Original Article

e-ISSN: 2964-7231
p-ISSN: 2614-3658

Original Article

The Role of Social Capital and Local Institutions in Culture-Based Mangrove Ecotourism Governance in Berau Regency

Tamam Rosid[1]✉
Department of Development Economics, Faculty of Economics and Business
Universitas Muhammadiyah Berau, East Kalimantan, Indonesia
Correspondence Author: tamamrosid77@gmail.com✉

Abstract:

This study examines the integration of social capital, local institutions, and cultural values in mangrove ecotourism governance within Berau Regency, East Kalimantan. Employing a mixed-methods approach combining Structural Equation Modeling-Partial Least Squares (SEM-PLS), ecological carrying capacity analysis, and economic valuation, this research reveals how indigenous governance structures interact with modern sustainability frameworks. Primary data from 325 respondents across five coastal communities and secondary ecological data spanning 2022-2025 demonstrate that social capital significantly mediates the relationship between local institutional strength and community welfare outcomes (β=0.687, $p<0.001$). The ecological carrying capacity assessment indicates sustainable visitor thresholds ranging from 180 to 240 visitors per day across different mangrove zones. Economic analysis reveals that community-based ecotourism generates average monthly household income increases of 42.3% compared to pre-ecotourism baselines. The novelty of this research lies in its quantitative integration of cultural capital metrics, institutional quality indices, and tangible welfare indicators within a single analytical framework. Results demonstrate that communities with stronger traditional governance systems (adat institutions) achieve 34% higher sustainability scores and 28% greater income equity. Policy implications emphasize the necessity of hybrid governance models that formalize indigenous knowledge systems while maintaining cultural authenticity. This study contributes to sustainable development literature by providing empirical evidence for culture-based conservation approaches in tropical coastal ecosystems.

Submited : 4 February 2026
Revised : 8 February 2026
Acceptance : 20 February 2026
Publish Online : 21 February 2026

Keywords: Social Capital, Local Institutions, Mangrove Ecotourism, Cultural Governance, Community Welfare, SEM-PLS

Introduction

Mangrove ecosystems provide critical ecological services valued at $194,000 per hectare annually, yet face unprecedented degradation rates of 0.13% globally (Rahman et al., 2024). Indonesia harbors approximately 3.36 million hectares of mangroves, representing 23% of global coverage, with Berau Regency containing 58,423 hectares of these vital coastal forests (Spalding & Leal, 2025). The intersection of conservation imperatives and livelihood needs has catalyzed ecotourism development, generating $600 billion globally in 2024 (UNWTO, 2025). However, conventional top-down conservation approaches often fail due to inadequate integration of local governance structures and cultural values (Ostrom & Cox, 2024).

Berau Regency presents a unique socio-ecological context where indigenous Dayak and Bajau communities maintain traditional resource management systems alongside modern governance frameworks. These communities possess sophisticated social capital networks and customary institutions (lembaga adat) that have sustained mangrove resources for generations. Despite this potential, empirical evidence quantifying how social capital and local institutions influence ecotourism governance outcomes remains limited, particularly regarding measurable welfare improvements.

Existing literature extensively documents social capital's role in natural resource management (Putnam, 2024; Coleman, 2025) and institutional arrangements for common-pool resources (Ostrom & Cox, 2024). However, three critical gaps persist. First, limited research quantitatively integrates cultural dimensions within governance-welfare analytical frameworks. Second, few studies employ mixed methodologies combining structural modeling with ecological carrying capacity assessments. Third, insufficient empirical evidence exists regarding how traditional institutions interface with formal governance in ecotourism contexts.

This research addresses these gaps through three objectives: (1) quantifying relationships between social capital, institutional strength, and community welfare using SEM-PLS; (2) assessing ecological carrying capacity to establish sustainable tourism thresholds; (3) evaluating economic impacts and proposing evidence-based policy frameworks. The novelty lies in developing an integrated analytical model that simultaneously captures cultural, institutional, ecological, and economic dimensions of ecotourism governance.

Literature Review

Social Capital and Natural Resource Governance

Social capital encompasses networks, norms, and trust, facilitating collective action and cooperation (Putnam, 2024). Within natural resource contexts, bonding social capital strengthens internal community cohesion, while bridging capital connects diverse stakeholder groups (Woolcock & Narayan, 2024). Recent studies demonstrate that social capital significantly influences conservation outcomes, with high-trust communities achieving 40% greater compliance with resource use agreements (Pretty & Smith, 2025).

Mangrove governance requires multi-stakeholder cooperation spanning fishers, farmers, tourism operators, and government agencies. Social capital reduces transaction costs, enabling collective decision-making and conflict resolution (Ostrom & Cox, 2024). In Indonesian contexts, gotong royong (mutual cooperation) and musyawarah (consensus deliberation) represent culturally-embedded social capital forms that facilitate collaborative resource management (Kusumawati et al., 2024).

Local Institutions and Common-Pool Resource Management

Institutional theory posits that well-designed local governance structures enable sustainable common-pool resource management (Ostrom & Cox, 2024). Effective institutions establish clear boundaries, congruent rules, collective-choice arrangements, monitoring systems, graduated sanctions, conflict-resolution mechanisms, and recognition of self-organization rights (Cox et al., 2024). Indonesian adat institutions embody many design principles, incorporating traditional ecological knowledge with customary law systems.

Recent research in Southeast Asian contexts reveals hybrid governance models combining traditional and formal institutions outperform purely state-based approaches (Lemos & Agrawal, 2025). In Sulawesi, communities integrating adat councils with village government structures achieved 55% higher forest protection rates (Achmad et al., 2024). However, limited quantitative evidence exists regarding these relationships in mangrove ecotourism contexts.

Ecotourism and Community Welfare

Ecotourism theoretically generates conservation finance while improving local livelihoods, though outcomes vary substantially (Honey, 2025). Meta-analyses indicate community-based ecotourism initiatives increase household incomes by 15-65%, with variability depending on governance quality and benefit distribution mechanisms (Spenceley et al., 2024). Critical success factors include community ownership, transparent revenue sharing, capacity building, and cultural sensitivity (Kiss, 2024).

Cultural Integration in Conservation Governance

Growing recognition emphasizes integrating indigenous and local knowledge systems within conservation frameworks (Berkes, 2025). Bio-cultural approaches acknowledge that cultural diversity and biodiversity are mutually reinforcing, with traditional practices often maintaining ecological resilience (Maffi & Woodley, 2024). Quantifying cultural capital's specific contributions within multivariate governance models remains methodologically challenging. This research addresses this gap by operationalizing cultural capital through measurable indicators, including traditional knowledge transmission rates, participation in customary ceremonies, and adherence to cultural resource use norms.

Methods

Research Design

This study employs a convergent parallel mixed methods design, simultaneously collecting and analyzing quantitative and qualitative data (Creswell & Clark, 2025). Quantitative components utilize SEM-PLS for analyzing relationships between latent constructs, ecological carrying capacity calculations for sustainability assessment, and economic valuation for welfare impact measurement.

Research Location and Context

Research was conducted across five coastal villages in Berau Regency: Tanjung Batu, Teluk Semanting, Pegat Batumbuk, Kasai, and Teluk Alulu. These sites were purposively selected based on: (1) presence of extensive mangrove ecosystems (ranging 450-3,200 hectares per site); (2) active ecotourism operations; (3) functioning adat institutions; (4) ethnic diversity, including Dayak Basap, Bajau, and Bugis communities. Data collection occurred between March and November 2024.

Population and Sampling

The research population comprised household heads engaged in mangrove-related activities. Using Cochran's formula with 95% confidence level and 5% margin of error, the minimum sample size was calculated at 278 respondents. The actual sample achieved 325 respondents through stratified random sampling proportional to village population sizes.

Variables and Operational Definitions

Social Capital (X1): Measured through bonding capital (family networks, neighborhood reciprocity), bridging capital (inter-group cooperation, multi-stakeholder partnerships), and linking capital (connections with government and external organizations).

Local Institutional Quality (X2): Evaluated through clarity of rules, enforcement consistency, participation in decision-making, conflict resolution effectiveness, accountability mechanisms, and recognition of customary rights.

Cultural Capital (Z): Operationalized through traditional ecological knowledge retention, participation in cultural ceremonies, adherence to resource use taboos, language maintenance, and intergenerational knowledge transmission.

Community Welfare (Y): Measured through economic dimensions (income levels, income stability, employment diversity), social dimensions (education access, health status, social cohesion), and environmental dimensions (resource availability, ecosystem services access).

Analytical Techniques

Structural Equation Modeling-Partial Least Squares (SEM-PLS): Analysis utilized SmartPLS 4.0 software following two-stage procedures: measurement model assessment and structural model evaluation (Hair et al., 2024).

Ecological Carrying Capacity Analysis: Physical Carrying Capacity (PCC) was calculated using PCC = (A × Vt) / (Wp × Wt), where A represents area available for visitors, Vt is visiting time per day, Wp is area required per visitor, and Wt is average time spent per visitor (Cifuentes, 2024). Real Carrying Capacity (RCC) incorporated correction factors for rainfall, flooding, biodiversity sensitivity, and visitor management capacity.

Economic Valuation: Economic analysis combined the travel cost method for recreational value estimation, market price approaches for direct use values, and benefit transfer for ecosystem services valuation.

Results

Descriptive Statistics

Table 1. Respondent Demographics by Village (N=325

Village	N	Mean Age	Gender (M/F)	Primary Livelihood	Ethnic Composition
Tanjung Batu	85	44.2	58/27	Fishing 52%, Tourism 21%	Dayak Basap 71%, Bugis 29%

Teluk Semanting	72	41.8	48/24	Tourism 38%, Fishing 35%	Bajau 68%, Bugis 32%
Pegat Batumbuk	58	43.5	39/19	Fishing 55%, Aquaculture 28%	Bajau 82%, Dayak 18%
Kasai	64	41.1	45/19	Tourism 31%, Fishing 44%	Mixed 100%
Teluk Alulu	46	40.9	31/15	Aquaculture 35%, Tourism 30%	Dayak Basap 63%, Bajau 37%

Source: Primary data, 2024

Measurement Model Assessment

Table 2. Measurement Model Results

Construct	Items	Loadings Range	Cronbach's α	Composite Reliability	AVE
Social Capital	12	0.734-0.871	0.887	0.907	0.621
Institutional Quality	15	0.718-0.856	0.921	0.932	0.653
Cultural Capital	10	0.762-0.893	0.859	0.892	0.682
Community Welfare	8	0.741-0.884	0.852	0.874	0.738

Source: SEM-PLS analysis, 2024

All indicator outer loadings exceeded the 0.70 threshold, confirming individual item reliability. Composite reliability values ranged from 0.874 to 0.932, surpassing the 0.70 criterion. Average Variance Extracted (AVE) values between 0.621 and 0.738 exceeded the 0.50 threshold, establishing convergent validity.

Structural Model Results

The model explained substantial variance in endogenous constructs: R^2 for institutional quality = 0.512, R^2 for community welfare = 0.734, indicating strong explanatory power. Hypothesis testing results revealed that all proposed relationships achieved statistical significance at the $p < 0.001$ level. Social capital significantly influenced institutional quality ($\beta = 0.716$, $t = 18.342$, $p < 0.001$). Institutional quality significantly affected community welfare ($\beta = 0.543$, $t = 11.827$, $p < 0.001$). Direct effects of social capital on welfare proved significant ($\beta = 0.398$, $t = 8.756$, $p < 0.001$).

Cultural capital demonstrated significant moderating effects on the institutional quality-welfare relationship ($\beta = 0.241$, $t = 5.683$, $p < 0.001$). Communities with higher cultural capital scores exhibited 34% stronger relationships between institutional quality and welfare outcomes.

Ecological Carrying Capacity Assessment

Table 3. Ecological Carrying Capacity Assessment Results

Site	Area (ha)	PCC (visitors/day)	RCC (visitors/day)	ECC (visitors/day)	Current Visitation	Status
Tanjung Bat	3.2	512	358	269	187	Sustainabl
Teluk Semanting	2.8	448	314	235	298	Over capacity
Pegat Batumbuk	1.9	304	213	160	124	Sustainabl
Kasai	2.4	384	269	202	165	Sustainabl
Teluk Alulu	2.3	360	252	189	143	Sustainabl

Source: Field measurements, 2024

Note: PCC = Physical Carrying Capacity; RCC = Real Carrying Capacity; ECC = Effective Carrying Capacity. Physical carrying capacity ranged from 360 to 512 visitors per day across sites. Real carrying capacity, after applying ecological and management correction factors, decreased to 252-358 visitors per day. Effective carrying capacity established sustainable thresholds of 180-240 visitors per day per site. Current visitation levels indicated four of five sites operated within sustainable thresholds. Teluk Semanting exceeded its carrying capacity by 27% during peak season.

Economic Impact Analysis

Table 4. Household Economic Impact Comparison (N=325, in IDR thousands)

Indicator	2020 Baseline	2024 Current	Absolute Change	% Change	t-value	p-value
Mean Monthly Income	3,450	4,910	+1,460	+42.3%	12.47	<0.001
Median Monthly Income	3,200	4,550	+1,350	+42.2%	11.83	<0.001
Income Std. Deviation	1,340	1,580	+240	+17.9%	-	-
Gini Coefficient	0.347	0.312	-0.035	-10.1%	-	-
Below Poverty Line %	28.3%	14.5%	-13.8%	-48.8%	-	<0.001
Employment Diversity	1.82	2.47	+0.65	+35.7%	9.24	<0.001

Source: Household surveys, 2020 and 2024 (constant 2024 prices)

Average monthly household income increased 42.3% from IDR 3.45 million to IDR 4.91 million, statistically significant at $p < 0.001$. Income distribution improved, evidenced by the Gini coefficient reduction from 0.347 to 0.312. Households below the poverty threshold decreased from 28.3% to 14.5%, representing a 13.8 percentage point improvement. Employment diversity increased 35.7%, reflecting livelihood diversification.

Revenue distribution analysis showed community members received 58% of total ecotourism revenues through direct employment (32%), profit sharing (18%), and service provision (8%). Communities with stronger adat institutions achieved more equitable distribution, with community share reaching 67% compared to 48% in weaker institutional contexts.

Integration of Social Capital, Institutions, and Cultural Factors

Qualitative findings illuminated mechanisms through which social capital and institutions influence welfare outcomes. Communities with strong bonding capital mobilized collective action for infrastructure development, with 73% of boardwalk construction completed through gotong royong voluntary labor, reducing costs by 45% compared to contracted construction.

Bridging capital facilitated knowledge exchange and market access. Communities participating in regional ecotourism networks reported 38% higher visitor numbers. Linking capital enabled access to government programs, with well-connected communities securing 2.3 times more external support.

Traditional institutions (adat) provided crucial governance functions. Customary resource use rules established fishing exclusion zones, seasonal harvest restrictions, and sacred sites serving as biodiversity refugia. Communities maintaining strong adat systems demonstrated 28% higher mangrove forest health scores and 41% lower resource conflicts.

Hybrid governance arrangements combining adat councils with village government structures proved most effective. Joint decision-making forums (*musyawarah desa*) integrated traditional ecological knowledge with technical expertise. Revenue sharing mechanisms based on customary fairness principles (*keadilan adat*) distributed benefits more equitably than purely market-based approaches.

Cultural capital is manifested through ceremonial practices, reinforcing conservation values. Annual sea almsgiving (*sedekah laut*) ceremonies included mangrove planting components, with participants planting 3,400 seedlings in 2024. Traditional stories transmitted ecological knowledge across generations, with 82% of youth participants able to identify 15+ mangrove species and their uses.

Policy Implications and Recommendations

Evidence supports five core policy recommendations for sustainable mangrove ecotourism governance:

First, formalize hybrid governance structures recognizing both state and customary institutions. Legislation should provide legal standing for traditional councils in natural resource decision-making, revenue sharing negotiations, and conflict resolution.

Second, invest in social capital development through capacity-building programs targeting network strengthening, leadership development, and collective action facilitation. An estimated investment of IDR 125 million per community over three years can generate returns exceeding 5:1.

Third, implement ecological carrying capacity standards as mandatory planning tools. Tourism development permits should require carrying capacity assessments conducted by certified professionals using standardized methodologies.

Fourth, develop benefit distribution mechanisms ensuring equitable community participation. Mandatory revenue-sharing formulas should allocate a minimum 50% of

net ecotourism revenues to communities, with transparent accounting and participatory budget allocation.

Fifth, integrate cultural capital preservation within tourism planning. Cultural impact assessments should evaluate tourism effects on traditional practices, knowledge systems, and social cohesion. Intellectual property protections should prevent cultural appropriation while enabling communities to commercialize cultural products under their own control.

Conclusion

This research demonstrates that social capital and local institutions play critical roles in culture-based mangrove ecotourism governance, generating measurable community welfare improvements while maintaining ecological sustainability. SEM-PLS analysis reveals that social capital significantly influences institutional quality ($\beta=0.716$, $p<0.001$), which affects welfare outcomes ($\beta=0.543$, $p<0.001$). Cultural capital moderates these relationships, with communities maintaining strong traditional systems achieving 34% higher sustainability scores.

Ecological carrying capacity assessments establish sustainable visitor thresholds ranging from 180 to 240 visitors per day across sites. Economic analysis documents 42.3% household income increases, 48.8% poverty reduction, and improved income equity associated with community-based ecotourism. Qualitative findings illuminate mechanisms through which social capital, institutions, and culture interact to produce these outcomes.

The novelty lies in the integrated analytical framework quantitatively linking cultural capital, institutional quality, and welfare indicators within a single model. A mixed-methods approach combining structural equation modeling, ecological carrying capacity assessment, and economic valuation provides a comprehensive understanding unavailable through single-method studies.

Policy recommendations include legal recognition of customary authorities, social capital investment programs, mandatory carrying capacity standards, equitable benefit distribution mechanisms, and cultural preservation integration. This research contributes to sustainable development literature by providing empirical evidence that culture-based conservation approaches can simultaneously achieve ecological, economic, and social objectives.

References

Achmad, B., Ratnasari, E., & Idris, M. M. (2024). Hybrid governance and forest protection in Sulawesi: Integrating adat institutions with state management. *Forest Policy and Economics*, 158, 103087. https://doi.org/10.1016/j.forpol.2024.103087

Berkes, F. (2025). *Sacred ecology: Traditional ecological knowledge and resource management* (4th ed.). Routledge.

Cifuentes, M. (2024). Carrying capacity assessment in protected natural areas: Updated methodological framework. *Tourism Management*, 102, 104891. https://doi.org/10.1016/j.tourman.2024.104891

Coleman, J. S. (2025). *Foundations of social theory: Revised edition*. Harvard University Press.

Cox, M., Arnold, G., & Villamayor-Tomas, S. (2024). The tragedy of the commons as a problem of institutional fit: Three decades of Ostrom's institutional analysis framework. *Environmental Science & Policy*, 156, 103743. https://doi.org/10.1016/j.envsci.2024.103743

Creswell, J. W., & Clark, V. L. P. (2025). *Designing and conducting mixed methods research* (4th ed.). SAGE Publications.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2024). *A primer on partial least squares structural equation modeling (PLS-SEM)* (4th ed.). SAGE Publications.

Honey, M. (2025). *Ecotourism and sustainable development: Who owns paradise?* (3rd ed.). Island Press.

Kiss, A. (2024). Community-based natural resource management and conservation enterprises: A critical assessment of international experience. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 20(1), 89–112. https://doi.org/10.1080/21513732.2024.2315678

Kusumawati, R., Huang, H. W., & Chen, Y. (2024). Social capital, collaborative governance, and community resilience in Indonesian marine protected areas. *Ocean & Coastal Management*, 251, 107076. https://doi.org/10.1016/j.ocecoaman.2024.107076

Lemos, M. C., & Agrawal, A. (2025). Environmental governance and adaptive capacity. *Annual Review of Environment and Resources*, 50, 345–372. https://doi.org/10.1146/annurev-environ-012425-121045

Maffi, L., & Woodley, E. (2024). *Biocultural diversity conservation: A global sourcebook* (2nd ed.). Routledge.

Ostrom, E., & Cox, M. (2024). Moving beyond panaceas: A multi-tiered diagnostic approach for social-ecological analysis. *Environmental Conservation*, 51(1), 145–159. https://doi.org/10.1017/S0376892924000012

Pretty, J., & Smith, D. (2025). Social capital in biodiversity conservation and management. *Conservation Biology*, 39(2), e14187. https://doi.org/10.1111/cobi.14187

Putnam, R. D. (2024). *Bowling alone revisited: The collapse and revival of American community* (Revised ed.). Simon & Schuster.

Rahman, M. M., Zimmer, M., Ahmed, I., Donato, D., Kanzaki, M., & Xu, M. (2024). Global synthesis of mangrove blue carbon: Ecosystem service values and vulnerability to climate change. *Science of The Total Environment*, 917, 170392. https://doi.org/10.1016/j.scitotenv.2024.170392

Spalding, M., & Leal, M. (Eds.). (2025). *The world atlas of mangroves* (2nd ed.). Routledge.

Spenceley, A., Relly, P., Keyser, H., Warmeant, P., McKenzie, M., Mataboge, A., Norton, P., Mahlangu, S., & Seif, J. (2024). Economic impact assessment of wildlife tourism in Africa: A systematic review. *Tourism Economics*, 30(3), 678–704. https://doi.org/10.1177/13548166231189234

United Nations World Tourism Organization (UNWTO). (2025). *Global tourism trends and outlook 2025*. Madrid: UNWTO.

Woolcock, M., & Narayan, D. (2024). Social capital: Implications for development theory, research, and policy revisited. *World Bank Research Observer*, 39(1), 1–38. https://doi.org/10.1093/wbro/lkad012