IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)
e-ISSN: 2319-2402, p- ISSN: 2319-2399.Volume 18, Issue 12 Ser. 2 (December 2024), PP 43-48
www.iosrjournals.org

Sustainable Mangrove Ecosystem Management Strategy In Supporting Folu Net Sink 2030 In Ambon City

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Abstract
Mangroves are tropical coastal vegetation communities dominated by several species of mangrove trees which are able to grow and develop in muddy coastal tidal areas. The existence of mangrove forests in Rutong Village which are currently used as tourist attractions, needs to be identified for their biodiversity and environmental services, so that they can become the basis for recommendations for future management policies. In order to manage sustainable mangrove forests in Negeri Rutong, it is expected to formulate appropriate and integrated management strategy priorities, so that it will encourage participation and collaboration of all stakeholders involved in its management. This study aims to analyze internal and external factors in the management of mangrove ecosystems and determine the priority of mangrove forest management strategies. The results of the quadrant analysis show that the position of mangrove management in Negeri Rutong, South Leitimur District is in Quadrant I. Therefore, in its management, a strategy must be created by using strengths to take advantage of opportunities. Several SO (strength opportunities) strategies that are alternatives include: Formulating regional policies on Mangrove Forest management; Promote the potential value of mangroves and their development opportunities; Improving the role and performance of stakeholders in the management of mangrove forests, and mproving the people's economy and empowering coastal communities.

Date of Submission: 07-12-2024 Date of Acceptance: 17-12-2024

I. Introduction

Indonesia, which is part of the global community, continues to commit to controlling and stabilizing the earth's temperature between 1.5 - 2.0 degrees Celsius from pre-industrial temperature levels. This commitment is realized by signing the Paris Agreement and implementing commitments through the Updated Nationally Determined Contribution (Enhanced NDC) documents of each country. Indonesia has targeted a reduction in Greenhouse Gas (GHG) emissions by 29 percent with independent efforts, and an increase in the target to 41 percent with financial and technological support from developed countries, both government and private.

In the context of implementing the 2020-2030 NDC, Indonesia has also established a roadmap as a direction for stakeholders, both government and non-government. They can contribute to efforts to achieve the NDC target by providing information on physical targets, timelines, and indications of potential locations for implementing mitigation actions, as well as parties who can contribute to its implementation. This roadmap can also help align programs and activities carried out to achieve the set NDC targets.

Indonesia's Folu Net Sink 2030 through the determination of mitigation actions from the forestry sector category is carried out by considering the activities contained in the REDD+ scheme. Based on the results of meetings and discussions with experts, academics, researchers, and practitioners, it was determined that mitigation actions that can contribute to reducing emissions or increasing absorption from the forestry sector category include 6 (six) mitigation actions as follows: (a). Reducing deforestation; (b). Reducing forest degradation; (c). Sustainable forest management; (d). Increasing carbon stocks; (e). Increasing the role of conservation; (f). Peatland management.

Increasing the role of conservation is one of the mitigation actions that can be carried out as an effort to reduce emissions/increase GHG absorption Mitigation actions to increase the role of conservation can be carried out through mitigation action components in the form of determining high conservation value areas (HCV).High conservation value areas (HCV) based on Perdirjen KSDAE Number: P.5/KSDAE/SET/KUM.1/9/2017 concerning Technical Instructions for Determining High Conservation Value Areas Outside Nature Reserve Areas, Nature Conservation Areas, and Hunting Parks are defined as patches of areas that have important value for biodiversity conservation and produce environmental services (ecosystems) that are important for local communities. The high conservation value areas (HCV) that will be studied are 1: Species diversity, 2:

Ecosystems and habitats, 3. Ecosystem services.

The area of mangrove forest in Negeri Rutong, South Leitimur District, Ambon City is 3.15 Ha (BPKH Maluku, 2023). The existence of mangrove forests in Negeri Rutong which are currently used as tourist attractions, needs to be identified for their biodiversity and environmental services, so that they can be the basis for recommendations for future management policies.The principle of sustainable development has a general effect on the overall context of decision-making by integrating the concepts of justice, environment and economy, specifically the impact is on the economic dimension, environmental resource management and socio-cultural development (Wiharyanto & Laga, 2010). Achieving policy objectives related to mangrove ecosystem management requires the support of effective management planning strategies that are built from various views, knowledge and experiences sourced from practitioners, researchers and various stakeholders (Patang, 2012). In the context of sustainable mangrove forest management in Negeri Rutong, it is hoped that the right and integrated management strategy priorities can be formulated, so that it will encourage the participation and collaboration of all stakeholders involved in its management. This study aims to analyze internal and external factors in mangrove ecosystem management and determine priority strategies for mangrove forest manageme**nt.**

II. Material And Methods

This research was conducted in Rutong Village, Ambon City, in May-July 2024.

Figure 1. Research location in Rutong Village Research Procedure

Preparation

Before conducting data collection, preparation is done by conducting a survey to the location and looking for secondary data about the research location. Based on the survey results, it is expected that a plan of activities in the field can be prepared.

Field Activities

The activities carried out in this stage are collecting mangrove vegetation data, measuring physical parameter data, collecting data and conducting in-depth interviews.

Data Analysis

The data processing stage is carried out by evaluating data from the field, namely mangrove vegetation data with the results of interviews with related stakeholders.

Data collection was carried out by asking questions to obtain responses from the community about the existence of mangrove forests, the use of mangroves by the community and how the community manages them, stakeholder identification consists of: Government consisting of, City and Provincial Forestry Services, City and Provincial Fisheries Services, Bappekot, Provincial Bappeda, Bappedalda, Environmental Impact Control Office, etc; . Private sector; NGOs/Environmental Observers; Researchers/Academics (Universities/Lippi) and Community Leaders (Village Heads, Village Heads, Youth Leaders, Religious Leaders).

III. Results And Disccusions

Sustainable Mangrove Forest Management Strategy

SWOT analysis is a qualitative analysis used to systematically identify various factors to formulate an activity strategy. This analysis is based on logic that can maximize the strengths and opportunities of an activity, which can simultaneously minimize weaknesses and threats (Rangkuti, 2006). The impact of mangrove forest management activities in Negeri Rutong can be analyzed using SWOT analysis, can be classified into external factors (opportunities and threats) or can be said to be a direct impact. While the indirect impact is classified into internal factors (strengths and weaknesses). Both factors provide positive impacts originating from opportunities and strengths and negative impacts originating from threats and weaknesses. By using internal and external matrices, weights and ratings can be given to the predetermined parameters, so that a value (score) will be obtained. This value will provide direction on future prospects for sustainable mangrove management.

IV. Identification Of Internal And External Factors

Some internal and external factors that are considered to determine the priority of management strategies and opportunities for mangrove forest management are as follows:

a. Strengths
1. Functions as a natural disaster barrier
2. Public awareness is quite high in mangrove management
3. Largest carbon storage
4. Potential for quite high biodiversity
5. Tourists can enjoy the comfort of the natural environment
6. Easily accessible

b. Weaknesses
1. Vulnerable to climate change.
2. Mangrove growth is rather slow and recovery is difficult.
3. There is no legal protection and government attention.
4. Lack of promotion of the potential and beauty of mangrove forests.
5. Lack of supporting infrastructure

c. Opportunities
1. The role of mangroves in climate change.
2. Conservation and rehabilitation of mangrove areas
3. Sustainable economic benefits
4. Opportunities for funding and national collaboration.
5. Opportunities for development as mangrove ecotourism

d. Threats
1. Habitat destruction.
2. Climate change threats
3. The existence of superior processed mangrove food products in other areas
4. Mangrove damage
5. The absence of state regulations on mangrove management

Strategy Analysis with SWOT Approach

To obtain the right strategy formulation, SWOT analysis is used, which begins with identifying internal and external factors. Based on the results of the identification of internal and external factors, weighting, ranking and scoring of each element are carried out, which are complete and continued with the determination of the development strategy using the SWOT Matrix.

Table 1. Internal Strategic Factors

Internal Dimension Factors		Weight	Rating	Score
Strenghts				
1	Functions as a natural disaster barrier	0,1233978	3,75	0,4627419
2	Public awareness is quite high in mangrove management	0,1194916	3,63	0,433157
3	Largest carbon storage	0,1232795	3,75	0,462298
4	Potential for quite high biodiversity	0,1068386	3,25	0,3472256
5	Tourists can enjoy the comfort of the natural environment	0,1106265	3,38	0,3733645

6	Easily Accecible	0,1228754	3,75	0,4607827
				2,5395697
Weaknesses				
1.	Vulnerable to climate change.	0,0409722	1,25	0,0512153
2.	Mangrove growth is rather slow and recovery is difficult.	0,0571273	1,75	0,0999728
3.	There is no legal protection and government attention	0,0530951	1,63	0,0862795
4.	Lack of promotion of the potential and beauty of mangrove forests	0,0448785	1,38	0,0617079
5.	Lack of supporting infrastructure	0,0485067	1,50	0,07276
Total				**0,3719355**

Table 2. External Strategic Factors

External Dimension factors		**Weight**	**Rating**	**Score**
Opportunity				
1.	The role of mangroves in climate change.	0,1221625	3,88	0,4733797
2.	Conservation and rehabilitation of mangrove areas	0,1103017	3,50	0,3860559
3.	Sustainable economic benefits	0,0791088	2,50	0,1977720
4.	Opportunities for funding and national collaboration.	0,0787606	2,50	0,1969016
5.	Opportunities for development as mangrove ecotourism	0,0825408	2,63	0,2163170
				1.4704262
Threats				
1.	Habitat destruction	0,0827706	2,63	0,2172730
2.	Climate change threats	0,0709175	2,25	0,1595644
3.	The existence of superior processed mangrove food products in other areas	0,0548984	1,75	0,0960722
4.	Mangrove damaged	0,0788790	2,50	0,1971975
5.	The absence of state regulations on mangrove management	0,0826669	2,63	0,2170006
Total				**0.88710771**

Based on the results of data processing on the internal and external strategic factor evaluation matrices, the value of each matrix is obtained, which will then be entered into the quadrant analysis.

Internal Strategic Factor Evaluation Matrix Value:

Total Strengths - Total Weaknesses

2.54 - 0.37 = 2.17

External Strategic Factor Evaluation Matrix Value:

Total Opportunities - Total Threats

1.47 - 0.88 = 0.59

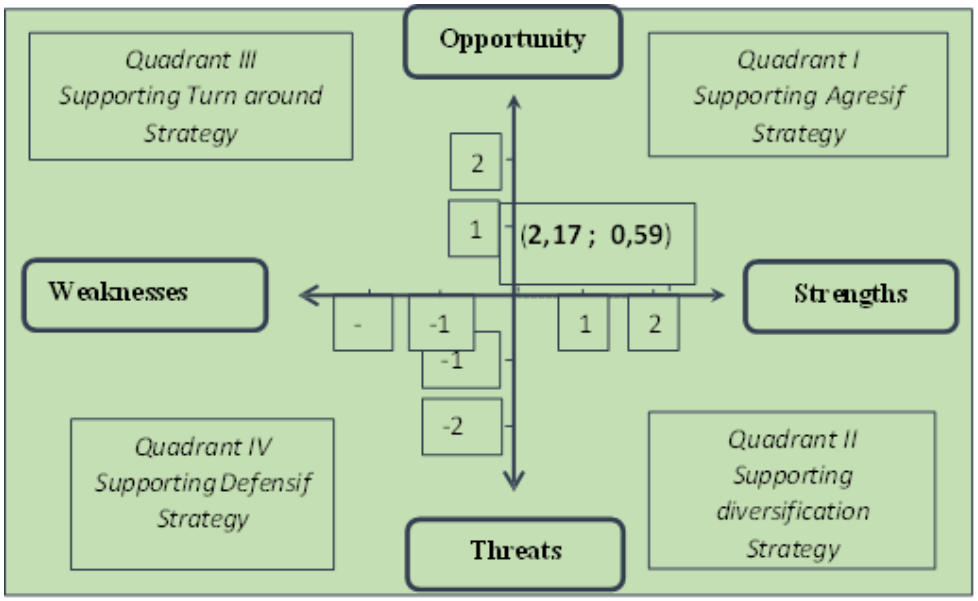

Figure 2. Quadrant Analysis Results

Based on Figure 2, the results of the quadrant analysis show that the position of mangrove management in Negeri Rutong, South Leitimur District is in Quadrant I. This position illustrates that management is facing various threats, but still has internal strengths. The strategy that needs to be developed is to use strengths to take advantage of opportunities so that weaknesses can be overcome.

V. Alternative Mangrove Forest Management Strategies

From the results of the SWOT analysis conducted, mangrove management in Negeri Rutong is included in the First Quadrant in the SWOT diagram, while the alternative strategy used is SO (Strength and Opportunities). Therefore, in its management, a strategy must be created by using strengths to take advantage of opportunities. Several SO (strength opportunities) strategies that are alternatives include:

Formulating regional policies on Mangrove Forest management

The government has a strategic role in developing sustainable mangrove conservation policies. Policies include strategic legal instruments such as conservation spatial planning to technical instruments regarding services, which are played by the central and regional governments. In this position, the government establishes basic rules regarding territorial boundaries, potential, protection and rescue, management planning, private sector participation infrastructure, and local population empowerment.

Promote the potential value of mangroves and their development opportunities.

The potential value of mangroves and their development opportunities as tourism areas, taking into account the diversity of mangrove flora and fauna and other environmental services, especially in climate change mitigation and adaptation programs. Various types of tourism activities that can be offered in mangrove forest areas, one of which is educational tourism, namely:

- Introduction to the types of mangrove vegetation found in the area,

  This introduction starts from the name of the type, characteristics and benefits or uniqueness that it has starting from the shape of flowers, fruits, leaves, ecology and distribution.
- Observation of the types of animals in the mangrove forest.

Increase the role and performance of stakeholders in managing mangrove forests.

Development activities essentially involve the role of all existing stakeholders. The stakeholders in question include 3 (three) parties, namely: government, private sector and community, with all their respective roles and functions. Therefore, within the framework of development activities, every effort or development program implemented must pay attention to the position, potential and role of the community as the subject or actor of development.

To maintain the sustainability of the mangrove ecosystem, all related parties must be involved in maintaining and preserving the environment. Related agencies that have a role as stakeholders include the City Government, Forestry Service, Forestry Service, Non- Governmental Institutions (Universities and NGOs). In addition, the participation of these stakeholders is expected to support improving the welfare and quality of life of the community and encourage the sustainability of natural resources.

Improving the people's economy and empowering coastal communities.

Community participation in maintaining and preserving mangrove forests as an initial step provides them with the opportunity to play a role in sustainable mangrove management by providing education and training to the surrounding community regarding business activities that can help improve welfare and support mangrove conservation, for example: through the formation of mangrove conservation groups and the manufacture and sale of processed mangrove food products, in the form of fish balls, fish nuggets and fish floss.

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