ANALYSIS OF THE ROLE OF GOVERNMENT AND SUSTAINABILITY OF MARINE PROTECTED AREA MANAGEMENT OF GILI KETAPANG ISLAND AREA

aErlinda Indrayani, bHarsuko Riniwati, cRosihan Asmara, dSolimun, eNiken Hendrakusma Wardani

ABSTRACT

Purpose: Good management of regional marine protected areas requires direct government such as making policies, conducting supervision, and making plans and strategies. Therefore, this study aims to analyze the role of the government on the sustainability of regional marine protected area management of Gili Ketapang Island.

Theoretical Reference: PERMEN-KP Number 31 of 2020 and Law Number 1 of 2014 are used to understanding about conservative area, especialy for Marine Protected Area. RAPFISH by Kavanagh & Pitcher (2004) is used to analized the sustainbility of Marine Protected Area in Gili Ketapang Island.

Method: This research uses primary data with the sample being stakeholders and communities around the Gili Ketapang conservation area using purposive sampling technique. Plans and strategies were analyzed using Analysis Hierarchy Process and sustainability analysis with Multidimensional Scaling using RAPFISH technique.

Result dan Conclusion: The results obtained are the priorities of the government as the maker of plans and strategies, namely conducting socialization and providing alternative building materials that do not damage the environment. In addition, the social dimension requires special attention for the sustainability of the Gili Ketapang conservation area.

Originality/Value: This research produces aspects that need to be improved in order to increase the sustainability of the marine protected area on Gili Ketapang, which incidentally is a newly designated conservation area that has not been researched before.

Keywords: marine protected area, government role, sustainability, Gili Ketapang.
ANÁLISE DO PAPEL DO GOVERNO E SUSTENTABILIDADE DA ÁREA MARINHA PROTEGIDA GESTÃO DA ÁREA DA ILHA GILI KETAPANG

RESUMO

Objetivo: A boa gestão das áreas marinhas protegidas regionais requer um governo direto, como a elaboração de políticas, a realização de supervisão e a elaboração de planos e estratégias. Portanto, este estudo visa analisar o papel do governo na sustentabilidade da gestão regional da área marinha protegida da Ilha Gili Ketapang.


Método: Esta pesquisa usa dados primários com a amostra sendo partes interessadas e comunidades em torno da área de conservação de Gili Ketapang usando técnica de amostragem proposta. Os planos e estratégias foram analisados por meio do Processo de Hierarquia de Análise e análise de sustentabilidade com Escala Multidimensional utilizando a técnica RAPFISH.

Resultado dan Conclusão: Os resultados obtidos são as prioridades do governo como o criador de planos e estratégias, ou seja, conduzir a socialização e fornecer materiais de construção alternativos que não prejudicam o meio ambiente. Além disso, a dimensão social requer especial atenção para a sustentabilidade da área de conservação de Gili Ketapang.

Originalidade/valor: Esta pesquisa produz aspectos que precisam ser melhorados a fim de aumentar a sustentabilidade da área marinha protegida em Gili Ketapang, que aliás é uma área de conservação recém-designada que não foi pesquisada antes.

Palavras-chave: área marinha protegida, função governamental, sustentabilidade, Gili Ketapang.

CUMPLIMIENTO DEL DERECHO DE VOTO PASIVO DE LAS COMUNIDADES COSTERAS EN LAS ELECCIONES LEGISLATIVAS REGIONALES EN INDONESIA

RESUMEN

Propósito: La buena gestión de las áreas marinas protegidas regionales requiere un gobierno directo, como la formulación de políticas, la realización de la supervisión y la elaboración de planes y estrategias. Por lo tanto, este estudio tiene como objetivo analizar el papel del gobierno en la sostenibilidad de la gestión regional del área marina protegida de la isla Gili Ketapang.


Método: Esta investigación utiliza datos primarios, siendo la muestra las partes interesadas y las comunidades alrededor del área de conservación de Gili Ketapang utilizando la técnica de muestreo intencional. Los planes y estrategias fueron analizados mediante Análisis de Jerarquía de Procesos y Análisis de Sostenibilidad con Escalamiento Multidimensional utilizando la técnica RAPFISH.
Resultado y conclusión: Los resultados obtenidos son las prioridades del gobierno como creador de planes y estrategias, es decir, realizar la socialización y proporcionar materiales de construcción alternativos que no dañen el medio ambiente. Además, la dimensión social requiere una atención especial para la sostenibilidad del área de conservación de Gili Ketapang.

Originalidad/Valor: Esta investigación produce aspectos que deben mejorarse para aumentar la sostenibilidad del área marina protegida en Gili Ketapang, que por cierto es un área de conservación recientemente designada que no se ha investigado antes.

Palabras clave: área marina protegida, papel gubernamental, sostenibilidad, Gili Ketapang.

1 INTRODUCTION

Indonesia is an archipelago that has the potential for abundant natural resources and diverse ethnic regional cultures that greatly support the development of the national strategic sector, namely tourism. Through the implementation of Law No. 12/2008 on Local Government, the central government has given authority to local governments to manage and optimize the potential of their regions independently, including managing the tourism sector. Sustainable tourism in the context of the environment, society, culture, and economy considers the long-term impacts of tourism on both the locals and visitors to the host communities. Four main principles are put into practice to make this concept a reality: long-term socioeconomic sustainability, ongoing development of cultural sustainability, preservation of environmental sustainability, and sustainable management of tourism enterprises. (Badriyah, 2023). Tourism development efforts in East Java Province were demonstrated by the East Java Culture and Tourism Office with the existence of a "Visit East Java" program in 2011 which aims to attract tourists by introducing to the world that East Java has a variety of natural and cultural wealth that is very special. In this Visit East Java program, Gili Ketapang island tour in Probolinggo Regency was appointed as one of the leading tourism destinations in East Java (Dermawana and Anom, 2019).

Gili Ketapang Island has a strategic location because it is in the Madura Strait and not too far from the mainland. Gili Ketapang Island has access to ferries that connect the mainland with Gili Ketapang Island. The Gili Ketapang water area presents a combination of underwater beauty, white sandy beaches and biodiversity. The underwater nature reserve has a charm of attraction with a variety of coral reefs and fish. This is a great potential for the development of tourism activities in the Gili Ketapang region. This tourism potential then encouraged local youth to develop snorkeling tourism since 2016.
According to the statistics of Probolinggo Regency, the number of tourists in 2017 was 686,711 people (Fakri and Purwanti, 2021).

The waters of Gili Ketapang are one of the waters that have been made a Regional Marine Conservation Area on June 30, 2020, in accordance with the enactment of the Ministerial Decree of the Ministry of Fisheries number 64 of 2020. Based on KEPMEN-KP Number 64 of 2020 concerning the Gili Ketapang Waters Conservation Area whose purpose is to protect, preserve and utilize various kinds of potential on Gili Ketapang Island. The determination of Gili Ketapang waters as a Regional Marine Conservation Area is a comprehensive step considering that the waters of Gili Ketapang and the surrounding waters in East Java Province have a great opportunity to support the development of sustainable aquatic tourism.

The establishment of Gili Ketapang Island as a marine protected area is expected to increase the potential of the area. However, the establishment of the new Gili Ketapang conservation area requires a direct government role such as making policies, conducting supervision, and making plans and strategies in managing the Gili Ketapang conservation area so that the Gili Ketapang conservation area can survive and be sustainable. Therefore, it is important to study the role of the government in the sustainability of the management of the Gili Ketapang Island Regional Marine Protected Area. This research aims at the parties that have an important role in the Gili Ketapang conservation area as well as plans and strategies to maintain the environment of the Gili Ketapang conservation area. In addition, this research also assesses the sustainability index in each dimension of the Gili Ketapang conservation area to get the dimensions that are good and those that are not good enough to increase the chances of sustainability of the Gili Ketapang conservation area.

2 THEORITICAL FRAMEWORK

2.1 CONSERVATION AREA

Damanik (2019) states that a conservation area is an area or region that has been designated by the government as an area that must be protected with the aim that the conditions in the area remain sustainable. Areas that are used as conservation areas have certain uniqueness and distinctiveness and have a very important role for the surrounding
environment. Conservation areas are areas that have been designated as areas for nature conservation and nature reserves.

Based on PERMEN-KP Number 31 of 2020 Conservation Areas are areas that have certain characteristics as a unity of biodiversity, and ecosystems that are protected, preserved, and utilized sustainably. According to Law Number 1 of 2014 concerning Management of Coastal Areas and Small Islands defines conservation as an effort to protect, preserve and utilize coastal areas and small islands as well as biodiversity, and their ecosystems to ensure the existence, availability and sustainability of coastal resources and small islands while maintaining and improving the quality of their value and diversity. According to Law 27/2007 aimed protect, conserve, rehabilitate and enrich coastal resources and small islands and sustainable ecosystem. This law recognizes, respect and protects indigenous and traditional people, including coastal area local wisdoms (Al Mukarramah et al. 2023).

Marine protected areas are areas designated and managed for the long-term conservation of marine resources, ecosystems, services, or cultural heritage. The term marine protected area covers a wide range of conservation and management methods, including marine reserves or "no-take" areas that restrict extractive activities to protect and sustain biodiversity, threatened species, or fisheries. Marine protected areas can have multiple benefits allowing activities such as fishing, recreation, and industrial use (Kriegl et al. 2021).

Marine protected areas themselves cover the diversity of marine ecosystems, from estuaries to coastal areas and the open sea. In other words, a marine protected area is any area in tidal or subtidal areas, together with the waters above them and their associated flora, fauna, historical and cultural features, that has been reserved by law or other effective means to protect part or all the enclosed environment (Humphreys and Clark, 2020). Gili Ketapang Conservation Area is a marine conservation area located in the waters around Gili Ketapang Island in Probolinggo Regency, East Java, Indonesia. The conservation area has an area of 476.78 hectares and is divided into three types of sustainable fishing zones and other zones. The zoning of Coastal and Small Island Conservation Areas is based on their carrying capacity and ecological processes, and each conservation area can have one or more zones according to its physical, bioecological, social, economic, and cultural characteristics.
The establishment of marine protected areas is closely related to social, ecological and economic considerations (Pendleton et al., 2018; Humphreys and Clark, 2020; Kriegl et al. 2021). In every MPA establishment, there will be a community of resource users whose actions are regulated by MPA managers. Different governance approaches and policy frameworks address the challenges associated with marine resource management and biodiversity conservation. (McCay and Jones, 2011; Jones, 2012; Gaymer et al., 2014; Kriegl et al. 2021). Ultimately, the effectiveness and success of individual MPAs (like most other management tools) is strongly influenced by community behavior and acceptance (Bennett and Dearden, 2014; Kriegl et al. 2021).

2.2 SUSTAINABILITY OF CONSERVATION AREAS

Conservation areas, including marine protected areas (MPAs) are essential for maintaining ocean health and preserving biodiversity. Marine protected areas can increase fish populations, provide ecological benefits to surrounding ecosystems, protect predators, maintain ecosystem stability, and help preserve cultures with close ties to the ocean. However, the sustainability of these protected areas depends on strong governance that influences human behavior and reduces impacts on marine and coastal ecosystems.

Conservation area sustainability refers to efforts to maintain, conserve and manage natural resources in an area by ensuring the long-term resilience and balance of the ecosystem. The role of sustainable conservation is intended to develop the economic value contained therein without damaging the existing ecosystem. Achieving the concept of sustainable marine conservation is the responsibility of the government and the community, especially fishermen, how the relationship between the government and the community, especially fishermen, communicates the concept of sustainability. In addition, active participation from every element of society is needed to support the management of sustainable marine protected areas (Setiawan et al., 2018).

Ecological, social, and economic benefits can be achieved through the conservation of marine resources, and the involvement of local communities and stakeholders is critical in planning and equitably sharing benefits. Governments, indigenous peoples, community leaders, NGOs, scientists, and others should accelerate protection measures and find innovative ways to increase the effectiveness of marine
protected areas, including approaches that provide safe passage for marine life between areas (Ban et al., 2019).

2.3 GOVERNMENT ROLE

According to Law No. 1 of 2014, the management of coastal areas and small islands is a process of coordinating planning, utilization, supervision, and control of coastal resources and small islands between sectors, between the government and local governments, between biodiversity, and land and marine ecosystems, as well as between science and management to improve the welfare of the community. Based on Law No. 27/2007, local governments are also authorized to develop coastal area management plans. The government in this conservation effort bridges the coastal community in maximizing the underwater products of the region.

According to Sarminingsih (2008) local governments have a very strategic role in providing knowledge and efforts to increase understanding of water conservation and its application in all levels of society can be grouped into 3 (three) target groups namely: first, politicians and policy makers they need to understand how water conservation concerns can help solve water shortage problems while providing socio-economic and environmental benefits. Second, water managers and experts involved in water planning, development, and management, including managers and scientists working for environmental conservation. Third, mass media and educators, their knowledge of the water sector may be limited but they are experts in public relations, communications, marketing, and education.

The government has an important role in the establishment, management, and monitoring of marine protected areas. Governments establish MPAs to protect threatened marine ecosystems and other underwater resources from intrusive human activities. Strong governance that can influence human behavior and reduce impacts on marine and coastal ecosystems is essential for MPAs to be truly effective (Kriegl et al., 2021). Governments should ensure that MPAs integrate ecological, social, and economic aspects and involve local communities and stakeholders in planning and equitable benefit sharing.
3 RESEARCH METHODS

3.1 RESEARCH DATA

The research was conducted on Gili Ketapang Island, which is in Sumberasih District, Probolinggo Regency, East Java. The research was conducted in February 2023 - March 2023. In this study there are two types of data used, namely primary data obtained from the results of surveys with questionnaires and observations in the field. The population in this study are the parties involved in the Gili Ketapang marine conservation area. The samples in this study were stakeholders and the community of Gili Ketapang marine conservation area. The sampling method used was nonprobability sampling with purposive sampling method. The criteria for respondents in this study are someone who has influence and is affected by the existence of the Gili Ketapang marine protected area. In analyzing the role of the government, 17 respondents were obtained consisting of government, stakeholders, and the community. Meanwhile, to analyze the sustainability of conservation areas, 45 respondents were obtained in the form of fishermen on the recommendation of related agencies in accordance with the research criteria.

3.2 ANALYSIS METHOD

This research consists of two analyses, namely analysis of the role of government with Analysis Hierarchy Process (AHP) and sustainability analysis with Multidimensional Scaling (MDS) analysis. From the analysis with AHP will produce government roles as well as plans and strategies with the aim of the government's role in managing the Gili Ketapang conservation area while with MDS will produce elements that affect the management of the Gili Ketapang conservation area and the sustainability index of each dimension of the management of the Gili Ketapang conservation area.

Analysis Hierarchy Process (AHP) is a method of analysis and synthesis that is able to help the decision-making process. AHP is a powerful and flexible decision-making tool that helps in setting priorities and making decisions where both qualitative and quantitative aspects are involved. By reducing complex factors into a series of "one on one comparisons" and then synthesizing the results, AHP can also provide clear and precise thinking. The 3 steps of using the AHP (Analysis Hierarchy Process) method
include problem identification, hierarchical structure preparation, and creating a pairwise comparison matrix. Problem identification is the identification of factors that support the main objectives in the form of goals, criteria, and alternatives. What is meant by goals in the hierarchy is goals, what is meant by criteria is strategies, and what is meant by alternatives is sub-strategies. After the main strategy and sub-strategy are compiled, the next is the preparation of the hierarchical structure. Next, make a questionnaire according to the comparison matrix. Based on the objectives of the existing research, the answers from informants were obtained from these points, namely the role of the government in the management of marine protected areas in the Gili Ketapang Island area.

Multidimensional Scaling (MDS) analysis is a multiple variable technique that can be used to determine the position of an object based on its similarity assessment, as well as to determine the interdependence relationship between variables or data (Johnson & Wichern, 1992). This relationship is not known through reduction or grouping of variables, but by comparing the variables in each object concerned using perceptual maps. MDS deals with the creation of maps to describe the position of an object with other objects based on the similarity of these objects. The main purpose of MDS is to describe multidimensional data in a simpler visual form, such as in two or three-dimensional space, so that it is easier to understand. In analyzing MDS data, values are used that describe the level of similarity or the level of dissimilarity between objects called proximity which is divided into similarity and dissimilarity (Ginanjar, 2008). Based on the type of data, MDS is divided into two, namely metric multidimensional scaling and non-metric multidimensional scaling.

Sustainability regarding the management of marine protected areas can be analyzed using an analytical tool called Multidimensional Scaling with an analytical technique called Rapid Appraisal for Fisheries (RAPFISH). The determination of the score on each dimension uses a three-category Likert scale (0,1,2) where based on the value of the indicator that the value of 2 indicates a good condition (good) while the value of 0 indicates a bad indicator condition (bad) while the value of 1 indicates a moderate condition. The sustainability index value used in this study is divided into 4 where the estimated score of each dimension is expressed on a scale of 0% bad to 100% good. The sustainability index categories are used to show where the sustainability conditions of the five dimensions discussed are located. The range of values is based on the ordination
values resulting from the analysis using RAPFISH (Kholil, et al., 2015). The sustainability index categories can be seen in Table 1.

**Table 1**

*Sustainability Index Category*

<table>
<thead>
<tr>
<th>No.</th>
<th>Index Value</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0-25</td>
<td>Not Sustainable</td>
</tr>
<tr>
<td>2.</td>
<td>26-50</td>
<td>Less Sustainable</td>
</tr>
<tr>
<td>3.</td>
<td>51-75</td>
<td>Moderately Sustainable</td>
</tr>
<tr>
<td>4.</td>
<td>76-100</td>
<td>Sustainable</td>
</tr>
</tbody>
</table>

Source: Kholil, et al. (2015)

There are several dimensions that determine sustainable water development. These dimensions include ecological, economic, social, institutional, and technological aspects. Each dimension has characteristics that must be met and become an indicator of the diversity and sustainability of waters so that sustainability can be achieved. In RAPFISH testing, the sustainability dimension is an important foundation for understanding stakeholder perceptions and assessments of the sustainability of marine protected area management. By utilizing this analytical tool, evaluations and improvements can be made to achieve better sustainability in the management of marine protected areas.

The analysis process using this technique will be carried out in several stages, including:

1. Determination of dimensional attributes to evaluate technical resource management in the Regional Marine Protected Area of Gili Ketapang Island;
2. Attribute assessment on an ordinal scale based on dimensional sustainability criteria (ecological, economic, social, technological, and legal and institutional);
3. Data analysis using RAPFISH technique;
4. Assessing the index value and sustainability status of dimensions;
5. Assessing sensitive attributes affecting sustainability using;
6. Assess the influence of errors in calculations using Monte Carlo analysis, and;
7. mapping the results of the MDS analysis into a kite diagram.
4 RESULT AND DISCUSSION

4.1 DEMOGRAPHICS OF GILI KETAPANG ISLAND

The demographic aspect is one of the important elements in an area, this is because the demographic aspect is a description of the population that affects the quality of human resources (Human Resources) contained in the region so that it has an impact on the ability to manage the area, namely Gili Ketapang Island. Some points in demography are related to population, gender and migration data or population movements. The total population on Gili Ketapang Island can be seen in Table 2.

Table 2

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>985</td>
<td>1.000</td>
<td>1.985</td>
</tr>
<tr>
<td>15-64</td>
<td>3.043</td>
<td>3.002</td>
<td>6.045</td>
</tr>
<tr>
<td>&gt;64</td>
<td>218</td>
<td>309</td>
<td>529</td>
</tr>
<tr>
<td>Total</td>
<td>4.246</td>
<td>4.311</td>
<td>8.557</td>
</tr>
</tbody>
</table>

Source: Gili Ketapang Village Office (2023)

Based on Table 2, the population of Gili Ketapang Village is mostly at working age, so that the number of people who are at working age can increase opportunities to develop the potential of Gili Ketapang as a conservation and tourism area. The number of community livelihoods on Gili Ketapang Island is also described to see the economic potential of Gili Ketapang Village. The number of community livelihoods on Gili Ketapang Island can be seen in Table 3.

Table 3

<table>
<thead>
<tr>
<th>No.</th>
<th>Livelihoods</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>TNI/POLRI</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>Civil Servants</td>
<td>6</td>
</tr>
<tr>
<td>3.</td>
<td>Farmer</td>
<td>6</td>
</tr>
<tr>
<td>4.</td>
<td>Trader</td>
<td>203</td>
</tr>
<tr>
<td>5.</td>
<td>Fisherman</td>
<td>2.226</td>
</tr>
<tr>
<td>6.</td>
<td>Private Employee</td>
<td>11</td>
</tr>
<tr>
<td>7.</td>
<td>Others</td>
<td>292</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2.744</td>
</tr>
</tbody>
</table>

Source: Gili Ketapang Village Office (2023)
Based on Table 2, it can be seen that the main livelihood on Gili Ketapang Island is fisherman, this is in accordance with the geographical conditions in the form of islands and surrounded by sea waters as a fishing ground (fishing area) by fisherman from Gili Ketapang Island. However, the number of workers is not proportional to the working age in Gili Ketapang Village. With so many people of working age, it can increase opportunities to utilize the Gili Ketapang area properly, such as opening up jobs, especially for tourist areas so as to increase the income of the community in the Gili Ketapang area.

4.2 GOVERNMENT ROLE ANALYSIS

Analyzing the government's role in managing marine protected areas of Gili Ketapang Island using AHP. AHP produces a hierarchy of complex problems to facilitate the government's role in conservation area management. The government can use AHP to consider the priority of actions that need to be taken in the management of marine protected areas of Gili Ketapang Island. Overall, AHP can help the government to make more informed and objective decisions or policies in the management of marine protected areas of Gili Ketapang Island.

Some factors that can become AHP criteria regarding the analysis of the government's role in the management of marine protected areas in the Gili Ketapang area include:

1. The management system is not well organized;
2. Environmental damage around the conservation area;
3. Law enforcement has not been comprehensive;
4. Empowerment program for wives of fisherman has not been implemented.

Analysis using AHP with the aim of Government Role in the Management of Marine Protected Areas in the Gili Ketapang Island area consists of 3 hierarchies, namely:

1. First Hierarchy.

The first hierarchy contains factors that influence the role of government in the management of marine protected areas of Gili Ketapang Island. The first hierarchy is the criteria included in the main problem which amounts to 4 criteria including:

M1: The management system is not well organized.
M2: Environmental damage around the conservation area.
M3: Law enforcement that has not been comprehensive.
M4: Unimplemented program to empower the wives of fisherman.

2. Second Hierarchy

The second hierarchy is the factors that influence the criteria or subject matter of the government's role in the management of marine protected areas of Gili Ketapang Island. The second hierarchy is the criteria of the main criteria which consists of 12 sub criteria, namely:

  M1A: Absence of SUOP (Unit Operational Management Unit).
  M1B: Monitoring activities that have not been optimized.
  M1C: Lack of stakeholder contribution in conservation area management.
  M2A: Many people take sand for development.
  M2B: Large amount of domestic waste from the community.
  M2C: The amount of waste sent from other regions.
  M3A: Lack of socialization of applicable rules and policies.
  M3B: Not yet optimal licensing in the utilization of conservation areas.
  M3C: Less strict sanctions for violators.
  M4A: Lack of socialization activities regarding the empowerment of fisherman's wives.
  M4B: The absence of training and coaching activities for the wives of fisherman to improve the economy of the families of fisherman.
  M4C: There is no business fund assistance for the wives of fisherman.

3. Third Hierarchy

This third hierarchy is a factor that helps the government's role in prioritizing decisions or policies from criteria or subject matter in the management of marine protected areas in the Gili Ketapang Island area. The third hierarchy is alternative sub-criteria or decision selection from criteria totaling 12 alternative sub-criteria including:

  S1A: Establishing SUOP and division of duties.
  S1B: Intensive supervision in the management of conservation areas.
  S1C: Increase stakeholder participation in conservation area management.
  S2A: Conduct socialization and provide alternative building materials that do not damage the environment.
  S2B: Increase public awareness and implement a good and systematic waste management system.
S2C: Perform preventive and curative actions on the problem of waste shipment.
S3A: Improve socialization of policies and regulations to the community.
S3B: Strengthening licensing in the utilization of conservation areas.
S3C: Providing strict and real sanctions to violating parties.
S4A: Organizing optimal socialization activities regarding the empowerment of fisherman's wives.
S4B: Organizing training and coaching activities for the wives of fisherman.
S4C: Allocate assistance funds for businesses to the wives of fisherman.

Figure 1
Hierarchical Structure of The Government's Role In The Management of The Gili Ketapang Island Regional Marine Protected Area

4.2.1 Prioritization Results for Each Hierarchy Level

Each hierarchy was tested for Inconsistency Ratio to determine the validity of the data and analysis results. An Inconsistency Ratio of less than 0.1 indicates that the data and analysis results are valid. Prioritization at each level is seen from the priority that has the largest score. The results of the prioritization of each level of the hierarchy of the role of government in the management of marine protected areas of Gili Ketapang Island are presented in Table 4.
The results of the analysis in Table 4 show that environmental damage around conservation areas (M2) is a priority because it has a very bad impact on environmental conditions, biodiversity, and marine ecosystems on Gili Ketapang Island. Environmental damage around the conservation area is caused by human activities, namely the number of people who take sand for development, the amount of domestic waste from the community, and the amount of garbage sent from other areas. In addition, the lack of socialization and community empowerment from the government has made the Gili Ketapang conservation area not well organized and managed. Therefore, the government can take action by forming a SUOP (Unit Operational Management Unit) that will manage the Gili Ketapang conservation area. The government also needs to socialize policies and regulations and provide alternative building materials that do not damage the environment. The government should also empower the wives of fisherman such as the utilization of marine waste that is created so that it can have economic value which is expected to increase family income in the Gili Ketapang Region.

Table 4

<table>
<thead>
<tr>
<th>Hierarchy</th>
<th>Inconsistency Ratio</th>
<th>Greatest Score</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>0.020</td>
<td>0.558</td>
<td>Environmental damage around the conservation area (M2)</td>
</tr>
<tr>
<td></td>
<td>0.020</td>
<td>0.472</td>
<td>Absence of SUOP (Unit Operational Management Unit) (M1A)</td>
</tr>
<tr>
<td></td>
<td>&lt;0.001</td>
<td>0.731</td>
<td>Many people take sand for development (M2A)</td>
</tr>
<tr>
<td></td>
<td>0.006</td>
<td>0.656</td>
<td>Lack of socialization of applicable rules and policies (M3A)</td>
</tr>
<tr>
<td></td>
<td>0.006</td>
<td>0.569</td>
<td>There is no business fund assistance for the wives of fisherman (M4A)</td>
</tr>
<tr>
<td>Level 2</td>
<td>0.006</td>
<td>0.464</td>
<td>Establishing SUOP and division of duties (S1A)</td>
</tr>
<tr>
<td></td>
<td>0.004</td>
<td>0.691</td>
<td>Conduct socialization and provide alternative building materials that do not damage the environment (S2A)</td>
</tr>
<tr>
<td></td>
<td>0.020</td>
<td>0.642</td>
<td>Improve socialization of policies and regulations to the community (S3A)</td>
</tr>
<tr>
<td></td>
<td>0.003</td>
<td>0.594</td>
<td>Organizing optimal socialization activities regarding the empowerment of fisherman's wives (S4A)</td>
</tr>
</tbody>
</table>

Source: Author Results (2023)

4.3 LEVEL OF SUSTAINABILITY OF MARINE PROTECTED AREA MANAGEMENT

Based on the results of the analysis used using Multidimensional Scaling (MDS) or RAPFISH on 5 dimensions of sustainability, namely ecological, economic, social,
institutional, and technological on the sustainability of marine protected area management on Gili Ketapang Island, the stress value can be seen in Table 5.

According to Kavanagh and Pitcher (2004), a good stress value is less than 0.25 and an R2 value close to 1.0. These values indicate that the attributes of each dimension of regional marine protected area management on Gili Ketapang Island studied using RAPFISH analysis are quite accurate and can be considered.

Table 5

*MDS Stress and R-Square Values*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Stress Value</th>
<th>Squared Correlation (R²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecology</td>
<td>0.15</td>
<td>0.93</td>
</tr>
<tr>
<td>Economy</td>
<td>0.17</td>
<td>0.92</td>
</tr>
<tr>
<td>Social</td>
<td>0.19</td>
<td>0.91</td>
</tr>
<tr>
<td>Institutional</td>
<td>0.17</td>
<td>0.92</td>
</tr>
<tr>
<td>Technology</td>
<td>0.15</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Source: Author Results (2023)

Based on the results of a series of analyses using RAPFISH on the five dimensions that affect the sustainability of regional marine protected area management on Gili Ketapang Island, the results of the level of sustainability are presented in a kite diagram so that priorities can be determined that need to be taken in improving these dimensions. Figure 2 is a kite diagram that clearly shows the comparison of the five dimensions.

Figure 2

*Kite Diagram*
Based on Figure 2, shows that from the results of RAPFISH that has been carried out on each dimension, an ordination value or sustainability index is generated, namely the ecological dimension of 84.75 which means it is in a sustainable condition, the index value in the economic dimension is 45.10 which means it is in a less sustainable condition, then for the social dimension which is 49.76 which means it is in a less sustainable condition, and the index value in the institutional dimension is 54.57 which means it is in a fairly sustainable condition, while the index value in the technological dimension is 81.01 which means it is in a sustainable condition, this shows that only the ecological and technological dimensions are in a sustainable condition. When averaged, the index value of the five dimensions is 63.03, which means that based on the index value of the five dimensions it is still in a fairly sustainable condition.

The research implication on the economic dimension shows that the sustainability value of the regional marine protected area on Gili Ketapang Island shows less sustainable, the findings of the research conducted that the establishment of the conservation area is not economically beneficial for the community, especially fishermen. So that new activities are needed that produce for fishermen or communities that will have an impact on improving economic conditions due to the establishment of the conservation area.

Furthermore, the dimension that is in a less sustainable condition is the social dimension. The research implication of this social dimension means that the establishment of the conservation area does not provide social benefits to the community, especially fishermen. Counseling is needed related to this marine protected area, especially for fishermen so as to provide awareness of the importance of the sustainability of the regional marine protected area, so that a sense of participation arises from those who understand the importance of maintaining the regional marine protected area.

Then for the institutional dimension, what really has to be done by the Provincial Maritime and Fisheries Service is the establishment of a Management Operational Unit (SUOP) that stands with a complete management SOP, so that management can be carried out routinely.
4.4 RESEARCH IMPLICATIONS IN ECONOMIC, SOCIAL, AND INSTITUTIONAL DIMENSIONS TO RAISE THE SUSTAINABILITY LEVEL OF GILI KETAPANG CONSERVATION AREA MANAGEMENT

Matters related to sensitive attributes of the economic, social, and institutional dimensions are important to increase the level of sustainability of the management of regional marine protected areas on Gili Ketapang Island, if there is no strengthening of the economic, social, and institutional dimensions, it is feared that the management of regional marine protected areas on Gili Ketapang Island will not continue into the future.

The results of this study are in accordance with the evaluation report on the effectiveness of marine protected area management (EVIKA) of the Regional Marine Protected Area of Gili Ketapang Island and its Surrounding Waters published by the Directorate of Conservation and Diversity of Marine Products, in the report it is written that the final value of EVIKA is 44.37 which means that the management of regional marine protected areas on Gili Ketapang Island is minimally managed, the value is less than 50% which states the condition in the bronze rank. Evaluation of conservation areas is carried out using measuring instruments that have been determined through the Decree of the Director General of Marine Spatial Management Number 28/KEP-DJPRL/2020 concerning Technical Guidelines for Evaluating the Effectiveness of Conservation Area Management. The 2021 EVIKA assessment of conservation areas is carried out so that it can be used as a baseline for assessing the effectiveness of future conservation area management.

5 CONCLUSION

1. Plans and strategies for the role of the government in the management of marine protected areas in the Gili Ketapang Island area obtained are the most prioritized alternative sub criteria, namely conducting socialization and providing alternative building materials that do not damage the environment. This is also due to the most prioritized criteria, namely environmental damage around the conservation area and the results of prioritizing sub-criteria on the criteria for environmental damage around the conservation area, namely the number of people who take sand for development. So that the plans and strategies that are prioritized are to improve
and manage the environment of the marine conservation area of Gili Ketapang Island properly and correctly.

2. Based on the sustainability index of each dimension of Regional Marine Protected Area Management on Gili Ketapang Island, there are ecological dimensions and technological dimensions that are in a sustainable condition with an ecological dimension index value of 84.75 and a technological dimension of 81.01. While the dimension that is in a moderately sustainable condition is the institutional dimension with an index value of 54.57. While there are economic and social dimensions that are in a less sustainable condition with index values of 45.1 and 49.76 respectively, so that the main attention needs to be paid to the economic and social dimensions, because they have the potential to be bad and affect the sustainability of Regional Marine Protected Area Management on Gili Ketapang Island.
REFERENCES


Undang-Undang Nomor 1 Tahun 2014 tentang Perubahan atas Undang-Undang Nomor 27 Tahun 2007 tentang Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil (Lembaran Negara Republik Indonesia Tahun 2014 Nomor 2, Tambahan Lembaran Negara Republik Indonesia Nomor 5490).