

Community-Based Ecotourism in a Protected Coastal Landscape: Challenges and Opportunities from Guang-Guang Mangrove Park, Pujada Bay, Mati, Philippines

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Abstract

Mangrove ecotourism is increasingly promoted as a strategy for linking coastal conservation, environmental education and local livelihood development. However, its contribution to community-based conservation depends on whether local stakeholders participate meaningfully in decision-making, revenue governance and benefit-sharing. This study assessed the challenges and opportunities for community-based ecotourism (CBET) development at Guang-Guang Mangrove Park and Nursery in Mati City, Davao Oriental, Philippines. Using a mixed-methods case-study design, data were collected through a participatory transect walk, semi-structured interviews with 12 key stakeholders and visitor surveys with 54 respondents from April to June 2023. Qualitative data were analyzed thematically using environmental, economic, social and organizational dimensions, while survey responses were summarized using descriptive statistics. Results showed favorable visitor attitudes toward mangrove conservation and community involvement, but also revealed constraints related to electricity, water supply, access infrastructure, interpretation materials, waste management, revenue restrictions, weak benefit-sharing, limited community influence in strategic decisions, litter, vandalism and fragmented coordination. The findings suggest that Guang-Guang is best understood as a community-associated and multi-stakeholder mangrove ecotourism site that has not yet fully institutionalized CBET principles. Strengthening protected-area-aligned revenue governance, community representation, visitor management and conservation-first tourism planning is essential for improving ecological integrity and local benefits.

1. Introduction

Mangrove ecosystems provide essential provisioning, regulating, cultural and supporting services to coastal communities, including coastal protection, fisheries maintenance, carbon storage and opportunities for recreation and tourism (Barbier et al., 2011; Lee et al., 2014; Nyangoko et al., 2022). These services are especially important in tropical coastal landscapes because mangroves function simultaneously as habitat, shoreline buffers, blue-carbon reservoirs and livelihood-support systems (Alongi, 2002). Despite these values, mangroves remain vulnerable to land conversion, aquaculture expansion, infrastructure development, pollution and unsustainable resource extraction as well as. Global analyses show continuing changes in mangrove extent, with Southeast Asia remaining a major region of concern (Bunting et al., 2022). In the Philippines, mangrove loss has historically been associated with aquaculture development, coastal settlement and weak enforcement, even though mangroves are important for food security, disaster-risk reduction and biodiversity conservation (Garcia et al., 2014; Primavera, 2000).

The conservation of Philippine mangroves is also a livelihood and governance issue. Mangroves reduce coastal flooding risks for many coastal residents, including vulnerable and low-income populations (World Bank Group, 2016). At the same time, conservation rules may restrict extractive uses such as cutting, fishing access or aquaculture expansion. Philippine mangrove decline has also been linked to overlapping institutional mandates, weak enforcement and policy incentives that historically favored

aquaculture conversion, indicating that restoration and protection cannot be treated as technical planting activities alone (Primavera, 2000). Restoration and protection programs therefore require stronger sociocultural and economic integration with local livelihoods if they are to be sustained (Rönnbäck et al., 2007; Song et al., 2021; Valenzuela et al., 2020; Walters et al., 2008).

Ecotourism has been promoted as one possible approach for reconciling conservation with local development. In principle, ecotourism should minimize negative environmental impacts, generate educational value and support conservation financing (Fennell, 2020; Friess, 2017; A. L. Stronza et al., 2019). Recent work on mangrove ecotourism in Southeast Asia also indicates that ecotourism is increasingly used as a financial and educational mechanism for mangrove conservation, although outcomes depend strongly on governance quality, visitor management and community benefit systems (Blanton et al., 2024). In the Philippines, sustainable ecotourism is also linked to value-chain development, visitor experience and community participation (Rivera & Gutierrez, 2019). Community-based ecotourism (CBET) goes further by emphasizing local involvement in planning, operation, management and benefit-sharing (Mohd Noh et al., 2020; Scheyvens, 1999). However, the community-based term was used carefully as participation may range from passive attendance in meetings to direct influence over rules, revenue and enterprise decisions (Arnstein, 1969; J. N. Pretty, 1995; Tosun, 2000).

A central problem in CBET is that tourism projects may involve communities as workers or beneficiaries without transferring real decision-making authority. Philippine community-based tourism studies have shown that institutional arrangements can create participation gaps, elite capture and dependence on government or external actors (Gutierrez, 2022). International ecotourism literature similarly cautions that ecotourism is not a guaranteed solution to conservation or poverty challenges, especially when visitor growth, weak governance and unequal benefit distribution are not addressed (Das & Chatterjee, 2015; Ghosh & Ghosh, 2019; A. Stronza & Gordillo, 2008). Stakeholder participation is also not automatically effective; its quality depends on early involvement, transparency, representation, deliberation and the capacity of participants to shape outcomes (Reed, 2008).

The protected-area context makes these issues especially important. Under the Expanded National Integrated Protected Areas System Act of 2018, protected-area management in the Philippines involves Protected Area Management Boards (PAMBs), management planning, resource-use regulation and mechanisms for fees and retained income (Republic Act No. 11038: Expanded National Integrated Protected Areas System Act of 2018, 2018). The national guidelines on ecotourism planning in protected areas also emphasize environmental safeguards, community participation, visitor management and consistency with protected-area objectives (Department of Tourism & Department of Environment and Natural Resources, 2024) (Department of Environment and Natural Resources, 2013). The National Ecotourism Strategy and Action Plan likewise frames ecotourism as a tool for conservation, education, community benefit and local development (Department of Tourism & Department of Environment and Natural Resources, 2024). Visitor management guidance for protected areas stresses that tourism development must be planned according to ecological limits, interpretation needs, local benefits and long-term management capacity (Leung et al., 2018).

Guang-Guang Mangrove Park and Nursery in Mati City, Davao Oriental, offers a useful case for examining these issues. The site forms part of the Pujada Bay Protected Landscape and Seascape and has been developed as a mangrove conservation, nursery and ecotourism area, also known as City of Mati Environmental & Eco-Tourism Center (CMEEC) (Inoco & Villegas, 2024; Jimenez et al., 2015). It contains a concrete boardwalk, registration area, nursery space and other visitor facilities, and is associated with restoration and management efforts involving government offices, academic institutions, non-government organizations and community groups. Previous local work has documented mangrove growth, restoration activities and species composition in Guang-Guang and nearby Dahican mangrove areas (Bersaldo et al., 2023; Uyanguren, 2017; Yap et al., 2023). More recent perception-based work in Guang-Guang also shows that local tourists recognize mangroves as storm barriers, erosion-control systems, aquatic habitats and livelihood-supporting resources, while identifying shrimp-pond expansion, plastic pollution, land reclamation and illegal cutting as continuing threats (Inoco & Villegas, 2024). However, limited attention has been given to whether tourism development at the site reflects the institutional, economic and participatory conditions required for CBET. In particular, there remains a lack of site-specific analysis of how governance arrangements, revenue mechanisms, benefit-sharing, infrastructure, visitor management and community influence shape the viability of CBET in a protected coastal landscape. Addressing this gap is important because mangrove tourism sites may be described as community-based even when local actors participate mainly in implementation rather than strategic decision-making.

This study therefore assessed the challenges and opportunities for developing community-based mangrove ecotourism at Guang-Guang Mangrove Park and Nursery. Specifically, the study aimed to: (1) characterize the current status of mangrove ecotourism activities, facilities, visitor profile and stakeholder involvement; (2) examine stakeholder and visitor perceptions of the environmental, social, economic and organizational dimensions of CBET; (3) identify key constraints affecting sustainable mangrove ecotourism development, particularly infrastructure, revenue governance, benefit-sharing, visitor management and community participation; (4) assess the extent to which current arrangements reflect CBET principles of community involvement, local benefit, shared decision-making and conservation-oriented management; and (5) propose locally appropriate management recommendations for strengthening mangrove conservation, community benefit-sharing and sustainable tourism planning within the protected-area context.

2. Materials and Methods

2.1 Study site

The site is linked with conservation activities involving the local community, Davao Oriental State University-Regional Integrated Coastal Resource Management Center (DOrSU-RIC XI), Mama Earth Foundation, the Department of Environment and Natural Resources (DENR), local government offices and civil-society partners. The mangrove study area has been reported to contain approximately 850 ha of mangrove forest and 19 mangrove species (Bersaldo et al., 2023). Earlier plot-based assessments in

Guang-Guang documented common mangrove species including *Ceriops tagal*, *Rhizophora stylosa*, *Rhizophora apiculata*, *Bruguiera gymnorhiza*, *Sonneratia alba*, *Avicennia officinalis*, *Pemphis acidula*, *Aegiceras corniculatum* and *Avicennia alba* (Yap et al., 2023), while nearby Dahican assessments recorded similar *Rhizophora*-dominated communities affected by settlement, cutting and other anthropogenic disturbances (Uyanguren, 2017). Visitor facilities include an entrance and registration area, comfort rooms, a mangrove nursery and a concrete boardwalk of approximately 333 m completed in 2021. The site layout and major visitor facilities are shown in Fig. 2, and the transect-walk route and selected observation points are shown in Fig. 3.

Figure 2. Site layout and major visitor facilities of Guang-Guang Mangrove Park and Nursery, Mati City, Davao Oriental, Philippines. Map layout by [Removed for anonymous review].

2.2 Research design and analytical framework

The analysis was guided by a modified Quadruple Bottom Line framework comprising environmental, economic, social, and organizational or governance dimensions (Table 1; Fig. 4). Adapted from Rivera & Gutierrez (2019), the framework was used because community-based ecotourism outcomes depend not only on ecological protection and economic viability, but also on community participation and institutional arrangements.

A deductive coding approach was applied using a codebook that defined each dimension, its scope, and indicative evidence. The unit of analysis was a meaning unit representing a distinct experience, practice, benefit, constraint, or governance issue. Relevant passages were coded under one or more dimensions when they addressed multiple themes. The environmental dimension covered mangrove conservation, visitor impacts, resource use, monitoring, and environmental education. The economic dimension examined livelihoods, employment, revenues, benefit distribution, infrastructure, and financial constraints. The social dimension focused on participation, stewardship, ownership, capacity development, and perceived community benefits. The organizational dimension was treated as governance and included stakeholder roles, coordination, revenue rules, accountability, decision-making authority, and links with protected-area management. Participation was interpreted according to its depth rather than its mere presence. Community membership or involvement in implementation was distinguished from stronger forms of influence, such as participation in planning, rule formulation, financial decisions, monitoring, and benefit allocation. This distinction reduced the risk of equating operational involvement with meaningful empowerment or community control (Scheyvens, 1999; Tosun, 2000). The framework therefore served as an organizing heuristic for comparing ecological, livelihood, social, and governance conditions across data sources and stakeholder perspectives (Wondirad et al., 2020).

Table 1
Data sources and analytical linkage to the modified Quadruple Bottom Line framework.

Dimension	Main questions examined	Primary data sources	Examples of indicators or themes
Environmental	How does tourism relate to mangrove protection and visitor impacts?	Transect walk, interviews, tourist survey	Litter, vandalism, environmental awareness, interpretation and carrying-capacity concerns
economic	What livelihood and revenue opportunities or constraints are present?	Interviews, tourist survey, field observations	Employment, entrance-fee support, infrastructure limits, enterprise potential and visitor spending
Social	How are community participation, ownership and local benefits perceived?	Interviews, transect walk, tourist survey	Stewardship, community pride, participation in conservation, women and fisherfolk involvement
Organizational	How do governance, coordination and institutional arrangements shape CBET?	Stakeholder analysis, interviews, document-informed review	Decision-making power, PAMB/LGU/DENR roles, NGO intermediation and political continuity

2.3 Participatory transect walk

A participatory transect walk was conducted on 27 April 2023 with six participants, including the external supervisor and officers from the City Civil Security Unit and DENR. Transect walks are commonly used in participatory and qualitative field research to document site conditions, identify locally relevant resources and generate discussion while moving through a landscape (Kanstrup et al., 2014; Okoko et al., 2023). The activity followed an anticlockwise route along the boardwalk for approximately 50 min. Global Positioning System (GPS) points were recorded at discussion and observation sites, and field notes and photographs were used to document facilities, environmental issues, visitor-management concerns and local observations. Audio recording was not used to encourage open dialogue during the activity.

2.4 Semi-structured stakeholder interviews

Key stakeholders were selected through purposive sampling based on their involvement in park management, conservation, tourism, enforcement, community organization or protected-area governance. Purposive sampling was appropriate because the study sought information-rich participants with direct knowledge of site operations, policy constraints, stakeholder coordination and community involvement (Palinkas et al., 2015). Twelve informants participated, representing local government units, the City Tourism Office, City Environment and Natural Resource Office, City Civil Security Unit, Provincial Environment and Natural Resources Office (PENRO)- and Community

Environment and Natural Resources Office (CENRO)-linked offices, Mama Earth Foundation and the Women's City Federation. The profile of stakeholder interview participants is shown in Table 2.

The interview guide contained 27 questions addressing economic, environmental, social and organizational dimensions of mangrove ecotourism. Seven interviews were audio-recorded and transcribed, while five interviews relied on detailed field notes because of respondent preference or field conditions. Five interviews were conducted in Cebuano with assistance from [Removed for anonymous review] University students. Interviewees were classified as ground-level staff or management-level stakeholders to compare operational and decision-making perspectives.

Interview transcripts and detailed field notes were treated as qualitative records for thematic analysis. For interviews without audio recordings, only themes that were captured clearly in the field notes were used in the synthesis. This approach reduced the risk of overstating unrecorded statements while retaining operational insights from participants who preferred not to be recorded.

Table 2
Stakeholder interview participants and their roles (n = 12).

Interview No.	Date	Agency / Organization	Code Name	Management Level
1	01/05/2023	City Civil Security Unit (CCSU)	JO 1	No
2	01/05/2023	City Tourism Office	JO 2	No
3	01/05/2023	City Environment and Natural Resource Office (CENRO)	JO 3	No
4	01/05/2023	City LGU	JO 4	No
5	16/05/2023	City LGU	JO 5	No
6	17/05/2023	Mama Earth Foundation (NGO)	NGO 1	Yes
7	26/05/2023	City Tourism Office	Tourism 1	Yes
8	26/05/2023	Women's City Federation (WCF)	WCF 1	Yes
9	01/05/2023	City Tourism Office	JO 6	No
10	29/05/2023	City Environment and Natural Resource Office	Environment 1	Yes
11	29/05/2023	CENRO Environmental Specialist	Environment 2	Yes
12	08/06/2023	PENRO with CENRO official present	Environment 3	Yes
Note: JO = job order; LGU = local government unit; NGO = non-government organization; PENRO = Provincial Environment and Natural Resources Office; CENRO = Community Environment and Natural Resources Office.				

2.5 Tourist survey

A structured visitor survey was administered after visitors completed the boardwalk loop. The survey assessed visitor characteristics, motivations, environmental attitudes, perceptions of ecotourism, support for entrance fees and facility ratings. Survey items were informed by ecotourism principles in the literature and were pilot-tested on 30 April 2023 before final administration. Final survey forms were available in English and Cebuano.

Surveys were conducted across five field days between April and June 2023. All visitors aged 18 years and above were invited to participate when the research team was present; therefore, the survey should be interpreted as an availability sample rather than a probability sample of all park visitors. A total of 54 valid responses was obtained. Likert-scale items used a five-point scale from 1 = strongly disagree to 5 =

strongly agree. The ecotourist-profile score was calculated as the mean of seven items representing community value, community involvement, environmental protection, environmental education and site attractiveness. Because survey administration was limited to periods when the researchers were on site, the results describe the surveyed visitor group and should not be generalized to all Guang-Guang visitors.

2.6 Data analysis, ethics and limitations

Qualitative data from interviews and transect-walk notes were analyzed thematically. Thematic analysis was suitable because it allows systematic identification of repeated meanings across qualitative data while remaining flexible for applied environmental and social research (Braun & Clarke, 2006). Deductive codes were developed from the research objectives and the modified Quadruple Bottom Line framework, while inductive codes were added when recurrent themes emerged from the data. Examples of inductive themes included education, collaboration, economic management, political continuity, litter and vandalism. Quantitative survey data were encoded in Microsoft Excel and analyzed using descriptive statistics, including frequencies, percentages, means and standard deviations. The stakeholder interest-influence matrix was developed from interview accounts, observed roles, and document-informed understanding of formal responsibilities; it should therefore be interpreted as an analytical heuristic rather than a measured power score.

The study was conducted after approval from the Protected Area Management Board (PAMB) and followed institutional ethics procedures. Informed consent was obtained before participation, anonymity was assured and data were stored securely. The research team recognized the importance of cultural and linguistic sensitivity because some researchers had limited familiarity with local cultural values. Local students and stakeholders assisted in communication and field conduct.

Several limitations qualify these findings. The visitor survey was small and skewed toward young, local, university-affiliated, environmentally aware respondents, while fisherfolk, potential vendors, informal workers, youth, and unaffiliated residents were underrepresented relative to government and institutional perspectives. The results therefore represent an institutional and visitor-based assessment of CBET potential, not a full evaluation of community empowerment. The study relied mainly on perceptions and did not measure ecological impacts, carrying capacity, willingness to pay beyond basic fees, income distribution, or household livelihood effects; post-pandemic reopening may also have shaped respondents' preferences. These limitations matter because support for ecotourism, participation, and community association do not necessarily demonstrate community control, equitable benefit sharing, or long-term sustainability.

3. Results and Discussion

3.1 Stakeholder landscape and governance implications

The stakeholder analysis showed that Guang-Guang mangrove ecotourism is shaped by a complex network of national agencies, local government offices, community groups, academic institutions, non-government organizations and site personnel (Fig. 5). DENR-related offices, the City Tourism Office and Mama Earth Foundation were positioned as key players because they combined relatively high influence with strong engagement in conservation or tourism activities. Context setters such as the City Environment and Natural Resource Office, the city leadership and national government actors had substantial policy or resource influence, even when their day-to-day operational involvement differed. This governance structure is typical of protected-area tourism settings where formal authority, operational responsibility and community interest are distributed across multiple actors rather than concentrated in a single managing entity (Reed, 2008).

Stakeholders with high interest but lower direct influence included local fisherfolk, researchers, DOrSU-RIK XI, the Women's City Federation and some local government units. This pattern is important because CBET depends not only on stakeholder interest but also on whether high-interest local actors can influence planning, rules, investment priorities and benefit-sharing. The matrix therefore suggests that Guang-Guang is better described as a multi-stakeholder and community-associated site than as a fully community-controlled CBET initiative. Similar participation gaps are widely discussed in CBET literature, where community members may participate in implementation but have less control over strategic decisions (Kunjuraman et al., 2022; Tosun, 2000). From an analytical perspective, the key governance issue is therefore not simply the number of stakeholders involved but the distribution of authority among them. Local support for conservation is more likely when communities perceive that management rules are legitimate, livelihood impacts are addressed and decision-making processes are responsive (Bennett & Dearden, 2014).

This finding sharpens the interpretation of CBET at Guang-Guang. The site already has community association through restoration, employment, stewardship and organizational participation (Inoco & Villegas, 2024), but it has not yet institutionalized the stronger forms of community control emphasized in CBET theory. Scheyvens (1999) argues that ecotourism is more likely to support empowerment when communities have meaningful control and equitably share benefits. In Guang-Guang, empowerment should therefore be assessed not only by attendance in meetings or participation in planting but by whether community actors can influence the rules governing fees, enterprise opportunities, visitor management and conservation priorities.

3.2 Visitor profile and current tourism status

Visitor records and survey responses indicate that Guang-Guang functions primarily as a local and domestic ecotourism destination. From January to April 2023, recorded visitors were overwhelmingly domestic, with local visitors comprising 99.68% of total recorded tourists. Among survey respondents, 78% came from the local area, 61% were aged 18–25 years and 41% were enrolled in college or university. Private transport was the dominant access mode, reported by 91% of respondents.

The visitor profile has two implications. First, Guang-Guang has strong local appeal and can serve as a domestic environmental education and recreation site. Second, the results may overestimate conservation awareness because the sample included many educated and university-affiliated visitors. Nearly half of respondents stayed for less than one-hour, which stakeholders attributed to limited amenities, lack of electricity and water, and few activities beyond walking and photography. These findings suggest that tourism potential exists, but visitor experience remains short and facility dependent. They also show that Guang-Guang's current market is not yet comparable to international destination ecotourism; it is primarily a local learning and recreation space where domestic visitor management, interpretation and repeat visitation may be more relevant than international marketing. A summary of the visitor sample characteristics of the visitor is provided in Table 3.

Table 3
Summary of visitor sample characteristics based on survey responses (n = 54).

Variable	Main result	Interpretive note
Gender	53% male; 47% female	Approximately balanced gender distribution
Age	61% aged 18–25 years	Young visitors dominated the sample
Education	63% with postsecondary education; 41% enrolled in college/university	Likely influenced high environmental-awareness scores
Origin	78% from the local area	The site functions mainly as a local/domestic destination
Transport	91% used private transport	Access is easier for visitors with private vehicles
First-time visitors	17% first-time visitors	Most respondents had visited previously
Visit duration	49% stayed less than 1 h	Amenities and activities may limit length of stay
Main motivations	Relaxation, photography/social media and nature enjoyment	The site has recreational and educational potential

3.3 Environmental awareness and ecotourism values

Respondents expressed strong agreement with ecotourism values. The overall mean ecotourist-profile score was 4.64 out of 5.00. The highest-rated items were the importance of community involvement in mangrove conservation and the attractiveness of mangrove forests as tourist destinations, both with a mean of 4.75. Environmental protection as an important attribute of ecotourism also received a high mean score of 4.66.

These findings indicate favorable visitor attitudes that may become enabling conditions for conservation-oriented tourism if supported by effective governance, interpretation and benefit-sharing.

However, they should be interpreted with caution because 67% of respondents had previously joined environmental activities such as conservation meetings or cleanups. The sample therefore likely represents environmentally inclined visitors rather than the general tourist population. Nevertheless, the result is consistent with local tourist-perception evidence from Guang-Guang showing that visitors associate mangroves with shoreline protection, habitat provision, biodiversity conservation and livelihood support (Inoco & Villegas, 2024). This convergence suggests that conservation awareness is already present among some local visitors, but it also indicates the need to translate awareness into managed visitor behavior, interpretation and support for conservation financing. Domestic ecotourism development cannot assume that all future visitors will have the same level of environmental knowledge or compliance. Environmental education and interpretation should therefore be treated as core management needs rather than optional activities (Fennell, 2020; Inoco & Villegas, 2024; Thompson, 2022). The ecotourist-profile items and mean scores are presented in Table 4.

Table 4
Ecotourist profile of respondents (n = 54).

No.	Theme	Statement	Mean	SD
1	Community value	Community-managed project is important.	4.58	0.53
2	Community value	Ecotourism can provide additional income.	4.58	0.53
3	Community involvement	Community involvement is important for mangrove restoration and conservation.	4.75	0.48
4	Environmental protection	Environmental protection is important in ecotourism.	4.66	0.52
5	Environmental protection	Ecotourism can support mangrove conservation.	4.63	0.60
6	Environmental education	Environmental education is important in ecotourism.	4.55	0.54
7	Site attraction	Mangrove forests are attractive tourist destinations.	4.75	0.43
Average ecotourist-profile score			4.64	
Note: Likert scale: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. SD = standard deviation.				

3.4 Facility assessment, visitor management and environmental education

The distribution of visitor ratings by facility category is shown in Fig. 6. Facility ratings were generally positive. The boardwalk received the highest mean rating at 4.69 out of 5.00, followed by cleanliness at 4.59. However, open-ended comments and transect-walk observations showed persistent concerns about litter, vandalism, weak interpretation and limited signage. Information and education facilities

received a lower mean rating of 4.26, while maintenance concerns, including vandalism, received a mean of 4.22.

The difference between high cleanliness ratings and narrative comments about litter suggests that standard rating scales may not capture specific visitor-management problems. Plastic waste was observed in root systems, branches and open areas, despite restrictions on food and drink along the boardwalk. Stakeholders also reported vandalism and difficulty controlling visitor behavior. These issues are common in nature-based tourism sites where visitor numbers increase faster than monitoring, interpretation and enforcement capacity (Leung et al., 2018). The result also cautions against treating carrying capacity as a simple maximum visitor number. Carrying capacity is more useful when translated into management standards, monitoring indicators and acceptable limits of change for resource conditions and visitor behavior (McCool & Lime, 2001).

Environmental education is one of the strongest unrealized opportunities at Guang-Guang. At the time of data collection, educational materials were limited, and guides were not consistently available for all visitors. The site could support guided mangrove walks, school modules, nursery demonstrations, citizen-science activities and interpretation panels explaining ecosystem services, fisheries links, coastal protection and waste impacts. This recommendation is supported by local perception findings that call for stronger public awareness, environmental education and community involvement in decision-making for Guang-Guang mangrove conservation and regeneration (Inoco & Villegas, 2024). These activities would improve visitor experience while creating livelihood roles for trained local guides and educators. More importantly, they would convert the park from a short photo-stop destination into an interpretation-based conservation site, which is closer to ecotourism principles than visitor access alone (Buckley, 2012; Fennell, 2020).

3.5 Economic constraints, revenue governance and benefit-sharing

Stakeholders viewed ecotourism as a potential source of employment and alternative livelihood. Existing and potential roles included planting, nursery work, guiding, security, cleaning, food selling, souvenir production and visitor interpretation. However, the current level of economic benefit remains limited. Only a small number of community members benefit directly from existing activities, and some opportunities remain informal or irregular.

The most significant economic constraint is the absence of a clear and sustainable revenue mechanism. Informants reported that standard entrance-fee collection was constrained by administrative or grant-related arrangements. This creates a management paradox: increasing visitor numbers generate maintenance, waste and enforcement needs, but the site receives limited direct income to address those needs. Because 94% of surveyed visitors supported an entrance fee if proceeds were used for maintenance and community benefit, there is a strong basis for exploring a transparent environmental fee, voluntary donation system, guided-tour fee, parking fee or PAMB/LGU-approved revenue

mechanism. However, revenue generation alone would not make the site community-based. To support CBET, any fee or donation system should include clear allocation rules, community representation in budget decisions, public reporting and direct links to conservation, guide livelihoods, nursery work and maintenance.

Visitor support for fees should not be interpreted as sufficient evidence that ecotourism will generate equitable local benefits. A fee or donation system would require legal authorization, transparent collection procedures, public reporting, agreed allocation rules and community participation in expenditure decisions. Without these safeguards, additional tourism revenue could reproduce the same participation gap by financing site maintenance or institutional operations without creating visible and fair benefits for local households, guides, nursery workers or community organizations. Benefit-sharing should therefore be treated as a governance mechanism, not simply as an expected by-product of higher visitor numbers.

Infrastructure constraints further limit benefit-sharing. The lack of electricity and water prevents the development of food stalls, coffee shops, souvenir areas, evening activities and more formal education programs. Access-road limitations also affect transport availability and may exclude poorer visitors who depend on public or hired transport. Basic infrastructure should therefore be understood not only as a tourism convenience but as a prerequisite for local enterprise development. Ecotourism literature emphasizes that infrastructure and management capacity are necessary for aligning tourism practice with conservation and community benefits (Ross & Wall, 1999; Thompson, 2022). The analytical issue is sequencing: infrastructure should first support conservation and locally owned livelihood functions before broader marketing increases visitation pressure.

3.6 Community participation, stewardship and empowerment

Social impacts were among the most positively perceived outcomes. Stakeholders described local pride, stewardship and growing awareness of the relationship between mangrove health and fisheries resources. Community members involved in planting, guarding, cleaning and restoration activities were perceived as developing stronger ownership of the site. This supports the idea that CBET can strengthen conservation behavior when local people see ecological and livelihood connections (Ostrom, 1990; Pulhin et al., 2017). It also aligns with community-based conservation literature, which emphasizes that local knowledge, trust, rules, monitoring and social capital can improve the legitimacy and durability of conservation action (Berkes, 2004; J. Pretty & Smith, 2004).

At the same time, the evidence indicates that community participation is stronger in implementation than in strategic decision-making. Community members and organizations participate in meetings, conservation activities and site operations, but key decisions about infrastructure, fees, promotion and management appear to remain concentrated among institutional actors. This distinction matters because CBET requires more than consultation. A stronger model would institutionalize community representation in planning, rule-making, revenue allocation and monitoring. Transparent benefit-sharing

is also needed to maintain legitimacy, especially if tourism revenue increases. In empowerment terms, Guang-Guang appears strongest in psychological and social empowerment, expressed through pride, stewardship and collaboration, but weaker in political and economic empowerment because community actors have limited control over revenue and strategic decisions (Scheyvens, 1999).

Taken together, these results suggest that Guang-Guang currently reflects partial rather than full CBET implementation. Community involvement is evident in restoration, site maintenance, stewardship and organizational participation, but community control over strategic decisions, revenue allocation, enterprise development and visitor management remains limited. Using empowerment criteria, the site appears stronger in psychological and social empowerment than in economic and political empowerment. This distinction is important because a site may be community-associated without being community-managed. For Guang-Guang, the next stage of CBET development should therefore focus less on branding and promotion and more on institutionalizing community representation, transparent benefit-sharing and shared authority over tourism-related decisions.

3.7 Environmental conservation and organizational capacity

Stakeholders consistently argued that tourism should remain secondary to environmental protection. One environmental informant emphasized that there is no tourism without the environment, capturing the conservation-first logic expressed across interviews. This position is appropriate because mangrove tourism depends on the ecological integrity of the site.

The main environmental threats identified were litter, vandalism, possible visitor-growth impacts and external pressures such as aquaculture encroachment. Some informants described recurring mangrove cutting and reoccupation in areas where mangroves regenerate. These threats are not isolated observations: local studies in Guang-Guang and Dahican have also documented anthropogenic pressures, including shrimp-pond conversion, plastic pollution, land-use change, illegal cutting, settlement expansion and weak policy implementation (Inoco & Villegas, 2024; Uyanguren, 2017; Yap et al., 2023). These threats show that tourism development cannot be separated from broader coastal enforcement and land-use governance. Similar mangrove ecotourism cases show that restoration and tourism can support conservation only when visitor use, local livelihoods and resource-use pressures are managed together (Hakim et al., 2017; Swangjang & Kornpiphat, 2021). A conservation-first approach should therefore define tourism as a management tool rather than an end in itself. This means that promotion should be conditional on waste control, interpretation, compliance monitoring, habitat protection and agreed limits on visitor behavior.

Organizational coordination was generally viewed positively, but information gaps were also evident. Management-level informants had a clearer understanding of formal structures and policy processes than ground-level staff. Such vertical information gaps matter because frontline workers interact directly with visitors and communities. Improved communication between decision-makers and implementers would help ensure consistent messaging, enforcement and adaptive management. In practical terms,

Guang-Guang needs not only more facilities but a clearer governance operating system: who sets visitor rules, who explains them, who monitors compliance, who receives income, who decides expenditure and how community members can contest or revise decisions.

The protected-area context creates both safeguards and constraints for CBET. PAMB and DENR oversight can help ensure that tourism remains consistent with conservation objectives, zoning rules and environmental safeguards. At the same time, unclear authority over fees, maintenance budgets, enterprise approval and visitor rules can slow local initiative and weaken accountability. For a protected-area mangrove site, the governance challenge is therefore not to bypass formal institutions but to make them more legible and participatory: community actors need to know how decisions are made, how revenues are authorized, how benefits are allocated and how concerns can be raised within the management structure.

3.8 Management implications for sustainable CBET

The findings point to a practical management agenda for Guang-Guang. First, the fee issue should be formally clarified within protected-area and local government procedures. If legally permissible, revenue mechanisms should be designed transparently and linked to conservation, maintenance, community livelihood and education. Second, infrastructure investments should prioritize electricity, water, sanitation, waste systems and access improvements because these directly affect visitor experience and local enterprise potential. Third, ecological interpretation should be anchored in the site's documented mangrove diversity and local threats, using previous Guang-Guang and Dahican assessments as locally grounded content for signs, guide scripts and school modules (Inoco & Villegas, 2024; Uyanguren, 2017; Yap et al., 2023). Fourth, stakeholder participation should be structured as an ongoing decision process rather than one-off consultation, consistent with best-practice participation principles that emphasize early engagement, transparency, clear objectives and influence over outcomes (Reed, 2008). Fifth, a community ecotourism committee or similar mechanism could include fisherfolk, women's groups, youth, local guides, academic partners, site workers and relevant government offices. Sixth, visitor management should be developed before large-scale promotion through carrying-capacity guidance, multilingual signage, guided interpretation, waste controls, vandalism penalties and routine visitor monitoring.

Tourism scaling should be treated as a risk-sensitive process. If visitation is promoted before governance and monitoring systems are strengthened, Guang-Guang may face increased litter, vandalism, boardwalk congestion, disturbance to mangrove habitats, commercialization without local benefit, unequal participation and displacement of conservation priorities. Near-term livelihood options should therefore emphasize activities compatible with conservation, such as trained local mangrove guides, nursery demonstrations, school-based interpretation assistants, community-managed refreshments outside sensitive zones, locally made educational souvenirs and paid maintenance or waste-monitoring roles. Larger tourism-circuit integration with Dahican and Pujada Bay should proceed only after conservation safeguards and benefit-sharing systems are in place, because sustainable tourism outcomes depend less on promotional success alone and more on whether governance,

monitoring and local benefits can keep pace with visitor demand (Blanton et al., 2024; Buckley, 2012). The priority management recommendations are summarized in Table 5.

Table 5
Priority recommendations for strengthening CBET at Guang-Guang Mangrove Park.

Priority area	Recommended action	Responsible actors	Expected contribution to CBET
Revenue governance	Clarify entrance-fee restrictions and explore PAMB/LGU-approved environmental fees, donations or guided-tour fees.	PAMB, DENR, Mati City LGU, City Tourism Office and community representatives	Generates funds for maintenance, conservation and community benefit-sharing.
Basic infrastructure	Prioritize electricity, water, sanitation, waste systems and access-road improvement.	Mati City LGU, PAMB/DENR, City ENRO, City Tourism Office and barangay partners	Creates conditions for longer stays and local enterprise development.
Community empowerment	Establish a community ecotourism committee or formal consultation mechanism with representation from fisherfolk, women, youth and site workers.	PAMB/LGU, fisherfolk groups, women's groups, youth representatives and DOrSU-RIC XI	Moves participation from implementation toward shared decision-making.
Benefit-sharing	Develop transparent allocation rules for revenue to support guides, nursery workers, education activities and site maintenance.	PAMB, LGU, community ecotourism committee, accredited guides and vendors	Improves equity, legitimacy and local support for conservation.
Visitor management	Develop carrying-capacity guidance, multilingual signs, waste controls, vandalism penalties and monitoring protocols.	Site managers, City Tourism Office, DENR/PAMB, CCSU and community guides	Reduces visitor impacts and protects mangrove integrity.
Environmental education	Prepare guided-walk scripts, school modules, interpretation panels and nursery demonstrations.	DOrSU-RIC XI, schools, DENR, City Tourism Office, local guides and Mama Earth Foundation	Converts the park into an education-based ecotourism product.
Tourism circuit integration	Link Guang-Guang with Dahican and other Mati attractions only after safeguards and benefit-sharing systems are strengthened.	City Tourism Office, PAMB/DENR, barangay stakeholders and destination operators	Expands market reach while reducing the risk of unmanaged growth.

4. Conclusions

This study examined the challenges and opportunities for community-based mangrove ecotourism at Guang-Guang Mangrove Park and Nursery in Mati City, Davao Oriental, Philippines. The site has favorable enabling conditions for conservation-oriented CBET, including high visitor support for conservation, strong local and domestic appeal, existing restoration activities, community stewardship and opportunities for environmental education.

However, Guang-Guang has not yet fully institutionalized CBET principles. The main constraints are not only limited tourism promotion but the absence of enabling systems: basic infrastructure, clear revenue mechanisms, transparent benefit-sharing, formal community influence in decision-making and comprehensive visitor management. These constraints limit the site's ability to convert visitor demand into conservation financing and equitable livelihood benefits. The central implication is that Guang-Guang should be treated as an emerging community-associated ecotourism site requiring stronger governance design before wider tourism scaling. The case demonstrates that community association, community participation and community control are distinct conditions that should not be conflated in CBET assessment.

Future development should prioritize conservation-first tourism planning, protected-area-aligned revenue governance, infrastructure that supports community enterprises, formal community representation and environmental education. Further research should assess carrying capacity, willingness to pay, ecological impacts and actual benefit distribution. With these improvements, Guang-Guang can become a stronger model for mangrove conservation and community-associated ecotourism in the coastal Philippines.

Declarations

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Figures

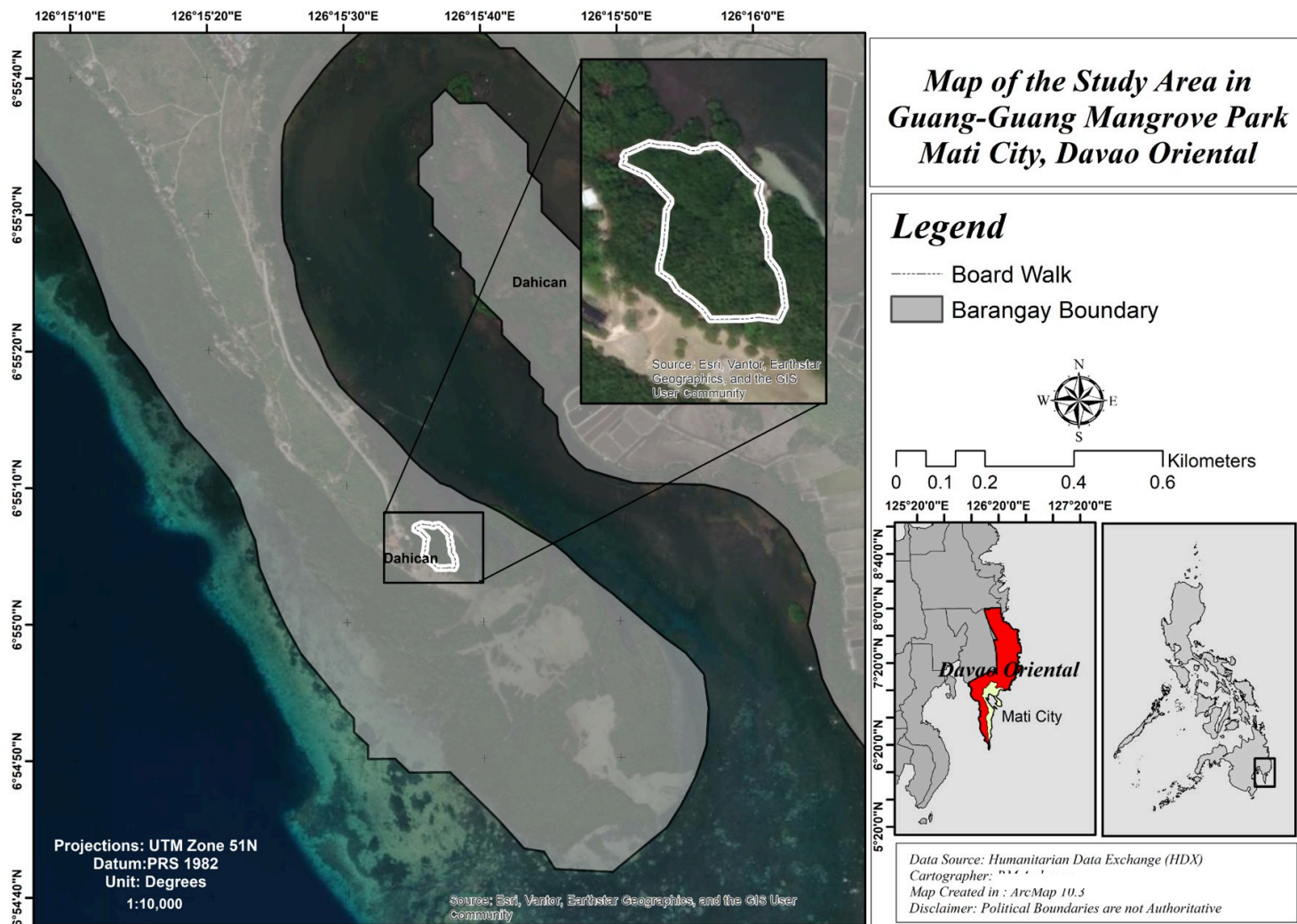


Figure 1

Map of the study area showing Guang-Guang Mangrove Park in Dahican, Mati City, Davao Oriental, Philippines.



Figure 2

Site layout and major visitor facilities of Guang-Guang Mangrove Park and Nursery, Mati City, Davao Oriental, Philippines. Map layout by [Removed for anonymous review].



Figure 3

Transect-walk route and selected observation points within Guang-Guang Mangrove Park and Nursery.
Map layout by [Removed for anonymous review].

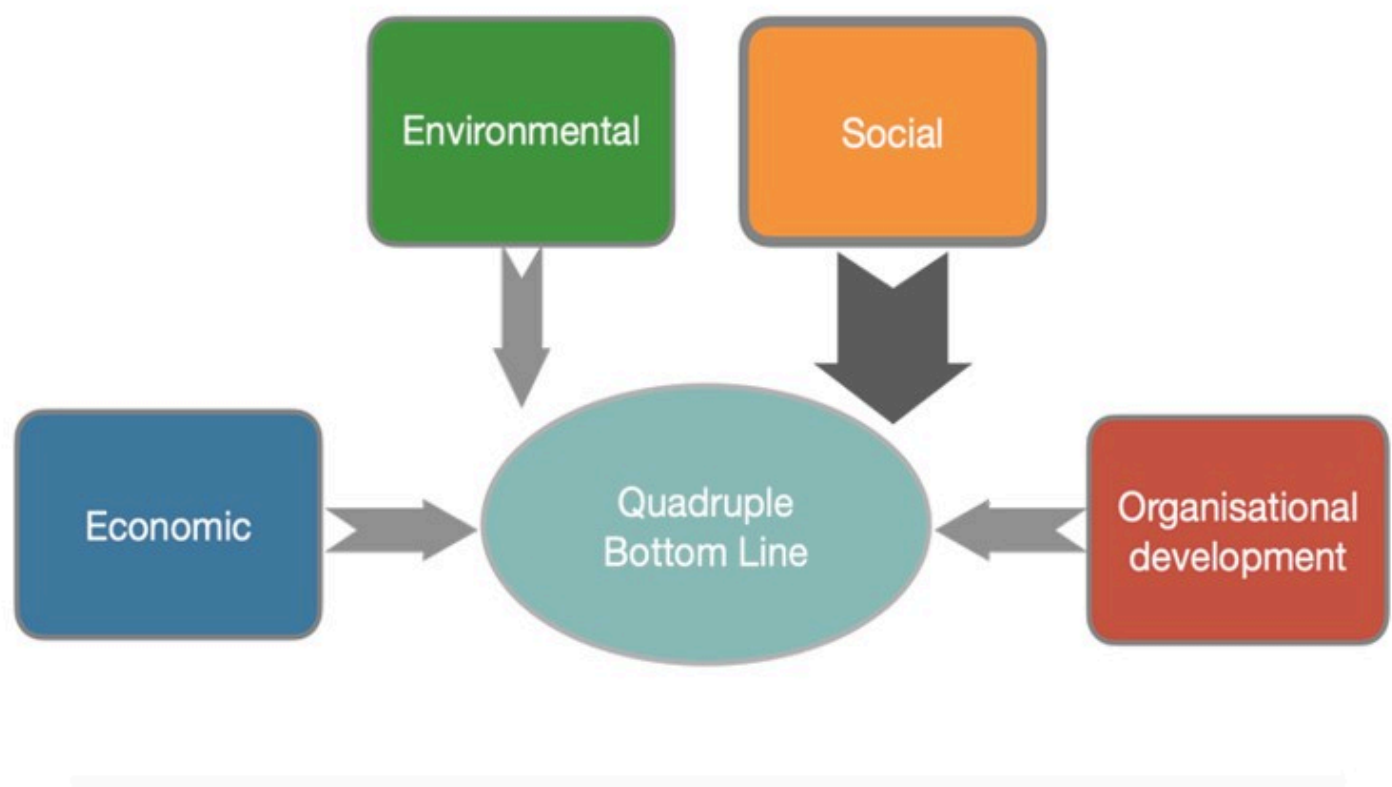


Figure 4

Quadruple Bottom Line framework modified from Rivera and Gutierrez (2019).

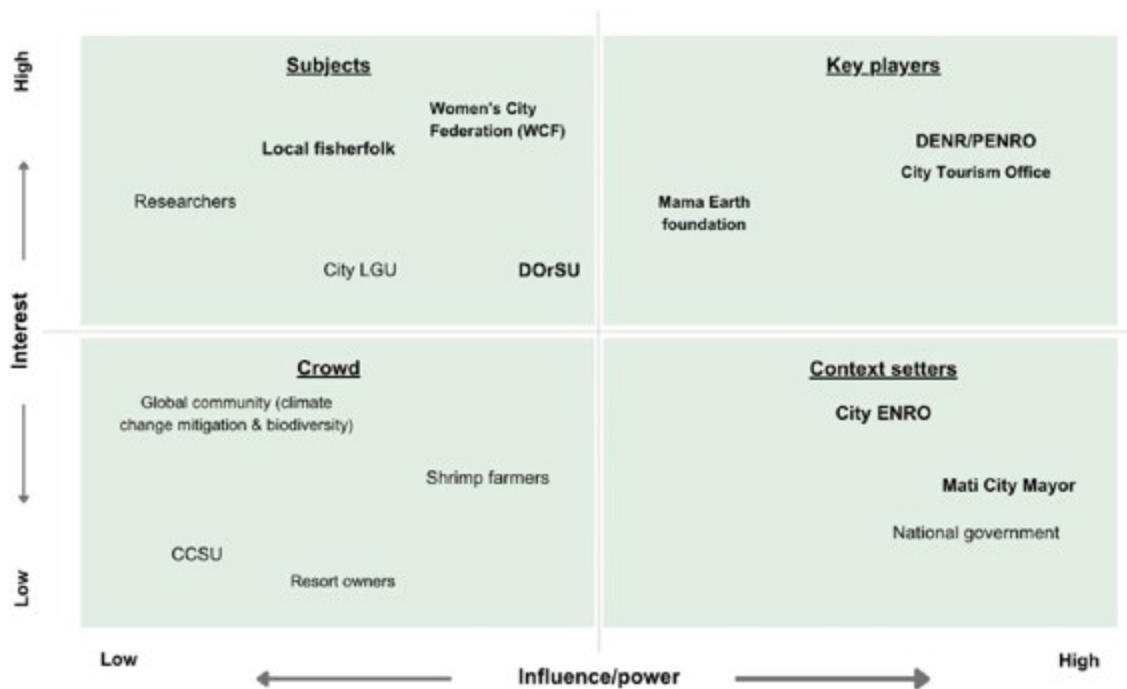


Figure 5

Stakeholder interest-influence matrix for Guang-Guang Mangrove Park and Nursery. The matrix illustrates relative stakeholder power and engagement in CBET development.

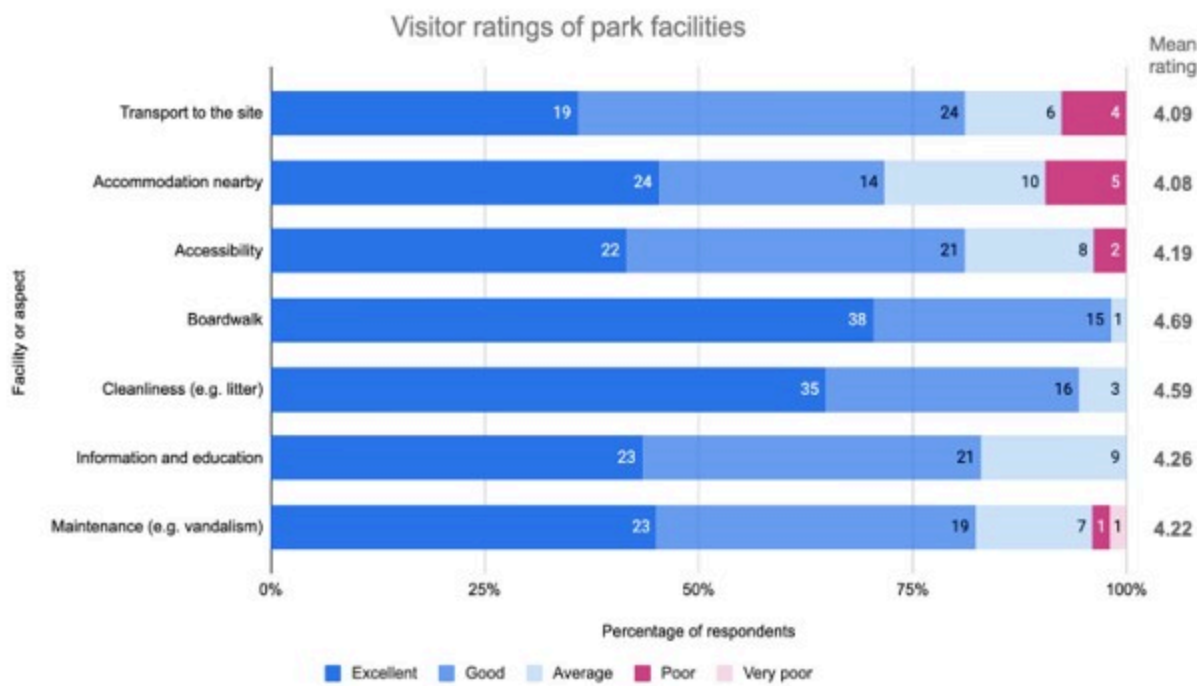


Figure 6

Visitor ratings of selected park facilities at Guang-Guang Mangrove Park. Values inside bars indicate respondent counts per rating category; mean ratings are shown at right.

Supplementary Files

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