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Social-ecological outcomes of conservation-based tourism in marine protected areas: evidence from Raja Ampat, Indonesia

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ABSTRACT

Marine Protected Areas (MPAs) are increasingly expected to deliver both biodiversity conservation and community development; however, evidence integrating ecological, socio-economic, and governance outcomes remains limited, particularly in biodiversity-rich archipelagic regions such as Raja Ampat, Indonesia. This study examines the social-ecological outcomes of conservation-based tourism using a Social-Ecological Systems (SES) framework. A convergent mixed-methods design combined a structured 36-item Benefits of Marine Protected Areas (MKK) Index with in-depth interviews involving 104 respondents across seven districts of the Raja Ampat Marine Protected Area. Descriptive statistics and reflexive thematic analysis were integrated to assess livelihood transformation, perceived benefits, governance, equity, resilience, and sustainability. The findings indicate that conservation-based tourism has generated positive social-ecological outcomes (overall MKK Index = 3.83/5), particularly through livelihood diversification, local economic opportunities, and strengthened community adaptation. Nevertheless, benefits remain unevenly distributed, while governance challenges—including limited participation, unequal benefit sharing, and transparency—continue to constrain inclusive conservation outcomes. The study advances the SES literature by integrating quantitative and qualitative evidence through a multidimensional assessment framework, providing practical guidance for strengthening equitable governance and community-based tourism. These findings offer nationally relevant evidence to support more inclusive and adaptive marine conservation policies in Indonesia.

INTRODUCTION

Marine Protected Areas (MPAs) have become one of the most prominent policy instruments for conserving marine biodiversity while simultaneously promoting sustainable development (Chang et al., 2026; Galveia & Macusi, 2025; Hasri et al., 2026; IUCN, 2025; White et al., 2025; Yavarmoghadam et al., 2025). Beyond their ecological function, MPAs are increasingly expected to generate socio-economic benefits through conservation-based tourism by creating employment opportunities, diversifying local livelihoods, and providing sustainable financing for conservation initiatives (Costello, 2024; Pike et al., 2024; Sidqi et al., 2026). Consequently, the

effectiveness of MPAs is no longer evaluated solely by ecological indicators such as coral reef recovery or fish biomass, but also by their capacity to enhance community well-being, ensure equitable benefit distribution, and foster inclusive governance within complex social-ecological systems (Bennett et al., 2020; Fujii & Makino, 2026; Picone et al., 2021).

The growing integration of conservation and tourism has transformed many coastal regions into destinations where environmental protection and economic development are expected to reinforce one another (Chen et al., 2026; Martínez et al., 2024). Nevertheless, empirical evidence suggests that these objectives are not always mutually

beneficial. While conservation-based tourism may stimulate local economies, it can also generate unequal access to economic opportunities, livelihood transformations, governance challenges, and conflicts among stakeholders (Jung, 2025; Khuluq et al., 2025; Saehu et al., 2026; Shimhanda et al., 2026; Y. Sun et al., 2025; van Megen & Anthony, 2024). Increasingly, scholars argue that successful marine conservation depends not only on ecological effectiveness but also on social equity, community participation, institutional legitimacy, and adaptive governance (Cadoret & Jones, 2024; Garcia Rodrigues et al., 2024). These interrelated dimensions highlight the importance of understanding MPAs as social-ecological systems, where ecological sustainability is intrinsically linked to social and institutional processes (Belgrano et al., 2021; Fudge et al., 2021; Islam, 2021; Schlüter et al., 2013).

Raja Ampat, Indonesia, represents one of the world's most significant marine biodiversity hotspots and has become an internationally recognized model of conservation-based tourism (Maharani, 2026; Novarina, 2025; Rosel, 2026). Located within the Coral Triangle, the region supports exceptional marine ecosystems while attracting a rapidly growing number of domestic and international visitors. Tourism has contributed substantially to local economic development through employment creation, community-based enterprises, homestays, marine guiding services, and conservation financing (Hani et al., 2020). At the same time, however, the rapid expansion of tourism has introduced new challenges related to governance effectiveness, environmental carrying capacity, unequal distribution of tourism benefits, and the long-term sustainability of coastal livelihoods (Balestracci et al., 2025; P.-C. Sun & Ng, 2025). These dynamics illustrate the inherent complexity of balancing conservation objectives with local development aspirations in marine protected areas (Calado et al., 2025; Djosetro & Behagel, 2020; Savage et al., 2020).

Despite extensive research on marine conservation and tourism, important knowledge gaps remain. Previous studies have predominantly examined either the ecological effectiveness of MPAs or the economic performance of tourism, often treating social, environmental, and governance dimensions separately (Jokhu et al.,

2025; Tressa & Yohanes, 2026). Fewer studies have adopted an integrated social-ecological perspective that simultaneously examines how conservation policies, tourism development, governance quality, community participation, benefit distribution, and livelihood changes interact to influence conservation outcomes (Hermawati et al., 2026; McCool & Mandic, 2025; Wally et al., 2025). Moreover, evidence from biodiversity-rich archipelagic regions such as Raja Ampat remains limited, particularly regarding the experiences and perceptions of diverse local stakeholders whose livelihoods are directly affected by conservation-based tourism (Atmodjo et al., 2020; Habibi et al., 2025; Kadir, 2019; Maas et al., 2020).

Addressing this gap, the present study applies a Social-Ecological Systems (SES) perspective to examine the social-ecological outcomes of conservation-based tourism in the Raja Ampat Marine Protected Area. Rather than focusing exclusively on economic impacts or ecological performance, this study investigates how conservation-based tourism influences livelihood diversification, perceived socio-economic benefits, community participation, governance effectiveness, social equity, and sustainability. By integrating qualitative and quantitative evidence from multiple stakeholder groups across the Raja Ampat archipelago, this research provides a more comprehensive understanding of the interactions between environmental conservation and community development.

The findings contribute to the growing body of literature on conservation and sustainable tourism by demonstrating that the long-term success of marine protected areas should be evaluated through a multidimensional framework encompassing ecological integrity, social equity, governance quality, and community well-being. These insights offer important implications for developing more inclusive, adaptive, and socially legitimate conservation policies, not only for Raja Ampat but also for other marine protected areas seeking to reconcile biodiversity conservation with sustainable regional development.

MATERIALS AND METHODS

Study area

This study was conducted in the Marine Protected Areas (MPAs) of the Raja Ampat

Archipelago, Southwest Papua Province, Indonesia. Raja Ampat, located within the Coral Triangle, is internationally recognized as one of the world's richest marine biodiversity hotspots and a leading destination for conservation-based tourism (Rosel, 2026). The region comprises extensive coral reef ecosystems, mangrove forests, and seagrass habitats that support exceptional marine biodiversity, hosting approximately 75% of the world's known hard coral species and over 1,700 fish species, while also sustaining the livelihoods of coastal communities (Setyawan et al., 2024).

Since 2007, ten Marine Protected Areas covering over two million hectares have been established through a community-driven approach integrating customary sasi traditions with formal conservation regulations, ranking highest in Indonesia's management performance (Qutrothunnada, 2025). However, visitor numbers have surged dramatically, with foreign tourists now accounting for 95% of approximately 42,000 annual visitors, and the number of liveaboard vessels exceeding 100, far surpassing the original cap of 40, creating congestion, anchoring damage, and waste management challenges (Butler, 2025). This rapid expansion of tourism directly affects coastal communities that depend on both fishing and tourism-based livelihoods. At the same time, nickel mining concessions granted on northern islands within the Geopark have intensified tensions between conservation objectives and extractive economic interests (Sani & Sonni, 2026).

These conditions, combined with shifting governance authority, funding gaps, and limited community understanding of zonation systems, make Raja Ampat a strategic site for examining the experiences and perceptions of diverse local stakeholders whose livelihoods are directly affected by conservation-based tourism (Qutrothunnada, 2025).

Fieldwork was undertaken across seven districts representing different levels of tourism intensity, accessibility, and community dependence on marine resources: South Misool, North Misool, Kofiau, Teluk Mayalibit, Selat Dampir, Fam, and Ayau Asia. These districts were purposively selected to capture variations in tourism development and conservation experiences, ranging from highly visited tourism destinations (e.g., Selat Dampir and South Misool) to relatively remote

communities with limited tourism activities (e.g., Ayau Asia and Kofiau). This spatial variation enabled a comprehensive assessment of the social-ecological outcomes associated with conservation-based tourism.

This study was conducted in the Marine Protected Areas (MPAs) of the Raja Ampat Archipelago, Southwest Papua Province, Indonesia. Raja Ampat is located within the Coral Triangle and is internationally recognized for its exceptional marine biodiversity and conservation-based tourism. The region encompasses extensive coral reef, mangrove, and seagrass ecosystems that support both marine biodiversity and coastal livelihoods.

Fieldwork was conducted across seven districts: South Misool, North Misool, Kofiau, Teluk Mayalibit, Selat Dampir, Fam, and Ayau Asia. These locations were purposively selected to capture variation in tourism intensity, accessibility, and community dependence on marine resources. South Misool and Selat Dampir represent areas with relatively intensive conservation-based tourism, whereas Ayau Asia and Kofiau represent more remote settings with lower tourism accessibility. This spatial variation enabled the study to examine social-ecological outcomes across communities experiencing different levels of tourism development and dependence on marine resources.

Research design

This study adopted a convergent parallel mixed-methods design (Creswell & Clark, 2018), allowing qualitative and quantitative data to be collected simultaneously, analyzed independently, and integrated during interpretation. This design was chosen because the research sought not only to quantify perceived socio-economic outcomes but also to understand the governance dynamics and lived experiences that shape them.

Conceptually, the study was guided by the Social-Ecological Systems (SES) framework, treating conservation outcomes as the product of interaction among ecological conditions, governance institutions, tourism development, and community livelihoods. Both components of the study were accordingly designed around six recurring dimensions: livelihood transformation, perceived benefit, access and equity, governance and participation, adaptation and resilience, and economic multiplier effects.

Ethical considerations

Before data collection, all participants were informed of the study's objectives, confidentiality procedures, and their right to decline or withdraw at any stage. Verbal informed consent was obtained from every respondent before interviews began. Personal identifiers were replaced with anonymized respondent codes (R1–R104) during data processing; only the research team retains the key linking codes to identities, stored separately from the analytical dataset. Participation was voluntary, and data were used exclusively for academic research.

Sampling strategy

A purposive sampling strategy was employed to recruit respondents possessing direct experience with marine conservation and conservation-based tourism. Selection criteria included residency within the study area, direct dependence on marine resources or tourism-related livelihoods, and experience with conservation management or tourism activities.

The study involved 104 community respondents, representing the principal livelihood groups within Raja Ampat's coastal communities. These consisted of fishers ($n = 27$), homestay owners ($n = 21$), micro- and small-scale enterprise

operators ($n = 18$), farmers ($n = 8$), tour guides ($n = 8$), formal-sector employees ($n = 7$), community members ($n = 7$), marine transportation providers ($n = 5$), and other informal occupations ($n = 3$).

Rather than pursuing statistical representativeness, the sample size was determined to ensure adequate representation of the major livelihood groups across the seven districts while achieving sufficient information richness for qualitative analysis. Sampling continued until no substantially new themes emerged during interviews, indicating adequate analytical saturation.

Research instruments

The quantitative component employed the MKK Index, a 36-item perception instrument developed through four stages: literature review, adaptation of existing socio-economic indicators, expert content review, and item refinement. Items were organized into eight thematic dimensions and measured on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Ten supplementary items (No. 37–46) were administered to tourism-enterprise respondents only, and item subsets were re-aggregated into two supplementary indices — Tourism Dependency and Governance.

Mapping of Questionnaire Items to the Composite Dimensions of the MKK Instrument

Composite Dimension	Questionnaire Items	Number of Items (n)	Construct Measured
Change	Q1–Q4	4	Perceived changes in environmental conditions, local economy, livelihoods, and tourism opportunities following the implementation of conservation-based tourism.
Benefits	Q5–Q9	5	Perceived socio-economic benefits derived from conservation, including employment, income generation, and improved livelihood opportunities.
Access and Zoning	Q10–Q14	5	Understanding of marine protected area zoning regulations, access to marine resources, and adaptation to conservation rules.
Distribution and Equity	Q15–Q19	5	Perceptions of fairness in the distribution of tourism and conservation benefits, including attention to vulnerable and marginalized groups.
Adaptation and Resilience	Q20–Q24	5	Household adaptive capacity, livelihood diversification, and resilience in responding to environmental and economic changes.

Social Dynamics	Q25, Q26, Q27, Q28	4	Community cooperation, social cohesion, conflict occurrence, and conflict resolution associated with conservation and tourism development.
Economic Multiplier Effect	Q29–Q33	5	Local economic circulation generated by tourism, including business linkages, indirect employment, and multiplier effects on community enterprises.
General Reflection	Q34–Q36	3	Overall evaluation of conservation-based tourism and respondents' support for the long-term sustainability of marine conservation initiatives.
Total	Q1–Q36	36	Composite perception instrument assessing the social-ecological outcomes of conservation-based tourism in Raja Ampat.

Source: Developed by the authors based on the structured questionnaire used in the field survey (2025–2026).

Four semi-structured guides — for community members, tourism entrepreneurs, fishers/resource users, and guides/transport operators — covered six common themes: livelihood and resource use, conservation experience, governance and participation, benefit distribution, social dynamics, and adaptation/future aspirations.

Reliability and validity

Content validity was established through independent review by three specialists (marine conservation, socio-economic development, tourism management), followed by pilot testing with five respondents outside the study sample to check

comprehension and cultural appropriateness; this refined item wording without altering the core constructs. Internal consistency was assessed using Cronbach's alpha for each dimension (Table 1). The overall MKK Index showed good reliability ($\alpha = 0.85$); dimension-level alphas ranged from 0.65 (Social Dynamics) to 0.82 (Benefits), with Social Dynamics and Distribution and Equity falling in the “questionable” range — consistent with the multidimensional, mixed-valence nature of those constructs.

Table 1. Internal Consistency Reliability of the MKK Instrument

Composite Dimension	Number of Items (n)	Cronbach's alpha (α)	Interpretation
Change	4	0.78	Acceptable
Benefits	5	0.82	Good
Access and Zoning	5	0.71	Acceptable
Distribution and Equity	5	0.69	Questionable
Adaptation and Resilience	5	0.73	Acceptable
Social Dynamics	4	0.65	Questionable
Multiplier Effect	5	0.76	Acceptable
General Reflection	3	0.80	Good
Overall Instrument	36	0.85	Good

Interpretation: ≥ 0.9 Excellent, 0.8–0.89 Good, 0.7–0.79 Acceptable, 0.6–0.69 Questionable, < 0.6 Poor (DeVellis, 2017)

Limitations

Construct validity was not assessed via factor analysis because the item-to-sample ratio (36 items, $n = 104$; $\approx 3:1$) fell well below the recommended 10:1 threshold. Test–retest reliability was not assessed due to respondent mobility, and

perception-based responses remain susceptible to social desirability bias, particularly on conservation-support items.

Data Collection

Quantitative data were collected via structured face-to-face interviews by enumerators who

completed a 2-day training program (objectives/framework, item-by-item instrument review, mock interviews, ethics/consent, data quality control). Qualitative data were collected via audio-recorded, verbatim-transcribed in-depth interviews (30–90 minutes) conducted by lead researchers experienced in qualitative methods, in Indonesian or local dialects (Biak, Numfor, Papuan Malay), per respondent preference. A reflexivity protocol — field journals and regular team debriefings — was maintained throughout to examine how researchers' disciplinary backgrounds and local familiarity might shape data collection and interpretation.

Data analysis

Quantitative Analysis

Quantitative data were analyzed using descriptive statistics to summarize respondent characteristics and perceptions across the eight dimensions of the MKK Index. Composite indices were calculated by averaging indicator scores within each dimension, allowing comparison of perceived conservation outcomes across different livelihood groups. Index scores were interpreted according to the following intervals:

Table 2. Criteria for Interpreting Perceived Social-Ecological Outcome Scores

Composite Index Score	Interpretation
1.00 – 1.80	Very Low
1.81 – 2.60	Low
2.61 – 3.40	Moderate
3.41 – 4.20	High
4.21 – 5.00	Very High

Source: Adapted from the five-point Likert scale interpretation developed for the Manfaat Kawasan Konservasi (MKK) Index.

These indices provided an overall assessment of perceived social-ecological outcomes associated with conservation-based tourism.

Qualitative analysis

Interview recordings were transcribed verbatim and analyzed using Reflexive Thematic Analysis (Braun & Clarke, 2022). Analysis

proceeded through six iterative stages: 1) familiarization with the data; 2) generation of initial codes; 3) construction of preliminary themes; 4) review and refinement of themes; 5) definition and naming of themes; and 6) interpretation and reporting. This approach enabled the identification of recurring patterns concerning governance, social equity, livelihood transformation, conflicts, and community perceptions of conservation.

Trustworthiness and quality assurance

The credibility of qualitative findings was enhanced through triangulation of respondents from different livelihood groups and villages, triangulation of multiple data sources, and member checking with selected participants to verify the accuracy of preliminary interpretations. For the quantitative component, content validity was established through expert review, while standardized enumerator training and uniform interview protocols ensured scoring consistency throughout field implementation. The integration of qualitative and quantitative evidence further strengthened the study's overall validity by providing methodological triangulation and enhancing the robustness of the findings.

RESULTS AND DISCUSSION

Respondent characteristics and livelihood structure

Table 3 presents the distribution of the 104 respondents by primary livelihood. Fishers constituted the largest group (25.9%), followed by homestay owners (20.2%) and MSME operators (17.3%). The remaining respondents comprised farmers and tour guides (7.7% each), formal-sector employees and community members (6.7% each), marine transportation providers (4.8%), and other informal occupations (2.9%). This distribution reflects the coexistence of traditional marine-based livelihoods and emerging tourism-related economic activities within the Raja Ampat Marine Protected Area.

Table 3. Distribution of Respondents by Primary Livelihood (n = 104)

Primary Livelihood	Number of Respondents (n)	Percentage (%)
Fishers	27	25.9
Homestay owners	21	20.2
MSME operators	18	17.3
Farmers	8	7.7
Tour guides	8	7.7
Formal-sector employees	7	6.7
Community members	7	6.7
Marine transportation providers	5	4.8
Other informal occupations	3	2.9
Total	104	100.0

Source: Authors' field survey (2025–2026).

Table 3 reveals that the study involved respondents representing diverse livelihood groups, reflecting the heterogeneous socio-economic structure of coastal communities within the Raja Ampat Marine Protected Area. Fishers constituted the largest occupational group, followed by homestay owners and micro-, small-, and medium-sized enterprise (MSME) operators. In contrast, smaller proportions were represented by farmers, tour guides, marine transportation providers, formal-sector employees, and other informal occupations. The predominance of fisheries alongside tourism-related occupations indicates that marine-resource-dependent livelihoods continue to play a central role despite the rapid expansion of conservation-based tourism (UNESCO, 2025).

The distribution of livelihoods also demonstrates an ongoing transition in local economic activities. Tourism-related occupations collectively account for a substantial proportion of respondents, suggesting that conservation-based tourism has created new employment opportunities without fundamentally replacing traditional fisheries. Instead, tourism has become an important complementary livelihood, broadening household income sources while maintaining dependence on marine ecosystems (Hatidja & Sulana, 2025). This pattern reflects the gradual diversification of local livelihoods as marine conservation and ecotourism initiatives are implemented in Raja Ampat (Perdanawati et al., 2025).

Qualitative interviews reinforced this pattern. Fishing remained the primary livelihood during periods of low tourist arrivals, while tourism-related activities — homestay operations, guiding, boat transport, and small-scale trade — provided

supplementary income during the peak season. A 72-year-old fisher from Kapatcool, South Misool, described this seasonal complementarity: “Day-to-day life here is fishing, with farming as a side activity. Our fishing work is always tied to the sea — we turn part of our catch into salted fish and sell it in neighboring villages” (R4, male, 72, Fisher, Kapatcool, South Misool).

Similarly, a homestay operator in Yellu, South Misool, explained how tourism supplements rather than replaces existing livelihoods: “I run a homestay in Yellu village together with my husband. Our homestay already offers a full package — airport transfer and breakfast, lunch, and dinner service.” (R13, female, 40, Homestay Owner, Yellu, South Misool).

A young resident of Yellu, combining formal employment with fishing, illustrated the layered nature of household livelihood strategies: “On my days off from work, my sister sometimes has guests and calls me in to help out... I also often go fishing, and if I catch more than we need, I sell it” (R14, male, 22, Company Employee, Yellu, South Misool).

These accounts, drawn directly from field transcripts, indicate that conservation-based tourism has promoted livelihood diversification rather than occupational substitution. From a Social-Ecological Systems perspective, this diversified structure plausibly enhances household resilience by reducing single-source income dependence, though the present dataset does not include a formal resilience index to quantify this claim — a direction for further analysis.

Social-ecological outcomes of conservation-based tourism

Table 4. Composite Scores of the MKK Index

MKK Dimension	Number of Indicators	Mean Score	Standard Deviation	Category
Change	4	4.07	0.68	High
Benefits	5	4.00	0.72	High
Access and Zoning	5	3.60	0.85	Moderate
Distribution and Equity	5	3.45	0.91	Moderate
Adaptation and Resilience	5	3.92	0.76	High
Social Dynamics	4	3.74	0.79	High
Multiplier Effect	5	3.62	0.82	Moderate
General Reflection	3	4.28	0.65	High
Overall MKK Index	36	3.83	0.77	High

Note: Categories were interpreted using the following intervals: 1.00–1.80 = Very Low; 1.81–2.60 = Low; 2.61–3.40 = Moderate; 3.41–4.20 = High; 4.21–5.00 = Very High.

Source: Authors' field survey (2025–2026).

Table 4 summarizes the composite scores of the eight dimensions of the Benefits of the Conservation Area (MKK) Index. Overall, respondents perceived conservation-based tourism as producing favorable social-ecological outcomes, with most dimensions achieving high mean scores. The highest perceptions were associated with livelihood benefits, economic multiplier effects, and community adaptation, indicating that conservation-based tourism has generated tangible improvements in local economic opportunities and strengthened household resilience. In contrast, comparatively lower scores were observed for governance effectiveness, benefit distribution, and access to tourism opportunities, suggesting that institutional and equity-related issues remain significant challenges despite the overall positive perceptions.

The quantitative findings are supported by qualitative evidence from in-depth interviews. Respondents consistently described tourism as an important source of supplementary income through homestay operations, marine transportation services, tour guiding, handicraft production, and small-scale food businesses. Many participants emphasized that tourism has reduced dependence on fishing by providing additional livelihood opportunities, particularly during periods of high tourist visitation. As one homestay owner explained: “Tourism has become an important additional source of income. During the peak tourist season, we earn more from visitors than from fishing, although fishing remains part of our daily livelihood” (Respondent H-12).

However, qualitative narratives also revealed that these benefits were not distributed evenly across communities (Atmodjo, 2020). Respondents from villages located near major tourism destinations reported substantially greater economic gains than those living in more remote districts with limited accessibility. Similarly, households possessing tourism-related assets, such as homestays or boats, were more likely to benefit directly from tourism than households relying solely on traditional fishing activities (Salossa et al., 2026). These findings help explain the relatively lower scores on the dimensions of Distribution, Equity and Access, and Zoning, highlighting persistent disparities in participation and economic opportunity (Tranter et al., 2022).

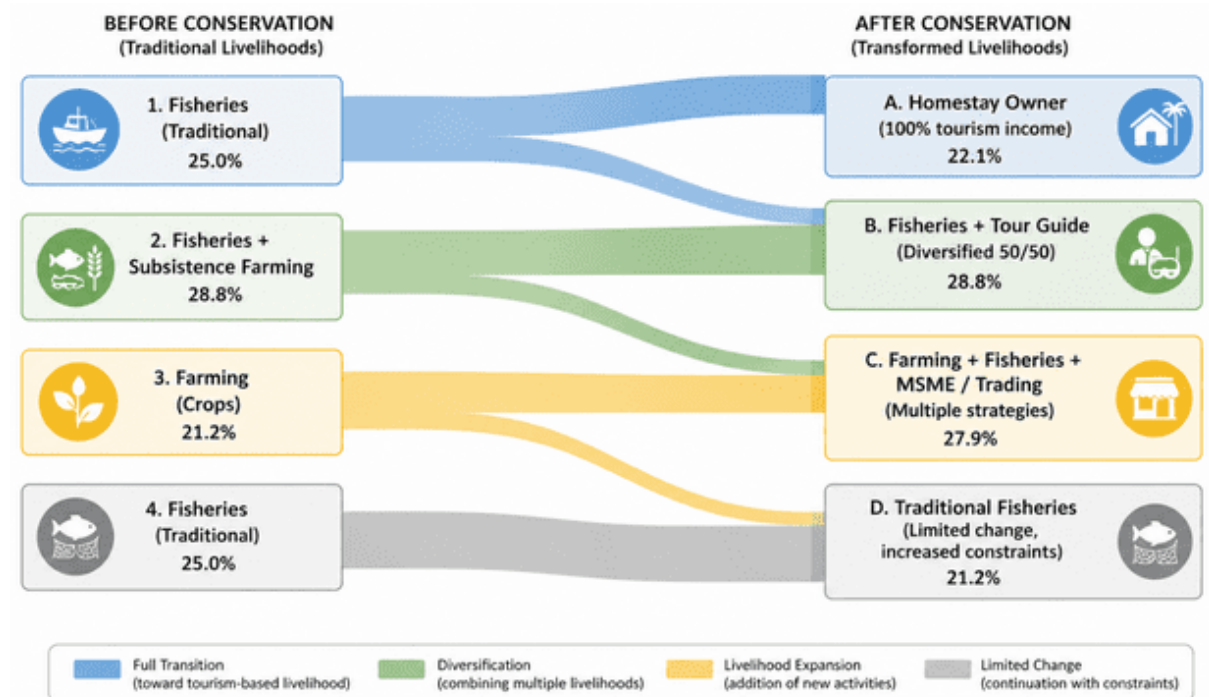
The integration of quantitative and qualitative findings demonstrates that conservation-based tourism has contributed positively to livelihood diversification and local economic development while simultaneously revealing structural inequalities in the distribution of tourism benefits. From a Social-Ecological Systems (SES) perspective, these findings suggest that ecological conservation alone is insufficient to ensure sustainable development. Rather, long-term conservation success depends on strengthening governance quality, expanding equitable access to tourism opportunities, and enhancing community participation in conservation management. Therefore, the effectiveness of Marine Protected Areas should be evaluated through an integrated framework that simultaneously considers ecological

sustainability, socio-economic equity, and institutional performance.

Livelihood transformation and economic multiplier effects

The establishment of the MPA and the subsequent growth of conservation-based tourism have triggered significant changes in how local

communities earn their livelihoods. As illustrated in Figure 1, the transformation follows distinct pathways. Some households have fully transitioned from traditional fisheries to tourism-related enterprises, while others have adopted diversified livelihood strategies that combine multiple income sources.



Source: Developed by the authors based on field survey data (n = 104) and in-depth interviews conducted during November 2025–February 2026. The conceptual flow diagram represents the authors' synthesis and interpretation of empirical findings and was visually rendered using AI-assisted graphic design tools.

Figure 1. Livelihood Transformation Associated with Conservation-Based Tourism

Table 5. Tourism-Related Economic Activities Reported by Respondents

Tourism-related Economic Activity	Number of Respondents	Percentage (%)	Primary Contribution
Homestay operation	21	20.2	Accommodation services
Tour guiding	8	7.7	Visitor guiding and interpretation
Marine transportation	5	4.8	Boat transfer and island tours
MSMEs (souvenirs, food, handicrafts)	18	17.3	Local products and services
Mixed tourism-related livelihoods	24	23.1	A combination of tourism activities
Traditional fisheries (primary livelihood)	28	26.9	Fisheries with limited tourism involvement
Total	104	100.0	

Source: Authors' field survey (2025–2026)

Figure 1 illustrates the transition of household livelihood strategies following the expansion of conservation-based tourism, while Table 5 summarizes the tourism-related economic activities undertaken by respondents. Together, these findings

demonstrate that conservation-based tourism has substantially diversified local livelihoods by creating employment opportunities in accommodation services, marine transportation, tour guiding, handicrafts, food businesses, and other

small-scale enterprises. Rather than replacing traditional fisheries, tourism has emerged as an additional livelihood strategy that broadens household income sources and strengthens local economic linkages.

The quantitative evidence is reinforced by qualitative interviews, in which respondents consistently described tourism as an important supplementary source of income that reduces economic vulnerability. Many households reported combining fisheries with tourism-related activities according to seasonal demand, thereby increasing their capacity to cope with fluctuations in fish catches and tourism arrivals. As one respondent explained, “We still fish, but during the tourist season our income comes mainly from homestay guests and boat services. Tourism helps us maintain our household income when fishing is less productive” (Respondent T-08).

This adaptive livelihood strategy reflects a gradual transition from single-resource dependence toward diversified income portfolios, enhancing household resilience within the Marine Protected Area.

Despite these positive developments, both quantitative and qualitative findings indicate that livelihood transformation remains spatially uneven. Respondents from Selat Dampir, South Misool, and other well-established tourism destinations reported substantially greater economic opportunities than communities in more remote districts such as Ayau Asia and parts of Kofiau, where limited accessibility constrains tourism growth. Consequently, the multiplier effects of tourism are concentrated in areas with higher visitor flows, stronger tourism infrastructure, and better market connectivity.

These findings suggest that conservation-based tourism contributes not only to household income diversification but also to broader local economic development through indirect employment and increased demand for goods and services. However, the unequal distribution of tourism opportunities indicates that conservation status alone does not guarantee inclusive economic benefits (Winter et al., 2025). From a Social-Ecological Systems (SES) perspective, livelihood transformation is mediated by interactions among ecological resources, tourism accessibility, local institutions, and market connectivity (Wu et al., 2024). Therefore, policies aimed at strengthening community-based tourism should prioritize improving infrastructure, expanding market access, and enhancing local entrepreneurial capacity to ensure that conservation benefits are distributed more equitably across all districts.

Governance, equity, and community participation

Table 6 shows a clear contrast between positive conservation outcomes and weaker governance performance. While 70% of respondents reported improved marine resources and 60% perceived increased economic opportunities, positive assessments were substantially lower for community participation (15%), PIN fee transparency (12%), equitable benefit distribution (18%), and trust in MPA management (25%). These findings indicate that perceived ecological and economic gains coexist with concerns over participation, transparency, equity, and institutional trust.

Table 6. Respondents' Perceptions of Conservation Outcomes and Governance Performance (n = 104)

Indicator	Strongly Disagree (%)	Somewhat Disagree (%)	Neutral (%)	Somewhat Agree (%)	Strongly Agree (%)
Marine resources have improved	5	10	15	30	40
Economic opportunities increased	8	12	20	35	25
I understand zoning rules	20	25	25	20	10
Community involved in decision-making	35	30	20	10	5
PIN fee management is transparent	40	30	18	8	4
Conservation benefits are shared evenly	30	30	22	12	6
Conflicts are resolved well	15	18	25	28	14
I trust the MPA management	25	28	22	15	10

Note: Responses were measured using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Percentages may not total exactly 100% because of rounding. Source: Authors' field survey (n = 104).

The qualitative findings further contextualized the quantitative patterns in Table 6, particularly the relatively low perceptions of participation, transparency, benefit distribution, and institutional

trust. Table 7 summarizes the major governance themes emerging from the interviews and provides further insight into these patterns.

Table 7. Major Governance Themes Identified from Qualitative Interviews

Them	Representative Findings	Interpretation
Community participation	Communities were consulted but had limited influence over final decisions.	Participatory governance remains largely consultative rather than collaborative.
Transparency	Limited public information regarding conservation fees and revenue allocation.	Transparency influences institutional trust.
Benefit distribution	Tourism benefits were concentrated among households with tourism assets and business networks.	Economic gains remain unevenly distributed.
Access to tourism	Remote villages had fewer tourism opportunities due to limited accessibility.	Geographic location affects tourism participation.
Institutional trust	Respondents generally supported conservation but requested greater accountability and communication.	Long-term legitimacy depends on transparent governance.

Source: Authors' thematic analysis based on in-depth interviews (2025–2026)

Table 6 indicates that governance-related dimensions consistently received lower evaluations than economic and livelihood-related dimensions presented in the previous section. While respondents generally acknowledged the ecological and economic contributions of conservation-based tourism, perceptions were comparatively lower regarding community participation, transparency, and the equitable distribution of tourism benefits. These findings suggest that the effectiveness of conservation management is influenced not only by

ecological performance but also by institutional quality and procedural fairness.

The qualitative evidence presented in Table 7 provides further explanation for these quantitative patterns. Interview participants frequently reported that community involvement in conservation planning and tourism management was largely limited to consultation, with relatively few opportunities to influence strategic decisions. Several respondents also expressed concerns regarding the transparency of conservation fee

management and the allocation of tourism-related revenues. Although respondents generally recognized that conservation regulations had improved environmental conditions, many perceived that households possessing homestays, boats, financial capital, or stronger business networks captured a disproportionate share of tourism benefits compared with other community members.

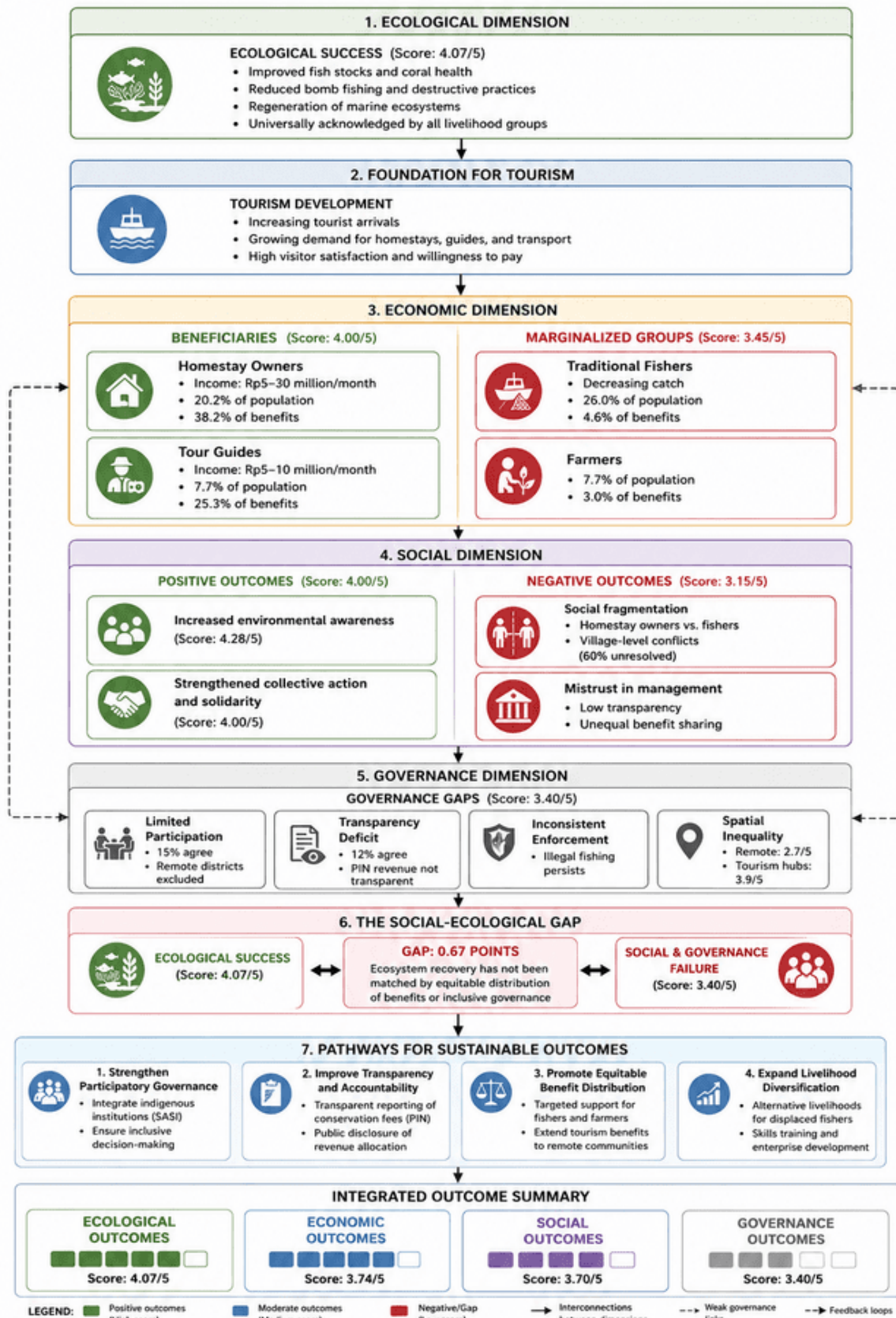
These governance challenges were particularly evident in remote districts where tourism activity remained relatively limited. Respondents from less accessible communities emphasized that restricted market connectivity and limited tourism infrastructure constrained their ability to participate in tourism-based livelihoods, despite being subject to the same conservation regulations. Consequently, perceptions of equity were influenced not only by institutional arrangements but also by geographic accessibility and differences in local tourism development.

The integration of quantitative and qualitative findings demonstrates that conservation-based

tourism has achieved considerable progress in supporting marine conservation and local economic development. Yet, institutional challenges continue to constrain its inclusiveness. From a Social-Ecological Systems (SES) perspective, governance functions as a critical mechanism linking ecological conservation with community well-being. Effective marine protected area management therefore requires transparent decision-making, equitable benefit-sharing mechanisms, meaningful community participation, and institutional accountability to strengthen trust and ensure the long-term legitimacy of conservation-based tourism.

Integrated social-ecological outcomes

Figure 2 presents the integrated conceptual framework derived from the findings. The framework illustrates how conservation-based tourism in Raja Ampat operates as a complex social-ecological system where ecological, economic, social, and governance dimensions interact to produce outcomes that are both positive and negative.



Source: Authors' analysis based on survey data (n = 104) and in-depth interviews, 2025–2026.

Source: Authors' analysis based on household survey (n = 104) and in-depth interviews conducted in Raja Ampat (November 2025–February 2026). The conceptual framework was developed by the authors and visually rendered using AI-assisted graphic design tools.

Figure 2. Integrated Social-Ecological Outcomes of Conservation-Based Tourism in Raja Ampat

The integrated findings demonstrate that conservation-based tourism in Raja Ampat has generated substantial ecological and socio-economic benefits while simultaneously revealing persistent governance and equity challenges. Quantitative evidence generally indicates positive perceptions of conservation outcomes. In contrast, qualitative findings show that these outcomes are mediated by tourism accessibility, institutional effectiveness, community participation, and the distribution of economic opportunities.

Taken together, the results illustrate that the sustainability of Marine Protected Areas depends on interactions among ecological conservation, tourism development, governance quality, livelihood diversification, and social equity. This integrated perspective extends the Social-Ecological Systems framework by demonstrating that conservation success cannot be measured solely through ecological indicators or tourism growth but should also encompass community well-being, institutional legitimacy, and adaptive capacity.

From a policy perspective, strengthening participatory governance, improving transparency in conservation financing, expanding tourism opportunities for marginalized communities, and enhancing local capacity are essential to ensure that conservation-based tourism contributes to both biodiversity conservation and inclusive regional development.

CONCLUSION

This study demonstrates that conservation-based tourism in the Raja Ampat Marine Protected Area has generated positive social-ecological outcomes by supporting ecological recovery, livelihood diversification, and local economic development. However, these benefits remain unevenly distributed, as tourism opportunities are concentrated among communities with greater access to tourism infrastructure and assets. In contrast, governance challenges—including limited participation, unequal benefit sharing, and insufficient transparency—continue to constrain inclusive conservation outcomes. These findings reinforce the Social-Ecological Systems (SES) perspective by showing that the long-term effectiveness of Marine Protected Areas depends not only on ecological integrity but also on equitable benefit distribution, adaptive governance,

and community well-being. Although the study provides a comprehensive understanding through an integrated mixed-methods approach, its findings should be interpreted in light of several limitations, including the context-specific sample, reliance on perception-based data, limited direct input from tourists, and the need for further psychometric validation of the MKK instrument across different settings. Future research should adopt longitudinal and comparative designs that integrate objective ecological, socio-economic, and governance indicators to evaluate conservation outcomes over time and identify institutional strategies to strengthen equity, participation, and resilience in marine protected areas. These findings provide practical evidence for developing more inclusive and adaptive conservation policies in Raja Ampat and other marine protected areas facing similar conservation–development challenges.

AI Use Statement

The authors conducted all aspects of this research, including study design, data collection, data analysis, interpretation of results, and manuscript preparation. AI tools (ChatGPT, OpenAI, 2025) were used only for language editing, improving readability, and visualizing figures based exclusively on the authors' analyses. AI was not used to generate or analyze research data or to develop the study's scientific conclusions. The authors reviewed and approved all AI-assisted outputs and assume full responsibility for the final manuscript.

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