-2.417	0.344	.094
Pro-sustainable behavior—education	College undergraduate	Senior high school	0.591	-	1.000
Pro-sustainable behavior—education	Postgraduate	Senior high school	2.623	-	.052
				0.425	

Note. z = standardized Dunn statistic; r_{β} = rank-biserial correlation from the corresponding individual Mann–Whitney comparison. The effect sizes and Dunn z statistics arise from related but distinct calculations. Bonferroni-adjusted p values use 10 comparisons for motivation by age and six comparisons for each education family.

No age pair remained significant after Bonferroni adjustment, despite the significant motivation omnibus test; the smallest adjusted age p value was .051 for ages 19–25 versus 26–35. Four education contrasts were significant for motivation: college graduates versus college undergraduates (p = .009) and senior high school visitors (p = .017), and postgraduates versus college undergraduates (p = .008) and senior high school visitors (p = .007). For environmental awareness, only postgraduates versus senior high school visitors remained significant (p = .038). For behavior, college graduates differed from college undergraduates (p = .036) and senior high school visitors (p = .029). Higher-education groups had higher descriptive scores in these supported contrasts. The largest absolute pairwise rank-biserial correlation was .532 for postgraduate versus senior high school motivation.

Motivation, environmental awareness, and pro-sustainable behavior were positively associated (Table 8).

Table 8
Spearman Correlations Among the Principal Variables

Variables	r_s	p
Motivation—environmental awareness	.648	< .001
Motivation—pro-sustainable behavior	.633	< .001
Environmental awareness—pro-sustainable behavior	.661	< .001

Note. N = 168. r_s = Spearman rank correlation. All three associations were statistically significant at p < .001.

All three bivariate relationships were positive and statistically significant. Motivation was associated with environmental awareness (r_s = .648, p < .001) and pro-sustainable behavior (r_s = .633, p < .001); environmental awareness had the largest observed association with pro-sustainable behavior (r_s = .661, p < .001). Higher scores on each construct therefore tended to occur with higher scores on the others. As cross-sectional associations, the coefficients do not establish temporal order or causality and were not statistically compared with one another.

Discussion and Analysis

The uniformly very high scores indicate that Suyac Island receives visitors who are strongly motivated, environmentally aware, and disposed toward sustainable conduct. The near-equivalence of push and pull motivation suggests that internal travel needs and destination attributes operate together. Suyac Island's ecological distinctiveness and community-managed character can attract visitors while also creating a receptive setting for conservation learning (Duong et al., 2023; Hoang et al., 2022). Differences among the dimension means were small, descriptive, and near the upper end of the response scale.

Educational attainment produced significant omnibus differences across all three outcomes, but the adjusted pairwise evidence was narrower. Motivation differed in four contrasts involving college graduates or postgraduates versus college undergraduates or senior high school visitors. Environmental awareness differed only between postgraduates and senior high school visitors, while behavior differed between college graduates and college undergraduates or senior high school visitors. These findings are consistent with literature linking education and ecological understanding (Suárez-Perales et al., 2021; Uçgun & Narci, 2022). Every educational group nevertheless remained in the very high category, and the supported contrasts did not form a uniform gradient across outcomes. The age-related motivation omnibus result likewise did not identify a significant individual age pair after adjustment. Visitor interpretation should remain accessible across educational backgrounds without assigning fixed traits to demographic groups.

Purpose of visit also differentiated motivation, awareness, and behavior. Business visitors—those attending conferences, seminars, training, education, meetings, or medical activities—reported higher means than relaxation



visitors. The business subgroup was small, and the study did not measure organizational expectations, itinerary structure, or prior sustainability orientation; these factors may help explain the observed pattern (Dodds & Holmes, 2022). Future surveys should define the category consistently and separate its component purposes when sample size permits.

Sex, marital status, and visit frequency were not associated with significant group differences. Slight mean differences did not provide evidence that one sex or marital group was more motivated, aware, or responsible. Repeated visitation likewise did not correspond reliably to stronger sustainable behavior. Visitor communication should maintain common conservation standards while offering varied formats and renewed prompts for both first-time and returning visitors.

Environmental awareness showed the largest observed correlation with pro-sustainable behavior, underscoring the practical value of credible and locally grounded environmental interpretation. Motivation can direct attention, awareness can clarify consequences and benefits, and visible facilities, guide practices, social norms, and community-led opportunities can make responsible action easier (Gomes & Lopes, 2023; Wang et al., 2024). These elements can be combined in visitor programming while their causal relationships are examined in future longitudinal or experimental research.

The theoretical perspectives address different aspects of visitor behavior. Push–Pull Theory explains attraction to the experience; Norm Activation and Value-Belief-Norm perspectives clarify the roles of ecological consequences and moral responsibility; the Theory of Planned Behavior emphasizes attitudes, norms, and perceived control; and the Triple Bottom Line situates behavior within environmental, economic, and social sustainability. Suyac Island’s visitor program can therefore integrate ecological protection, locally retained economic benefit, and respectful community interaction.

The findings are limited by purposive sampling, one destination, adult volunteers, self-report, unequal subgroup sizes, and a cross-sectional design. Ceiling effects may have restricted variability, and common questionnaire administration may have contributed to the observed correlations. The sample-size calculation targeted a correlation rather than every subgroup comparison. Bonferroni adjustment controlled multiplicity within each post hoc family but not across every omnibus test and correlation. The correlation and group-comparison estimates were reported without confidence intervals. The findings should therefore be generalized cautiously and replicated with broader samples and prospectively powered subgroup analyses.

Conclusion

Visitors to Suyac Island reported very high motivation, environmental awareness, and pro-sustainable tourism behavior. Push and pull motives were nearly equivalent, the three awareness dimensions were closely grouped, and pro-social behavior had the highest descriptive mean. The small differences among the dimensions were descriptive rather than statistically tested. Overall, the results indicate a visitor base receptive to conservation and community-oriented management.

Motivation showed omnibus differences by age and educational attainment and a two-group difference by purpose of visit; awareness and behavior differed by educational attainment and purpose. After Bonferroni adjustment, no age pair was significant, and the supported education contrasts varied by outcome. Sex, marital status, and visit frequency showed no significant differences. All three constructs were positively associated, with the largest observed coefficient between environmental awareness and behavior. These findings support integrated visitor interpretation and practical opportunities for responsible action at the eco-park.

Recommendations

First, management should implement a concise visitor-interpretation sequence from arrival through the boardwalk, using bilingual messages and optional QR-linked material to explain mangrove protection, biodiversity, fisheries, carbon storage, livelihood, and appropriate conduct.

Second, guides and tourist attendants should receive periodic training in mangrove ecology, inclusive communication, visitor facilitation, and accurate explanation of conservation rules, with messages adapted for varied educational backgrounds.

Third, the eco-park should make sustainable action visible and convenient through refill points, segregated waste stations, marked trails, low-waste options, and transparent opportunities to support local products and community-led conservation.

Fourth, management should periodically monitor motivation, awareness, satisfaction, and reported or observed behavior, consistently defining trip-purpose categories and recording subgroup sizes so programs can be refined without stereotyping visitors.



Finally, future studies should combine broader sampling with direct observation and repeated measurements to test whether interpretation and facility improvements are associated with behavioral change. Subgroup comparisons should be prospectively powered and reported with effect sizes, confidence intervals, assumption checks, and prespecified multiplicity procedures.

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