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The Analysis of Mangrove Area as a Marine Eco-Fisherytourism Area in Luwu Regency South Sulawesi, Indonesia

The Analysis of Mangrove Area as a Marine Eco-Fisherytourism Area in Luwu Regency South Sulawesi, Indonesia

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Abstract. Marine eco-fisherytourism is an approach to balancing the existing natural environments and conservation efforts to managing mangrove resources and exploring mangrove areas based on the adapting of silvofishery system support successfully the sustainable forest production. This study investigated the sustainability and profitability of mangrove areas by growing and expanding marine eco-fisherytourism areas. An observational study, intensive individual assessment using role-specific questions to the community around the mangrove area, local government, non-governmental organizations, and community leaders; and High-Resolution Satellite Imagery from Bing Maps, Google Maps, and Aerial Drone Photography has been collected. Strengths, Weaknesses, Opportunities, dan Threats (SWOT) analysis is suggested to determine how the productivity of mangrove forests development contributes to marine eco-fisherytourism. This analysis shows that the internal factors analysis strategy (IFAS) is approximately 1,09 while the external factors analysis strategy (EFAS) slightly drops to -1,38. Diversification strategy indicates innovation gains across internal factors to reduce external factors. Integrating mangrove forest areas like cultivation, silvofishery, ecotourism areas; involving local communities, community leaders, and stakeholders in planning, implementation, evaluation, and conservation for the development ecotourism; supporting infrastructure mangrove ecotourism visitors, and together with the community in conducting innovation/diversification of management based on the utilization and conservation of mangrove resources.

Keyword : Mangrove, Silvofishery, Marine, Eco-Fisherytourism

1. Introduction

Indonesia as the largest archipelagic country in the world has maritime economic potential and a very large source of marine wealth. This enormous source of marine wealth can be transformed into a source of progress and prosperity. One of the natural resources that can be managed is the natural resources found in the mangrove ecosystem. Mangroves are known as an important ecosystem in maintaining the livelihoods of households living in and around mangrove areas [1].

Communities sometimes to meet their daily needs destroy and convert mangrove forests for various purposes, such as ponds and housing. This fact can be seen by the fact that mangrove areas are converted into ponds, settlements and industries. People are generally allowed to catch fish and shrimp using nets or fishing rods because they do not damage the mangroves [2]. Damaged mangrove areas will have an impact on the loss of mangrove resources in the form of very economic value wood. If the mangrove

forest is managed properly and correctly, the preservation of the mangrove environment will be maintained and generate a large income.

Luwu Regency has a large and fertile mangrove forest area. Some of the mangrove forests on the island have been converted into pond land without regard to their sustainability and sustainability, causing the area of mangrove forest to decrease. In fact, if properly designed and managed, this mangrove forest can be a major source of income for the community around the mangrove forest area.

Marine ecotourism is an approach in managing coastal resources as a marine tourism object, as a guarantee of the sustainability of resources and the health of the ecosystem in its environment, also by utilizing the area as a place/area for aquaculture with a silvofishery system. Mangrove ecotourism management can support the function of mangrove forests as sustainable production forest areas. Mangrove forests will produce products of economic value that can be used as a source of income. Products from mangroves have been widely used for various purposes, both wood and non-timber, for example for fishing equipment, charcoal raw materials, bridge poles, leather tanning, pulp and tannins. For non-wood in the form of sweets, honey, various types of fish and shrimp and various shell crafts [3–5]

Mangrove forest management requires various criteria to ensure the health of its ecosystem and balance between social, economic and ecological dimensions. Various criteria have been developed to measure the performance of mangrove area management such as conservation of mangrove resources, health of mangrove ecosystems, diversity of flora and fauna, social, economic and cultural [6]. In principle, the concept of Sustainable Forest Management has three types, namely:

a. Forest product sustainability. This type of sustainability only focuses on the same annual or periodic wood yield. To realize this type of sustainability, various concepts of silvicultural systems have emerged, rotation determination, appropriate felling techniques, and so on
b. Conservation of forest product potential. The sustainabilty of forest product potential is oriented towards the forest as a timber factory. Forest managers have the opportunity to maximize the productivity of forest areas by not only producing conventional products so that the maximum profit is obtained.
c. Forest resource sustainability. Conservation of forest resources focuses on forests as an ecosystem that produces wood and non-timber, protects water systems and soil fertility, guards environmental sustainability, and functions as a storehouse for the survival of various genetic resources, both flora, and fauna [7].

Law enforcement in coastal areas and collaboration of various stakeholders, politicians, scientists, product certification from mangrove forests and management systems that do not damage mangrove areas, development planning that supports the preservation of mangrove ecosystem health, community-based tourism development, will determine the success of implementing mangrove forest management strategies [8–11].

The sustainable management of mangrove ecosystems should be considered comprehensively as an economic, environmental, and social aspect [12]. Tourism in mangrove areas is largely based on the value of environmental services [13,14] and hence creativity and innovation. Regarding the environmental perspective, planning and implementation of tourism in mangrove areas must also reduce and minimize various physical and biological risk factors. Designs for nature-based tourism destinations, including mangrove areas, must meet several criteria, namely landscape modification must be minimized, providing opportunities for local identities to survive[[15]. Biophysically, the right design for mangrove tourism areas must have the ability to accommodate the environment, support the preservation of biodiversity, and local character and culture [16–18]

Mangroves have a high potential to promote eco-tourism due to their position along with the land-sea interface and are very fertile ecosystems. Many studies have reported that mangroves and coastal environments are suitable places for sustainable ecotourism development such as in Peninsular Malaysia, Surat Thani, Thailand [19], and the northwestern coast of the Black Sea of Turkey [20]. Therefore, the development of mangrove ecotourism into ecotourism is something that is important as part of community-based mangrove management [18]. Community-based management primarily

indicates the centralization of rights and responsibilities from the government to local communities for natural resource management [18]. Moreover, local community involvement needs to be considered to implement sustainable mangrove management practices.

2. Methods

This research was conducted on the coast of Luwu Regency, South Sulawesi. The research plan is 8 (eight) months. This research is applied research that aims to identify, analyze, then make a solution to the problem, then from the results of this study a mangrove management strategy can be obtained. The observational study, intensive individual assessment using role-specific questions to the community around the mangrove area, local government, non-governmental organizations, and community leaders; and High-Resolution Satellite Imagery from Bing Maps, Google Maps, and Aerial Drone Photography has been collected. Strengths, Weaknesses, Opportunities, dan Threats (SWOT) analysis is suggested to determine how the productivity of mangrove forests development contributes to marine eco-fisherytourism. To determine the priority strategy is calculated using IFAS (internal factor analysis strategy) and EFAS (external factor analysis strategy)

3. Result and discussion

3.1. Internal factor

3.1.1. Strength

The factors that become strengths in mangrove management are as follows:

1) Mangrove forest areas in several sub-districts have been developed as ecotourism and coastal tourism areas.
2) Some pond owners carry out pond cultivation using the silvofishery
3) A sustainable management model by some local communities around the mangrove forest area
4) Very good perception and very high level of community participation towards the development of
5) Mangrove forest and human resources owned support
6) Supporting management and management system from village to district level.

3.1.2. Weakness

The factors that become weakness in mangrove management are as follows:

1) There is still a lack of assistance in maximizing the economic function of sustainable mangrove forests
2) Access the main road to enter the ecotourism/beach tourism area and a narrow parking lot.
3) The development of mangrove forest areas is still limited to tourism without integrating education.
4) Lack of non-formal education to the community around the mangrove forest area.
5) The development of mangrove forest areas as ecotourism areas sometimes without considering the carrying capacity and feasibility

3.2 External factors

3.2.1. Opportunity

The factors that become oppurtinities in mangrove management are as follows:

1) The trend of mangrove ecotourism The mangrove forest area provides something different from other natural attractions.
2) Potential of the mangrove nursery business
3) The economy of mangrove forests can be the main and additional source of livelihood for the community
4) The concern of NGOs and other community organizations towards the development of mangrove forests as a marine ecotourism area
5) Creation of job opportunities from small and medium-sized enterprises

3.2.2. Threat

The factors that become threats in mangrove management are as follows:

1) Communities around the mangrove forest area have experienced a decrease in income as a result of the COVID-19 pandemic.
2) The area of the mangrove forests is decreasing and leading to coastal damage
3) In some places, the conversion of mangroves into ponds is carried out without paying attention to the preservation of the mangrove environment.
4) Lack of awareness of tourists/visitors to maintain the beauty of ecotourism Tourists/visitors
5) Development of public facilities and infrastructure around the mangrove forest area which is still minimal

The table for calculating IFAS and EFAS scoring to determine the quadrant of the location of the priority strategy can be seen in the following table

Table 1. IFAS scoring

No	Internal Factors	Weight	Rating	Score
	Strenght			
1	Mangrove forest areas in several sub-districts have been developed as ecotourism areas and coastal tourism	0.12	4	0.48
2	Some pond owners carry out pond cultivation with an economic system	0.1	4	0.4
3	A model of sustainable management by some local communities around the mangrove forest area	0.08	3	0.24
4	Very good perception and very high level of community participation towards the development of mangrove forest areas as marine ecotourism areas	0.14	4	0.56
5	Mangrove forest and human resources that are owned support	0.06	3	0.18
6	Supporting management and management system from village to district level	0.14	4	0.56
	Total			**2.42**
	Weakness			
1	There is still a lack of assistance in maximizing the economic function of sustainable mangrove forests	0.06	4	0.24
2	Main road access to enter ecotourism and beach tourism areas and narrow parking spaces	0.1	4	0.4
3	The development of mangrove forest areas is still limited to tourism without combining education	0.06	3	0.18
4	Lack of non-formal education to communities around mangrove forest areas	0.05	3	0.15
5	The development of mangrove forest areas as ecotourism areas sometimes does not pay attention to the carrying capacity and feasibility	0.09	4	0.36
	Total	1		**1.33**

Table 2. EFAS scoring

No	External Factors	Weigh t	Ratin g	Score
	Opportunity			
1	Mangrove ecotourism trend	0.12	3	0.36
2	Mangrove nursery business potential	0.08	2	0.16
3	The economic value of mangrove forests that can be the main and additional source of livelihood for the community	0.08	4	0.32
4	The concern of NGOs and other community organizations towards the development of mangrove forests as a marine ecotourism area	0.1	3	0.3
5	Creation of job opportunities from small and medium sector businesses	0.12	3	0.36
	Total			**1.5**
	Threat			
1	Pond tenants from outside Luwu district	0.1	4	0.4
2	The area of mangrove forests is decreasing and leading to coastal damage	0.14	4	0.56
3	In some places the conversion of mangroves into ponds is carried out without paying attention to the preservation of the mangrove environment	0.14	4	0.56
4	Lack of awareness of tourists/mountains to maintain the beauty of ecotourism	0.06	3	0.18
5	Development of public facilities and infrastructure around the mangrove forest area	0.06	3	0.18
	Total	1		**1.88**

Based on the calculation of IFAS and EFAS, it can be obtained a graph of the strategic quadrants that are prioritized for the development of the potential of mangrove forests as marine eco-tourism areas as shown in the following figure.

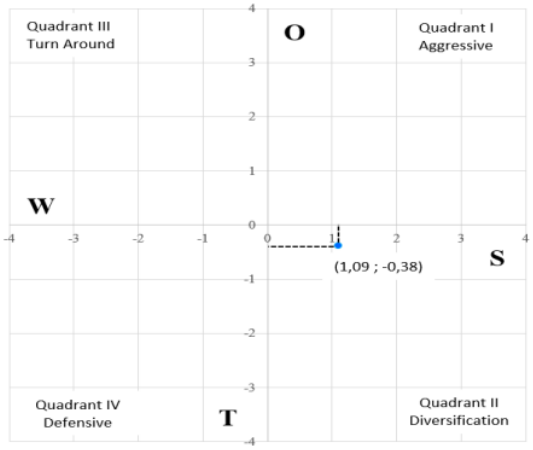

Figure 1. Priority strategy quadrant graphic

Based on the graph above, it can be seen that the strategy that will be used in developing the potential of mangrove forests as a marine ecotourism area in Luwu Regency is a diversification strategy in quadrant II.

Strenght (S) 1) Mangrove forest areas in several sub-districts have been developed as ecotourism and coastal tourism areas 2) Some pond owners carry out pond cultivation using the silvofishery system 3) A sustainable management model by some local communities around the mangrove forest area 4) Very good perception and very high level of community participation towards the development of mangrove forest areas as marine ecotourism areas 5) Mangrove forest and human resources owned support 6) Supporting management and management system from village to district level	**Strategy ST** a) Determination/determination of integrated and integrated mangrove forest areas as areas for cultivation, ecomina, ecotourism/econautics b) Involve local communities, community leaders and stakeholders in planning, implementation, evaluation and conservation for the development of mangrove forest areas as ecotourism/ecotourism areas (maritime ecotourism) c) Fulfillment of complete facilities and infrastructure that are the needs of ecotourism/marine tourism visitors d) Together with the community in innovating/diversifying management based on the utilization and conservation of mangrove resources
Threats (T) 1) Farmers from outside Luwu district 2) The area of mangrove forests is decreasing and leading to coastal damage 3) In some places the conversion of mangroves into ponds is carried out without paying attention to the preservation of the mangrove environment 4) Lack of awareness of tourists/mountains to maintain the beauty of ecotourism 5) Development of public facilities and infrastructure around the mangrove forest area	

The strategies that will be prioritized are as follows.

a. Designation/determination of integrated and integrated mangrove forest areas as cultivation, ecomina, ecotourism/econautical areas
b. Involve local communities, community leaders and stakeholders in planning, implementation, evaluation and conservation for the development of mangrove forest areas as ecotourism, ecotourism/ecotourism areas (maritime ecotourism)
c. Fulfillment of complete facilities and infrastructure that are the needs of ecotourism / marine tourism visitors
d. Together with the community in innovating/diversifying management based on the utilization and conservation of mangrove resources

4. Conclusion

The strategies used in the management of mangrove forests as marine ecotourism areas are: designation/determination of integrated and integrated mangrove forest areas as cultivation, ecomina, ecotourism/econautical areas, involve local communities, community leaders and stakeholders in planning, implementation, evaluation, and conservation for the development of mangrove forest areas

as ecotourism, ecotourism/ecotourism areas (maritime ecotourism), fulfillment of complete facilities and infrastructure that are the needs of ecotourism / marine tourism visitors and together with the community in innovating/diversifying management based on the utilization and conservation of mangrove resources

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