



Impact of Mangrove Damage in Jailolo District, West Halmahera Regency

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ABSTRACT

Jailolo has mangrove plants located on the coast that can protect the coastline from erosion, waves and sea water, but several villages in Jailolo Sub-district have shifted the development of mangrove plants where mangroves have been used as fuel and building materials. Saria Village and Gamtala Village are villages located near the coast and some of the people utilize mangroves as firewood and building materials. Based on the above background, the following problems can be formulated, namely how is the impact of mangrove damage in Jailolo District, West Halmahera Regency? And how to formulate a strategy for handling the impact of mangrove damage in Jailolo District, West Halmahera Regency? This research was conducted in Saria Village and Gamtala Village, Jailolo District, West Halmahera Regency. And the implementation of research in September - October 2021. The number of respondents taken in this study was 60 people consisting of 30 people per village close to the mangrove area. Data analysis techniques used in this research are Internal Factor Evaluation Matrix (IFE), External Factor Evaluation Matrix (EFE), Internal External Matrix (IE), SWOT Analysis Matrix and QSP Matrix (QSPM). The results showed that the impact of mangrove damage in Jailolo District, West Halmahera Regency, the impact on people's lives and the environment that occurred in Saria Village and Gamtala Village was a decrease in the catch of fishermen in this case fish, due to loss of habitat and fish populations, loss of fish breeding ground, causing coastal abrasion, because there is no barrier when the waves or tides due to mangrove reduction, can cause sunami because it does not withstand the movement of underwater waves, due to loss of mangrove habitat, SWOT results, with an IFE (Internal Factor Evaluation) value of 2.52 and EFE (External Factor Evaluation) of 2.50.

Introduction

Indonesia is a country that has the largest mangrove forest in the world (Onrizal, 2014). Mangrove forests are generally found throughout the coast of Indonesia and live and grow in locations that have a relationship with the influence of tides on river flows along the

coast (Tarigan, 2014). Mangrove forest is an ecosystem that has an important role in terms of ecological and socio-economic aspects. Mangrove forest is a type of forest that is overgrown with mangrove trees (mangroves) which are typically found along the coast or river mouth and are influenced by tides (Hogarth, 2014).

Indonesia has mangrove areas with an area of approximately 3.7 million hectares. Mangrove areas are spread across the coasts of Sumatra, Kalimantan, Java, Bali, and Papua. The cause of the lack of mangrove forests is land clearing or forest conversion into aquaculture, settlements, and industrial areas. In addition to the conversion of mangrove forest damage also occurs due to intensive utilization for firewood, building materials, utilization of mangrove leaves as animal feed, as well as mining of sea sand along the front coast of the mangrove area (Suryono, 2013).

The area of mangrove forests in Aceh is 50,000 hectares, North Sumatra 60,000 hectares, Riau 95,000 hectares, South Sumatra 195,000 hectares, South Sulawesi 24,000 hectares, Southeast Sulawesi 29,000 hectares, East Kalimantan 150,000 hectares, South Kalimantan 15,000 hectares, Central Kalimantan 10,000 hectares, West Kalimantan 40,000 hectares, West Java 20,400 hectares, Central Java 14,041 hectares, East Java 6,000 hectares, Nusa Tenggara 3,678 hectares, Maluku 100,000 hectares, Irian Jaya 2,934,000 hectares (Suryono, 2013).

North Maluku which also began to promote mangrove forest conservation is Ternate City, because mangrove forests in this area are threatened with extinction. Based on the results of the critical land inventory in 2007, the area of mangrove land in North Maluku Province reached 550,750 hectares, with a critical category of 259,360 hectares and a very critical category reaching 291,390 hectares. In 2011, the mangrove land area increased to 611,106 hectares with a critical category of 447,669 hectares and a very critical category of 163,438 hectares. One of the efforts to reduce and green critical land in North Maluku, various rehabilitation efforts have been carried out, among others, through planting and maintaining 1 billion trees. Through these activities since 2010, 12,574,262 trees have been planted, in 2019 there was an increase in planting which reached 13,319,676 trees. (33 North Maluku Forestry Profile)

West Halmahera Regency has a mangrove forest area of approximately 3,046.63 hectares, of which the primary mangrove forest has an area of approximately 2,387.53 hectares and the secondary mangrove forest has an area of approximately 659.11 hectares. This area with beautiful underwater natural charm also has abundant spice resources.

Causes of Mangrove Forest Damage to mangrove forests can occur naturally or under pressure by people living around mangrove forests. Naturally, it occurs due to natural events such as typhoons or prolonged climates that cause salt accumulation in mangrove plants. A serious disturbance to the sustainability of mangrove forests is the occurrence of forest

destruction and illegal logging. Other disturbances include violations in the implementation of forest exploitation and sedimentation. There are three main factors that cause mangrove forest damage (Kusmana, 2018), namely:

1. Pollution.

Pollution that occurs in mangrove forest areas is mainly caused by oil and heavy metals.

The two main sources of pollution of mangrove areas are the negative impact of shipping, industrial activities and leaks on industrial pipes/tankers and spills in transportation.

2. Land conversion of mangrove forests.

Conversion of mangrove forests for aquaculture, agricultural land, roads, industry, cities, mining, sand excavation and so on.

Legal and illegal logging of mangrove wood for firewood, charcoal and chip production has been going on for a long time. The exploitation is carried out excessively so that it has caused damage and decreased the function or production potential of mangrove forests.

Furthermore, (Kusmana, 2018) suggests that there are supporting factors that cause mangrove forest damage, among others, economic growth requires the availability of transportation facilities and infrastructure, especially roads, terminals, ports and other infrastructure, urbanization and so on. Increased economic activity like this helped accelerate the destruction of mangrove forest areas. (Kusmana, 2002).

Mangrove plants also act as a buffer (natural shield) and stabilize the soil by capturing and trapping material deposits from land carried by river water and which is then carried to the middle of the sea by the current. Mangrove forests thrive in deltas and large rivers with wide estuaries. In coastal areas where there is no river, the mangrove area is narrow. Mangrove forests have a high tolerance for salt content and can thrive in high salinity areas where ordinary plants cannot grow (Suryono, 2013).

Jailolo has mangrove plants located on the coast that can protect the coastline from erosion, waves and sea water, but some villages in Jailolo District have occurred a shift in the development of mangrove plants where mangroves have been used as fuel and building materials. This results in shifting marine biota or moving places. Similarly, the seepage of seawater enters closer to residential housing and coastal abrasion begins to occur. Saria and Gamtala villages are villages located near the coast and where some villagers use mangroves as firewood and buildings. Based on the background above, it can be formulated as follows is how is the impact of mangrove damage in Jailolo District, West Halmahera Regency? And how to formulate a strategy for the impact of mangrove damage in Jailolo District, West Halmahera Regency? While the research objectives are Knowing the impact of mangrove damage in Jailolo District, West Halmahera Regency. And formulate strategies to reduce the impact of mangrove damage in Jailolo District, West Halmahera Regency.

Research Method

Location and Time of Research

Research in Saria and Gamtala Villages, Jailolo District, West Halmahera Regency. And the implementation of research in September - October 2021.

Research Design

This research uses SWOT analysis method with qualitative and quantitative approaches. Quantitative by describing the condition of the community and the environment in Saria and Gamtala Villages, where there are mangrove plants. Observations were made directly and supported by questionnaires distributed to the community. As for quantitative, where giving numbers or values to measure strategies in overcoming mangrove damage is in the Jailolo sub-district of West Halmahera Regency.

Sampling Technique

Sampling using Purposive Sampling method. Purposive sampling is a sampling technique with certain considerations (Sugiyono 2011), meaning that respondents are selected based on the choice of the researcher, where the character of the respondent is in accordance with the intended research. The number of respondents taken in this study was 60 people consisting of 30 people per village who were close to the mangrove area.

Data Collection Technique

The data used in this study are primary data, then adjusted to secondary data using the insect determination key.

Data Analysis Technique

The data analysis techniques used in this study are the Internal Factor Evaluation Matrix (IFE), Internal Factor Evaluation Matrix (EFE), Internal External Matrix (IE), SWOT Analysis Matrix and QSP Matrix (QSPM).

Results And Discussion

Mangrove Damage in Jailolo District, West Halmahera Regency

Mangroves adapt both morphologically and physiologically. These adaptations can be seen in the form of a typical mangrove root system. These roots function to help mangroves breathe and stand upright, aquatic ecosystems, mangrove ecology has a very important

meaning, for the types of marine animals that live depending on mangrove ecology. Damage will occur if there is no good countermeasure from the community and government, it can cause damage to mangrove life and ecology, economic and social.

Generally, people in Saria Village and Gamtala Village have known how great the benefits of mangrove forests are, both in terms of ecology, economy and social. Mangrove forests have a major role for life, including as a protector against natural disasters, habitat for rare animals, siltation and others.

Based on the research, mangrove damage that occurred in Jailolo District, West Halmahera Regency, namely Saria and Gamtala Villages, has begun to show the impact of mangrove damage, where people in Saria Village, especially fishermen, catch fish far out from the beach in the village and sea water sometimes rises to residents' homes when high tide occurs. This can be overcome if the government provides socialization to the community about the importance of mangroves and their benefits on the coast and the need for mangrove planting or cultivation.

Mangrove Damage Impact Strategy in Jailolo District, West Halmahera Regency.

According to David, (2011) the mangrove forest conservation strategy used is preservation by involving the community. Mangrove forest conservation is a very complex endeavor to be implemented, because these activities require an accommodating nature to all elements around the area and outside the area. One strategy that can be applied in the context of mangrove forest ecosystem management is community-based management.

Strategies in terms of mitigating the impact of mangrove damage need to be done to reduce mangrove damage caused by community use in Saria and Gamtala Villages in Jailolo District, West Halmahera Regency.

The repetition strategy is an effort to reduce the impact of mangrove damage that occurs in Saria Village and Gamtala Village in Jailolo District, West Halmahera Regency can be seen in Table 1.

Based on the interview results from the Saria Village community, the percentage of strengths are:

1. Mangroves play an important role in protecting the coastline from erosion with 85% of the community strongly agreeing.
2. As a buffer (natural shield) and stabilize the soil, 93% of the community strongly agree
3. Preventing seawater intrusion, 50% strongly agree.
4. As a refuge for animals that are suitable to live in mangrove forests, 75% of people strongly agree and,
5. As a breeding ground for biotalaut. 70% of the community strongly agreed.

Table 1. Percentage of Strengths of Saria Village

No	Pertanyaan	Assessment Score				Total (%)
		Disagree	Less Agree	Agree	Strongly Agree	
1	Mangroves play an important role in protecting the coastline from erosion	0,00	0,00	15,00	85,00	100
2	As a buffer (natural shield) and stabilize the soil	0,00	0,00	6,25	93,75	100
3	Prevent sea water intrusion	0,00	0,00	50,00	50,00	100
4	As a refuge for animals that are suitable to live in mangrove forests.	0,00	0,00	25,00	75,00	100
5	As a breeding ground for biotalaut.	0	0	30,00	70,00	100

Source: Data Processed 2021

This illustrates the positive things that are in the community, where people still think that mangroves are plants that will protect the beach or coastline and the environment around the coast.

Table 2. Percentage of Weaknesses of Saria Village

No	Question	Assessment Score				Total (%)
		Disagree	Less Agree	Agree	Strongly Agree	
1	Mangroves are often used as building materials, firewood, and erosion will occur.	0,00	0,00	5,00	95,00	100
2	Mangroves are not properly maintained so that buffers and soil will be damaged.	0,00	0,00	20,00	80,00	100
3	Mangroves are continuously utilized by the community, so seawater intrusion occurs.	0,00	0,00	60,00	40,00	100
4	Mangroves are often cut down, so the sanctuary will be reduced.	0,00	0,00	40,00	60,00	100
5	Loss of place for marine biota.	0,00	10,00	30,00	60,00	100

Source: Data Processed 2021

Table 2. shows that from the presentation score of the results of interviews to the Saria Village community in this case the weaknesses that occur are, a percentage of 95% strongly agree that mangroves are often used as building materials, firewood it will cause erosion or coastal abrasion, and 80% also strongly agree that is a weakness if mangroves are not maintained then the soil buffer will be damaged. The weaknesses that occur if left unchecked will have an impact on the environment, where the environment on the coast will be damaged, especially the environment on the coast.

Table 3. Percentage of Opportunities in Saria Village

No	Question	Assessment Score				Total (%)
		Disagree	Less Agree	Agree	Strongly Agree	
1	As a breeding ground for flora and fauna	0,00	10,00	70,00	20,00	100
2	Has tourism potential	0,00	10,00	50,00	40,00	100
3	As a place of training education, and observation of science	0,00	10,00	80,00	10,00	100
4	Producer of industrial needs.	10,00	20,00	50,00	20,00	100
5	Producer of household needs	20,00	10,00	10,00	60,00	100

Source: Data Processed 2021

Table 3. Shows that the percentage score of the opportunities available to the community for mangrove plants, the assessment of the Saria Village community who disagree is 10%. Disagree a small part in the community due to the lack of knowledge about mangrove processing, while 50% who agreed, because they assume if mangrove is used as an industrial material then surely will be given training.

Table 4. Percentage of Threats in Saria Village

No	Question	Assessment Score				Total (%)
		Disagree	Less Agree	Agree	Strongly Agree	
1	Mangroves are used as building materials.	90,00	5,00	5,00	0,00	100
2	As food for livestock.	85,00	10,00	5,00	0,00	100
3	Mangroves are often utilized by humans	10,00	50,00	30,00	10,00	100
4	Excessive logging	80,00	10,00	10,00	0,00	100
5	lack of reforestation in coastal areas.	30,00	20,00	30,00	20,00	100

Source: Data Processed 2021

The results of interviews and observations made by mangroves can bring benefits and even good opportunities for people's lives and marine biota that live depending on mangroves. This happens in the lives of people in Saria Village.

Table 4. Shows Saria Village from the results of interviews to the community suggests that if damage occurs in the mangrove will have an impact in the form of threats to the social life of the economy and even the environment of people's lives and the lives of creatures whose lives depend on mangroves. The results showed 90% of the community disagreed stating that if mangroves are cut down for buildings, if there is no cultivation and 80% of the community disagreed because of logging.

According to Dahuri (2001), community-based management implies direct involvement of the community in managing natural resources in an area. The fundamental objective of mangrove ecosystem management is to improve conservation, rehabilitation and

sustainable utilization of mangrove ecosystems, which can be used as an indicator of how far the value of mangrove forest benefits lost due to conversion. Economic and ecological assessment is basically economic valuation, which is an effort to provide quantitative value to the goods and services produced by natural resources and the environment, this economic assessment can be used as a reference in terms of preparing processing strategies for coastal areas, especially to maintain the existence and sustainability of mangrove forests.

The results of observations and interviews from the development strategy of mangrove damage prevention efforts were also carried out in Gamtala Village which can be seen in Table 5.

Table 5. Gamtala Village Strengths Percentage

No	Question	Assessment Score				Total (%)
		Disagree	Less Agree	Agree	Strongly Agree	
1	Mangroves play an important role in protecting the coastline from erosion.	0,00	0,00	20,00	80,00	100
2	They act as a buffer and stabilize the soil.	0,00	0,00	75,00	25,00	100
3	Prevent sea water intrusion	0,00	0,00	75,00	25,00	100
4	As a refuge for animals that are suitable to live in mangrove forests.	0,00	0,00	80,00	20,00	100
5	As a breeding ground for marine life.	0,00	10,00	85,00	5,00	100

Source: Data Processed 2021

Table 6. Percentage of Weaknesses of Gamtala Village

No	Question	Assessment Score				Total (%)
		Disagree	Less Agree	Agree	Strongly Agree	
1	Mangroves are often used as building materials, firewood, so erosion will occur.	70,00	20,00	10,00	0,00	100
2	Mangroves are not well maintained so that buffers and soil will be damaged.	10,00	30,00	60,00	0,00	100
3	Mangroves are continuously utilized by the community and seawater intrusion occurs.	10,00	10,00	80,00	0,00	100
4	Mangroves are often cut down then the sanctuary will be reduced.	10,00	10,00	70,00	10,00	100
5	Loss of place for marine biota	10,00	10,00	70,00	10,00	100

Source: Data Processed 2021

Results in Table 5, shows that the people of Gamtala Village 85% strongly agree that mangrove plants exist on the coast with existing environmental conditions. Because it has great benefits to the environment and marine biota.

Table 7. Percentage of Opportunities for Gamtala Village

No	Question	Assessment Score				Total %
		Disagree	Less Agree	Agree	Strongly Agree	
1	As a breeding ground for flora and fauna.	0,00	0,00	80,00	20,00	100
2	Has tourism potential.	0,00	0,00	80,00	20,00	100
3	As a place of training education, and scientific observation.	0,00	0,00	15,00	85,00	100
4	Producer of industrial needs.	5,00	50,00	25,00	20,00	100
5	Producer of household needs	0,00	60,00	30,00	10,00	100

Source: Data Processed 2021

The results of table 7. Shows that Gamtala Village 85% strongly agrees with mangrove plant activities as a training ground located on the coast, where people hold activities. For this reason, it is necessary to have a good arrangement in the utilization of mangrove plants, both as building materials, firewood and medicinal raw materials. So that with this arrangement the utilization of mangroves can develop and be utilized as needed.

Table 8. Percentage of Threats in Gamtala Village

No	Question	Assessment Score				Total (%)
		Disagree	Less Agree	Agree	Strongly Agree	
1	Mangroves are used as building materials.	85,00	5,00	10,00	0,00	100
2	As food for livestock	60,00	30,00	10,00	0,00	100
3	Mangroves are often utilized by humans.	60,00	20,00	10,00	10,00	100
4	Excessive logging.	60,00	30,00	10,00	0,00	100
5	Lack of reforestation in coastal areas.	70,00	20,00	5,00	5,00	100

Source: Data Processed 2021

The results of table 8. Shows that Gamtala Village 85% disagrees with mangrove plant activities as building materials. For this reason, there needs to be a good arrangement in the utilization of mangrove plants, both as building materials, firewood and raw materials for medicines.

According to (Ongkosongo, 2004). The consequences that will result from human activities to exploit and convert the coastal areas are the loss and erosion of small islands in Indonesia. It is indeed necessary to scrutinize and contemplate so that the loss of islands does not continue. But the most important thing is to prevent the loss and extinction of mangrove and coastal ecosystems and habitats, the loss and extinction of biodiversity both flora and fauna both on land and in the waters. And it is important for us to live together so that environmental impacts such as abrasion, intrusion, and flooding do not occur.

SWOT Analysis

Strategies for overcoming mangrove damage in Jailolo District. Mangroves are one of the plants that have the potential to generate income for the community as well as the region if managed properly, it is necessary to identify the strengths and weaknesses that are owned based on the internal characteristics of the area. In this research, the analysis used is SWOT analysis.

The results of observations in the field and data analysis, known various potentials and problems in mangrove damage to the environment. By analyzing the potential problems, it can be identified SWOT variables that can be used to determine mangrove forest processing strategies in an effort to prevent damage made by the community around the mangrove forest in the future.

Identification of SWOT Factors

The elements obtained from the number of respondents selected then in this analysis include:

A. Strengths

1. Mangroves play an important role in protecting the coastline from erosion.
2. Buffer and stabilize the soil.
3. Prevents seawater intrusion
4. Source of traditional fuel, industrial and pharmaceutical raw materials
5. Source of income for fishermen (fish breeding ground).

B. Weaknesses

1. Mangroves are cut down for building and firewood and can cause abrasion.
2. Mangroves have not been well developed by the community or local government.
3. Lack of public knowledge of the benefits of mangroves
4. No protection of mangrove habitat
5. Overutilization can lead to loss of fish breeding grounds.

C. Opportunities

1. Has tourism potential.
2. As a refuge from air pollution.
3. Source of salt absorption.
4. Producer of household, industrial and medicinal raw materials.
5. As a breeding ground for flora and fauna.

D. Threats

1. Can cause abrasion and endanger the environment around the beach
2. Can cause losses to the community and government as a policy maker.

3. Causes coastal abrasion and can cause sunami.
4. Minimal knowledge of mangroves, causing destruction of mangroves.
5. Loss of habitat and fish population.

SWOT Matrix

After observing the internal environment and identifying strategic factors in evaluating utilization for mangrove forest development in West Halmahera Regency, the next step is to create a SWOT matrix consisting of IFE (Internal Factor Evaluation) and EFE (External Factor Evaluation) matrices. Both matrices need to be created to obtain a SWOT strategy.

IFE (Internal Factor Evaluation) Matrix

The IFE matrix is a strategy formulation tool that summarizes and evaluates the main strengths and weaknesses in various functions of an area. The IFE matrix is also known as IFAS (Internal Factor Analysis Summary).

Table 9. IFE Matrix of Mangrove Damage Impact Mitigation Strategy in Jailolo District, West Halmahera Regency

Internal Strategy Factors				
No	Strength	Weight	Rating	Weighted Score
1	Mangroves play an important role in protecting the coastline from erosion.	0.13	3.29	0.43
2	As a buffer and stabilize the soil.	0.13	3.19	0.41
3	Prevents seawater intrusion	0.09	3.19	0.29
4	Source of traditional fuel, industry and pharmaceutical raw materials	0.11	3.19	0.35
5	Source of income for fishermen (fish breeding ground).	0.11	3.19	0.35
Weaknesses				
1	Mangroves are cut down for building and firewood and can cause abrasion.	0.13	2.62	0.34
2	Mangroves have not been properly developed by the community or local government.	0.13	2.43	0.31
3	Lack of public knowledge of the benefits of mangroves	0.09	2.43	0.15
4	No protection of mangrove habitat	0.06	2.71	0.16
5	Overutilization can lead to loss of fish breeding grounds.	0.02	3.05	0.06
		1.00		2.52

Source: Primary data processed 2021

EFE Matrix (External Factor Efaluation)

The EFE matrix is a tool for measuring how well management (rating) responds to certain factors in terms of the level of importance of the weight of these factors for the quality of the region, so that this matrix helps organize external strategic factors into categories of opportunities and threats. The EFE matrix is also known as EFAS (External Factor Analysis Summary).

Table 10. IFE Matrix of Strategies to Mitigate the Impact of Mangrove Damage in Jailolo District, West Halmahera Regency

No	External Strategy Factors			
	Opportunities	Weight	Rating	Weighted Score
1	Has tourism potential.	0.09	4.19	0.37
2	As a refuge from air pollution.	0.09	2.29	0.20
3	Source of salt absorption.	0.08	3.33	0.27
4	Producer of household, industrial and medicinal raw materials	0.08	3.90	0.31
5	As a breeding ground for flora and fauna.	0.03	3.90	0.12
Threats				
1	Can cause abrasion and endanger the environment around the beach	0.13	1.24	0.16
2	Can cause losses to the community and government as a policy maker.	0.13	1.24	0.16
3	Causes coastal abrasion and can cause sunami.	0.13	1.24	0.16
4	Minimal knowledge of mangroves, causing destruction of mangroves.	0.12	4.48	0.54
5	Loss of habitat and fish population.	0.12	1.90	0.23
Total		1.00		2.50

Source: Primary data processed 2021

SWOT Strategy Matrix

The strategy of the impact of mangrove damage on the environment, the data or information obtained is analyzed using the fourth cross strategy technique from the SWOT factor, summarized in the SWOT matrix, the alternative strategy matrix of the research results is presented in table 11.

Tabel 11. SWOT Strategy Matrix

Internal	Strengths	Weaknesses	
	<ol style="list-style-type: none"> 1. Mangroves play an important role in protecting the coastline from erosion. 2. Buffer and stabilize the soil. 3. Prevents seawater intrusion 4. Source of traditional fuel, industrial and pharmaceutical raw materials 4. 5. Source of income for fishermen (fish breeding ground). 	<ol style="list-style-type: none"> 1. Mangroves are cut down for building and firewood and can cause abrasion. 2. Mangroves have not been properly developed by the community or local government. 3. Lack of public knowledge of the benefits of mangroves 4. No protection of mangrove habitat 5. Overutilization can lead to loss of fish breeding grounds. 	
Eksternal	Opportunities	SO strategy	WO Strategy
	<ol style="list-style-type: none"> 1. Has tourism potential. 2. As a refuge from air pollution. 3. Source of salt absorption. 4. Producer of household, industrial and medicinal raw materials. 5. As a breeding ground for flora and fauna. 	<ol style="list-style-type: none"> 1. Organize and make a source of income from the tourism aspect. 2. Learning objects and protection of the environment and nature. 3. Good availability of fresh water (drinking water) in the plain area. 4. Providing raw materials for industry and households. 5. As a place for the maintenance and cultivation of flora and fauna. 	<ol style="list-style-type: none"> 1. Create a craft center from mangrove raw materials 2. Create training, adding knowledge of the importance of mangroves 3. Socialization of the important role of mangrove cultivation around mangrove habitat 4. Structuring and making rules about the utilization of mangrove plants. 5. Making protection and rules for the life of flora and fauna around the mangrove forest.
Ancaman (Threats)	Strategi ST	Strategi WT	
<ol style="list-style-type: none"> 1. Dapat menyebabkan abrasi dan membahayakan lingkungan disekitar pantai 2. Dapat menyebabkan kerugian bagi masyarakat dan pemerintah sebagai penentu kebijakan. 3. Menyebabkan abrasi pantai dan dapat menyebabkan tsunami. 4. Pengetahuan yang minim terhadap mangrove, menyebabkan kehancuran terhadap mangrove. 5. Hilangnya tempat habitat dan populasi ikan. 	<ol style="list-style-type: none"> 1. Melakukan perbaikan kawasan pesisir terutama dilakukan di kedua desa sehingga tidak terjadi kerusakan pada garis pantai 2. Melindungi garis pantai, sehingga tidak dapat dimanfaatkan oleh manusia. 3. Memberikan pemahaman bagi masyarakat 4. Budidaya mangrove sebagai bahan baku dan tidak terjadi penebangan. 5. Sebagai sumber ikan dan tempat penghijauan di daerah pesisir. 	<ol style="list-style-type: none"> 1. Menyediakan tempat dan fasilitas dalam mengelolah mangrove. 2. Melakukan perlindungan bagi tanaman mangrove dalam mencegah pemanfaatan yang berlebihan bagi kebutuhan manusia. 3. Masyarakat bekerja sama dengan pemerintah sehingga pemanfaatan mangrove harus tetap dijaga. 4. Budidaya mangrove sehingga perlindungan bagi biota laut tetap terlindungi. 5. Budidaya mangrove dapat memberi kehidupan bagi flora dan fauna serta melestarikan penghijauan pada pesisir pantai agar tetap terjaga. 	

Source; Primary data processed 2021

The SWOT matrix of the impact of mangrove plant damage on the environment can be formulated in four types of strategies that can be taken, namely:

1. SO strategy
 - a. The government in this case must socialize the importance of mangrove forests on the coast.
 - b. The government needs to supervise mangrove forests and provide facilities for tourists.
 - c. The government must work with the community so as to maintain the availability of fresh water properly.
 - d. The community needs mangrove planting.
 - e. The community has mangrove forest management as a source of fish and a place for fish farming.
2. WO Strategy
 - a. The government needs to create a craft center from mangrove raw materials.
 - b. The government works with the local community to create training, providing knowledge of the importance of mangroves to the community.
 - c. Promote mangrove cultivation around mangrove habitat.
 - d. The government and local communities make arrangements and make rules for the utilization of mangrove plants for the environment.
 - e. The community must make protection and rules for the life of flora and fauna.
3. ST strategy
 - a. The government must cooperate with the community so that excessive logging does not occur.
 - b. Has the ability to buffer or dampen sea waves
 - c. Have an understanding that can change people's minds
 - d. Have raw materials that can be utilized
 - a. The community has the potential for mangrove planting
4. WT strategy
 - a. the role of local government in controlling damage to mangrove forests is very important.
 - b. the preservation of mangrove forests is a must that needs to be implemented immediately, otherwise the rich biodiversity contained therein will be destroyed and the balance of nature will be disrupted.
 - c. it is necessary to increase the role of local government to prioritize environmental management and conservation.
 - d. participate in reforestation programs so that flora and fauna are well preserved
 - e. mangroves as a natural habitat for various types of biota

This internal external matrix was developed and used to cover the internal parameters of the government and mangrove forests that will develop in an area, as well as the externals faced by the government and mangrove forests.

The parameters used include internal strengths of the government and mangrove forest and external influences faced by the government and community. This IE matrix is useful for positioning a decision into a matrix consisting of 9 (nine) cells. The IE matrix consists of two dimensions, namely (a) the X dimension, showing the total score of the IFE matrix, and (b) the Y dimension, showing the total score of the EFE matrix. According to David (2002), the X axis and the IFE matrix describe 3 (three) standard scores, namely:

- a) A score of 1.0 - 1.99 states that the internal position of an organization is weak.
- b) A score of 2.0 - 2.99 states that the position of the organization is average and
- c) A score of 3.0 - 4.0 indicates that the organization's position is strong.

With the same method, on the Y axis used for the EFE matrix, for 3 (three) standard scores, namely:

- a) A score of 1.0 - 1.99 indicates the organization's external position is low
- b) A score of 2.0 - 2.99 indicates that the external position of the organization is medium and
- c) A score of 3.0 - 4.0 indicates that the external position of the organization is high.

Furthermore, the IE matrix has 3 (three) strategic implications that are different from one another, namely:

- 1) Cells I, II, or IV can be described as Grow and Build. Suitable strategies to build are intensive strategies (Market Penetration, Market Development, and Product Development) or Integrated Strategies (Backward Integration, Forward Integration and Horizontal Integration).
- 2) Cells III, V, and VII are best controlled with Hold and Maintain strategies. Commonly used strategies are Market Penetration and Product Development strategies.
- 3) Cells VI, VIII, or IX can use the Harvest or Divesture strategy.

The theory and understanding above, then compiled an IE matrix of the impact of mangrove damage to the environment in Jailolo District which can be seen in Figure 2.

The IE matrix analysis in Figure 2 can be seen that the IFE matrix score of 2.52 (indicating the internal position of the mangrove forest is moderate) and the EFE matrix score of 2.50 (indicating the external position of the mangrove forest is moderate), which is in the Hold and Maintain position, then the strategy developed is, socialization of the importance of mangrove plants and cultivation of cultivation and maintenance of mangrove plants, which is carried out by the government and run by the community around the coastal mangrove plantations.

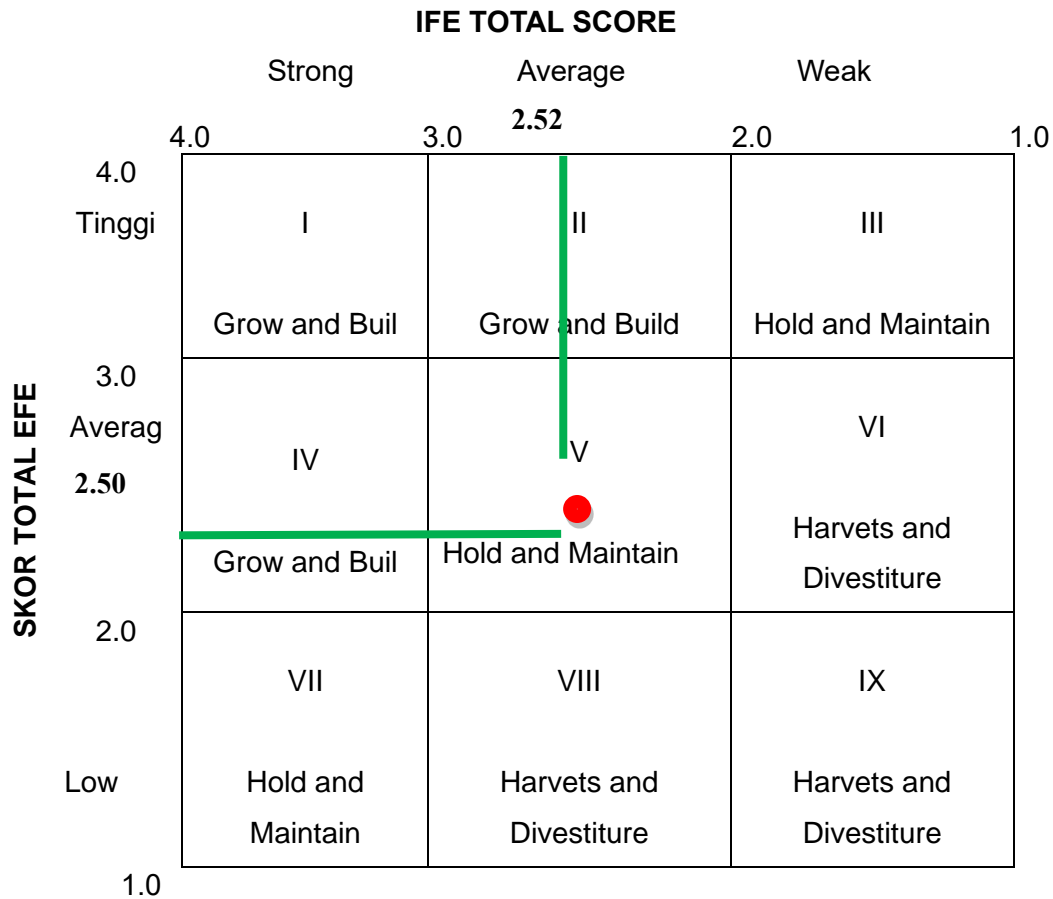


Figure1. Internal - External (IE) Matrix Analysis

This analysis also shows that the presence of mangrove forests scattered on the coast has a good impact on the lives of people living around the coast of Jailolo District.

Strategies that can be used to develop mangrove forests by involving the community, will be able to reduce the ugliness that occurs, and a good understanding in developing and utilizing mangrove forests. With this strategy can also help the community to be better again, than before, thus can answer the demands of the community against the government, and the community can live well and develop according to normal life without leaving the moral values of local culture that the community has.

Quantitative Strategic Planning Matrix Analysis

The following is the final stage in determining strategic decision making for the state of mangrove forests in Jailolo District, where EFE and IFE data become reference data to analyze in making the best decisions. The following are the results of the data processing. The results of the QSPM matrix analysis to obtain strategy priorities can be seen in table 12.

The results of the QSPM Matrix taken from the SWOT Matrix get a strategy that will be used in protecting the mangrove forest environment in Jailolo District as follows:

Table 12. Quantitative Strategic Matrix (QSPM)

No	External Factor Evaluation	Weight	Strategy	
			AS	TAS
Opportunities				
1	Has tourism potential.	0.09	2	0,18
2	As a refuge from air pollution.	0.09	2	0.18
3	Source of salt absorption.	0.08	2	0,16
4	Producer of household, industrial and medicinal raw materials	0.08	1	0.08
5	As a breeding ground for flora and fauna.	0,03	1	0,03
Threat				
1	Can cause abrasion and endanger the environment around the beach	0.13	2	0,26
2	Can cause losses to the community and government as policy makers.	0.13	2	0,26
3	Causes coastal abrasion and can cause sunami.	0.13	3	0,39
4	Minimal knowledge of mangroves, causing destruction of mangroves.	0.12	1	0,12
5	Loss of habitat and fish population.	0.12	3	0,36
TOTAL		1	18	2,02
Internal Factor Evaluation				
No	Opportunities	Weight	AS	TAS
			AS	TAS
1	Mangroves play an important role in protecting the coastline from erosion.	0.13	3	0,39
2	As a buffer and stabilize the soil.	0.13	3	0,39
3	Prevents seawater intrusion	0.09	3	0,27
4	Source of traditional fuel, industry and pharmaceutical raw materials	0.11	4	0,44
5	Source of income for fishermen (fish breeding ground).	0.11	4	0,44
Weakness				
1	Mangroves are cut down for building and firewood and can cause abrasion.	0.13	3	0,39
2	Mangroves have not been well developed by the community or local government	0.13	3	0,39
3	Lack of public knowledge of the benefits of mangroves	0.09	3	0.27
4	No protection of mangrove habitat	0.06	4	0,24
5	If overutilization can lead to loss of fish breeding grounds.	0.02	4	0,08
TOTAL		1	34	3,3

Source: Pripmer Data 2021

1. EFE (External Factor Evaluation) is seen in the highest opportunity factor, namely: has tourism potential and as a refuge from air pollution with a TAS score of 0.18. While the threat factor with the highest score value is causing coastal abrasion and can cause sunami with a TAS score of 0.39 and can cause abrasion and endanger the environment around the beach with a TAS score of 0.26. From the results of calculations using QSPM, the total TAS value in the EFE section is 2.02.
2. IFE (Internal Factor Evaluation) is seen in the strength factor with the highest score, namely: The source of traditional fuel, industry and pharmaceutical raw materials and a

source of income for fishermen (fish breeding grounds), with a TAS score of 0.44. also the strategy obtained in strength is mangroves play an important role in protecting the coastline from erosion and as a buffer and stabilize the soil with a score of 0.39. While the lowest factor for weaknesses is no protection of mangrove habitat with a score of 0.27 and If excessive utilization can cause the loss of fish breeding grounds with a score of 0.08. The results of calculations using QSPM obtained a total TAS value in the IFE section of 3.3.

Conclusions

Based on the results of the study, it can be concluded as follows:

1. The impact of mangrove damage in Jailolo District, West Halmahera Regency, the impact on people's lives and the environment that occurred in Saria and Gamtala Villages; (a) decreased yields of fishermen in this case fish, due to loss of habitat and fish population, (b) Loss of fish breeding ground, (c) cause coastal abrasion, because there is no barrier when the waves or tides due to reduced mangrove, (e) can cause the occurrence of tsunami because it does not withstand the movement of underwater waves, due to loss of habitat of mangroves, (f) the lack of government attention in socializing the importance of mangrove forests on the coast with the use of these plants, (g) damage can occur continuously and can hilngnya mangrove forests because of the lack of knowledge of the community in the use of mangrove plants, and mangroves are only used as fuel and not replaced or cultivated again. If the impact that occurs can be detrimental to the community, especially those around the mangrove plant area, in Saria Village and Gamtala for that there needs to be good handling, if the existing mangroves have been utilized for the benefit of people's lives.
2. SWOT results, with a score for IFE (Intrnal Factor Evaluation) of 2.52 and EFE (External Factor Evaluatin) of 2.50. The results of the IFE and EFE calculations are located in the Houl and Maintain position, where the government needs to socialize the importance of mangrove plants on the coast and their utilization also needs to cultivate these plants in order to avoid damage to the coastal environment caused by the destruction of mangrove forests. Based on QSPM analysis, where the total TAS for EFE 2.02. and IFE 3.3, the strategy that needs to be carried out is to socialize to the community about the importance of mangroves on the coast, which can be developed as a tourist attraction, can be used as a learning environment protection, providing a good freshwater source for the plains area as a source of marine life, especially fish breeding grounds. In addition, the government needs to set rules or laws on the utilization of mangorove, which as a plant that protects the panatai line and surrounding areas and reduces coastal abrasion and prevents seawater intrusion.

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