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Strategy for ecotourism development Bontang Mangrove Park of East Kalimantan Province, Indonesia

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Abstract

Bontang Mangrove Park (BMP) is part of the Kutai National Park area that is used for tourism activities. The BMP develop in 2018, while tourism development has not been based on scientific data, so a comprehensive and sustainable ecotourism development strategy is needed. This study aims to analyze formulate a sustainable ecotourism development strategy for Bontang Mangrove Park. The study employs a descriptive method with a case study approach to examine the conditions and management of ecotourism at Bontang Mangrove Park. Data the respondents consists of 3 local communities (choosen using snowball sampling) and relevant institutions (9 key informan). Data was collected through observation, interviews, and literature review. Data analysis used the SWOT-based development strategy and Analytical Hierarchy Process (AHP) methods. The research results indicate that the development strategy based on SWOT analysis places Bontang Mangrove Park in an aggressive approach (SO), leveraging strengths and opportunities through educational promotion, conservation tourism development, and integrated tourism packages. The AHP results indicate priority strategies in social media promotion, conservation participation, provision of educational and inclusive facilities, and photography tourism, to support sustainable and participatory ecotourism management.

Keywords: AHP; Ecotourism; Kutai National Park; Mangroves; SWOT

1. Introduction

Mangrove are one of the important ecosystem forests the located in transitional areas between land and sea and function as natural protection from abrasion, reduce sea waves, and absorb carbon emissions. In addition, mangrove forests are also home to various types of aquatic biota (Malik et al., 2019). However, this ecosystem is increasingly threatened by land conversion, pollution, and overexploitation, so wise and sustainable management efforts are needed (Mulyandi and Fitriani, 2010).

Mangrove-based ecotourism is one type of sustainable utilization that is currently developing. Ecotourism is an approach to nature tourism that is not only oriented to recreation, but also to environmental conservation and social and economic empowerment of local communities (Scace, 1993). Great opportunities for mangrove areas to become ecotourism destinations arise because of the shift in tourist trends from the concept of old toursm to new toursm (Rutana, 2011). Due to the high level of ecological vulnerability in this area, ecotourism based on mangrove ecosystems must be developed with caution. As a basis for determining tourism activities that can be carried out without causing environmental damage, it should be sustained in its use so as not to cause environmental degradation and social conflict (Tuwo, 2011).

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Bontang City located in East Kalimantan Province is one of the coastal areas with a significant potential for mangrove forests, which are spread from Gusung River to Manuk-manukan and the surrounding islands. One of the areas developed as an ecosystem-based tourist destination is Bontang Mangrove Park (BMP), which is located within the Kutai National Park area. This park began to be developed in 2018 with 29,258 visitors and over the next five years, the number of visitors increased by 52.14%, reaching 44,652 in 2023 (Kutai National Park, 2024). This shows that BMP has great appeal and potential as an ecotourism destination.

However, this increase in the number of visitors can cause problems, both in terms of ecological, physical area, and management. Activities such as tracking (broadwalk), viewing the scenery at the pier, and camping can have a negative impact if not regulated by the principle of carrying capacity of the area. From the physical side, supporting tourism infrastructure such as tracking (broadwalk) and docks are still not equipped with safety fences, which endanger visitors, especially children and the elderly. This reduces tourist comfort and safety, which should be an important component in traveling. Environmental damage can lead to a decrease in the quality of tourism, which in turn reduces the number of visitors to come. In terms of management, there is no systematic and scientific ecotourism development strategy for Bontang Mangrove Park.

Therefore, the management of Bontang Mangrove Park must be directed toward sustainable development by focusing on minimizing the negative impacts of increasing tourist numbers. This approach requires a systematic and scientifically based ecotourism management strategy that aligns with conservation principles. A key component of this strategy is the strengthening of promotional efforts, particularly those targeting educational segments such as schools, universities, and community groups. These segments play a strategic role in supporting the development of educational-based ecotourism that not only raises environmental awareness and literacy but also reinforces BMP's role as a site for conservation education. More intensive and targeted promotion is expected to expand visitor outreach while strengthening BMP's position as a leading environmental education tourism destination in East Kalimantan. Thus, the development of Bontang Mangrove Park should not merely aim to increase visitor numbers but also prioritize sustainability and conservation as the core foundations of responsible ecotourism.

2. Materials and methods

The research location is at Bontang Mangrove Park, which is located in North Bontang District, Bontang City, East Kalimantan Province. The research was conducted from August to November 2024. The method used in this research is descriptive with a case study approach. According to Nawawi (2007) Case study is research that focuses intensively on a particular research object by studying it as a case.

Respondents in this study were taken from among the people who live in the Bontang Baru Village, especially those who directly felt the impact of the existence of the BMP. Determination of respondents by selecting the location closest to ecotourism so that the community is expected to feel the most social, economic and environmental impacts of the existence of ecotourism. Furthermore, to determine the number of respondents, the snowball sampling technique is used, namely by starting from a small number of respondents who then recommend other respondents so that the number of respondents increases gradually (Sugiono, 2018). In this study, the number of respondents obtained was 30 people through the snowball sampling process.

Collecting data from related agency respondents to obtain researcher information from key informants. Key informants are people who are considered to have the capacity/ability of information about this research. 3 people of Kutai National Park Center, 2 people of Bontang Baru Village, 2 people of traders (in the Bontang Mangrove Park area), 2 people of Local Community and Awarness group.

SWOT analysis is an instrument used to assess the strengths, weaknesses, opportunities, and threats of a resource. The assessment results of the SWOT analysis can be used as the basis for analyzing management strategies (Chrismastianto, 2017). SWOT analysis is a well-organized identification to design strategies, including strengths and weaknesses of the internal environment, as well as opportunities and threats of the external environment. This analysis aims to maximize strengths and opportunities while minimizing weaknesses and threats by comparing internal and external factors (Rangkuti, 2016). The determination of various factors was obtained based on the results of respondent interviews and adjusted based on facts found in the field. The weighting in SWOT analysis has a scale of 1 to 5 (1= not important; 2= less important; 3= moderately important; 4= important; 5= very important).

Determination of the SWOT matrix must first know the internal strategic factors (IFAS) and external strategic factors (EFAS), by giving each factor weight and level of importance referring to the results of interviews and facts found in the field. The way to determine internal strategic factors is from determining factors that are strengths and weaknesses in

mangrove ecotourism management, giving weight to each factor according to the level of importance, this is also done to determine internal strategic factors (IFAS).

SWOT analysis is done by identifying internal strategic factors (IFAS) and external strategic factors (EFAS). After successfully identifying internal and external factors, proceed with determining the location of the grand strategy quadrant. There are four quadrants of aggressive, diversification, turn around, and defensive (Nurhayati, 2020).

The priority of development strategies is determined based on the relationship between internal and external factors. The weighting score becomes the basis for determining the ranking of strategies in mangrove ecotourism management. The results of SWOT are used to select alternative solutions that are considered the most appropriate using AHP to make effective decisions on the problems analyzed. AHP is a method introduced by Thomas L. Saaty, in 1970. AHP is a decision-making method that helps determine the best choice from several alternatives by 6 considering various criteria systematically, both rationally and intuitively (Saaty and Vargas, 2012).

Expert Choice is the name of an application related to the AHP developed by Thomas L. Saaty to facilitate the systematic decision-making process. It facilitates computation, visualization, and sensitivity analysis, and comes with an algorithm for assessing consistency. Expert Choice provides complete features ranging from data input criteria, alternative choices, to goal setting, thus supporting a more accurate and efficient decision-making process (Firmansyah, 2013).

3. Results and discussion

3.1. Bontang Mangrove Park Development Strategy

Bontang Mangrove Park development strategy using SWOT in formulating alternative strategies. Factors affecting development are identified by compiling an internal and external matrix, the internal matrix is a method for identifying and evaluating internal conditions consisting of strengths and weaknesses, the external matrix is used to identify and evaluate external conditions consisting of opportunities and threats .

3.1.1. Internal factors: Strengths and Weaknesses

Formulation of strategic steps in developing ecotourism Bontang Mangrove Park used SWOT analysis. Evaluation of internal factors is carried out by identifying strength and weakness factors, based on data and information obtained from direct observations and interviews, several factors are known to be strengths and weaknesses. *Internal* factors that describe strengths and weaknesses are summarized into an *internal* factor matrix (IFAS, *Internal Factor Analysis Summary*). Quantitative calculations of internal factor identification can be seen in Table 1.

Table 1 IFAS Matrix (Internal Factor Analysis Summary

Strategy Factors	**Weight**	**Rating**	**Value**
Strengths:			
Diverse Mangrove Species	0.08	3.00	0.25
Interesting Flora and Fauna	0.10	3.60	0.36
Active Promotion On Social Media	0.10	3.77	0.39
Complete Facilites & Infrastructure	0.10	3.63	0.36
Hotel/Lodging Available	0.06	2.33	0.15
Consistent Promotion	0.10	3.57	0.35
Total Strengths	0.55		1.86
Weaknesses:			
Low Community Participation	0.09	3.30	0.30
Limited Tour Guides	0.10	3.47	0.33
Damaged Facilites	0.09	3.27	0.29

Lack Development Program	0.09	3.40	0.32
Weak of Telecommunication Signal	0.08	3.03	0.25
Total Weakness	0.45		1.49
Total Strengths and Weakness	1.00		3.35

Source: Primary data processed, 2024.

Based on Table 1 the results of the IFAS matrix assessment show a total factor score of 1.86 and a score of 1.49 on weaknesses. This shows that the development of Bontang Mangrove Park ecotourism has greater strengths than its weaknesses with a difference of 0.37.

3.1.2. External Factors: Opportunities and Threats

Evaluation of external factors is carried out by identifying opportunity and threat factors. Based on data and information obtained from direct observations and interviews, several factors were identified as strengths and weaknesses. Environmental factors that reflect opportunities and threats are poured into the External strategic factor matrix (EFAS, *External Factor Analysis Summary).* Quantitative calculations of the identification of external factors can be seen in Table 2.

Table 2 EFAS Matrix (External Factor Analysis Summary)

Strategic Factors	**Weight**	**Rating**	**Value**
Opportunities:			
Agency cooperation	0.09	3.37	0.29
Local economic impact	0.08	3.27	0.27
Infrastructure support	0.08	3.30	0.28
High visitor interest	0.09	3.47	0.31
Crab cultivation	0.08	3.03	0.23
Community awareness grows	0.09	3.43	0.30
Local Government Support	0.08	3.33	0.28
Total Opportunities	0.59		1.96
Threats:			
Coastal abrasion	0.08	3.20	0.26
Lack of awareness of tourist	0.08	3.30	0.28
Tourist object competition	0.08	3.27	0.27
Mangrove logging	0.08	3.10	0.24
Potential damage to the area	0.08	3.20	0.26
Total Threats	0.41		1.32
Total Opportunities and Threats	1.00		3.28

Table 2 shows the identification of external factors with an opportunity score of 1.96 and a score on threats of 1.32 so that this shows that the development of Bontang Mangrove Park ecotourism has a greater opportunity than the threat with a difference of 0.64.

3.1.3. SWOT MATRIX

Based on the results of the IFAS and EFAS analysis, a score has been obtained to be used as a diagram analysis image. In the SWOT analysis diagram, the X axis is the difference between strengths and weaknesses, while the Y axis is the difference between threat opportunities. Can be seen in table 4.

Table 3 Scoring results of internal and external factors

No	Criteria	Score	Coordinates
	Internal Factor		
1	Strength	1.86	X = 0.37
2	Weaknesses	1.49	
	External Factors		
1	Opportunities	1.96	Y = 0.64
2	Threat	1.32	

Based on the difference in scores of strength, weakness, opportunity and threat factors in Table 3 shows the determination of the position of the Bontang Mangrove Park Ecotourism Development in obtaining the coordinates of the X axis = 0.36 and the Y axis = 0.65. The position of the coordinate point results is in quadrant I which shows that it is in a favorable position and has opportunities and strengths so that BMP can take maximum advantage of opportunities. The strategy used in quadrant I is an aggressive strategy. This aggressive strategy is more focused on the SO (*Strenght-Opportunities*) strategy, which can be described in the position diagram below.

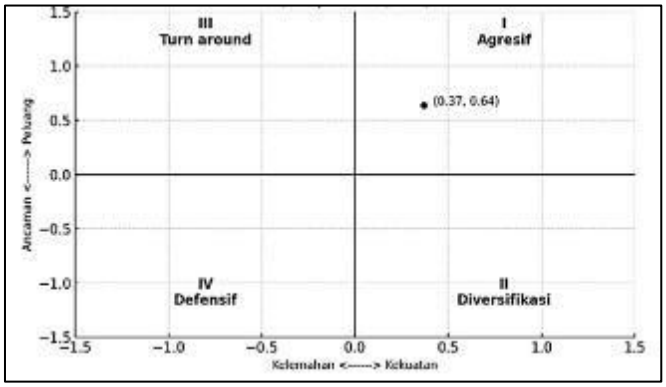

Figure 1 Position of the SWOT Quadrant BMP

Based on the SWOT results that have been illustrated in Figure 1, that the position of BMP is in a good and favorable position, namely quadrant I. This position has several strengths and opportunities. This position has several strengths and opportunities that can be utilized by Bontang Mangrove Park Ecotourism in determining development strategies both in the short and long term.

Table 4 SWOT Matrix Formulation

IFAS / EFAS	*Strenght* Diverse Mangrove Species Interesting Flora and Fauna Active Promotion On Social Media Complete Facilites & Infrastructure Lodging Available Consistent Promotion	(*Weakness*): Low Community Participation Limited Tour Guides Damaged Facilites Weak Development Program Lack of Telecommunication Signal
Opportunity Agency cooperation Local economic impact Infrastructure support High visitor interest	Strategy S-O Increase the intensity of promotion on social media with educational content. Develop flora and fauna-based conservation tourism.	Strategy W-O: Community & Guide Training Facility Revitalization Digital Promotion Signal Improvement

Crab cultivation Community awareness grows Local government support	Optimize infrastructure facilities with agency cooperation. Develop a complete tour package with accommodation.	
Threats Coastal abrasion Lack of awareness of tourists Tourism object competition Mangrove logging Potential damage to the area	Strategy S-T: Environmental campaign via social media Educational trails to prevent abrasion Showcase the uniqueness of BMP	Strategy W-T: SOP for eco-friendly tourism Anti-destruction education Collaboration with local government

The results of the SWOT matrix analysis in Table 4. 15 The strategy used is the strengths and opportunities strategy (SO Strategy). This strategy is made based on the company's way of thinking, namely by using all strengths to take advantage of the maximum opportunities (Rangkuti, 2009). The types of SO strategies include:

- Increase the intensity of promotions on social media with educational content.
- Developing flora and fauna-based conservation tourism.
- Optimizing infrastructure facilities with agency cooperation.
- Developing a complete tour package with accommodation.

3.2. Development Strategy with AHP (Analytical Hierarchy Process)

Development strategies with AHP (*Analytical Hierarchy Process*) are used to determine priority strategies in the development of Bontang Mangrove Park ecotourism. The stages in the analysis using the AHP method with the *Expert Choice* program tool are as follows.

3.2.1. Determination of Criteria and Alternative Strategies

The results of the SWOT analysis are used to determine alternative strategies that are considered the most appropriate using the AHP method to take effective decisions in solving the problems analyzed. The results of SWOT in the development of Bontang Mangrove Park ecotourism need to be carried out policies to maximize internal strengths in optimizing the ecotourism potential of Bontang Mangrove Park which are described as follows:

- Educational promotion on social media:
  - Influencer collaboration for mangrove exploration.
  - Mangrove educational content (infographics, videos).
  - Environmental education via social media with schools/campuses.
- Flora-fauna conservation tours
  - Birdwatching & animal photography with experts.
  - Participatory ecotourism (planting mangroves, cleaning up trash).
  - Information board with QR code for fauna info.
- Optimal infrastructure & cooperation
  - Educational signage & disability facilities.
  - Increased security (CCTV, monitoring post).
  - CSR cooperation for facility development.
- Tour packages + accommodation
  - "One Day Mangrove Adventure" (tracking, education).
  - Family package (fun games, craft workshop).
  - Nature photography packages with local guides.

3.2.2. Analysis of Ecoutrism development strategy criteria for bontang mangrove park

The formulation of a development strategy for Bontang Mangrove Park Ecotourism was carried out using the Analytic Hierarchy Process (AHP) method to identify key priorities. The use of this method enables a measurable assessment of various strategic alternatives based on the assigned weight values. The analysis results are presented in figure 2, which displays the priority order of strategies as a basis for consideration in the formulation of development policies for the Bontang Mangrove Park Ecotourism.

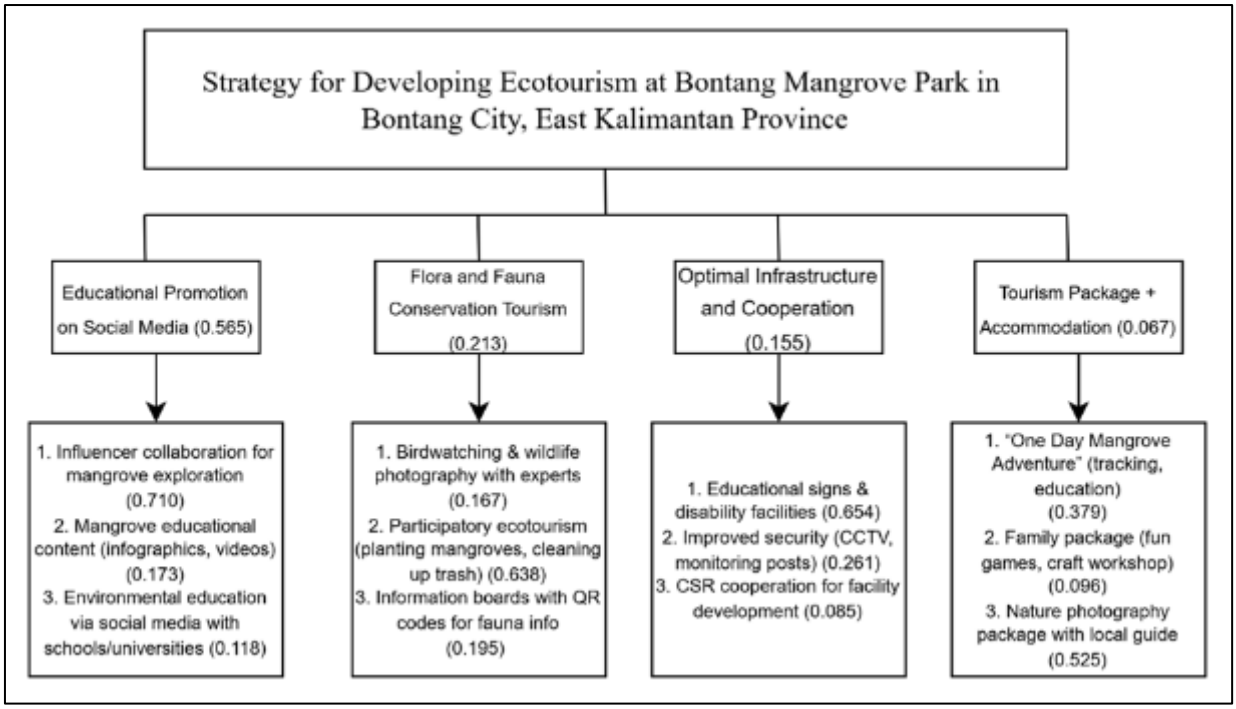

Figure 2 Criteria and Alternative AHP Strategies

Based on the AHP results, the main strategy that is most prioritized in the development of Bontang Mangrove Park Ecotourism in Bontang City, East Kalimantan, is educational promotion through social media with the highest priority weight of 0.565. This indicates that increasing public awareness of the importance of mangrove ecotourism is highly dependent on the effectiveness of digital promotion. The most dominant sub-strategy in this category is collaboration with influencers to explore the potential of mangroves, with a weight value of 0.710, as this approach is deemed capable of reaching a wide audience and building strong appeal for the tourist area. Additionally, the creation of educational content in the form of infographics and videos has a weight of 0.173, while environmental education involving schools and universities has a weight of 0.118.

The second strategy that has an important weight is flora and fauna conservation tourism with a value of 0.213. This strategy emphasizes the importance of ecosystem preservation through direct involvement of communities and tourists. The leading sub-strategy in this category is participatory ecotourism such as mangrove planting and garbage cleaning activities which have a weight of 0.638, followed by the development of interpretation trails with QR code fauna information (0.195) and birdwatching and animal photography activities with experts (0.167).

In third place is the strategy of optimizing infrastructure and cooperation with a weight of 0.155. The main focus of this strategy is the construction of disability-friendly facilities and the provision of educational information through signage, which is reflected in the highest weight of this sub-strategy of 0.654. Increasing security through the installation of CCTV and monitoring posts is also a concern with a weight of 0.261, followed by cooperation with CSR programs with a value of 0.085.

The last strategy, which has the lowest weight but is still relevant, is the development of tourism and accommodation packages, with a value of 0.067. Within this, nature photography packages with local guides took the top spot (0.525), showing that visual experiences are still an important draw for tourists. Educational tour packages such as the *"One Day Mangrove Adventure"* received a weight of 0.379, while family tour packages in the form of fun games and craft workshops received a value of 0.096.

Overall, educational, participatory and inclusive strategies are key to the development of ecotourism. This finding confirms that digital promotion and direct community involvement in environmental conservation must be a top priority in developing policies and programs for the development of Bontang Mangrove Park.

4. Conclusion

The Bontang Mangrove Park ecotourism development strategy based on SWOT analysis shows a position in Quadrant I (aggressive strategy - SO), which is a very profitable position because it has great strengths and broad opportunities, so that the strategy applied is focused on utilizing strengths to seize opportunities through educational promotions, conservation-based tourism development, cooperation of facilities and infrastructure, and the provision of integrated tour packages to strengthen Bontang Mangrove Park as a destination for sustainable ecotourism; while the results of AHP analysis with strategic priorities in the form of educational promotion through social media with *influencers*, strengthening participatory conservation tourism such as mangrove planting, providing educational signs and inclusive facilities, and developing nature photography tour packages with local guides, all of which aim to support sustainable, educational, inclusive and participatory ecotourism management.

Compliance with ethical standards

Disclosure of conflict of interest

The author(s) declares no conflict of interest.

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