

# MECHANICAL OF MANGROVE ECO-EDUTOURISM MODEL DEVELOPMENT: INDONESIAN CASE

Annita Sari<sup>1\*</sup>, Ambo Tuwo<sup>2</sup>, Chair Rani<sup>2</sup>, Amran Saru<sup>2</sup>

<sup>1</sup>PhD Student of Fisheries Science Departement, Faculty Of Marine Science and Fisheries, Hasanuddin University, Makassar, South Sulawesi, Indonesia.

<sup>2</sup>Marine Science and Fisheries Departement, Faculty Of Marine Science and Fisheries, Hasanuddin University, Makasar, South Sulawesi, Indonesia

## ABSTRACT

The high activity around Youtefa Bay has an impact on the rate of sedimentation, turbidity of river and seawater, increased industrial waste and changes in the function of mangrove land into a ring road or settlement, which causes forest function degradation, which results in several mangrove areas being reduced and even damaged, based on This requires an effort to develop mangrove ecotourism by implementing environmental education-based tourism as a way to preserve coastal ecosystems. This study aims to determine the socio-economic and cultural conditions; and formulate the stipulation of strategic directions for developing mangrove ecotourism. The research method uses descriptive-analytic through quantitative and qualitative approaches with SWOT analysis to provide information about the potential and strategies of sustainable mangrove forest management. The results showed that Youtefa Bay Nature Park is a coastal area that has mangrove forests with the mangrove species *Rhizophora apiculata*, *Rhizophora stylosa*, and *Bruguiera sp.* with environmental quality suitable for the growth and adaptation characteristics of mangroves. Based on the SWOT analysis results, it was found that there are five priority strategies for the development of mangrove ecotourism in Youtefa Bay, including a). coordination between the community, relevant agencies and stakeholders in planning, socializing, implementing and monitoring the concept of developing mangrove ecotourism; b). Re-arrangement of space for ecotourism activities, improvement of facilities and infrastructure (improvement of infrastructure, clean water networks, construction of public toilets, waste management and disposal systems), and supporting units needed by tourists; c). It is conducting socialization to the community regarding the management and training of productive and effective mangrove ecotourism marketing management; d). Analyzing the impact of tourism activities on the condition of the aquatic environment and the growth of mangroves with periodic monitoring, and e). explore the potential of natural tourism by fostering tourism in the community and completing the provision of tourism facilities and infrastructure.

Keywords: Ecotourism, Mangrove, SWOT, Youtefa Bay

## INTRODUCTION

Youtefa Bay Nature Park is located in South Jayapura District and Abepura District, Jayapura, Papua Province. Geographically, Youtefa Bay tourist park is located between 02o34'32"-02o38'25" South Latitude and 140o41'11"- 140o44'25" East Longitude. The air temperature in the Youtefa Bay tourist park ranges from 25oC-31oC, with air humidity ranging from 80%-84.5%. Rainfall is influenced by the area's topography, in the western part of the Cyclops Mountains, in the eastern part of the Pacific Ocean. The range of rainfall throughout the year is 1,500-2,500 mm. Youtefa Bay has a wet tropical climate caused by the influence of tidal winds and southeast monsoons and rain that falls throughout the year (BPS, 2019).

Youtefa Bay is one of the tourist attractions in Jayapura City, with beautiful natural scenery. Besides beach tourism, one of the tourism objects is the mangrove forest area in Tobati, Enggros and Nafri villages. The mangrove forest area in the Youtefa Bay Nature Tourism Park is significant for Papuan women because it is a place for social and cultural interaction for women (Mama = a unique nickname for women) when looking for shells (bia = local language), snails, shrimp and wood-burn.

The condition of the mangrove forest in the Youtefa Bay area is currently experiencing a decline. Data from the Forest Area Stabilization Center (BPKH) Region X Papua in (Hamuna et al. 2018) explains that there has been a change in the area of mangrove forest cover in the Youtefa Bay area from 1967 to 2008, where the mangrove area in 1967 was 511.24 Ha and in 2008 only 241.24 Ha. Changes in the area of mangrove areas still occur due to the impact of high development activities in the coastal area of Jayapura City. The use of Youtefa Bay and its surroundings is increasing by the community, fishers, and the government for anthropogenic activities that can affect the carrying capacity of the river ecosystem and the Youtefa Bay ecosystem (Janviter, 2012). The construction of a ring road causes the degradation of mangrove forests, changing the function of mangrove forests into residential land (Tebay, 2004; Kubelabobir, TM; Akerina, 2015; Rafiq & Mukhtar, 2020; Ngabito et al., 2021) and making rowing venues for XX PON activities in 2019-2020. The reduced area of mangrove forests can indirectly lead to a decrease in the function of mangroves and threaten organisms and the community, especially "mama" who use the place to look for food and

others. The high level of human activity that does not pay attention to the sustainability aspects of the ecosystem has destroyed physical conditions in the surrounding environment.

Therefore, to be able to optimize the potential of resources and the environment in the mangrove forest area located in the Youtefa Bay Natural Tourism Park, it is necessary to conduct an assessment to determine the potential, problems and suitability of sustainable development strategies that can develop optimally to serve as ecotourism areas.

## RESEARCH METHODOLOGY

This research was conducted in the Youtefa Bay Tourism Park area from April to August 2019. The observation stations are in Tobati Village; Enggros Village; Nafri 1 village (The mangroves are relatively natural and located in the Youtefa Bay basin, far from settlements); Desa Nafri 2 (The Mangrove Ecosystem is close to settlements, and part of the land is used for residential areas and road widening); Abe Beach and Youtefa Bay Pier. The research location can be seen in Figure 1.

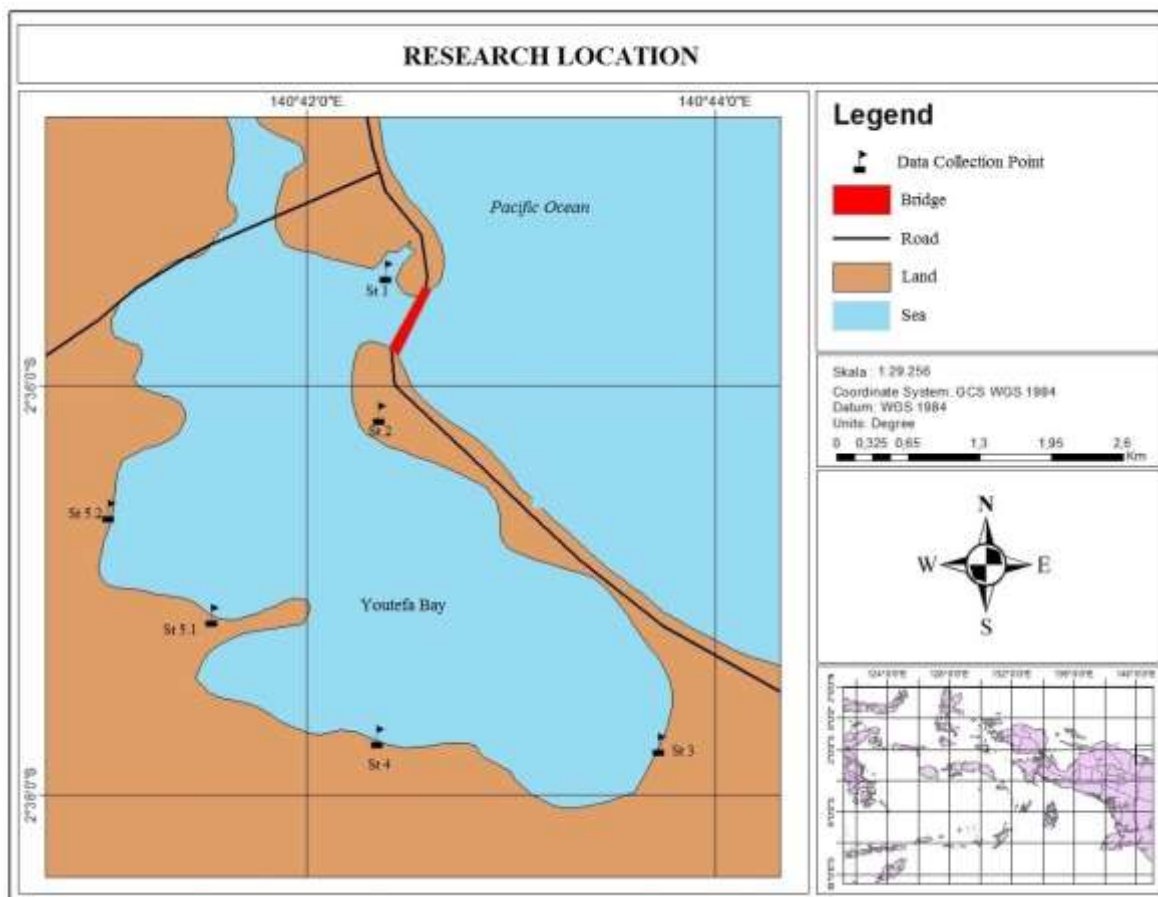


Figure 1. Research Location

The research method applied descriptive analysis through quantitative and qualitative approaches with SWOT analysis to provide information about the potential and strategies of sustainable mangrove forest management. SWOT analysis to find out the strengths as supporting factors and weaknesses as a barrier in order to know the direction of the strategy with interview studies conducted with residents (OAP and Non-OAP) and OAP and Non-OAP visitors of 30 respondents with accidental sampling and Focus Group Discussion (FGD) between the relevant agencies and stakeholders as well as the surrounding community. However, there are vital informants, namely Ondoafi from Enggros, Tobati and Nafri villages. The total number of respondents are 100 respondents.

This study used a SWOT analysis model. The SWOT analysis identifies various factors to formulate a management strategy that prioritizes strengths and opportunities while minimizing weaknesses and threats simultaneously. (Local Government/Management, Tourist and Community). The SWOT analysis steps are as follows (Tuwo, 2011):

1. Identifying strategic management factors.
2. Identifying strengths (S), Weaknesses (W), Opportunities (O), and threats (T) from the observations made.
3. From the identification results, 5 (five) points are selected, which are considered necessary from each SWOT component.

4. Next, determine the strategy to be carried out by making a combined matrix of the four SWOT components. From the results of the combined matrix, we can determine strategies in general groups (SO, WO, ST, and WT), which will then be described in a more specific form.

Determination of the weight of internal and external factors according to the level of importance. The sum of all weights must be 1.0. After that, give a rating for each factor based on the answer/response effect. These factors affect the management of mangrove ecosystems in the Youtefa Bay Tourism Park area (with scores: 4 = very good, 3 = good, 2 = not good, 1 = below average). Then multiply the weight with the rating value of each factor to determine the score, then add up all the scores to get the total score. The next stage is data analysis to develop strategic factors, processed in a SWOT matrix. This matrix can clearly describe how external opportunities and threats may arise and adjustments to their strengths and weaknesses.

## RESULTS AND DISCUSSION

### Demographics

In the Youtefa Bay Natural Park area, three villages existed before this area was designated as a conservation area, namely Tobati Village (South Jayapura District), Enggros Village (Abepura District), and Nafri Village (Abepura District).

#### a) Tobati Village (Tobatji)

Tobati village, with an area of 0.53 km<sup>2</sup>, is divided into 1 RW and 2 RT. The location of Tobati Village is geographically at 140°44' east longitude and 2°36' south latitude. It comprises 214 residents consisting of 122 men and 92 women (BPS, 2019), and the livelihoods of the majority of the population are fishermen. Besides that, some work as Civil Servants, TNI/POLRI, private sector and trade. The original inhabitants of Tobati village are the Hamadi, and Ireuw tribes which are the main tribes and the lower groups include the Haai, Dawir, Asor, Hababuk, Injama, Afaar, Mano, and Itaar tribes.

#### b) Enggros Village (Injros)

Enggros village consists of two syllables, namely Inj, which means village; Ros: two, so Enggros village is the second. The area of Enggros village is 19.05 km<sup>2</sup>, consisting of 1 RW and 2 RT. Geographically, Enggros village is located at 140°45' east longitude and 2°37' south latitude. The total population of Enggros village is 452 people, consisting of 237 men and 215 women (BPS, 2019). The main livelihood of the village community is fishing. In addition, some work as Civil Servants, TNI/POLRI, private sector and trade. The original inhabitants of the village consist of several tribes (keret), including the large tribes (Drunyi, Sanyi and Meraudje) and followed by other tribes, namely Hababuk, Haai, Itaar, Semra, Samai and Hanasbei (results of an interview with the village head Enggros, Mr Meraudje, 2019).

#### c) Nafri Village

The area of Nafri village is 74.08 km<sup>2</sup>. The geographical location of Nafria village is 140°30'-140°29' east longitude and 2°31'-2°37' south latitude. The total population of Nafri village is 1,561 people consisting of 732 women and 829 men (BPS, 2019). The people's livelihood, in general, is gardening. Besides gardening at this time, many also work as Civil Servants, TNI/POLRI, private sector and trade, and sago sticks. 13 tribes live in the Nafri village, namely the Awi, Nero, Finngkreuw, Tjoe, Uyo, Awi, Taniau, Merahabia, Mramra, Khai, Hanuebi, Wmiau and Sibri tribes (Interview with the head of Nafri Village, Mr Hanuebi, 2019).

### Social, Economic and Cultural Conditions

Based on the results of interviews with the community (OAP) and Non-OAP who live in Tobati, Enggros and Nafri villages, the assessment of social, economic and cultural aspects is as follows:

#### 1. Attitude of Public Acceptance:

In general, the public's response to ecotourism is quite good (25%), but the community's understanding of ecotourism is still relatively minimal, so more socialization about ecotourism studies must be carried out. The same thing was conveyed in research (Sitorus et al., 2014). Public knowledge about the function of mangrove forests is still minimal. The people of Tobati and Enggros villages still know little about the regulations and laws governing the management of mangrove ecosystems, so it is necessary for the government always to carry out socialization. In making an ecotourism development program starting from planning, making documents and implementing it, the community must involve the community because the community has an interest in being involved in ecotourism activities because the involvement of the community in the development and management of ecotourism in the Youtefa Bay tourist park can provide additional income for the community (Figure 2).

## 2. Culture

Youtefa Bay has 3 (three) indigenous tribes who live in a village/village, namely tobati, engross and nafri. The Tobati tribe belongs to the Malayan ethnic group. They are included in the tribal group found in Humbolt Bay. This tribal group consists of wood people, nafri, skow and tobati. The Tobati tribe has two groups of people, namely tobati (Tobatji), which means that they have become people here or my village here and enggros (Injros), which consists of two words, namely inj (place) and ros (two) which means the second place to live (village). , because of the development and population, in the end, the two groups of people who were once united are now separated (Janviter, 2012) (Tebay, 2004).

The understanding of traditional values in indigenous peoples in particular (Tobati, Enggros, and Nafri villages) is excellent (25%). However, it has been degraded because the original culture itself has been eroded by outside culture (e.g. K-Pop), community involvement in various activities, for example, rituals, arts and culture as well as competitions to show self-actualization are still very good, so they need to be maintained and preserved so that they can continue to be passed on to the next generation (Figure 2).

## 3. Security

The level of security at the location of the Youtefa Bay Natural Tourism Park is still lacking (15%) because there are still conflicts over resources due to the location of the village, which is in the Youtefa Bay natural park area, so this often happens, besides that there are still burglaries, muggings and there are still drunk people around the tourist area. (Figure 2).

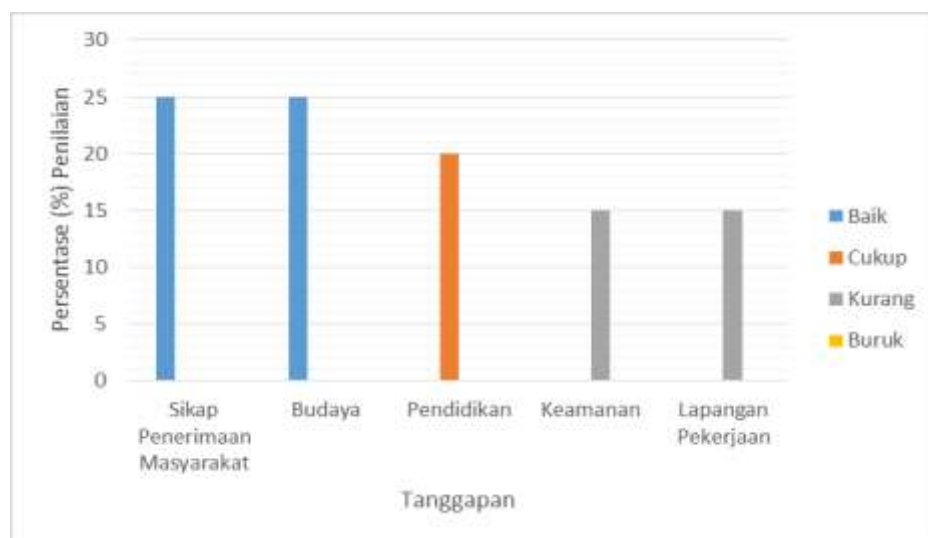


Figure 2. Assessment of Socio-Economic Aspects (Source: data processing, 2020)

Institutional aspects, both government and community, also need to be analyzed to not become an obstacle in the development of ecotourism. The criteria for institutional and regional facilities (support), according to (Tuwo, 2011) are as follows. Assessment of supporting factors for ecotourism development in community institutions (LMA, Ondoafi, tribal chiefs) (30%). The role of institutions in the development of the Youtefa Bay Natural Park area is significant, so it requires commitment and participation from institutional elements in order to be carried out properly, but what is found in the field is that between stakeholders and institutional elements are sometimes not in line so that they do not support each other in program planning. This was also conveyed by (Janviter 2012) (Tebay, 2004) (Arifiani, 2016) (Husamah et al., 2018) that the lack of stakeholder commitment regarding environmental management, differences in objectives between stakeholders, unintegrated work programs, conflicts of interest, lack of LMA support, ondoapi, tribal chiefs are in the independent sector, this sub-element has a significant driving force in assessing the constraints on developing the management model of Youtefa Bay.

Accessibility is excellent, the accessibility of the location of the Youtefa Bay Tourism Park because it is located in the middle of the city so one can use the land route (car or motorbike) with a travel time of approximately 10-15 minutes and there is also a speedboat available if you want to go around Youtefa Bay with a ticket price of IDR 50,000 per person per one way (figure 3).

Clean water facilities and infrastructure and electricity (20%) are still not good, so there is a need for improvement because there are still villages that do not have sanitation, clean water and electricity so that villagers still buy clean water for their daily needs.

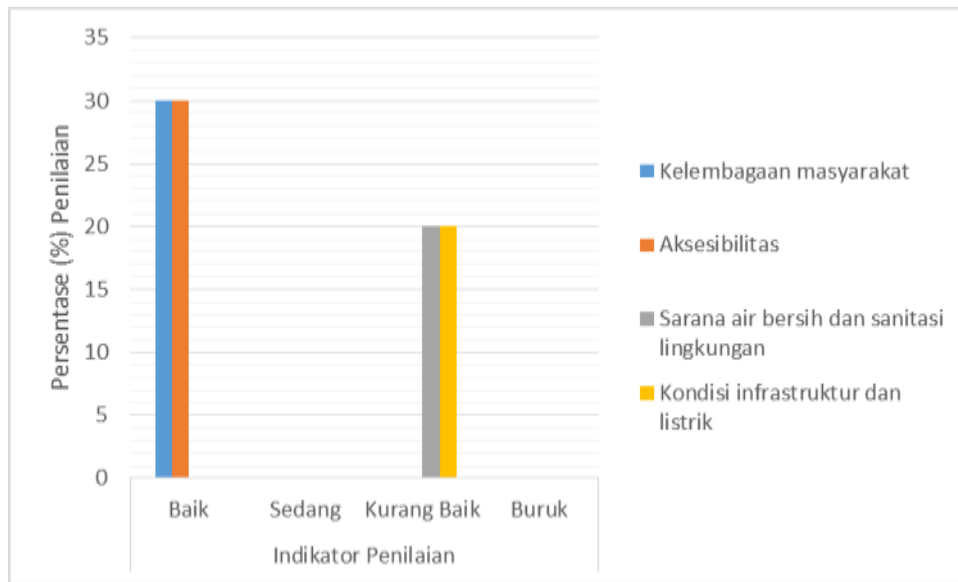


Figure 3. Assessment of the Conditions of Supporting Factors for Ecotourism Development

### SWOT ANALYSIS

The preparation of the SWOT matrix is carried out to describe the opportunities and threats that exist, then adjusted to the strengths and weaknesses possessed to produce a strategic plan in the management of the mangrove area in the Youtefa Bay Nature Park Area to become a sustainable and environmentally friendly ecotourism area can be seen in table 1

Table 1. SWOT Matrix

IFAS  EFAS	<p><b><u>Strength (S)</u></b></p> <ol style="list-style-type: none"> <li>1. The beauty of the natural panorama, the density of mangroves, and the diversity of animals (S1)</li> <li>2. The attraction of the beauty of the underwater world (S2)</li> <li>3. Effective mangrove rehabilitation activities to maintain their function and sustainability (S3)</li> <li>4. High commitment and awareness of the surrounding community in mangrove forest management (S4)</li> <li>5. Community participation with stakeholders in the development of mangrove ecotourism (S5)</li> </ol>	<p><b><u>Weakness (W)</u></b></p> <ol style="list-style-type: none"> <li>1. Amount of waste from the household, industrial and domestic tourist waste (W1)</li> <li>2. Inadequate facilities and infrastructure for ecotourism activities (W2)</li> <li>3. The quality of human resources is still relatively low (skills) (W3)</li> <li>4. Strategic plans and promotions related to the development of mangrove ecotourism in the TWATY Area are still minimal (W4)</li> <li>5. Effect of Abrasion (W5)</li> </ol>
	<p><b><u>Opportunity (O)</u></b></p> <ol style="list-style-type: none"> <li>1. Increasing the number of visitors who come to carry out ecotourism activities (O1)</li> <li>2. Support from the government in the form of allocation of funds for the creation of grand design ecotourism (O2)</li> <li>3. Availability of natural resources to support human resources as workforce (O3)</li> </ol>	<p><b><u>Strategy S-O</u></b></p> <ol style="list-style-type: none"> <li>1. Conduct ecotourism socialization and promotion activities (S1+S2+S3+ S5+ O1+ O4+ O5)</li> <li>2. Invite investors and the private sector to participate in ecotourism development (S1+S2+ O2+ O3+ O4+O5)</li> <li>3. Involvement of the surrounding community with stakeholders in the development of a holistic</li> </ol>

4. The opening of new job alternatives to increase local people's income (O4) 5. Increase PAD (Regional Original Income) income (O5)	ecotourism concept (S3+S4+ S5+ O2+O4)	W4+ O3+ O4+ O5)
<b>Threat (T)</b> 1. Environmental degradation that causes damage to mangrove and coastal ecosystems (T1) 2. Conquest of land tenure causing social conflict in the community (T2) 3. some individuals want to gain unilaterally (T3) 4. The decline in local cultural values into modern culture (T4) 5. Lack of coordination between the community and stakeholders consistently on ecotourism development (T5)	<b>Strategy S-T</b> 1. Construction of quality and environmentally friendly facilities and infrastructure (S1+ S2+ S3+S4+ T1+ T5) 2. Provide technical and managerial skills training to the community to improve welfare (S4+ S5+ T2+T3+T4) 3. Create an ecotourism program on a Monthly/Annual basis to attract tourists (S1+S2+S5+ T4+ T5)	<b>Strategy W-T</b> 1. Protecting the mangrove ecosystem from environmental degradation pressures (W1+ W2+W3+ W5+T1+ T5) 2. Making the mangrove area one of the tourist destinations in Youtefa Bay Nature Park (W3+ W4+ W5+ T4+T5) 3. Establish a supervisory group that is responsible for implementing ecotourism activities (W4+ W5+ T2+ T3+ T4)

Source: Research data processing, 2020

Determining strategic priorities is a policy direction in developing ecotourism by adding up the scores of the related SWOT factors so that a priority ranking can be obtained to measure the success, efficiency and effectiveness of implementing the strategy, which can be seen in Table 2.

Based on the results of the SWOT analysis, there are 12 (twelve) priority management strategies that need to be determined in implementing the development of mangrove ecotourism in the Youtefa Bay Nature Tourism Park which are grouped into 5 (five) main strategies, namely:

- coordination between the community, relevant agencies and stakeholders in planning, socializing, implementing and monitoring the concept of developing mangrove ecotourism;
- Re-arrangement of space for ecotourism activities, improvement of facilities and infrastructure (improvement of infrastructure, clean water networks, construction of public toilets, waste management and disposal systems), as well as supporting units needed by tourists;
- Conducting socialization to the community regarding the management and training of productive and effective mangrove ecotourism marketing management;
- The results of the analysis of the impact of tourism activities on aquatic environmental conditions and mangrove growth with periodic monitoring;
- Exploring the potential of natural tourism by fostering tourism in the community and completing the provision of tourism facilities and infrastructure.

The scoring results show that the development and management of the Youtefa Bay tourist park area are centred on the local community, related agencies and stakeholders (HR), improvement of the tourist park area, etc. The same thing can also be seen in research results (Tebay, 2004). The results of the SWOT analysis get 6 (six) strategies that emphasize: the community must be more empowered in the management of the Youtefa bay area, increase human resources based on potential resources, improve the status of the area, increase protection and security of the area's potential and the use and development of the area.

Table 2. Determination of Management Strategy Priorities based on the SWOT Matrix

No	Strategy	Value	Priority
Strategy S-O			
1	Conducting outreach activities and promotion of information packages	2,30	1
2	ecotourism to the wider community (S1 + S2 + S3 + S5 + O1 + O4 + O5)	2,05	2
3	Invite investors to participate in	1,92	3
Strategy W-O			

1	Increase mangrove rehabilitation activities and provide the infrastructure that supports ecotourism activities (W1+W2+ W5+ O2+ O3)	1,84	4
2	Provide maximum service to visitors	1,24	8
3	Provide training and business capital loans to the community to support ecotourism activities (W3+ W4+ O3+ O4+ O5)	1,18	9
Strategy S-T			
1	Construction of quality and environmentally friendly facilities and infrastructure (S1+ S2+ S3+S4+ T1+ T5)	1,52	6
2	Provide technical and managerial skills training to the community to improve welfare (S4+ S5+ T2+T3+T4)	1,71	5
3	Create an ecotourism program on a Monthly/Annual basis to attract tourists (S1+S2+S5+ T4+ T5)	1,32	7
Strategy W-T			
1	Protecting the mangrove ecosystem from environmental degradation pressures (W1+ W2+W3+ W5+T1+ T5)	0,90	12
2	Making the mangrove area one of the tourist destinations in Youtefa Bay Natural Tourism Park (W3+ W4+ W5+ T4+T5)	1,00	11
3	Forming a supervisory group that is responsible for implementing ecotourism activities (W4+ W5+ T2+ T3+ T4)	1,03	10

Source: Research Data Processing, 2020

## CONCLUSION

1. There are three (3) villages located in the Youtefa Bay Nature Park area, where each village has a different tribe and clan so that the area's management is based on the local wisdom of indigenous peoples.
2. Assessment of social, economic and cultural aspects is still in the Good category, except for security which still needs to be improved
3. The SWOT analysis results of the development of mangrove ecotourism in the Youtefa Bay Natural Park area are grouped into five strategic priorities, a). coordination between the community, relevant agencies and stakeholders in planning, socializing, implementing and monitoring the concept of developing mangrove ecotourism; b). Re-arrangement of space for ecotourism activities, improvement of facilities and infrastructure (improvement of infrastructure, clean water networks, construction of public toilets, waste management and disposal systems), and supporting units needed by tourists; c). Conducting socialization to the community regarding the management and training of productive and effective mangrove ecotourism marketing management; d). Analyzing the impact of tourism activities on the condition of the aquatic environment and the growth of mangroves with periodic monitoring, and e). explore the potential of natural tourism by fostering tourism in the community and completing the provision of tourism facilities and infrastructure.

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