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Minawisata as Integrated Fisheries-Based Tourism: Development Potential in Kampung Madong–Sei Nyirih, Indonesia

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Abstract:
This study examines the development potential and carrying capacity of minawisata (fisheries-based marine tourism) in Kampung Madong–Sei Nyirih, Tanjungpinang City, Kepulauan Riau Province, in response to growing demands for sustainable coastal development and alternative livelihoods for fishing communities. The research aims to evaluate land suitability, environmental carrying capacity, and infrastructure readiness for three main clusters: mangrove ecotourism, fishing tourism, and floating net cage aquaculture. A mixed-methods approach was applied, combining Geographic Information Systems (GIS)-based spatial analysis, carrying capacity calculations aligned with national regulatory standards, and qualitative input from government, community, academic, and private stakeholders. The results revealed that 66.03% (199.42 ha) of mangrove areas and 99.13% (322.47 ha) of marine waters are highly suitable for tourism activities, while only 1.0% of the assessed areas are suitable for floating net cage aquaculture. Carrying capacity estimates showed the potential to accommodate 1,595 daily visitors for mangrove-based tourism, 1,075 for fishing activities, and 45 for aquaculture tourism. These findings underscore significant opportunities for developing integrated fisheries-tourism models, especially through mangrove conservation and traditional fishing practices that align with sustainable tourism principles. However, challenges remain in addressing infrastructure gaps, institutional coordination, and community capacity for tourism service delivery. The study concludes that Kampung Madong–Sei Nyirih holds strong potential as a model for sustainable coastal development that integrates conservation, economic diversification, and community empowerment. Its implementation could provide practical lessons for similar coastal regions in Indonesia and Southeast Asia facing the dual challenges of environmental protection and livelihood improvement

Keyword: : Marine Tourism, Carrying Capacity, Land Suitability, Sustainable Tourism, Mangrove Ecotourism

INTRODUCTION

Central issue addressed in this study concerns the potential for developing minawisata, or fisheries-based tourism, in Kampung Madong Sei Nyirih, Tanjungpinang City, Kepulauan Riau Province. This issue arises from the growing need to integrate

coastal ecosystem conservation with livelihood diversification strategies for fishing communities that have long depended on traditional fishing activities (Wirajing & Nanfosso, 2025).

Previous studies on coastal tourism have largely emphasized economic contributions at the macro level, but have seldom highlighted the interconnectedness between traditional fisheries, mangrove ecosystems, and sustainable tourism (Hall, 2001; Honey & Krantz, 2007; Mahadiansar et al., 2023). Positioned within this scholarly discourse, this article aims to contribute an original perspective by analyzing land suitability, environmental carrying capacity, and institutional readiness as fundamental dimensions of sustainable minawisata development.

The urgency of this issue is underscored by the increasing pressures on coastal ecosystems, such as overexploitation, land conversion, and climate change. Mangrove ecosystems, for instance, play a critical role in shoreline protection, carbon sequestration, and biodiversity support, yet their coverage continues to decline due to human activities (Deakin et al., 2025; Kuenzer et al., 2011). At the same time, local fishing communities face declining fish catches and precarious incomes, creating the need for alternative livelihood strategies that both enhance economic resilience and incentivize conservation (Agit et al., 2024; Athari et al., 2023; Chen, 2021). Against this backdrop, minawisata emerges as an urgent and viable pathway for sustainable coastal development.

The urgency is further amplified by national and local government initiatives that increasingly frame sustainable tourism as a strategic component of economic development. Regulations issued by the Indonesian Ministry of Tourism and Creative Economy on natural tourism standards and sustainable destination guidelines provide a formal framework for assessing the readiness of local areas to develop minawisata. This research therefore contributes not only to the policy implementation discourse but also to academic debates on the integration of conservation, sustainable development, and community participation.

Within the broader academic field, much of the literature on coastal tourism has focused on economic growth or general tourist attractions, with limited attention to the integration of traditional fisheries, cultural heritage, and ecosystem conservation (Maryono et al., 2025). For example, previous studies on mangrove-based ecotourism in Southeast Asia have emphasized ecological and recreational values but rarely connected these with traditional fishing practices as integral tourism experiences (Mulyadi et al., 2021; Prihadi et al., 2024). This article seeks to fill that gap by offering an integrative analysis that combines ecological, socio-economic, and institutional perspectives, contextualized specifically to Kampung Madong–Sei Nyirih.

Moreover, this study also extends discussions on community-based tourism (CBT), which emphasizes local participation in tourism planning and management (Pomeroy, 1995). Scholars have highlighted that CBT's success is often contingent on local institutional capacity, the equitable distribution of economic benefits, and the involvement of communities in decision-making processes (Umilia & Asbar, 2016). In this light, evaluating institutional readiness, infrastructural feasibility, and community capacity becomes essential to ensure that minawisata development does not remain a top-down project but instead evolves as a genuinely community-driven initiative.

The main objective of this article is to assess the potential for minawisata development by examining land suitability, environmental carrying capacity, and infrastructure feasibility, while also incorporating stakeholder perspectives. By formulating strategic recommendations grounded in both quantitative and qualitative data, this research seeks to offer practical contributions for local governments, community organizations, and academics engaged in coastal resource management. The article argues that the integration of spatial science, policy analysis, and participatory approaches constitutes a crucial foundation for constructing inclusive and sustainable models of coastal development (Fabinyi et al., 2022; Kismartini et al., 2023)

Methodologically, this study employs a mixed-methods approach that combines Geographic Information Systems (GIS)-based spatial analysis, carrying capacity calculations aligned with regulatory standards, and structured interviews with key stakeholders. The quantitative component is used to measure the physical suitability of mangrove and marine areas, while the qualitative component captures stakeholder perspectives from government, community groups, and private actors. This integrative design allows for a more comprehensive assessment compared to studies that rely on a single methodological orientation.

The GIS-based analysis enables precise mapping of mangrove coverage, water depths, current velocity, and other ecological factors critical for determining suitable zones for minawisata activities. Such spatial techniques have proven effective in coastal resource management studies worldwide, offering empirical foundations for zoning and planning. Meanwhile, qualitative insights obtained from fishermen, community-based organizations, and government officials enrich the findings with narratives of local challenges, aspirations, and lived experiences, thereby contextualizing the biophysical analysis within the socio-cultural landscape.

The primary objective of this study was to assess the potential and carrying capacity for minawisata development in Kampung Madong-Sei Nyirih, focusing on three main activities: mangrove tourism, fishing tourism, and floating net cage aquaculture tourism. Specific objectives included: (1) analyzing land suitability and carrying capacity for each minawisata cluster, (2) evaluating infrastructure feasibility and facility completeness, and (3) providing recommendations for sustainable development implementation.

RESEARCH METHOD

The Research Method section of this study outlines a comprehensive and systematic approach to evaluating the potential of minawisata development in Kampung Madong–Sei Nyirih, Tanjungpinang City, Kepulauan Riau Province. This research employs a mixed-methods design with a descriptive and exploratory approach, aiming to assess land suitability, environmental carrying capacity, infrastructure feasibility, and stakeholder perspectives in relation to fisheries-based tourism (Wang et al., 2024).

The target population of this study comprised local stakeholders directly or indirectly involved in minawisata development, including government officials, community-based organizations, traditional fishing groups, academic representatives, and private sector actors. From this population, a purposive sampling method was applied to ensure that only individuals with relevant expertise and experience were included. The final sample consisted of 35 participants, representing a balanced mix of

institutional and community perspectives. Participant selection criteria included (1) direct engagement in coastal resource management or tourism, (2) minimum of two years of involvement in related activities, and (3) willingness to participate voluntarily.

Data collection involved both primary and secondary sources. Primary data were gathered through structured interviews, direct field observations, and environmental measurements. Interviews were conducted using an interview guide specifically designed for this study to capture stakeholder views on opportunities, constraints, and recommendations for minawisata development. Observations focused on the condition of infrastructure, accessibility, and tourism-supporting facilities, documented through an observation checklist. Environmental data were collected using standardized instruments to assess water quality, mangrove density, and other ecological parameters. Secondary data were obtained from official reports, regulatory documents, and satellite imagery.

The data collection process was carried out in a structured and stepwise manner. Preparations included mapping the study site using GIS software and pre-testing interview instruments for clarity. Fieldwork lasted for three months, during which interviews and ecological assessments were conducted sequentially. All participants provided informed consent, and confidentiality agreements were explained to ensure the protection of their identities and responses.

For data analysis, qualitative data from interviews were processed using thematic analysis. Quantitative environmental and spatial data were analyzed using Geographic Information Systems (ArcGIS) for land suitability mapping and carrying capacity calculations based on national standards. Descriptive statistics were applied to summarize ecological indicators, while comparative analysis ensured alignment with existing regulatory thresholds.

Finally, this study adhered to ethical considerations throughout the research process. Prior to fieldwork, ethical clearance was obtained from the Institutional Review Board (IRB) of Universitas Maritim Raja Ali Haji. All procedures followed the principles of voluntary participation, informed consent, confidentiality, and respect for local cultural values. These safeguards were designed to protect participants' rights and ensure compliance with ethical standards for research involving human subjects. By combining rigorous spatial analysis with systematic stakeholder engagement, this methodological framework enhances the validity, reliability, and replicability of the study, ensuring that its findings can contribute meaningfully to both academic scholarship and practical policy development in sustainable coastal tourism.

The assessment criteria were formulated by referring to several formal regulatory frameworks. These include the Minister of Tourism and Creative Economy Regulation No. 4 of 2021 concerning Natural Tourism Business Standards, and the Minister of Tourism and Creative Economy Regulation No. 9 of 2021 regarding Sustainable Tourism Destination Guidelines. In addition, the framework also incorporates the Minister of Environment and Forestry Regulation No. P.13/MENLHK/SETJEN/KUM.1/5/2020 on Natural Tourism Infrastructure Development, as well as the Indonesian National Standard (SNI) 8013:2014 on Natural Tourism Management Guidelines.

Land suitability analysis was conducted using Geographic Information Systems (GIS) with ArcView Version 3.4. Spatial overlay modeling was employed with weighted factors for each assessment parameter. Suitability classes were determined through

multi-criteria analysis incorporating: mangrove tourism parameters, fishing tourism parameters, and floating net cage parameters.

Table 1. Criteria of Selected Spatial Analysis

No.	Parameters		
	Mangrove Tourism	Fishing Tourism	Floating Net Cage
1.	Mangrove thickness and density	Fish species diversity	Water Depth
2.	Species diversity	Current velocity	Current Patterns
3.	Biota diversity	Water depth	Water Quality
4.	Tidal range	Substrate type	Protection from Waves
5.	Distance from other land uses	Accessibility	Distance from Pollution sources

Source: Author, 2025

The assessment framework integrates multiple national regulations and standards to ensure comprehensive sustainability and suitability in tourism development, while the GIS-based land suitability analysis provides a spatially grounded decision-making tool. By applying multi-criteria analysis across mangrove, fishing, and floating net cage tourism parameters, the approach balances ecological, economic, and infrastructural considerations.

For instance, mangrove tourism emphasizes vegetation density and biodiversity, fishing tourism relies on aquatic diversity and substrate conditions, while floating net cages prioritize hydrological and water quality factors. This systematic overlay not only highlights the interdependence between environmental health and tourism viability but also offers a structured, regulation-compliant method to guide spatial planning and minimize potential conflicts between land uses.

The environmental carrying capacity analysis was conducted by applying standardized formulas that account for both land and visitor thresholds. For land carrying capacity, the formula DDL = LLS × KL was used, where the suitable land area (LLS) is multiplied by the land capacity factor (KL). This approach provides a measurable estimate of how much ecological pressure the area can sustain without causing significant environmental degradation, thereby serving as the foundation for sustainable spatial planning.

Visitor carrying capacity was determined using the formula DDK = K × (Lp/Lt) × (Wt/Wp), which integrates visitor density, spatial allocation, and temporal factors. This calculation considers the number of visitors per unit area (K), the proportion of the site available for visitors (Lp/Lt), and the balance between available daily time and the duration of each visit (Wt/Wp). By doing so, the model ensures that tourism activities remain within acceptable thresholds, maintaining visitor satisfaction while minimizing environmental stress.

To ensure a holistic understanding, data analysis combined both quantitative and qualitative approaches. Quantitative data were processed using statistical software and GIS applications for spatial modeling, offering precise insights into land and visitor capacities. In parallel, qualitative data obtained from stakeholder interviews were analyzed thematically to capture perceptions of development opportunities and constraints. The integration of these methods provided comprehensive insights into the

potential and requirements for minawisata development, ensuring that planning decisions are both evidence-based and socially inclusive.

RESULT AND DISCUSSION

1. Land Suitability Analysis

a. Mangrove Tourism Suitability

The analysis of 302.02 hectares of mangrove habitat indicates that most of the area possesses favorable conditions for tourism development. Approximately 199.42 hectares, or 66.03%, were classified as suitable, meeting critical ecological and environmental parameters such as mangrove thickness exceeding 500 meters, high tree density of more than 1,500 trees per hectare, and diverse species composition. These characteristics provide a strong ecological foundation for promoting mangrove-based tourism while ensuring the sustainability of the ecosystem.

Meanwhile, 91.48 hectares (30.29%) were categorized as conditionally suitable, requiring specific interventions or management strategies to optimize their potential. These areas may present partial limitations in terms of species diversity, tidal fluctuations, or proximity to other land uses. A small portion, around 11.12 hectares (3.68%), was deemed unsuitable, primarily due to ecological constraints that could undermine the integrity of mangrove ecosystems if exploited. This classification highlights the importance of careful spatial planning to prioritize areas most capable of sustaining tourism without ecological degradation.

b. Fishing Tourism Suitability

Marine waters covering 325.29 hectares were analyzed for fishing tourism suitability, and the results were overwhelmingly positive. The study found that 322.47 hectares (99.13%) were classified as suitable, demonstrating a high potential for fishing tourism activities. This suitability was attributed to abundant fish species, moderate current velocities ranging from 0.2 to 0.5 meters per second, and water depths between 3 and 15 meters, which together create ideal conditions for recreational fishing experiences. Furthermore, the favorable substrate types and good accessibility from the shoreline enhance the overall feasibility of fishing tourism in these waters.

Only 2.82 hectares (0.87%) were identified as conditionally suitable, suggesting minor limitations that may still be managed with targeted interventions, such as regulating fishing intensity or improving access infrastructure. Notably, no areas were categorized as unsuitable, underscoring the overall robustness of this marine environment for fishing-related activities. This outcome demonstrates significant potential for the development of sustainable fishing tourism that supports both local livelihoods and environmental stewardship.

c. Floating Net Cage Tourism Suitability

The suitability assessment of 323.7 hectares for floating net cage aquaculture revealed relatively constrained opportunities compared to mangrove and fishing tourism. Only 3.2 hectares (1.0%) were classified as suitable, meeting criteria related to water quality, depth, and protection from waves. An additional 51.1 hectares (15.8%) were conditionally suitable, requiring adjustments such as engineering interventions to stabilize water conditions or careful zoning to minimize conflicts with other marine

activities. These findings highlight that while potential exists, the scale of viable development is considerably limited.

In contrast, a dominant 269.4 hectares (83.2%) were deemed unsuitable for floating net cage tourism. Shallow water depths, strong current patterns, and overlapping usage with fishing grounds and navigation routes were the main constraints. These limitations underline the challenges of introducing aquaculture-based tourism in this region without significant risk to both safety and ecological balance. As a result, floating net cage tourism requires a highly selective and cautious development approach, ensuring that activities are confined only to areas capable of supporting them sustainably.

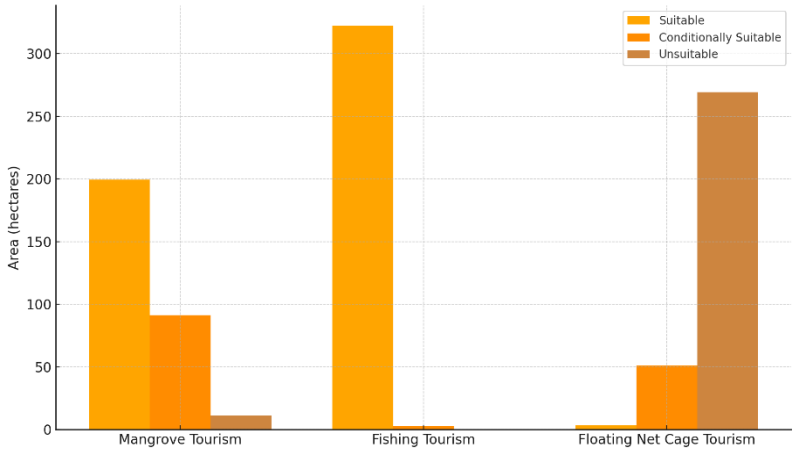

Figure 1. Land Susitabiity Analysis Tourism Development
Source: Author, 2025

2. Potential and Opportunities

The assessment results demonstrate significant potential for minawisata development in Kampung Madong-Sei Nyirih, particularly for mangrove ecotourism and traditional fishing activities. The high suitability ratings for mangrove tourism (66.03% suitable areas) and fishing tourism (99.13% suitable areas) indicate favorable biophysical conditions for sustainable tourism development. These findings align with previous studies highlighting the potential of mangrove ecosystems for ecotourism development in Southeast Asia.

The diversity of potential tourism activities identified in the study reflects the integrated nature of minawisata, combining conservation education, cultural experiences, and recreational activities. This diversity provides opportunities for market segmentation and year-round tourism operations, potentially reducing seasonal fluctuations common in marine tourism destinations (Dimitrovski et al., 2021; King et al., 2021; Orams, 2002). The combination of mangrove tracking, traditional fishing experiences, and aquaculture demonstrations offers unique value propositions that differentiate Kampung Madong-Sei Nyirih from conventional beach tourism destinations.

The calculated carrying capacities (1,595 visitors/day for mangrove tourism, 1,075 visitors/day for fishing tourism) suggest the area can accommodate moderate tourism development without exceeding environmental thresholds. These capacity limits align

with sustainable tourism principles emphasizing the importance of maintaining ecological integrity while providing economic benefits to local communities.

3. Development Constraints and Challenges

One of the primary constraints in the development of minawisata is the limited suitability of floating net cage tourism areas, which account for only 1.0% of the total assessed marine space. This condition reflects the inherent ecological and hydrological challenges such as shallow water depths, strong currents, and overlapping marine uses including fishing grounds and navigation routes. The spatial limitations make floating net cage tourism less viable compared to other forms of marine tourism, highlighting the importance of careful site selection and the application of targeted interventions in specific locations (Hayati et al., 2020; Marine-Roig & Anton Clavé, 2015). Failure to address these ecological constraints could lead to unsustainable practices that endanger both marine ecosystems and tourism safety.

Infrastructure deficiencies represent another major development barrier. The absence of tourism-standard facilities such as clean sanitation systems, safe transportation access, and visitor amenities significantly hampers the ability to attract and sustain tourism activities. Moreover, the lack of adequate waste management infrastructure creates risks of environmental degradation, which could undermine the ecological foundations upon which minawisata depends. With carrying capacity calculations indicating increasing visitor numbers, the demand for substantial infrastructure investments is undeniable. Without proactive infrastructure planning and development, visitor satisfaction and environmental sustainability would be compromised.

Institutional challenges also play a critical role in limiting immediate development. The management of minawisata requires coordination among multiple government agencies, community groups, and private stakeholders. The proposed establishment of a Technical Implementation Unit (UPTD) is an important step toward formalizing management structures, yet its success depends on the clarity of roles, adequate authority, and consistent funding support. Weak institutional frameworks can result in fragmented decision-making, conflicting interests, and delays in implementation. Strengthening these institutions is therefore an urgent priority.

Equally important is the development of human resource capacity among local communities. Tourism success depends on well-trained individuals capable of providing services that meet visitor expectations while safeguarding environmental values. Currently, limited skills in tourism service provision, environmental conservation, and business management create barriers to sustainable growth. Capacity-building programs tailored to local needs are essential, enabling community members to transition from resource-dependent livelihoods to diversified roles in tourism and conservation. These constraints collectively illustrate the multifaceted challenges that must be addressed to unlock minawisata's potential.

4. Sustainability Considerations

Sustainability is central to the proposed development model, reflecting global trends in integrating tourism with conservation objectives. By prioritizing mangrove conservation, the framework not only secures ecological services such as carbon

sequestration and shoreline protection but also creates economic incentives for communities to protect rather than exploit these resources. Tourism becomes a tool for conservation, with revenue generation linked directly to ecosystem health. This dual function addresses the intertwined challenges of biodiversity protection and poverty alleviation, particularly relevant in coastal regions of developing countries where resource pressures are high.

The promotion of community-based management further strengthens sustainability outcomes. Involving local stakeholders in planning, implementation, and monitoring ensures that tourism benefits are equitably distributed and culturally appropriate. Existing community structures, such as fishing groups, cultivation groups, and tourism awareness organizations, provide a ready foundation for participatory governance. By embedding local knowledge and leadership into management structures, the risks of external domination and cultural homogenization are minimized. This participatory approach not only enhances legitimacy but also fosters long-term commitment to sustainable practices.

Adaptive management strategies are also critical in maintaining sustainability under dynamic environmental and social conditions. Carrying capacity calculations provide valuable baseline thresholds, but they must be continuously updated to reflect evolving realities such as climate change impacts, fluctuating visitor numbers, and ecological shifts. Monitoring systems that track water quality, biodiversity health, and visitor impacts allow managers to identify early warning signals and adjust strategies accordingly. Without adaptive frameworks, sustainability goals risk becoming static and ineffective.

Education and awareness form another pillar of sustainability. Local communities must be empowered with knowledge about conservation practices, sustainable business operations, and the ecological value of their environments. Simultaneously, visitors should be engaged in edu-ecotourism experiences that foster respect for nature and cultural heritage (Arnegger et al., 2024; Honey, 2008; Susanto et al., 2020). This dual process of community empowerment and visitor education creates a shared responsibility for conservation outcomes, ensuring that sustainability is not merely an institutional objective but a collective practice embedded in everyday interactions.

5. Sustainability Considerations

Minawisata development in Kampung Madong–Sei Nyirih offers significant opportunities for economic diversification. By integrating direct tourism services such as guiding, accommodation, and transport with indirect economic activities like local product sales, the community can benefit from multiple income streams. This diversification reduces reliance on traditional fisheries, which are often vulnerable to seasonal fluctuations and overexploitation. In similar coastal tourism destinations, well-managed marine tourism has been shown to produce substantial multiplier effects, creating ripple benefits across entire local economies.

The development of value-added products represents another economic opportunity. Initiatives such as fish crackers, sea cucumber oil, and culinary tourism allow communities to extend their value chains beyond raw resource extraction. By branding and marketing these products, communities can tap into broader markets, generating revenue that is not wholly dependent on visitor arrivals. These linkages

between tourism and local production systems enhance economic resilience, enabling communities to withstand external shocks such as downturns in global tourism demand.

However, the pursuit of economic benefits carries inherent risks. Increased tourism activity can drive inflation in local prices, particularly for food, housing, and services, disproportionately affecting lower-income households. Furthermore, without careful management, economic gains may be concentrated among a small segment of the community, exacerbating inequality. Dependence on volatile tourism markets also presents long-term risks, as shifts in global demand or external shocks (such as pandemics) can destabilize local economies. A balanced approach is therefore necessary, one that promotes equitable distribution and safeguards against market vulnerabilities.

Effective monitoring of economic impacts is critical to maintaining sustainability. This involves tracking indicators such as income distribution, employment generation, and local price inflation. Transparent governance structures that involve community participation in decision-making help ensure that economic benefits are equitably shared. By embedding economic monitoring within broader management frameworks, minawisata development can avoid common pitfalls observed in other tourism-dependent regions, ensuring that economic gains translate into improved well-being for all community members.

CONCLUSION

This comprehensive assessment of minawisata development potential in Kampung Madong-Sei Nyirih demonstrates significant opportunities for sustainable marine tourism development. The high suitability of mangrove areas (66.03%) and marine waters (99.13%) for tourism activities, combined with substantial carrying capacities (1,595- 1,075 visitors/day), indicates favorable conditions for integrated fisheries-tourism development. The study identified diverse tourism activity potentials including mangrove ecotourism, traditional fishing experiences, aquaculture demonstrations, and cultural tourism, providing foundations for market differentiation and year-round operations. However, successful development requires addressing infrastructure constraints, strengthening institutional capacity, and implementing coordinated management approaches.

Key recommendations for sustainable minawisata development include: (1) phased infrastructure development aligned with carrying capacity limits, (2) establishment of dedicated management institutions with clear coordination mechanisms, (3) comprehensive capacity building programs for local communities, (4) implementation of environmental monitoring and adaptive management systems, and (5) development of partnerships with educational institutions and private sector operators. The integration of conservation and development objectives through minawisata provides a model for sustainable coastal development that can generate economic benefits while protecting marine ecosystems. Success in Kampung Madong-Sei Nyirih could provide valuable lessons for similar coastal communities throughout Indonesia and Southeast Asia facing challenges of economic development and environmental conservation.

Future research should focus on detailed market analysis, economic impact assessment, and development of specific management protocols for each tourism

activity type. Long-term monitoring of environmental and social impacts will be essential for ensuring the sustainability of minawisata development and providing evidence for adaptive management decisions. The findings of this study contribute to growing knowledge about integrated coastal management approaches that combine conservation, community development, and sustainable tourism. The minawisata model developed for Kampung Madong-Sei Nyirih demonstrates the potential for innovative approaches to coastal development that address multiple objectives while maintaining environmental integrity and community well-being.

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REFERENCES

Agit, A., Wanner, P. J., Muharram, S., & Oktavianty, O. (2024). The interconnection between technology and economic through tourism sectors. *Indonesian Tourism Journal*, *1*(1), 46–58. https://doi.org/10.69812/ITJ.V1I1.17

Arnegger, J., Herz, M., & Campbell, M. (2024). Mass ecotourism, media, and wildlife experience. *Journal of Outdoor Recreation and Tourism*, *45*. https://doi.org/10.1016/J.JORT.2023.100732

Athari, S. A., Alola, U. V., & Alola, A. A. (2023). A global perspective of the role of domestic economic, financial and political risks in inbound tourism. *International Journal of Emerging Markets*, *18*(10), 4191–4213. https://doi.org/10.1108/IJOEM-11-2020-1370

Chen, K. (2021). Research on the integration development of tourism industry from the perspective of all-for-one-tourism: Chengdu Plain Economic Zone as an example. *ACM International Conference Proceeding Series*, 124–130. https://doi.org/10.1145/3485190.3485210

Deakin, K., Porter, A., Osorio Baquero, A., & Lewis, C. (2025). Plastic pollution in mangrove ecosystems: A global meta-analysis. *Marine Pollution Bulletin*, *218*, 118165. https://doi.org/10.1016/J.MARPOLBUL.2025.118165

Dimitrovski, D., Lemmetyinen, A., Nieminen, L., & Pohjola, T. (2021). Understanding coastal and marine tourism sustainability - A multi-stakeholder analysis. *Journal of Destination Marketing and Management*, *19*. https://doi.org/10.1016/j.jdmm.2021.100554

Fabinyi, M., Belton, B., Dressler, W. H., Knudsen, M., Adhuri, D. S., Abdul Aziz, A., Akber, M. A., Kittitornkool, J., Kongkaew, C., Marschke, M., Pido, M., Stacey, N., Steenbergen, D. J., & Vandergeest, P. (2022). Coastal transitions: Small-scale fisheries, livelihoods, and maritime zone developments in Southeast Asia. *Journal of Rural Studies*, *91*, 184–194. https://doi.org/10.1016/J.JRURSTUD.2022.02.006

Hall, C. M. (2001). Trends in ocean and coastal tourism: the end of the last frontier? *Ocean & Coastal Management*, *44*(9–10), 601–618. https://doi.org/10.1016/S0964-5691(01)00071-0

Hayati, Y., Adrianto, L., Krisanti, M., Pranowo, W. S., & Kurniawan, F. (2020). Magnitudes and tourist perception of marine debris on small tourism island: Assessment of

Tidung Island, Jakarta, Indonesia. *Marine Pollution Bulletin*, *158*. https://doi.org/10.1016/j.marpolbul.2020.111393

Honey, M. (2008). *Ecotourism and Sustainable Development*. Islandpress. https://islandpress.org/books/ecotourism-and-sustainable-development-second-edition

Honey, M., & Krantz, D. (2007). *Global Trends in Coastal Tourism*. World Wildlife Fund. https://www.foresightfordevelopment.org/sobipro/55/335-global-trends-in-coastal-tourism

King, C., Iba, W., & Clifton, J. (2021). Reimagining resilience: COVID-19 and marine tourism in Indonesia. *Current Issues in Tourism*, *24*(19), 2784–2800. https://doi.org/10.1080/13683500.2021.1873920

Kismartini, K., Roziqin, A., & Authori, N. (2023). A stakeholder analysis for sustainable development of Maritime Village in Semarang coastal community, Indonesia. *Public Administration and Policy*, *26*(3), 321–334. https://doi.org/10.1108/PAP-10-2022-0119

Kuenzer, C., Bluemel, A., Gebhardt, S., Quoc, T. V., & Dech, S. (2011). Remote sensing of mangrove ecosystems: A review. *Remote Sensing*, *3*(5), 878–928. https://doi.org/10.3390/RS3050878

Mahadiansar, M., Alfiandri, A., & Syuzairi, M. (2023). Analysis of Collaborative Governance in Tourism Based on Coastal Community Empowerment in Indonesia. *Proceedings of the International Conference Social - Humanities in Maritime and Border Area*, 5–10. https://doi.org/10.2991/978-2-38476-150-0_2

Marine-Roig, E., & Anton Clavé, S. (2015). Tourism analytics with massive user-generated content: A case study of Barcelona. *Journal of Destination Marketing & Management*, *4*(3), 162–172. https://doi.org/10.1016/J.JDMM.2015.06.004

Maryono, B., Suhana, S., & Marlianingrum, P. R. (2025). Strategi Pengembangan Minawisata: Studi Kasus Situ Cipule, Karawang Jawa Barat. *Jurnal Kebijakan Sosial Ekonomi Kelautan Dan Perikanan*, *15*(1), 27–37. https://doi.org/10.15578/JKSEKP.V15I1.15152

Mulyadi, A., Efriyeld, Hamidy, R., & Nofrizal. (2021). Development of Mangrove Ecotourism in Bandar Bakau Dumai Based on Disaster Mitigation. *International Journal of Sustainable Development and Planning*, *16*(7), 1359–1367. https://doi.org/10.18280/IJSDP.160716

Orams, M. (2002). Marine Tourism: Development, Impacts and Management. In *Marine Tourism*. Routledge. https://doi.org/10.4324/9780203197110

Pomeroy, R. S. (1995). Community-based and co-management institutions for sustainable coastal fisheries management in Southeast Asia. *Ocean & Coastal Management*, *27*(3), 143–162. https://doi.org/10.1016/0964-5691(95)00042-9

Prihadi, D. J., Zhang, G., Lahbar, G. M., & Pasaribu, B. (2024). Integration of Community-Based Tourism (CBT) Index and Biophysical Assessment for Sustainable Ecotourism Mangrove: A Case Study of Karangsong, Indonesia. *Sustainability 2024, Vol. 16, Page 2806*, *16*(7), 2806. https://doi.org/10.3390/SU16072806

Susanto, N., Nurkertamanda, D., Prastawa, H., & R Nugraha, A. (2020). Development of Ecotourism-Based Strategy: A Case Study of Tinjomoyo Tourism Forest. *E3S Web of Conferences*, *202*. https://doi.org/10.1051/E3SCONF/202020203004

Umilia, E., & Asbar. (2016). Formulation of Mangrove Ecosystem Management Model Based on Eco-minawisata in the Coastal Sinjai, South Sulawesi. *Procedia - Social and Behavioral Sciences*, *227*, 704–711. https://doi.org/10.1016/J.SBSPRO.2016.06.136

Wang, X., Zeng, Y., Lai, Q., & Lin, M. S. (2024). Why do start-up tourism small and medium-sized enterprises imitate? A mixed-methods research design. *Journal of Hospitality and Tourism Management*, *61*, 11–22. https://doi.org/10.1016/j.jhtm.2024.08.012

Wirajing, M. A. K., & Nanfosso, R. T. (2025). Households' resilience capacity in the Cameroon fishing communities: case of the internally displaced and Immigrants fishermen. *World Development Perspectives*, *38*, 100678. https://doi.org/10.1016/J.WDP.2025.100678