

Sustainable tourism in a small Island of Indonesia: blue economy and local wisdom integration

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Abstract: This research aims to evaluate the effectiveness of management of the sea tribe residential areas on Bertam Island, Indonesia, with a focus on sustainable tourism, local wisdom, and blue economy. The authors used a qualitative approach, conducting in-depth interviews with multi-stakeholders and local indigenous communities. The methodology also implied using the Multipol application. The results indicate that this area has significant potential for developing a sustainable blue economy while preserving its cultural heritage and natural environment. Despite the challenges of modernisation and social change, the indigenous traditions of the sea tribe continue to play an important role in the sustainability of the area as a tourism destination. The implications of this research include the need for strategic measures from the government and other stakeholders to strengthen sustainable management, protect local wisdom, and ensure harmonious integration between local communities and their environment.

Key Words: *Bertam Island, sea tribe, sustainable tourism, local wisdom, blue economy, social change.*

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Introduction

Coastal areas play an important role in the national economy, especially through various activities such as marine fisheries, aquaculture, trade, tourism, transportation, and oil mining (Adepoju et al., 2023; To & Lee, 2018). In the context of tourism, coastal areas offer stunning natural beauty, including marine resources such as mangroves, coral reefs, seagrass meadows, and exotic beaches, attracting tourists from around the world (Quyet et al., 2023). Coastal tourism increases local economic productivity, generates foreign exchange, creates jobs, and increases local community incomes.

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However, the development of settlements in coastal areas to support the tourism sector has brought various impacts on local conditions. These impacts include an increase in the number of people entering the tourism industry, the development of economic and social infrastructure, and the growth of the hotel and service industries (Akamavi et al., 2023). While coastal tourism can provide significant economic benefits, it can also cause negative environmental impacts, including the degradation of mangrove ecosystems and coral reefs, water pollution, and coastal erosion (Rahmadyani et al., 2023). Therefore, sustainable tourism management is essential to maintain a balance between economic growth and environmental preservation in coastal areas (Nitivattananon & Srinonil, 2019).

Bertam Island is inhabited by nomadic canoe tribes who live on boats. The Sea Tribe is a group of Old Malays widely spread along the East Coast of Sumatra Island, including the Riau and Lingga Islands, as well as areas on the West Coast of the Malay Peninsula, including the territory of the Srivijaya Kingdom in the past (Tadda et al., 2023). These Sea Tribe people live in groups. One group usually consists of 5-6 canoes from several families. This island is in Kasu Village, Rear Padang District, which is 7 miles from Tanjung Uncang Batam Port or 10 miles from Batam Sekupang Port. This small island is located in a remote coastal area, so researchers are interested in studying it in greater depth (Figure 1).

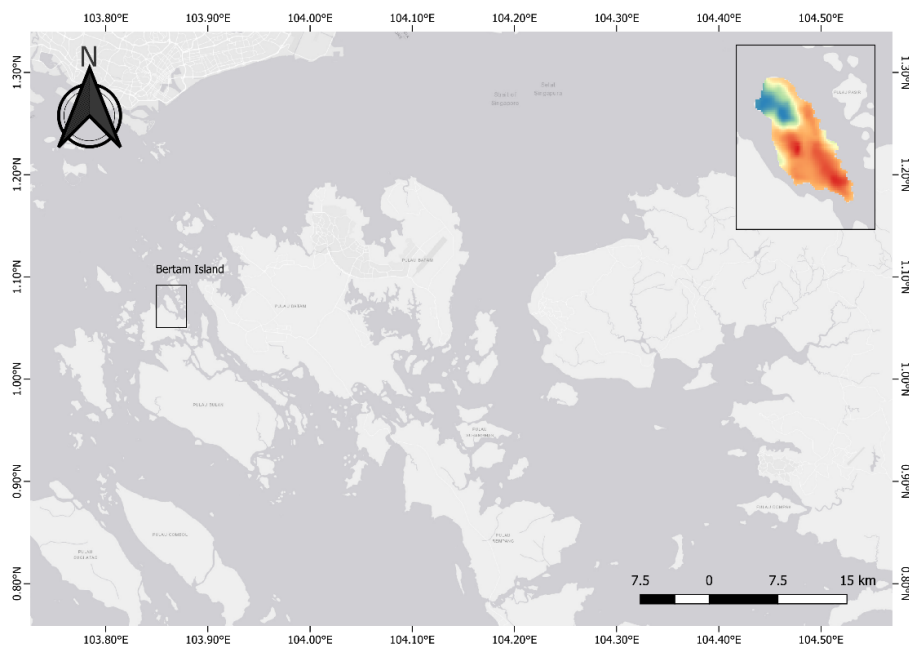


Figure 1. Map of The Study Area on Bertam Island, Indonesia

Source: made by the authors, June 2024.

The entire life activities of the Sea Tribe are entirely on boats on the sea (Aswani, 2002; Mardikian & Galani, 2023). Government resettlement programs implemented since the 1980's and continued in subsequent years encouraged Sea Tribe communities to transition from living on boats to more permanent settlements. This change was not easy for the Sea Tribe, who were very dependent on the sea, so they chose to build a house on the water. The life of the Sea Tribe is still far behind that of Batam City, an advanced metropolis, full

of charm (Berry, 2015). Bertam Island has an area of 158,874 hectares with a population of 177 people.

The implementation of this settlement empowerment initiative has led to significant changes in the Sea Tribe community (Fischer et al., 2022). Those previously accustomed to living freely at sea now must adapt to life on land and obey the rules like other citizens. This transition also affects their livelihoods: the Sea Tribe, who usually make a living from marine products, must now look for alternative jobs on land. Modernisation and government intervention have led to the local customs and wisdom of the Sea Tribe to fade, as a more modern lifestyle replaces traditional values. Social and economic changes pose a major challenge for the Sea Tribe, who must balance adapting to modern lifestyles with maintaining their cultural identity (Hariram et al., 2023; Kaur & Singh, 2023). The Sea Tribe struggles to maintain its customs and traditions, which are increasingly endangered by outside influences. Their originally simple, unpretentious lives began to change as they faced pressure to conform to the norms of wider society.

The concept of studying the development of coastal areas has been put forward by various researchers, each with their own perspective. On the one hand, Rizal et al. (2022) argue that coastal management research is based on local wisdom. In contrast, Andersen et al. (2018) focus only on the development of coastal areas through tourism integration. Meanwhile, Ebarvia (2016) also researched the potential for sustainable blue economy-based areas. However, the researchers mentioned did not comprehensively examine the three aspects, namely local wisdom, tourism, and blue economy. Currently, there is no tool to integrate and form a new framework. So, we propose tools to synchronise the three aspects, especially in coastal management.

Therefore, this research aims to explore the life of the Sea Tribe community and their development in the aspects of tourism, local wisdom, and the blue economy. This research will investigate how the Sea Tribe adapts to social and economic changes and how government policies affect their lives. In addition, this research will highlight the tourism potential derived from the local wisdom of the Sea Tribe and how the blue economy can be applied to improve their welfare. This effort will also examine how traditional values and customs that remain can be preserved amid modernisation. As such, this research will provide in-depth insights into effective ways to integrate Sea Tribes into the modern economy without losing their unique cultural identity, and will offer relevant policy recommendations for governments and other stakeholders.

Methodology

Data collection was conducted through semi-structured interviews in May 2024. A total of 15 respondents were purposively selected to represent key stakeholders involved in the management and development of Bertam Island. The respondents consisted of the Head of Kasu Village (1), traditional leaders of the Sea Tribe community (2), local tourism actors (3), fishermen (4), women community representatives (2), youth representatives (1), and local government officials responsible for coastal and tourism development (2). The interviews focused on four main themes: (1) local wisdom and cultural preservation of the Sea Tribe community, (2) tourism development opportunities and challenges, (3) implementation of blue economy principles in coastal resource management, and (4) stakeholder collaboration and policy support for sustainable development. Each interview lasted approximately 45–90 minutes and was conducted in Indonesian. The collected data were analysed using the Multipol application, a tool that enables policy analysis based on systematic interview results (Rustini et al., 2023). This approach involves calculating the

variation in weighting between the community's and the local government's perceptions. The Multipol application is used to map and analyse various aspects of the empowerment and development of Sea Tribe Settlement Areas, grounded in local wisdom, tourism, and the blue economy.

Table 1 lists criteria weighted to evaluate vital aspects of coastal management in sea tribe settlement areas on Bertam Island, Indonesia. These criteria have been carefully selected to ensure that all essential elements for the region's sustainability and development are covered. Weighting is based on public perception and the government at the study location.

Table 1. List of Weighted Criteria using the Multipol

Criteria List	Weight	Description of Criteria
Environmental preservation (EP)	6	Protection and preservation of the marine environment
Cultural reinforcement (C)	5	Increasing public awareness and behaviour
Economy (E)	5	Poverty reduction through economic management
Information, Science, and Technology (IST)	5	Utilisation of information systems, science, and technology
Infrastructure (I)	5	Fulfilment of facilities and infrastructure needs
Stakeholder (S)	4	Strengthening solidity and achieving synergy between stakeholders
Implementation effectiveness (IE)	3	Improvement of regulatory effectiveness

Source: produced by the authors, May 2024.

Environmental Conservation (weight 6) highlights the protection and preservation of the marine environment rich in biodiversity (Nguyen et al., 2023). It includes efforts to maintain mangrove ecosystems, coral reefs, and seagrass beds, which are important habitats for marine life in the vicinity. Cultural Strengthening (weight 5) refers to efforts to increase public awareness and behaviour toward the local wisdom and traditions of the Sea Tribe (Mohd Salim et al., 2023). It includes the promotion and preservation of the language, dance, and indigenous practices unique to this community. The Economic Aspect (weight 5) concerns regional economic management to reduce poverty and improve community welfare through the development of sustainable tourism, fisheries, and other economic activities (Díaz-Padilla et al., 2023). The Utilisation of Information Systems and Technology (weight 5) emphasises the importance of integrating information technology to improve efficiency in area management, including tourism information management and real-time environmental monitoring (Aboflan et al., 2024).

Infrastructure (weight 5) includes meeting basic needs for facilities and infrastructure that support daily life and economic activities, such as reliable roads, electricity, and clean water (Rathnayaka et al., 2023). Strengthening Solidity and Synergy Between Stakeholders (weight 4) highlights the importance of strong collaboration between various stakeholders, including the government, local communities, and the private sector, to achieve common goals in regional management (Zawilińska & Mika, 2013). The effectiveness of implementing regulations (weight 3) is a key factor in ensuring that policies are properly implemented and have a real, positive impact on the community and the surrounding environment (Kazapoe et al., 2023). This table is not only a tool for assessing current performance but also a guide for formulating better strategies and policies in the future.

(Ariyani & Fauzi, 2023). By considering all these criteria holistically, it is hoped that the Sea Tribe settlement area on Bertam Island can continue to develop sustainably while maintaining valuable cultural heritage and natural environment for future generations.

Table 2 illustrates the various actions evaluated by weight using the Multipol application to support tourism and infrastructure development in the Sea Tribe Settlement Area, Bertam Island (Panagiotopoulou & Stratigea, 2014). Land-sea integration (weight 6) aims to integrate land- and sea-based tourism activities to maximise the sustainable use of natural resources. Sustainable tourism (weight 5) emphasises tourism development that prioritises environmental sustainability and local culture. The 5A program (weight 5) aims to improve tourism facilities. Sustainable tourism incentives (weight 5) are planned to encourage local community participation in sustainable tourism management. Local wisdom (weight 5) focuses on identifying and integrating local wisdom to promote the cultural heritage of the Sea Tribe community on Bertam Island. This table serves as a strategic guide for designing holistic policies to support sustainable tourism growth that consider environmental and local cultural aspects.

Table 2. List of Weighted Actions using The Multipol

Action List	Weight	Description of Criteria
Land-sea integration	6	Integration of tourism on land and sea
Sustainable tourism	5	Sustainable tourism
5A Programs	5	Implementation of the 5A program: Amenities, Accessibility, Activities, Attractions, and Accommodation
Sustainable tourism incentives	5	The implementation of incentives, accompanied by a study to strengthen sustainable tourism
Local wisdom	5	Identification and introduction of local wisdom in tourism management

Source: produced by the authors, May 2024.

Table 3. List of Weighted Policies using The Multipol

Policy List	Weight	Description of Criteria
Information and communication technology	6	Information and communication technology-based management in coastal tourism management
Regional development	6	Development of coastal tourism management areas
Blue Economy	6	Coastal tourism management through a blue economy approach
Multi-stakeholder	6	Management approach with a multi-stakeholder framework

Source: produced by the authors, May 2024.

Table 3 lists policies evaluated by weight using the Multipol application to support sustainable coastal tourism management in the Sea Tribe Settlement Area, Bertam Island. The Information and Communication Technology Policy (weight 6) focuses on the use of technology in coastal tourism management (Nanda et al., 2023). With the application of sophisticated information technology, the management of tourism data and information can be carried out effectively and efficiently, making it easier to supervise and improve tourism services. Regional Development (weight 6) aims to design an organised and

sustainable management system for coastal tourism areas (Navascués et al., 2023). It includes developing adequate infrastructure, regulating tourism zones, and the public facilities supporting tourism activities. As the area continues to develop, it is expected to attract more tourists and offer a better visitor experience.

The Blue Economy Approach (weight 6) refers to the management of coastal tourism by sustainably utilising marine resources (Pournara et al., 2023). The concept of the blue economy emphasises the importance of maintaining the balance of the marine ecosystem while maximising the economic potential of marine resources. With this approach, coastal tourism can provide significant economic benefits to local communities without damaging the environment. The Multi-stakeholder Approach (weight 6) is designed to enhance collaboration and stakeholder involvement in the management of the area (Sigalla et al., 2021). The involvement of various parties, including the government, local communities, tourism industry players, and non-governmental organisations, is essential to creating comprehensive policies acceptable to all.

This approach also ensures that the interests and needs of all parties can be accommodated in the planning and implementation of tourism policies. This table provides strategic guidance for designing policies that support sustainability and synergy in coastal tourism development on Bertam Island. Efficient and sustainable coastal tourism management can be established by weighing and describing each policy and providing optimal economic and environmental benefits for the Sea Tribe community on Bertam Island. These policies are also expected to increase Bertam Island's attractiveness as a unique and sustainable tourist destination at the global level.

Table 4. List of Weighted Scenarios using The Multipol

Scenario List	Weight	Description of Criteria
Vertical Approach	6	The coordination mechanism of government agencies in the central regions and the work units under them is hierarchical in the implementation of policies and programs.
Horizontal Approach	6	Coordination mechanisms that involve all relevant stakeholders, such as non-governmental institutions in the central and regional governments, cooperation with the government, partner institution organisations, the private sector, and all components of society

Source: produced by the authors, May 2024.

Table 4 presents scenarios assessed with weights to design vertically and horizontally coordinated mechanisms for implementing policies and programs in the Sea Tribe's settlement areas. The vertical approach involves coordination between central and local government agencies, while the horizontal approach involves all relevant stakeholders (Breuer et al., 2023).

This study relies on the Multipol application to organise the data obtained from interviews, facilitating an in-depth analysis of the complexity of challenges and opportunities in the management of Marine Tribal Settlement Areas. The results of this analysis are expected to provide policymakers and relevant practitioners with a comprehensive view to promote sustainable development and preserve local wisdom in the region.

Results

An integrated evaluation matrix between points is shown in Tables 5-8. Table 5 presents the evaluation of certain actions against the criteria listed. The assessment is carried out on a scale of 0 to 20, which indicates how well these actions meet the set criteria. Table 6 is a matrix that evaluates policies against specific criteria. Table 7 presents the evaluation of scenarios based on the set criteria.

Table 5. Evaluation of Actions Related to Criteria.

	EP	C	E	IST	I	S	IE
Land-sea integration	20	5	15	4	18	5	10
Sustainable tourism	20	20	5	15	5	5	5
5A programs	5	10	10	20	5	18	4
Sustainable tourism incentive	20	5	8	15	12	8	20
Local wisdom	8	20	18	4	5	10	10

Source: made by the authors with Multipol, June 2024.

Table 6. Evaluation of Policies Related to Criteria.

	sum	EP	C	E	IST	I	S	IE
Information and communication technology	100	15	15	15	15	15	15	10
Regional development	100	10	0	20	15	20	5	30
Blue economy	100	5	30	10	20	5	20	10
Multi-stakeholder	100	30	15	10	10	15	15	5

Source: made by the authors with Multipol, June 2024.

Table 7. Evaluation of Scenarios Related to Criteria.

	sum	EP	C	E	IST	I	S	IE
Vertical approach	100	15	11	12	15	17	10	20
Horizontal approach	100	18	40	8	18	0	8	8

Source: made by the authors with Multipol, June 2024.

Table 8. Evaluation of Policies Concerning Scenarios.

	Vertical approach	Horizontal approach	Moy	Ec. Ty	No.
Information and communication technology	14	14.6	14.3	0.3	2
Regional development	16	8.9	12.5	3.6	1
Blue economy	13.1	19.7	16.4	3.3	4
Multi-stakeholder	13.9	15.6	14.8	0.9	3

Source: made by the authors with Multipol, June 2024.

Table 8 shows the assessment of certain policies in the context of the set scenarios. This evaluation matrix calculates policy scores based on the criteria weights set for those scenarios. It helps in classifying policies based on their relevance to existing scenarios.

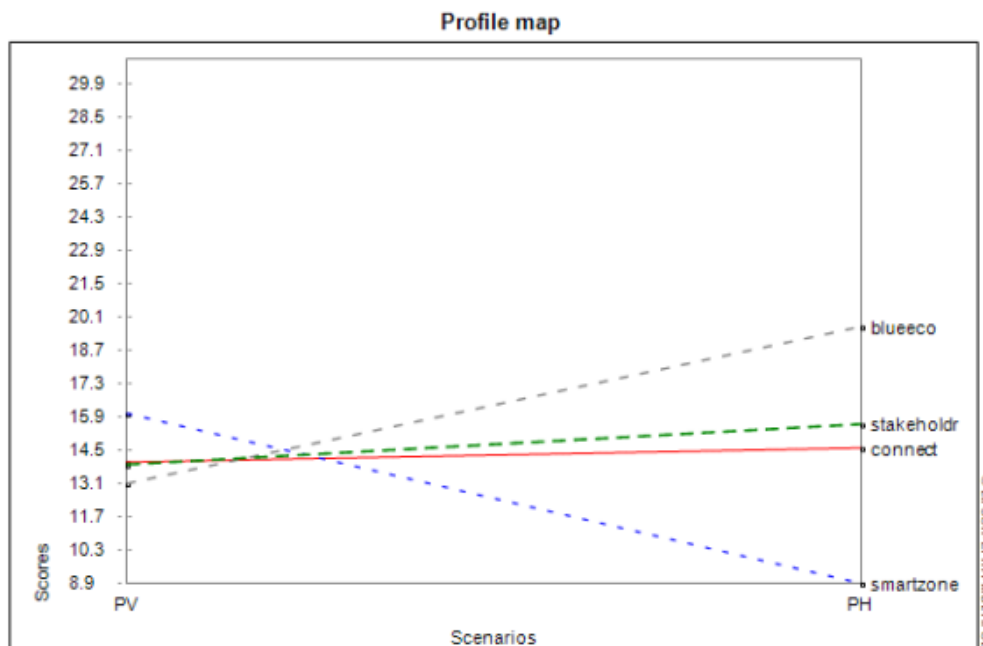


Figure 2. Profile Map by The Multipol.

Source: made by the authors with Multipol, June 2024.

Figure 2 shows the policy score profile against the scenarios. It aligns the policy evaluation matrix with the scenario, aiding the visualisation and analysis of patterns or trends in the collected data. This visualisation was created using the Multipol application, which enables an in-depth, structured analysis of the research data (Made et al., 2023). This analysis helps in understanding and making decisions based on data collected on the management of the Sea Tribe Settlement Area on Bertam Island, Indonesia.

The map refers to the blue economy as the aspect with the highest horizontal approach (PH) scenario value, at 19.7. Meanwhile, Smartzone is the key to the value of the vertical approach (PV) scenario, which is 16.

Discussions

The residential area on Bertam Island, which is located on the coast, has great potential to be developed as a tourist destination based on the Blue Economy (Pranita et al., 2023). This concept is very relevant in today's global context, where environmental sustainability is the main focus of tourism development. Figure 3 shows that the Blue Economy is in quadrant 1, underscoring the importance of sustainably using marine resources to support economic growth in coastal areas such as Bertam Island.

This classification sensitivity map depicts the policy score on the x-axis and the standard deviation on the y-axis. It provides additional information on how consistent or varied the policy score is concerning existing scenarios (Rohat et al., 2018).

Sustainable tourism has been a major spotlight in efforts to promote environmentally friendly and inclusive development (Khizar et al., 2023). On Bertam Island, efforts to develop Blue Economy-based tourism can not only increase local income but also respect and maintain the local wisdom of the Sea Tribe, which is an integral part of the island's cultural heritage (Thornton & Hope, 2023). Figure 4 is a scheme of coastal management's linkage to the three aspects, namely local wisdom, tourism, and blue economy, especially which can be implemented on Bertam Island, Indonesia.

The rich history of Bertam Island, as conveyed by Miss Winnie Bertam Residents, highlights the important role of her grandfather, Jeremia Mahadan, in shaping and preserving the traditions of the Sea Tribe. Her initiative in making and presenting a canoe to Mrs Sri Sudarsono, as a typical symbol of Bertam Island, demonstrates its commitment to preserving its maritime culture.

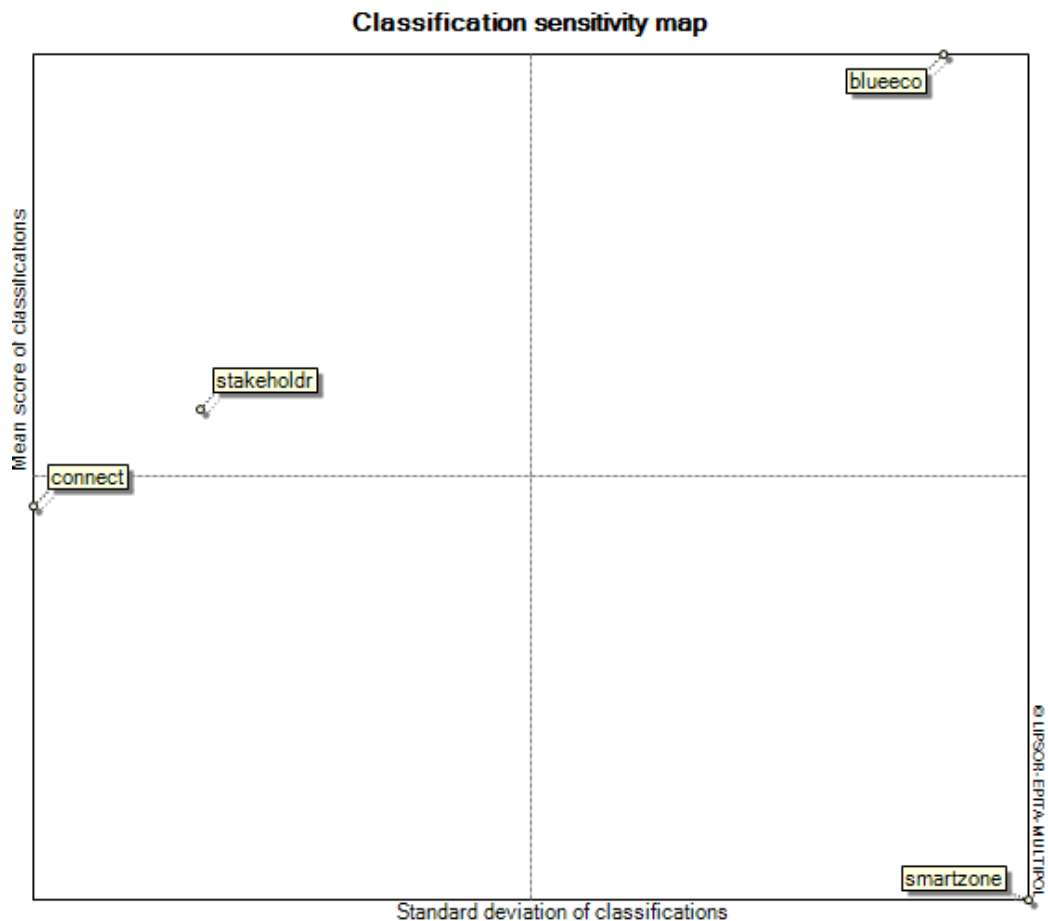
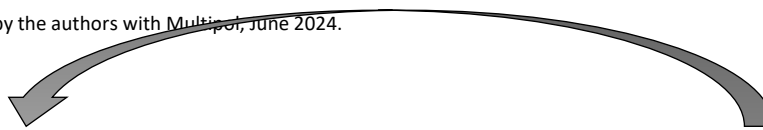


Figure 3. Classification Sensitivity Map by The Multipol.

Source: made by the authors with Multipol, June 2024.



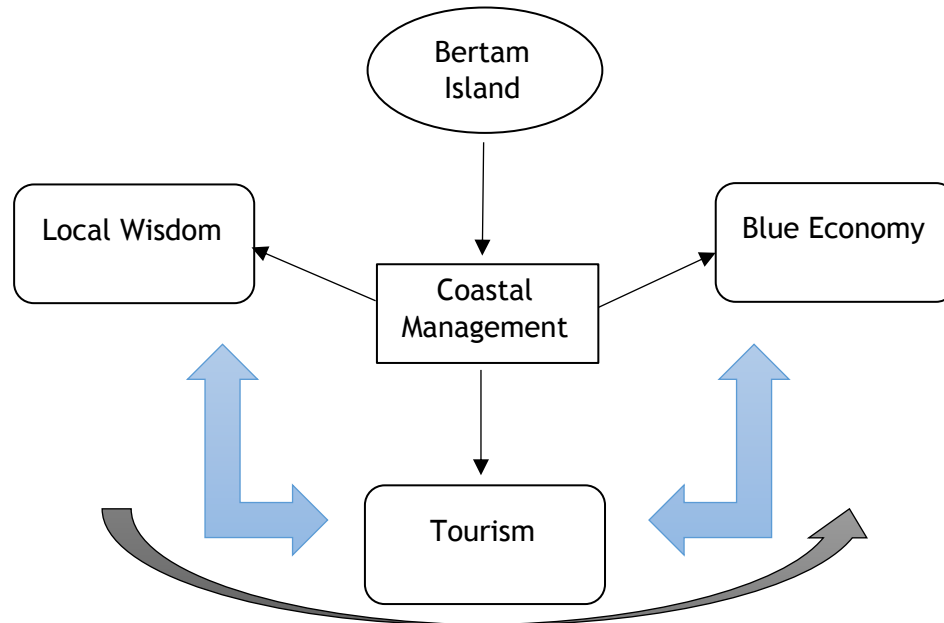


Figure 4. Scheme of Linkage of Aspects of Coastal Management in Bertam Island, Indonesia.

Source: made by the authors, June 2024.

However, the challenge faced, as expressed by the Head of Kasu Village, is the lack of maintenance of cultural symbols, such as destroyed monuments, which threatens the sustainability of the Sea Tribe's customs. In addition, the Chief of the Sea Tribe also identified the decline in marine product resources due to problems caused by damaged ships as a source of activity to increase income. This emphasises the need for a holistic approach to tourism management on Bertam Island, one that considers economic factors but also prioritises environmental conservation and local wisdom (Basu & Mishra, 2023).

This research makes significant contributions in two main areas: first, expanding the understanding of how the concept of the Blue Economy can be applied to sustainable tourism management in coastal areas; second, identifying real challenges and solutions to maintain and develop the cultural heritage of the Sea Tribe on Bertam Island. An in-depth analysis of the economic, social, and environmental factors influencing this initiative's success will provide valuable insights for academics, practitioners, and policymakers interested in sustainable and inclusive tourism development worldwide. By combining a strong scientific approach with a narrative rich in local experience and history, this research is expected to be a valuable contribution to the international literature on sustainable tourism management and cultural preservation.

Conclusions

The conclusion of this study indicates that the Sea Tribe settlement area on Bertam Island has great potential to be developed as a Blue Economy-based tourism destination that can compete globally. However, to realise this potential, intensive educational

measures for local indigenous peoples need to be implemented. They would not only ensure people's participation in tourism management but also maintain and preserve local wisdom, an asset to this destination's attractions.

The government has a crucial role in facilitating synergy between various related parties, including local communities, tourism industry players, and non-governmental organisations. By strengthening integration between land and sea management and raising awareness of the importance of environmental conservation, Bertam Island can serve as a successful example of implementing the blue tourism concept.

This research suggests that tourism management on Bertam Island not only considers economic aspects but also prioritises environmental sustainability and local cultural preservation. Good integration between local wisdom and blue economy practices can be a strong foundation for creating a unique and sustainable tourism experience. Thus, this article is expected to make a significant contribution to the international literature on sustainable tourism management and cultural preservation in coastal areas.

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