

Ecotourism Management and Economic Valuation of the Bahowo Mangrove Area: A Strategy for Revitalization into a Sustainable Tourism Destination

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ABSTRACT

The Bahowo mangrove ecotourism area in Manado City has declined in economic and ecological value after its functional shift to a transit dock. This condition contradicts the principles of a sustainable tourism destination, which demands a balance among ecological, economic, and socio-institutional aspects. This study intends to evaluate existing conditions and formulate an ecotourism management strategy, grounded in economic valuation, integrity tourism, and the heptahelix model, to revitalize Bahowo as a sustainable tourism destination. The research approach combines physical carrying capacity analysis with the Contingent Valuation Method (CVM) to measure visitors' Willingness to Pay (WTP). The results show that the resource suitability level is classified as "unsuitable," with an index of 1.84, due to the complete destruction of tourist trail infrastructure (0%) and stagnation in institutional governance. However, the economic valuation analysis discloses a high potential for latent demand; the average visitor's willingness to pay for ecotourism packages is USD 4.75 per person. This financial finding delivers an economically rational justification for capital investment in infrastructure recovery, demonstrating viability and supporting the economic pillar of sustainability. The recommended revitalization strategy focuses on capitalizing on the WTP value through Integrity Tourism principles, implemented through the interaction of the Heptahelix Collaboration Model, which serves as the primary prerequisite for realizing a sustainable tourism destination.

INTRODUCTION

The paradigm of ecotourism goes beyond mere nature-based recreation; it fundamentally requires becoming a Sustainable Tourism Destination (STD). This concept is intrinsically anchored in the Triple Bottom Line (TBL) framework, a strong governance philosophy that mandates the synchronous optimization of three interconnected pillars: ecological protection (planet), socio-institutional empowerment (people), and economic

sustainability (profit) (Elkington, 1997; UNWTO, 2013). Ecologically, sustainability dictates that tourism activities must operate strictly within the thresholds of the environment's physical and biological carrying capacities. It requires proactive conservation management that protects biodiversity, sustains essential ecosystem services, and prevents the degradation of fragile natural capital, such as mangrove forests, ensuring their resilience for future generations (Yulianda, 2019; Butarbutar, 2021; Oroh et al., 2024).

From a socio-institutional perspective, the 'people' dimension emphasizes community-based empowerment and social fairness. A sustainable destination governance structure must prevent the marginalization of local populations through integrating them as active, central stakeholders in the decision-making process. This approach fosters social resilience, respects local wisdom, and makes certain that tourism development is consistent with and strengthens the cultural integrity of the host community (Scheyvens, 1999). Economically, viability refers to the destination's capacity to generate equitable, long-term financial returns. It goes beyond merely maximizing immediate revenue, concentrating instead on improving the economic multiplier effect while limiting financial leakage. Within a sustainable framework, economic valuation and revenue generation must be reinvested in a circular manner to fund ongoing ecological conservation efforts and raise the socio-economic welfare of the local community, thereby creating a self-sustaining monetary ecosystem (Dwyer, 2010; Ridwansyah, 2023). Ultimately, the failure to harmonize these three pillars inevitably leads to a decline in the tourism life cycle, transforming a valuable ecotourism asset into an extractive and unsustainable operational model.

Historically, the Bahowo Mangrove area in North Sulawesi has embodied these principles, serving as a top mangrove ecotourism destination recognized for its abundant biodiversity and active community participation (Tuwongkesong et al., 2018; Handayani et al., 2021; Lintong et al., 2023). During its peak, Bahowo served as a model for conservation-based tourism in Manado City, delivering considerable ecological and economic benefits to the surrounding communities (Zhu et al., 2024). However, recent developments indicate a drastic decline in ecological and functional conditions. The area has progressively lost its status as a primary ecotourism destination, undergoing a functional shift in which the mangrove ecosystem is now used primarily as a transit dock for crossings to Bunaken Island (Kontu et al., 2025). This functional transformation has triggered stagnation within the local management's institutional structure and the severe deterioration of dedicated tourism facilities. From a scientific perspective, destination management that loses focus on the tourism economy inevitably leads to ecological degradation. Previous studies indicate that the Bahowo area is currently in a suboptimal condition for sustainable ecotourism, as evidenced by highly negative visitor perceptions of physical facilities and educational value.

These prior studies primarily focused on the ecological and perceptual dimensions, lacking a quantified managerial model to restore its former success, specifically regarding the viability of financial investment. From a strategic management standpoint, revitalizing

Bahowo as a sustainable tourism destination requires sound financial justification—specifically, economic valuation—to attract investment and empower the local economy. This must be accompanied by a commitment to clean governance, framed within the concept of Integrity Tourism, and multi-stakeholder collaboration through the Heptahelix Model. Therefore, this study aims to assess existing conditions and formulate a sustainable ecotourism management strategy to revitalize Bahowo, ensuring it returns to being a sustainable mangrove tourism destination with positive ecological and economic impacts for the local community.

RESEARCH METHODS

This study used a concurrent mixed-methods research design to methodically examine the three core pillars of a Sustainable Tourism Destination (STD): socio-institutional, ecological, and economic. This integrated approach permits a holistic diagnosis of the destination's degradation by triangulating subjective human governance factors with objective biophysical and financial indicators. The qualitative dimension of this research focused on evaluating the socio-institutional pillar and tracing the destination's functional shift over time. Primary qualitative data were gathered through in-depth, semi-structured interviews (Ngcobo, 2022) and Focus Group Discussions (FGDs). Informants were selected utilizing a purposive sampling technique, targeting key local stakeholders including village government officials, former members of the local Tourism Awareness Group (*Pokdarwis*), and community leaders. Thematic analysis was applied to these accounts to identify the root causes of the governance vacuum and to construct the joint framework for the Heptahelix Model.

Simultaneously, the quantitative ecological assessment was conducted to measure the biophysical suitability and environmental thresholds of the Bahowo mangrove ecosystem. Primary field observations were conducted to assess the defined structural parameters, notably mangrove density and thickness, using standard ecological transect methods. These biophysical metrics, combined with the measurement of the accessible tourist area, were subsequently integrated into the calculation of the Physical Carrying Capacity (PCC) (Iswara et al., 2021). This calculation is important for determining the absolute maximum daily visitor threshold that the spatial area can accommodate without triggering ecological degradation or compromising the mangrove root systems.

To evaluate the economic pillar, the primary analysis used the Contingent Valuation Method (CVM), a strong environmental economics technique for estimating the monetary value of non-market ecological goods and services. A structured field survey was administered to a sample of 60 tourists ($n=60$), utilizing an accidental sampling technique aiming at individuals visiting or transiting through the area. The survey instrument was specifically designed to elicit respondents' maximum Willingness to Pay (WTP) for a hypothetical market scenario featuring an integrated, conservation-based ecotourism package.

To ensure methodological strictness and facilitate cross-regional comparability within the global environmental economics discourse, all elicited monetary variables and operational

cost structures were standardized and tabulated exclusively in United States Dollars (USD). In the final analytical synthesis, the aggregated average WTP derived from the 60 respondents was mathematically projected against the destination's empirical operational cost structure. This financial feasibility projection served as the quantitative baseline for formulating a comprehensive transformation strategy, demonstrating that implementing Integrity Tourism and Heptahelix governance is not only ecologically necessary but also economically viable.

RESULTS AND DISCUSSION

Ecological and Infrastructure Failure in the Context of Sustainability

Fundamentally, the Bahowo mangrove area possesses a substantial spatial footprint, encompassing an accessible ecotourism development space of 12,400 m². Theoretically, this vast area translates to a highly potential Physical Carrying Capacity (PCC) capable of accommodating a significant volume of sustainable visitor interactions. However, an inherent paradox exists between this spatial potential and its actual functional feasibility. Recent empirical examinations confirm that the Tourism Suitability Index (*Indeks Kesesuaian Wisata/IKW*) has plummeted to a critically low score of 1.84, categorizing the area as strictly "Unsuitable" for ecotourism utilization (Kontu et al., 2025). This critical degradation is primarily driven not by natural ecological regression but by anthropogenic factors and managerial negligence.

Field observation findings and institutional diagnostic analyses disclose that the root causes of this unsuitability are profoundly systemic, originating from a severe governance vacuum (as detailed in Table 1). The functional paradigm shift in the Bahowo area—from a dedicated conservation-based ecotourism destination to a mere logistical transit dock for Bunaken Island—has led to institutional abandonment by local management groups. This managerial neglect directly catalyzes the rapid deterioration of the destination's infrastructure and the destination's ecological support parameters (Table 2).

Table 1. Matrix of Governance and Destination Management Findings

Focus Indicator / Topic	Summary of Informant Statements / Field Findings
A. History & Root Causes	
1. Onset of the visitation decline phase	Began around 2021; the area lacks ecotourism activities as it is primarily utilized as a crossing dock to Bunaken Island.
2. Primary visitor complaints in the past	Mangrove tourism facilities are neglected (absence of trails, boats, and guides). The central point for mangrove tourism has shifted to the Batumeja area in Tongkeina.
B. Existing Institutional Structure	
1. Current role of Pokdarwis	The Tourism Awareness Group (Pokdarwis) structure in the area is no longer active.
2. Role of Village Government / BUMDes	The village government solely focuses on

	managing the area as a transit dock.
3. Transparency constraints & SOP	Absence of official tourism Standard Operating Procedures (SOP) and formal entrance tickets. Only parking retribution (approx. USD 0.65 - USD 3.25) is collected by area guards.
C. New Governance Formulation (Heptahelix)	
1. Proposed flagship tourism package	Enjoying the mangrove landscape while awaiting departure schedules, environmental research, trail reactivation, and small boat explorations.
2. External collaborator requirements	Academics, content creators, international researchers, and conservation activists.
3. New regulatory agreements & sanctions	Prohibition of mangrove destruction, with sanctions mandating the provision of seedlings or rehabilitation compensation funds for any violations.

The most prominent physical manifestation of this institutional failure is the total collapse of the area's ecotourism infrastructure. The elevated wooden boardwalk (tourist trail), which previously served as the lifeblood of Bahowo's tourism success, is currently rated at 0% usability (completely destroyed). In the context of mangrove conservation, a boardwalk is not simply a recreational amenity; it operates as a critical ecological mitigation structure that prevents soil compaction, protects sensitive pneumatophores (breathing roots) from trampling, and guides visitor flow. Therefore, its complete destruction represents both a depreciation of physical assets and a serious threat to ecological soundness. Furthermore, this infrastructural decay considerably reduces the destination's educational and aesthetic value, exacerbating negative visitor perceptions. Consequently, despite the massive spatial capacity of 12,400 m², the absence of functional governance and mitigation infrastructure renders the area's carrying capacity obsolete and ecologically hazardous to exploit in its current state.

Table 2. Recapitulation of Environmental Carrying Capacity and Ecological Perception Data

Observation / Measurement Parameter	Measurement Results	Current Condition	Conservation Follow-Up Plan
A. Natural Resource Suitability			
1. Mangrove Density	11/100 m ²	Moderate	Planting to increase density and species enrichment.
2. Physical condition of wooden trails	0% (unavailable)	Requires rebuilding	Route mapping survey and reconstruction of tourist trails.
B. Physical Carrying Capacity (PCC)			
1. Total accessible tourist area	12,400 m ²	Moderate	Planting to increase density and species enrichment.
2. Average visit duration	90 minutes	Moderate	Improve facilities to increase

			tourist length of stay.
3. Maximum daily visitors	50 persons/day	Not yet reached	Multi-stakeholder collaboration for sustainable destination marketing.
C. Visitor Perception & Participation			
1. Mangrove visual satisfaction index	3 (scale 1-5)	Moderate	Improve flora diversity and mangrove density.
2. Tourism education satisfaction index	2 (scale 1-5)	Poor	Provision of digital information boards and tour guides.
3. Seedling donation participation rate	80%	High	Improve seedling donation participation.

Economic Valuation (WTP): The Economic Foundation of a Sustainable Destination

Despite the severe degradation of both ecological carrying capacity and physical infrastructure, empirical findings reveal a strong latent potential for visitor socio-ecological consciousness. As summarized in Table 2 (point C3), a significant majority (80%) of surveyed tourists exhibited a high propensity for pro-environmental behavior, specifically through their willingness to participate in conservation seedling donation programs. This high participation rate indicates that current visitors do not perceive the Bahowo mangrove merely as a passive recreational backdrop; rather, they recognize its intrinsic ecological value and are strongly inclined to contribute directly to its active restoration.

This positive ecological attitude is quantitatively corroborated by the economic valuation analysis derived from the Contingent Valuation Method (CVM) (Table 3). The analysis shows a substantial Willingness to Pay (WTP) among visitors. The calculated average WTP of USD 4.75 per individual goes beyond a simple commercial entry fee. In environmental economics, this figure serves as a quantified proxy for the ecosystem's use and non-use values. It offers empirical evidence that tourists are willing to pay significant compensation for an integrated, conservation-oriented tourism experience that ensures environmental management and educational enrichment.

Table 3. Tabulation of Economic Valuation and Operational Cost Structure

Economic Valuation Component	Quantity / Frequency	Monetary Value (USD)	Data Source / Remarks
A. Willingness to Pay (WTP)			
1. Lowest WTP value from respondents	2 persons	2	Visitor Survey
2. Highest WTP value from respondents	1 person	10	Visitor Survey
3. Average WTP for Ecotourism Package	Per person	4.75	Visitor Survey

B. Operational Cost Structure (Monthly)			
1. Trail maintenance & infrastructure costs	1 month	112	Interview with former management
2. Administrative management costs	1 month	585	Interview with former management
3. Specific conservation fund allocation	1 month	140	Interview with former management
C. Projected Alternative Revenue			
1. Estimated net cash surplus	1 month	588	Projection (WTP x Visits) - Total Costs

From managerial and financial feasibility perspectives, capturing this WTP value gives a compelling economic foundation for the destination. When this average WTP is aggregated and projected against the destination's total monthly operational expenditure—estimated at USD 837.00 to cover comprehensive trail maintenance, administrative overhead, and dedicated conservation fund allocations—the financial model shows considerable resilience. Simulations show that capitalizing this WTP can reliably generate a net operational surplus of approximately USD 588.00 per month.

This projected financial reality is a critical prerequisite for achieving a genuinely sustainable tourism destination. It transitions the conservation effort from a vulnerable cost-center reliant on external subsidies to a self-sustaining economic ecosystem. More importantly, this continuous net surplus provides a rigorous, data-driven justification for policymakers, local government, and potential investors to inject the initial capital required to reconstruct the completely destroyed wooden trails. It guarantees a clear mechanism for cost recovery (Return on Investment) while ensuring that the economic pillar effectively subsidizes the long-term ecological rehabilitation of the Bahowo mangrove area.

Management Strategy: Transformation Towards a Sustainable Tourism Destination

To effectively operationalize the projected net surplus of USD 588.00 per month and utilize on the exceptionally high tourist conservation participation rate (80%), governance in the Bahowo mangrove area can no longer rely on fragmented or partial management approaches. The successful transformation from a degraded transit node back into a sustainable ecotourism destination requires a systemic paradigm shift. This research recommends a dual-core strategic framework: institutionalizing Integrity Tourism as the ethical engine of sustainability, and orchestrating cross-sectoral synergy through the Heptahelix Collaboration Model.

1. Integrity Tourism: The Ethical and Financial Engine

The economic valuation derived from the Willingness to Pay (WTP) is fundamentally a psychological and financial contract between the destination and the tourist; it demands absolute public faith. The concept of Integrity Tourism (Lintong, 2023) is actualized through the transparent, accountable, and fair management of tourism tariffs. Structurally, this requires the complete eradication of rent-seeking behaviors and informal, illegal levies that

previously plagued the area. The aggregated WTP collection of USD 4.75 per visitor must be formally institutionalized and accountably distributed to fulfill three critical financing buckets as, essentially creating a localized circular bioeconomy (as projected in Table 3, Part B): 1) Infrastructure Depreciation and Maintenance (USD 112.00): Maintaining the continuous physical safety and structural soundness of the newly proposed ecotourism facilities, 2) Infrastructure Depreciation and Maintenance (USD 112.00): Guaranteeing the continuous physical safety and physical integrity of the newly proposed ecotourism facilities, and 3) Ecological Reinvestment (USD 140.00): A dedicated mangrove replanting circulation fund that guarantees conservation education persists an active, on-site reality rather than mere rhetoric.

2. The Heptahelix Collaboration Model: The Structural Framework

While Integrity Tourism provides the ethical operational foundation, creating a resilient, sustainable tourism destination requires substantial cross-sectoral capital and multidisciplinary interventions (Kepel et al., 2024). To resolve the complex system-wide failures identified in Bahowo, the Heptahelix Model is highly relevant, binding seven interdependent institutional pillars into a synergistic ecosystem: 1) Government (Public Sector): Acting as the regulatory steward. Local authorities must enforce strict spatial licensing and zoning regulations to ensure that commercial dock activities do not trespass on or disadvantage the 12,400 m² dedicated mangrove conservation area. 2) Academics (Knowledge Sector): Driving science-based policymaking. Higher education institutions must continuously conduct silvicultural and carrying-capacity research to scientifically elevate the Tourism Suitability Index (IKW) from its current critical state. 3) Business/Industry (Private Sector): Mobilizing initial capital. Private entities must direct Corporate Social Responsibility (CSR) investments specifically toward the immediate reconstruction of the wooden trail, serving as the primary catalyst for resolving the acute 0% infrastructure deficit. 4) Community/Pokdarwis (Civil Society): Ensuring grassroots operationalization. The local Tourism Awareness Group must be re-institutionalized and capacity-built to foster a strong sense of local ownership and to manage daily ecotourism operations. 5) Media (Communication Sector): Spearheading strategic destination rebranding. The media is tasked with changing the public narrative, reconstructing Bahowo's image from a mere "transit port" back to a "premier ecotourism and conservation destination." 6) Non-Governmental Organizations (Advocacy Sector): Providing moral oversight. NGOs are important for advocating environmental justice, monitoring ecological compliance, and guaranteeing the strict enforcement of social sanctions against ecological degradation. 7) Financial Institutions/Philanthropy (Funding Sector): Providing financial scalability. These institutions are needed to design sustainable, long-term funding schemes—such as micro-financing or green grants—to cover any developmental funding gaps beyond the capacity of operational WTP revenues. By simultaneously deploying Integrity Tourism and the Heptahelix

framework, Bahowo can establish a robust, self-sustaining governance architecture that unites economic profitability with rigorous ecological protection.

CONCLUSION AND SUGGESTIONS

This study finds that the acute degradation of the Bahowo mangrove ecotourism area is not a byproduct of inevitable ecological decline but rather the direct consequence of systemic, fragmented destination management that has fundamentally deviated from the principles of sustainability. The area's recent functional shift into a mere logistical transit node has precipitated profound institutional neglect. Consequently, despite its substantial spatial capacity, the destination's physical and ecological parameters are currently classified as critically unsuitable for tourism, as evidenced by a very low Tourism Suitability Index (IKW) of 1.84. This critical status is mainly driven by the total deterioration (100% destruction) of essential ecological mitigation infrastructure, specifically the wooden tourist trails.

However, the economic valuation analysis, executed via the Contingent Valuation Method (CVM), empirically counters this physical bleakness by revealing a highly resilient latent demand. It is well established that the area retains exceptional potential for holistic revitalization. With an average visitor Willingness to Pay (WTP) of USD 4.75 for an integrated, conservation-based experience, the destination demonstrates the capacity to generate a projected operational net surplus of USD 588.00 per month. This robust financial metric confirms that ecotourism in Bahowo—if meticulously managed—is not an economic burden but rather a self-sustaining financial engine capable of funding its own environmental recovery while elevating the socio-economic welfare of the local community.

To catalyze the transformation of Bahowo back into a premier sustainable tourism destination, this research proposes a multidimensional strategic intervention for relevant stakeholders: 1) Immediate Infrastructural Rehabilitation: Priority must be given to the immediate physical reconstruction of the wooden trails using sustainable materials. This is a critical prerequisite not only to restore the area's physical carrying capacity but also to mitigate further anthropogenic damage (such as soil compaction and root trampling) to the mangrove ecosystem. 2) Socio-Institutional Reactivation: Local government and development agencies must facilitate the social reactivation and capacity building of the local Tourism Awareness Group (*Pokdarwis*). Re-establishing grassroots institutional structures is vital to ensure local ownership and operational readiness. 3) Systemic Governance Overhaul: The future management of Bahowo must strictly implement the principles of Integrity Tourism, ensuring absolute transparency and accountability in the utilization of the WTP revenues. Furthermore, this ethical governance must be orchestrated through the Heptahelix Collaboration Model. By synergizing the roles of government, academia, private industry, civil society, media, NGOs, and financial institutions, the destination can secure the cross-sectoral capital needed to translate its latent economic potential into tangible, sustainable development.

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