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Model for Sustainable Mangrove Ecosystem Management Policies in Support of Folu Net Sink 2030 in Ambon City

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Abstract
Mangrove forests are renewable or flow resources that provide multiple benefits ecological, economic, and social. Ecologically, mangroves serve a wide range of protective functions for both terrestrial and marine ecosystems and act as crucial habitats for various fauna species. As a conservation area, the coastal waters along the Rutong coast possess significant natural resource potential, making the rehabilitation and preservation of the remaining mangrove forests essential to ensure the sustainability of the ecosystem and the biodiversity of aquatic life in the region. hese conservation efforts also contribute to strengthening the local economy through the integration of education and tourism, supporting the growth of mangrove-based ecotourism, and consequently promoting regional tourism development. The existence of mangrove ecosystems is critically important, as they have a high capacity for carbon storage within their roots and sediments aligning with Indonesia's commitment to achieving the Forestry and Other Land Use (FoLU) Net Sink 2030 target. From the results of the analysis, the appropriate policy model is the Mangrove Edu-Tourism Model, because the success of the Edu-Tourism Model is very strong, supported by ecological facts in Negeri Rutong.

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I. Introduction

Mangrove forests are renewable resources or flow resources that have multiple benefits (ecological, economic, and social). Ecological benefits consist of various protective functions for both terrestrial and marine ecosystems and habitats for various types of fauna. Economic benefits include forest products such as wood (firewood, charcoal, construction wood, etc.) and non-wood forest products such as tourism. In addition, mangrove ecosystems also have social value that shapes the socio-cultural systems of communities living around mangrove forests. These communities have become an integral part of the mangrove ecosystem. The continuous increase in population has driven various needs that ultimately rely on existing natural resources. The mangrove ecosystem is one of the natural resources that is not immune to this pressure. Currently, mangrove ecosystems have been converted into agricultural land, fisheries (fish ponds), and settlements spread across almost all of Indonesia, while the richness of their flora and fauna is not yet known with certainty, nor are various other aspects related to the existence of these mangrove ecosystems. Therefore, it is necessary to take steps to conserve mangrove ecosystems.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.

The city of Ambon is one of a group of islands in the Maluku Islands with an area of 73.5 km, and most of its people earn their living as fishermen. To meet their daily needs, they depend on their catch, which mostly consists of fish, shrimp, crab, and mollusks from the surrounding mangrove ecosystem. Rutong is one of the districts in Ambon City that has a fairly diverse range of mangroves, with three types of pure mangroves (major mangroves) and two types of minor mangroves from five different families, namely: Avicennia alba, Sonneratia alba, Rhizophora mucronata, Scyphiphora hydrophyllacea, and Aegiceras corniculatum, and 2 associated species from 2 families, namely Ketapang (Terminalia catappa) from the Combretaceae family and Kayu Besi Pantai (Pongamia pinnata Merr) from the Sapindaceae family. The composition of the mangrove ecosystem is greatly influenced by existing habitat factors. Even a change in the quality of the mangrove habitat has the potential to change the composition of the mangrove vegetation. Environmental characteristics in one location that differ from those in another location can cause the composition and distribution of species to differ in each location, as this

depends on their ability to adapt.

As a conservation area, the coastal waters along the Rutong coast have considerable coastal resource potential, making it very important to rehabilitate and save the remaining mangrove forests in order to ensure the sustainability of the ecosystem and aquatic biodiversity in the coastal waters of the area. This will also support the strengthening of the community's economy through the integration of education and tourism, as well as supporting the development of mangrove tourism so that the tourism sector in the region will also grow rapidly. The existence of mangrove ecosystems is very important to maintain because they have the ability to store carbon in their roots and sediments, which is in line with the potential of mangroves in supporting Indonesia's FoLU Net Sink 2030.

In order to manage mangrove forests sustainably in Negeri Rutong, it is hoped that an appropriate and integrated management policy model can be formulated, thereby encouraging the participation and collaboration of all relevant stakeholders in their management. This research is also relevant to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 13 on tackling climate change through evidence-based policies and community involvement, SDG 15 which focuses on the protection of terrestrial ecosystems including forests, and SDG 11 which promotes the creation of sustainable and disaster-resilient settlements. This study aims to analyze the factors that influence mangrove ecosystem management policies; Formulate a sustainable mangrove forest management policy model in support of the FOLU Net Sink 2030, based on stakeholder contributions, taking into account factors that impact policy formulation relevant to management interests as a small island region in support of the FoLU NET SINK 2030 policy.

II. Material And Methods

This research was conducted in Rutong Village, Ambon City, in Juni - Oktober 2025

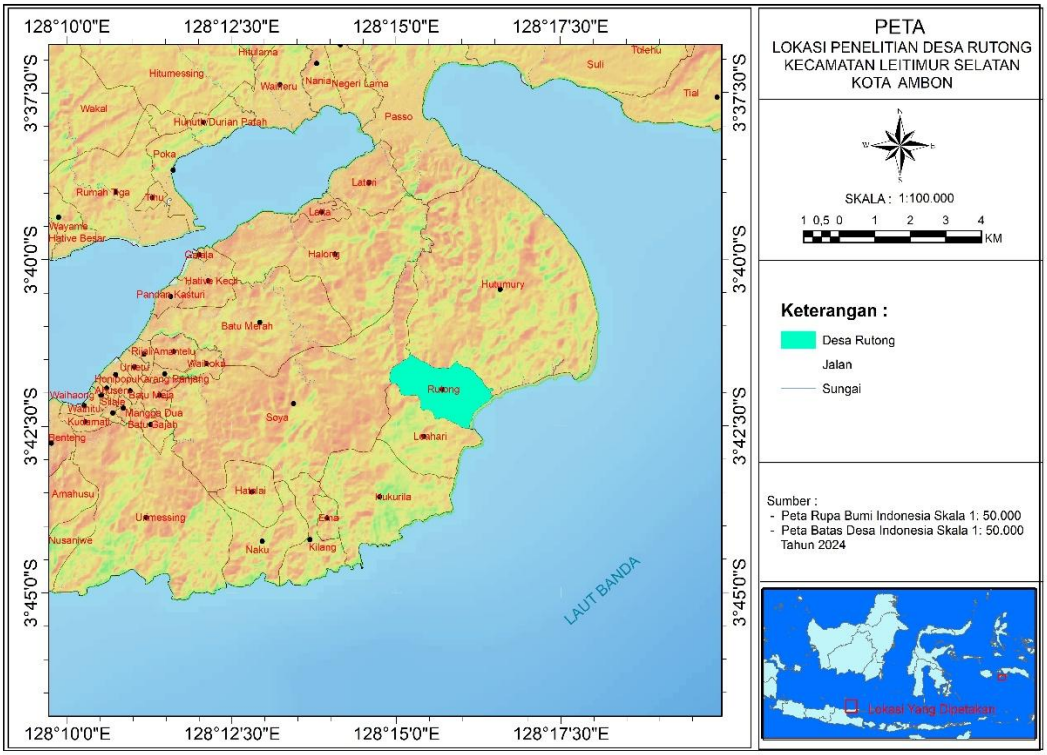

Figure 1. Research location in Rutong Village Research Procedure

Data collection was conducted using questionnaires based on the Analytic Hierarchy Process (AHP) framework. The output of this stage was knowledge among the community and other stakeholders in mangrove ecosystem management. The achievement indicator was the collection of 10 key actors who filled out the questionnaire and were interviewed in depth, followed by a focus group discussion. Data analysis, including Hierarchical Process Analysis (HPA) using MDS. The output of this stage is a report on the results of the Hierarchical Process Analysis. The achievement indicator is the availability of evidence-based analysis results for the formulation of a policy model. Formulation of a policy model for mangrove ecosystem management in Negeri Rutong. The achievement indicator is the development of a Policy Model validated by stakeholders.

Methods

In AHP, Saaty's numerical scale is used, ranging from 1, which describes attributes that are equally important to each other and always have a value of 1, to 9, which describes the level of importance between the issues being compared.

Consistency measurement values are needed to ensure the consistency of respondents' answers, which greatly determines the accuracy of the results. To determine whether a CI of a certain magnitude is sufficient or not, it is necessary to know the ratio that is considered good if the CR value is < 0.1, where CR (Consistency Ratio) and RI (Random Index) are calculated using the following formula:

The RI value follows the table issued by Oarkride Laboratory, which can be seen in Table 1 below.

Table 1. Standardization of RI (Random Index) values

N	1	2	3	4	5	6	7	8	9	10	11	12	13
RI	0,00	0,00	0,58	0,90	1,12	1,24	1,32	1,41	1,45	1,49	1,51	1,48	1,56

III. Results And Disccusions

The mangrove management policy study was conducted using the AHP method. The AHP method is a decision support model that describes complex problems with many factors or criteria. According to Saaty (1993), a hierarchy is a complex decision-making structure with levels ranging from the initial level to the final alternative level, followed by the factor, criterion, and sub-criterion levels. This method can control the consistency obtained from what. The priorities displayed follow the weight and criteria of each option. If the inconsistency value is ≤ 0.10, then the decision made by respondents to determine the priority scale is quite consistent (Pattimahu et al. 2010; Saaty 1993). n using AHP, complex and unstructured problems are simplified into a hierarchy that is described in a graphical form that has been grouped into several levels of focus, criteria, sub-criteria, and alternatives. The hierarchical structure of the mangrove management model can be seen in Figure 2.

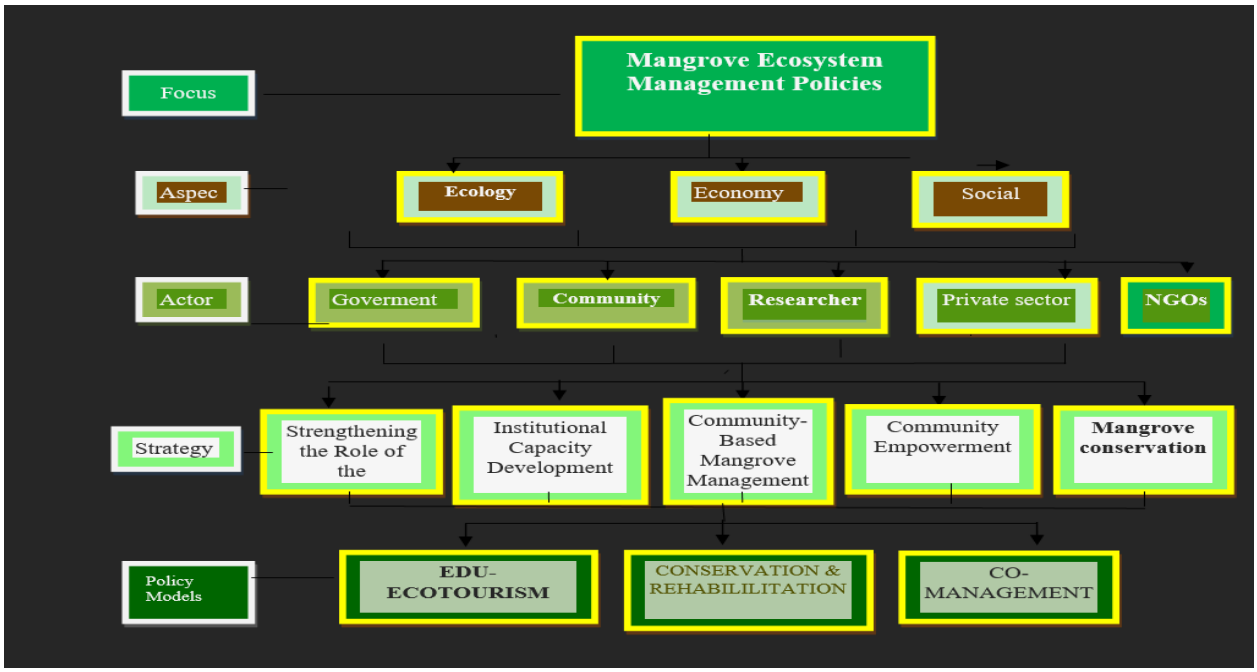

Figure 2. Analytical Hierarchy Process of Mangrove Ecosystem Management Policy in support of FoLU NET SINK 2030

1.1.The Role of Criteria in Mangrove Ecosystem Management

The AHP approach is a process that focuses on considerations of the most influential aspects and strategies in determining policy priorities for mangrove ecosystem management, based on the perceptions of each stakeholder. The two stages of analysis conducted previously provide an overview of the existing condition of mangrove management in the study area at this time. AHP aims to obtain a selection of operational steps from the perspective of stakeholders related to the management of these ecosystems.

Based on the results of the analysis, it shows that each criterion has a different role, with being the top priority in determining alternative policies. The hierarchy of priority objectives that are factors in mangrove ecosystem management includes ecology (0.72), economy (0.19), and social (0.09).

The role of criteria in the sustainable management of mangrove ecosystems in Negeri Rutong can be seen in Figure 3.

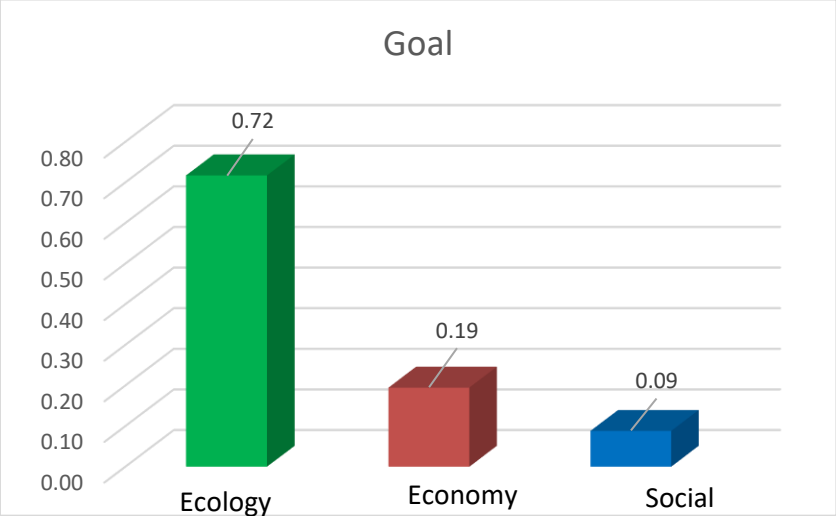

Figure 3. Priority Criteria in Sustainable Mangrove Ecosystem Management

Based on the results of the analysis, the aspect that becomes the priority in mangrove management policy is the ecological aspect, with a priority value of 72%. This is due to the fact that mangrove ecosystems play an essential role in supporting the sustainability of both aquatic and terrestrial ecosystems. Mangroves function as spawning grounds and nursery grounds for various species such as fish, shrimp, crabs, mollusks, birds, reptiles, and mammals. Thus, ecological factors are highly significant as they are related to the intrinsic value and life-supporting functions of the mangrove ecosystem itself.

From an ecological perspective, the existence and sustainability of mangroves play an important role in maintaining biodiversity, both flora and fauna, which depend on mangroves as their natural habitat, feeding ground, breeding ground, and shelter. In addition, mangroves serve a strategic function as carbon sinks due to their ability to store large amounts of carbon in their biomass and substrate. This factor forms an important basis for policies that integrate mangrove ecosystems into climate change mitigation strategies and emission prevention efforts resulting from forest degradation.

Furthermore, mangroves act as coastal protection barriers, serving to reduce wave energy, prevent erosion, mitigate seawater intrusion, and provide protection against natural disasters such as tsunamis and storms. Mangroves also contribute to maintaining water and soil quality through their role as natural filters that trap sediments and pollutants originating from the land before they reach marine waters.

The second aspect that should be prioritized in mangrove management policy is the economic aspect (19%), as mangroves support the livelihoods of local communities who are highly dependent on their existence. The economic factor also reflects the dependence of coastal communities on the resources provided by mangrove forests, which are sustained by the mangrove ecosystem.

Mangroves have economic value through their potential for ecotourism development, serving as a natural attraction that can generate income from entrance fees, tour guide services, and local small and medium enterprises (SMEs). This factor encourages the formulation of community-based ecotourism policies that emphasize conservation principles.

In addition, from an economic standpoint, the availability and adequacy of funding for mangrove management, research, and rehabilitation activities are essential to ensure sustainable management of the ecosystem.

The third aspect is the social aspect (9%), in which mangrove forests have become important sites for educational and research activities. This includes factors such as community participation and awareness, where the level of public involvement in the planning, implementation, and monitoring of mangrove management plays a crucial role.

Local wisdom also contributes significantly, as traditional practices, customs, and norms have long been applied to preserve mangrove ecosystems. In addition, the institutional factor is equally important—clarity of roles and coordination among government agencies, non-governmental organizations (NGOs), and community groups in mangrove management are essential. This factor requires a strong and well-coordinated institutional framework to prevent policy overlap and ensure effective management.

1.2. The Role of Stakeholders (Sub-Criteria) in Mangrove Ecosystem Management

The analysis results indicate that each stakeholder has different priorities, with the role of academics receiving the highest priority in determining alternative policy models. The hierarchy of stakeholder priorities in mangrove ecosystem management is as follows: academics with a weight of 1.48 (49%), non-governmental organizations (NGOs) 0.73 (24%), local communities 0.43 (14%), business actors 0.19 (6%), and government institutions 0.16 (5%).

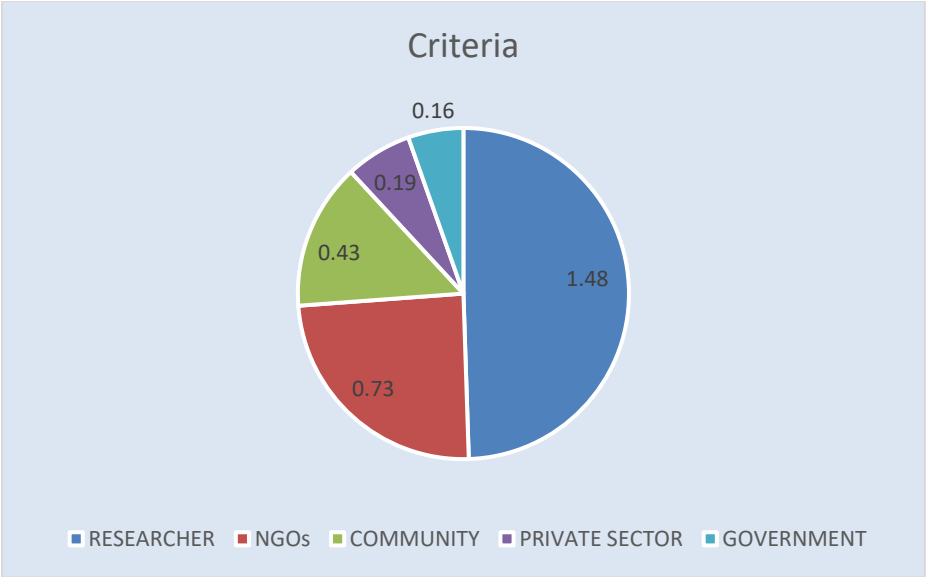

Figure 4. Stakeholder Priorities in Mangrove Ecosystem Management

Based on the figure above, the role of academics is highly significant in determining the success of mangrove ecosystem management. The involvement of academics should be emphasized in studying various bioecological aspects of mangroves and promoting integrated management approaches to generate constructive solutions for sustainable mangrove management. This is intended to ensure that mangrove management is not only based on empirical data but also grounded in research and scientific studies aligned with the advancement of science and technology.

The expertise of academics, in accordance with their competencies, serves as a fundamental asset in developing technological innovations related to sustainable mangrove forest management. Their role should produce strong policy recommendations and applicable technological solutions. Academics need to play an essential role as providers of research-based data, conducting in-depth studies on the bioecology of mangroves in Negeri Rutong. The results of such studies form the scientific foundation for determining rehabilitation sites, identifying appropriate and environmentally friendly species, and guiding sustainable restoration efforts.

Furthermore, academics should develop and evaluate management models that integrate ecological, economic, and social aspects in a balanced manner. In addition, they are expected to conduct studies on innovative technologies, such as developing monitoring systems for mangrove health, implementing adaptive seedling techniques in response to climate change, and creating innovations in non-timber mangrove product processing.

he government and other stakeholders are expected to align their objectives and targets in formulating appropriate decisions for mangrove ecosystem management planning in Negeri Rutong. Therefore, comprehensive socialization and outreach are required to support management activities in accordance with well-founded scientific studies. The government, as the authority holder, must act as a bridge between academic research findings and field implementation. It is essential for the government to harmonize effective mangrove management planning, formulate zoning policies, and develop management plans that are consistent with both scientific studies and community needs. The government should conduct comprehensive and effective socialization, ensuring that scientific research results are properly interpreted and communicated to the community and other decision-makers.

The role of other stakeholders, such as local communities and fisher groups, is to carry out conservation actions and ensure the sustainable utilization of mangrove resources in accordance with policies and local wisdom. These groups also serve as sources of empirical data and local knowledge for academics. Traditional and religious leaders play a role in utilizing their moral and social influence to promote conservation awareness within communities and to integrate mangrove conservation values into local norms and traditions.

Meanwhile, non-governmental organizations (NGOs) serve as independent monitors of policy

implementation, community mobilizers, and providers of technical assistance in community-based conservation programs. In addition, business actors or private sectors contribute through their Corporate Social and Environmental Responsibility (CSR) programs, particularly in activities related to rehabilitation, ecotourism development, and market provision for sustainable mangrove forest products.

I.3. **Hierarchy of Strategy for Mangrove Ecosystem Management**

Based on the analysis results, each aspect has a different level of priority in determining the appropriate strategy. Among the four actors analyzed, **mangrove conservation** emerges as the **main strategy** in managing the mangrove ecosystem in Rutong. Therefore, the implementation of the mangrove conservation strategy plays a crucial role in determining the overall success of **holistic mangrove management** in Rutong Village.

The analysis emphasizes that the **Mangrove Conservation Strategy** must become the **primary focus** in the management of the mangrove ecosystem in Rutong Village. This conclusion is based on the **highest weighting score** given by all four analyzed actors, indicating a strong consensus among stakeholders regarding the urgency of protecting the mangrove ecosystem.

The high priority given to mangrove conservation reflects several key understandings shared by the actors:

• **Importance of Ecological Functions:**

The actors recognize that without strong conservation efforts, all ecological functions—such as protection against coastal abrasion, carbon absorption, and serving as habitat for marine organisms—will be lost. Conservation is viewed as a fundamental prerequisite for sustainability.

• **Conservation as the Foundation:**

The conservation strategy is regarded as a **solid foundation** that must be established before any utilization strategy can succeed.

The establishment of conservation as the main strategy requires concrete efforts and policy interventions from the **Rutong Village Government** and other related stakeholders. The implementation of this strategy can be carried out through the following measures:

•Policy and Institutional Framework

The government must promptly integrate the conservation strategy into the Village Medium-Term Development Plan (RPJMDes). It is necessary to establish clear zoning between conservation/protected areas and utilization areas, as well as to strengthen specific institutions (such as Tourism Awareness Groups [Pokdarwis] or Mangrove Management Groups) that are responsible at the local level.

•Empowermen to Factors

Allocate funds and training programs to enhance the technical capacity of local communities in conservation efforts and to increase awareness of the ecological and economic value of mangroves through outreach and education activities.

• **Financing**

Ensure that a portion of the Village Fund Allocation (ADD) or other funding sources is consistently directed toward regular conservation programs, such as maintenance, monitoring, and the provision of supporting infrastructure and facilities.

• **Law Enforcement**

Implement strict Village Regulations prohibiting destruction, illegal logging, or waste disposal within mangrove areas.

Figure 5. Graph of Priority Strategy for Mangrove Ecosystem Management

I.4. Hierarchy of Alternative Models for Mangrove Ecosystem Management

The policy model for mangrove ecosystem management is largely determined by the roles and interactions of stakeholders involved in its implementation. Based on the results of the Analytical Hierarchy Process (AHP) analysis, three alternative policy models have been identified for mangrove ecosystem management, namely:

1. Conservation and Rehabilitation
2. Edu-Ecotourism (Eduekowisata)
3. Co-Management

The analysis indicates that the Edu-Ecotourism model is considered the most feasible and applicable for implementation. The synthesis results derived from the sub-criteria analysis show the following hierarchy of alternative policy models for mangrove ecosystem management in Negeri Rutong:

- Edu-Ecotourism (2.08)
- Co-Management (1.68)
- Conservation and Rehabilitation (1.24)

These results suggest that the Edu-Ecotourism model offers the most balanced approach, combining ecological conservation, economic benefits, and community participation in a sustainable framework for mangrove management.

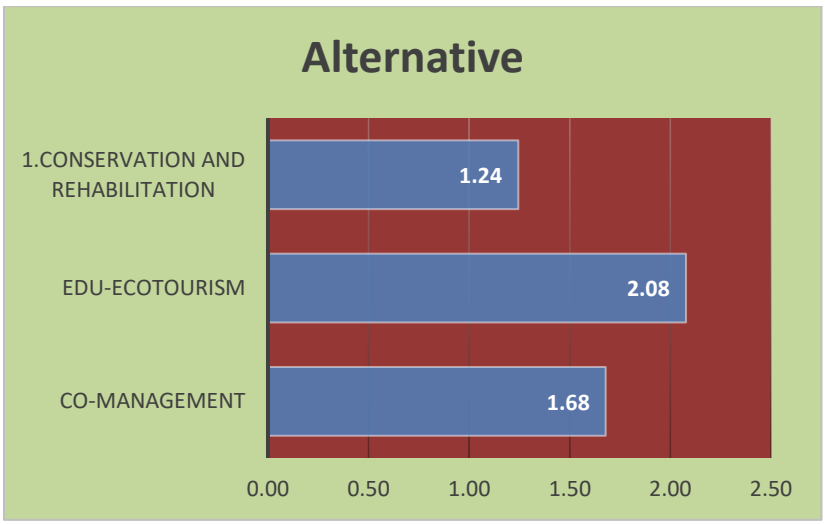

Figure 6. Graph of Priority Policy Models for Mangrove Ecosystem Management

The results of the Analytical Hierarchy Process (AHP) analysis indicate that the Edu-Ecotourism policy model is the top priority for mangrove ecosystem management in Negeri Rutong. The uniqueness and distinctive characteristics of the mangrove ecosystem in Negeri Rutong create an exceptional natural attraction. Various

efforts to promote mangroves as one of the region's ecotourism destinations continue to be encouraged, considering the high diversity of mangrove species combined with the unique aquatic fauna and wildlife inhabiting the area.

Previous studies have identified three major (true) mangrove species, two minor mangrove species, representing five different families, namely *Avicennia alba*, *Sonneratia alba*, *Rhizophora mucronata*, *Scyphiphora hydrophyllacea*, and *Aegiceras corniculatum*. In addition, there are two associated species from two different families, namely *Ketapang (Terminalia catappa)* from the Combretaceae family and *Kayu Besi Pantai (Pongamia pinnata Merr.)* from the Sapindaceae family. Meanwhile, four bird species were recorded in the area: the Collared Kingfisher (Todiramphus chloris), Willie Wagtail *(Rhipidura leucophrys),* Common Sandpiper (*Actitis hypoleucos*), and Slender-billed Crow (*Corvus enca*) all of which are associated with mangrove habitats. Although the mangrove area in Negeri Rutong is not very extensive and the distribution is relatively sparse across the study site, the presence of seven species (five major and two associated) representing seven different families demonstrates important genetic diversity, which provides strong educational value.

- Key Major Mangroves: The presence of *Avicennia alba*, *Sonneratia alba*, and *Rhizophora mucronata* reflects the fundamental ecological richness that can serve as the main focus of environmental education.
- Minor and Associated Mangroves: The existence of *Scyphiphora hydrophyllacea* and *Aegiceras corniculatum*, along with two associated species *Ketapang (Terminalia catappa)* and *Kayu Besi Pantai (Pongamia pinnata Merr.)* provides valuable educational material about mangrove zonation and ecosystem transition. This is essential for teaching that mangrove forests are complex and dynamic ecological systems.

The mangrove ecosystem can also serve as a location for adventure sports, such as fishing, boating, trekking, and birdwatching (Kordi, 2012). The development of mangrove areas as a tourism destination should ideally be directed toward coastal and marine ecotourism, which combines visits to natural areas with efforts to protect the environment while enhancing the welfare of local communities. This approach is also intended to minimize potential threats to the mangrove ecosystem.

Moreover, the mangrove ecosystem has strong potential to be developed as a center for education and research, where students and university researchers can conduct studies on mangrove biodiversity and other ecosystem services. In this regard, mangrove literacy programs are essential for school-age children to build awareness and foster responsibility in protecting and preserving mangrove ecosystems.

The success of the Edu-Ecotourism Model is strongly supported by the ecological characteristics found in Negeri Rutong. Its effectiveness largely depends on the three main pillars that must be harmonized by the government and stakeholders.

A. Educational Aspect (Strengthening the 72% Ecological Aspect)

The educational function should be the core of the policy, focusing on:

- Development of Local Curriculum: Designing educational modules or learning materials on bioecology, the importance of Blue Carbon, and coastal disaster mitigation, targeted at students, university learners, and the general public.
- Learning Facilities: Establishing infrastructure such as scientific themed tracking trails, interactive information boards, and interpretation centers that clearly explain the seven mangrove species and the roles of associated fauna.
- Science-Based Guide Training: Ensuring that local guides (community members) are trained by academics to communicate research findings in a simple yet accurate manner not merely guiding visitors to locations, but also educating them about ecological significance.

B. **Ecotourism Aspect (Supporting the 19% Economic Aspect)**

Economic utilization must be low-impact and conservation-oriented, including:

- Paid Conservation Tourism: Implementing fair entrance fees, where the majority of the revenue is reinvested into maintenance, research, and conservation incentives for local communities.
- Development of Non-Timber Products: Encouraging economic diversification among local communities through non-timber mangrove products (e.g., syrup or sweets made from *Sonneratia* fruit, and honey produced from *Sonneratia alba*) as eco-friendly souvenirs.
- Carrying Capacity Regulation: Setting maximum visitor limits and establishing buffer zones to ensure that tourism activities do not disrupt wildlife habitats or compromise the fragile health of the mangrove ecosystem.

C. **Aspect of Socialization and Synergy**

- Triple Helix Dialogue

A three-party dialogue involving the Government, Academia, and Community should be held regularly. Academics present evidence-based research findings periodically; the Government makes timely decisions based

on these data; and the Community provides feedback on field implementation, ensuring that policies remain practical and effective.

- Police Brief Socialization:

Academics should also formulate concise policy briefs for the Government and stakeholders to ensure that policy decisions are aligned with the latest developments in science and technology.

Alternative Model 2: Co-Management

The second policy model is Co-Management**.** In this context, co-management emphasizes that local communities, as primary stakeholders, should receive tangible benefits from the very beginning of the management process**, since** they best understand local conditions and community needs. However, in practice, community participation is both the object and subject in mangrove management remains very limited**.**

Therefore, it is essential to develop partnership-based relationships among stakeholders**,** grounded in the principles of equality, mutual dependence, mutual benefit, and sustainability. The formulation of co-management must be collaboratively developed with stakeholders to synchronize their various interests, ensure the sustainability of the mangrove ecosystem**,** and ultimately contribute to regional income growth and community welfare**.**

Collaborative partnerships in mangrove management should be strengthened to enhance effectiveness and efficiency in planning, implementation, monitoring, and evaluation. Such partnerships are based on shared responsibility for addressing crises in mangrove resource management and governance.

Collaborative management, according to Kustanti (2011)**,** is grounded in the shared interests of stakeholders to achieve mutual benefits in mangrove forest management. Furthermore, as noted by Sandström and Widmark (2007)**,** effective collaborative management requires an institutional approach to understand the complex relationships among stakeholders, including differences in interests and power dynamics.

Alternative Model 3: Conservation and Rehabilitation

The third policy model is Conservation and Rehabilitation, which represents a fundamental effort **to** preserve and sustain the potential of mangrove resources, ensuring sustainable mangrove management**.**

According to Law No. 41 of 1999 on Forestry, mangroves are recognized as an integral part of forest ecosystems. Therefore, the government holds responsibility for managing them based on principles of utility and sustainability. In addition, Government Regulation No. 27 of 2025 on the Protection and Management of Mangrove Ecosystems reinforces that the protection and management of mangrove ecosystem**s** must be implemented as a systematic and integrated effort aimed at preserving ecosystem functions and preventing environmental degradation**.**

This legal framework reflects the understanding that the mangrove ecosystem **is a** comprehensive and interconnected system**,** where each element interacts to maintain the **balance, stability, and productivity** of the ecosystem as a whole.

Policy Priorities in Mangrove Forest Ecosystem Management

In implementing the Eduecotourism policy model, it is essential to prioritize academic research findings. Academics, as the primary actors through their scientific studies, play a crucial role in providing constructive solutions for mangrove management to ensure that the ecological functions of mangrove forests are preserved particularly in addressing the growing threats of extreme climate change in recent years.

In addition, other stakeholders, especially government institutions, also play a vital role in mangrove ecosystem management. The local government, through relevant technical agencies, is expected to formulate operational and technical policy models for mangrove ecosystem management. Strong coordination among government bodies and stakeholders is therefore essential to design a comprehensive operational policy framework for mangrove management that is guided by an ecological approach.

Integration of Ecological Data in Decision-Making

Coordination between government agencies and stakeholders must ensure that all operational decisions align with and do not contradict the ecological functions of mangrove ecosystems. This entails the following principles:

1. Evidence-BasedDecision-Making:

Rejecting any development proposals that could potentially damage the mangrove ecosystem, even if they promise short-term economic gains, as such actions violate the **ecological principles** established through academic research.

2. Cross-SectoralHarmonization**:**

Strengthening collaboration among agencies such as the Department of Tourism, Department of Environment, and Department of Fisheries to ensure that tourism development aligns with environmental and ecological sustainability goals.

3. Partnership-BasedCoordinationMechanisms:

Establishing mechanisms of coordination that are rooted in collaborative partnerships, ensuring transparency, shared responsibility, and mutual benefit among all parties involved in mangrove ecosystem management.

Effective coordination requires the establishment of regular forums, such as a *Mangrove Management Council* or an *Eduecotourism Committee*, which involve the following components:

- Presenting the latest research findings and scientific evidence.
- Decision Makers (Government/Technical Agencies**):** Formulating and implementing policies based on research outcomes.
- Implementers (Communities/Private Sector): Providing feedback from field implementation and carrying out community-based activities.

By prioritizing research-based evidence and ensuring comprehensive coordination among all stakeholders, the Eduecotourism policy model can serve as a resilient framework against climate change while sustainably enhancing the welfare of the community in *Negeri Rutong*.

IV. CONCLUSION

Based on the results of the research above, several conclusions can be drawn as follows:

1. The factors influencing mangrove ecosystem management policies are ecological factors, economic factors, and social factors.
2. The sustainable mangrove forest management policy model that supports the FOLU Net Sink 2030 target in Rutong Village is the Mangrove Edu-Ecotourism Policy Model.

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