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STRATEGIES FOR COMMUNITY EMPOWERMENT IN UTILIZING THE ECONOMIC AND ECOLOGICAL FUNCTIONS OF SUSTAINABLE MANGROVE ECOSYSTEMS IN JENEPONTO DISTRICT, SOUTH SULAWESI

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Abstract: Mangrove forests in Balang Baru Village, Tarowang District have great potential for sustainable utilization of the economic and ecological functions of the mangrove ecosystem. Various potentials of the mangrove ecosystem in Balang Baru Village, Tarowang District include providing ecosystem services in the form of fish and other biota and multiple types of species that have economic value. Another potential of the mangrove ecosystem in Balang Baru Village, Tarowang District is its utilization as a nature-based tourism area. These various potentials can contribute to the welfare of local communities if they are utilized and managed sustainably. This study aims to analyze the potential area of mangrove forests, economic and ecological function services of mangrove ecosystems, perceptions and levels of community participation in mangrove ecosystem services, and create community empowerment strategies in utilizing of economic and ecological functions of mangrove forests. Data analysis of mangrove forest potential area by interpreting of LandSat 8 Satellite Imagery. Mangrove ecosystem benefits are calculated through economic valuation. Perception and level of community participation using Likert scale and tabulated in a frequency table. Data from in-depth interviews, FGDs, mangrove forest potential, perceptions, and levels of community participation were analyzed using SWOT. Determination of community empowerment strategies in utilizing the economic and ecological functions of the mangrove ecosystem is carried out by determining internal and external factors, compiling a SWOT matrix, then calculating the IFAS and EFAS matrices, and determining the location of the SWOT quadrant. The area of mangrove forest in Jeneponto Regency is 158.14 hectares. The total economic value of mangrove forests is Rp. 17,970,053,940/year or Rp. 1,046,596,036.113/ha/year. Community perceptions of mangrove ecosystem functions are influenced by the level of knowledge and education of the community. Local communities are involved in the utilization and management of mangroves. Priority strategies are developing the potential of sustainable and economically valuable mangrove forest resources, improving information, facilities and infrastructure that can support community empowerment activities, increasing promotion of ecotourism through online media, implementing conservation area policies and utilizing mangrove ecosystems, and increasing planting activities by involving various parties.

Keywords: Strategy, Community Empowerment, Economic and Ecological, Mangrove

INTRODUCTION

The mangrove ecosystem is one of the natural resources found in coastal areas. Mangroves have economic and ecological functions that can support people's lives, especially in terms of the economy.

One form is being able to maintain the community's profession as a fisherman or as a farmer (Arfan et al., 2022; Aye et al., 2019; Barua & Rahman, 2019). In addition, mangrove ecosystems provide ecosystem

services in the form of fish and other biota and various other species of economic value (Vincentius et al., 2018; Wahyudewantoro, 2018). These mangrove ecosystem services can then improve the welfare of local communities if utilized and managed sustainably (Getzner & Islam, 2020; Tanner et al., 2019), especially by supporting the economy of people who work as fishermen (Asbi & Rauf, 2019).

Most coastal communities rely on the marine and fisheries sectors for their livelihoods (Dewi & Dadiara, 2022). However, this is not in line with the maintenance of coastal ecosystems that are still not optimal, causing most ecosystem areas, especially mangroves, to experience damage, including mangrove ecosystems in Jeneponto Regency, South Sulawesi. Mangrove damage that occurs in coastal areas will have an impact on the survival of coastal communities and the income of people who are largely dependent on fisheries resources and coastal ecosystems. Therefore, coastal area management must be carried out sustainably so that it can benefit current and future generations (Indrasari, 2020) and a mangrove management strategy is needed so that it can function as a sustainable production forest (Arfan, Muin, Hasriyanti, Yusuf, & Sukri, 2023).

Tarowang District is one of the areas in Jeneponto Regency that has a mangrove ecosystem that is very supportive of sustainable utilization where the mangrove ecosystem at that location is still maintained in its authenticity and various species of economic value can improve the community's economy. Based on initial observations, one form of utilization of mangrove ecosystems in the research location is to utilize the mangrove ecosystem as a tourist area but the problem is that the form of utilization has not been carried out optimally due to the lack of community knowledge in managing the potential of mangrove ecosystems. Therefore, it is necessary to have a community empowerment strategy to optimize the potential of these natural resources. Community empowerment is an effort to increase community awareness related to their potential and strive to develop this potential (Halil, 2023) so that people can become the main actors in economic development and can utilize resources optimally and responsibly (Nasiha et al., 2023).

This study focuses on the types of community empowerment strategies by combining quantitative and qualitative methods to gain a comprehensive understanding of the problems in the study. The practical benefits obtained in this study are increasing community understanding and participation in the utilization and management of mangrove ecosystems. The results of this study can be used as material or reference for the government in formulating community empowerment strategies in utilizing the economic and ecological functions of mangrove ecosystems.

LITERATURE REVIEW

Some previous studies related to the utilization of mangrove ecosystems include Harefa et al., (2023) showing that people utilize mangrove ecosystems in various fields including fisheries, wood products, food (chips and dodol), as abrasion barriers and seawater waves, seawater intrusion barriers, coastal protection from storms and can be utilized as tourist attractions. (Nasiha et al., 2023) showed that various utilization of mangrove ecosystems can increase community income. Suwarsih (2018) explained that mangrove forest damage can cause loss of community income sources. Sam'un et al. (2022) explained the need for planning/development and management of mangrove areas by involving the government, the private sector, and the community. Kinasih & Purnaweni (2019) explained that the mangrove ecosystem requires the role of coastal communities which in its implementation requires empowerment. Mangrove ecosystem management needs to involve various parties. According to Suriansyah, Makmun, & Juwari, (2023) explained that in the management of mangrove forests, it is

necessary to involve multiple parties including the community, entrepreneurs, and non-governmental organizations where the management of mangrove ecosystem community wants to be directly involved in mangrove management activities starting from the planning, implementation, maintenance and supervision or preservation of the mangrove ecosystem. This is also explained by Zainuri, Takwanto, & Syarifuddin (2017) in their research that community involvement is very necessary for the preparation, planning, and management of mangrove forests sustainably. Furthermore, Nurhaliza, Lubis, & Ritonga (2024) explained that the development or empowerment of communities in managing mangrove ecosystems must be fully supported by various stakeholders. Mangroves have ecological and economic functions that can support people's lives, especially in terms of the economy. Mangrove forests greatly support the economy of coastal communities because they are a source of livelihood for those who work as fishermen, especially people who live in and around the mangrove area (Zainuri et al., 2017). According to Fitri (2017) economic valuation of resources is an economic tool that uses certain valuation techniques to estimate the value of goods and services produced by natural resources and the environment.

Understanding economic concepts can help policy makers determine the use of natural resources and the environment effectively and efficiently. Economic valuation can show the relationship between natural resource conservation and sustainable economic development.

Therefore, economic valuation can be used as an important tool in increasing public awareness of natural resources and environmental management. SWOT analysis is an analysis to see the strengths and weaknesses as well as the opportunities and threats that are owned. SWOT analysis is conducted to analyze internal and external factors so that the strengths and weaknesses as well as the opportunities and threats that exist can be identified. The data collected is then processed through the IFAS and EFAS matrices which are then forwarded in the SWOT analysis diagram. The values of the IFAS and EFAS factors that indicate the position in the quadrant produce strategic recommendations that will be used as a reference in formulating improvements. This research aims to analyze the potential area of mangrove forests, the economic and ecological function services of mangrove ecosystems, the level of community participation in mangrove ecosystem services, and create community empowerment strategies in utilizing the economic and ecological functions of mangrove ecosystems.

RESEARCH METHODS

This type of research is applied research which aims to find solutions to problems faced by the community (Rosyidah & Fijra, 2021). The data collection in this research are primary and secondary. Primary data were collected directly from respondents through in-depth interviews using the Participatory Rural Appraisal (PRA) approach to find out more about the situation, potential and specific problems of the community, Focus Group Discussions (FGDs) and aerial photography of mangrove areas using drones and satellite image interpretation. Secondary data was obtained by quoting and analyzing data from previous research results, journals, books, research reports, and data form related agencies.This research was conducted in the mangrove area of Tarowang District, Jeneponto Regency, South Sulawesi Province. The sample in the study was people aged 20-60 years with the consideration that at that age the respondent could better understand the meaning of the questionnaire to be given. A purposive random sampling technique, namely people/respondents who have felt the existence of mangrove ecosystems.

Data collection techniques are observation, documentation, in-depth interviews PRA method, FGDs, and drone aerial photo interpretation. In-depth interviews using the PRA (Participatory Rural Appraisal) method are a method and

approach to addressing rural conditions and life together and through rural communities. Data analysis used to determine the potential extent of mangrove ecosystems is through the interpretation and analysis of LandSat 8 satellite imagery and drone aerial photography. Mangrove ecosystem benefits are calculated through economic valuation. According to Setiyowati et al., (2017) the value of mangrove benefits can be calculated using the following formula: Direct Use Value (ML) is the value resulting from the direct utilization of mangrove forests (Widiastuti, Ruata, & Arifin, 2016). The direct benefits of mangrove ecosystems are calculated with the formulation:

ML = ML1 + ML2 + ML3 ..... + MLn (Rp/year) ***(1)***

Notes:

ML1 = Direct benefits, total yield from fisheries (Rp/year);
ML2 = Direct benefits, total yield from ponds (Rp/year);
ML3 = Direct benefits, total yield from mangrove seedlings (Rp/year);
ML4 = Direct benefits, total yield from mangrove fruit (Rp/year).

Indirect Use Value (IUV) is the value perceived indirectly to the goods and services produced by resources and the environment (Christy et al., 2019). Indirect benefits of mangrove ecosystems are calculated with the formulation:

ML = MTLe + MTLb (Rp/year) ***(2)***

Description:

MTLe = Ecological indirect benefits as coastal abrasion barrier (Rp/year);
MTLb = Indirect biological benefits as fish breeding ground (Rp/year).

Optional benefits refer to the value of biodiversity of mangrove forests, which is US $ 1,500 / km2 / year or US $ 15 / ha / year (Ruitenbeek, 1992 in Rahmawati et al., 2022). According to Hiariey, (2009), Suzana et al., (2011), Waty & Ulfah, (2013), Rosmiyati et al., (2022) this value can be used throughout the mangrove forest in Indonesia if the mangrove forest ecosystem is ecologically important and is maintained naturally. If formulated:

MP = MPb (Biodiversity Choice Benefit)
= US$ 15 per ha x mangrove forest area (IDR/year) ***(3)***

Existence value is obtained from the value of respondents' willingness to pay for the existence of mangrove forests in their area (Widiastuti et al., 2016) using Contingent Valuation Method (CVM), using the Contingent Valuation Method (CVM), measuring how much respondents are willing to pay (WTP) (Christy et al., 2019). The formulation is as follows:

$$ME = \sum_{i=1}^{n}(ME_i)/n \quad \textbf{(4)}$$

Description:

ME = Existence benefit (Rp/ha/year);
MEi = Existence benefit of the i-th respondent;
n = Number of respondents.

Heritage Value (HV), according to Santri et al. (2020) heritage value is the economic value obtained from mangrove ecosystem benefits that can be used for future generations. The calculation of the heritage value of mangrove ecosystems uses an estimated heritage value that is not less than 10% of the direct benefit value of mangrove forests.

HV = ML x 10% (Rp/year) ***(5)***

Description:

MW = Heritage value (Rp/year);
ML = Direct Benefits (Rp/year)

Total Economic Value (TEV) is the summation value of all benefits that have been identified, namely:

TEV = ML + MTL + MP + ME + MW (Rp/year) ***(6)***

Description:

TEV = Total economic value (Rp/year);
ML = Direct benefits (Rp/year);
MTL = Indirect benefits (Rp/year);
MP = Preferred benefits (Rp/year);
ME = Existence benefits (Rp/year);

MW = Legacy benefits (Rp/year).

Perceptions and levels of community participation in mangrove ecosystem services using a Likert scale and tabulated in a frequency table. Data from the results of in-depth interviews, FGDs, mangrove forest potential, perceptions, and levels of community participation were analyzed SWOT. According to Rangkuti (2005, 2016) SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) is a systematic identification of various factors to formulate strategies (Sukri et al., 2022).

According to Rangkuti (2005, 2016) SWOT analysis is a systematic identification of various factors to formulate a strategy. This analysis is based on logic that can maximize strengths and opportunities but simultaneously minimize weaknesses and threats. In a SWOT analysis, the first step taken is to conduct an internal analysis to determine strengths and weaknesses using the IFAS matrix, then conduct an external analysis to determine opportunities and threats using the EFAS matrix. After the internal strategic factors of an activity are identified, an IFAS (Internal Strategic Factors Analysis Summary) table is prepared to formulate these internal strategic factors within the framework of management strengths and weaknesses. To create the internal strategic factor matrix, several stages must first be completed. The stages of creating an internal strategic factor matrix are as follows:

a. Determine the strengths and weaknesses of management factors in column 1.
b. Give each factor a weight on a scale ranging from 1.0 (most important) to 0.0 (not important), based on the influence of these factors on the strategic position of the activity. All of these weights must not exceed a total score of 1.0
c. Calculate the rating (in column 3) for each factor by giving a scale ranging from 4 (very good) to 1 (very bad). Positive variables (all variables that fall into the strength category) are given a value ranging from +1 to +4 (very good). 4. Multiply the weight in column 2 by the rating in column 3, to obtain the weighting factor in column 4. The result is a weighting score for each factor whose value varies from 4.0 (very good) to 1.0 (very bad)
d. Add up the weighting scores (in column 4) to obtain the total weighting score for the company concerned. This total value shows how the company reacts to its internal strategic factors. This total score is used to compare the company's position with other companies.

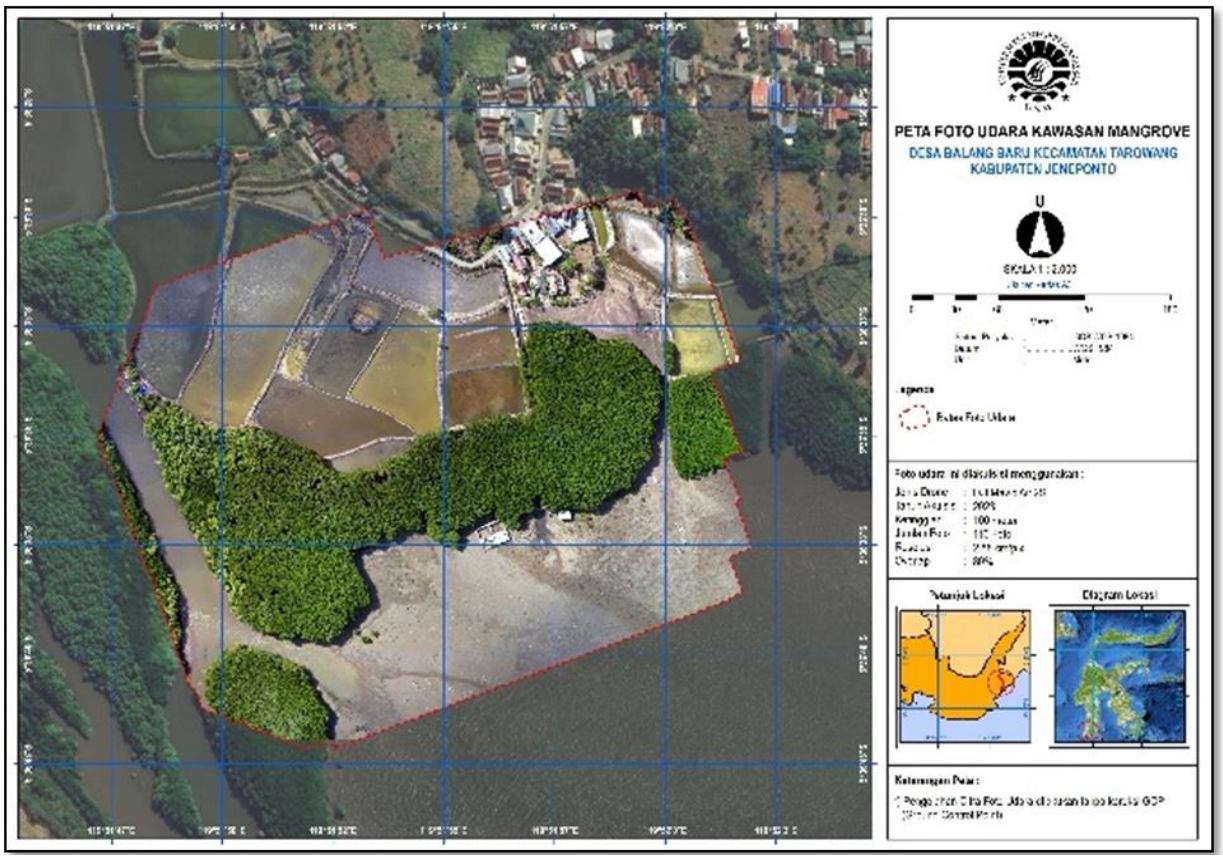
Determination of External Strategy Factors (EFAS)

a. Arrange in column 1 (5 to 10 opportunities and threats). Weight each of these factors on a scale from 1.0 (most important) to 0.0 (least important), based on the influence of these factors on the strategic position of the activity.
b. Calculate the rating (in column 3) for each factor on a scale from 4 (very good) to 1 (very bad). The rating for the opportunity factor is positive (greater opportunities are given a rating of +4, but if the opportunity is small, it is given a rating of +1).
c. Multiply the weights in column 2 by the ratings in column 3, to obtain the weighting factors in column 4. The result is a weighting score for each factor, the value of which varies from 4.0 (outstanding) to 1.0 (poor)
d. Add up the weighting scores (in column 4) to obtain the total weighting score for the company concerned. This total value shows how the activity reacts to its internal strategic factors. This total score can be used to compare the position of the activity with other activities.

The next step is determining the position of the SWOT quadrant to determine the type of strategy used based on the position of the SWOT quadrant. In this study, the testing of the validity of the data used was using triangulation techniques consisting of source triangulation and technique triangulation.

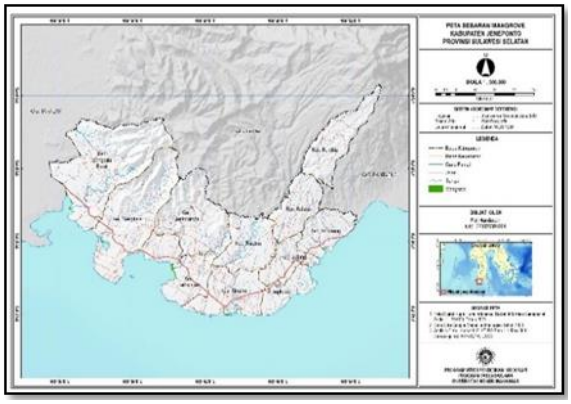
RESULTS AND DISCUSSION

The study area is located in Tarowang Sub-district, Jeneponto Regency, South Sulawesi Province. Tarowang sub-district is one of the sub-districts located in Jenepotno district which consists of 8 villages with an area of 40.68 km2. Of the total 8 villages, 6 villages are coastal areas and 2 villages are not coastal areas. Balang Baru Village is one of the villages in Tarowang Sub-district that is included in the coastal area.



Picture1. Aerial Photo of Balang Baru Village Mangrove Area

Based on the analysis of LandSat 8 imagery, the area of mangrove forests in Jeneponto Regency in 2023 is 158.14 Ha.



Picture2. Distribution of Mangroves in Jeneponto Regency

Mangrove ecosystems produce a variety of economically important species such as fish, shrimp, crabs, and mollusks. Mangrove ecosystems can also produce mangrove wood and non-wood processed products that are beneficial to coastal communities (Sondak, 2015). Another potential that can improve the economy of local communities is the development of mangrove areas as tourist areas (Harefa et al., 2020).

Mangrove ecosystems if managed conservatively can improve the community's economy, especially for communities around the mangrove ecosystem (Christy et al., 2019) if done sustainably to meet current needs without ignoring the needs of future generations both economically and ecologically from mangrove forests (Arfan et al., 2024). The economic value of resources is the value of goods and services produced by natural resources and the environment (Suparyana et al., 2022). Communities around the mangrove area

realize that mangrove forests have economic value. Communities living around the mangrove forest area should be able to implement awareness of the importance of the function and benefits of mangrove forests for the environment so that the mangrove ecosystem can be maintained in its sustainability (Widiastuti et al., 2016). The economic value of resources is the value of goods and services produced by natural resources and the environment (Suparyana et al., 2022). The study of the economic valuation of coastal and marine resources is one of the efforts made to see the extent to which the economic-ecological function can be calculated for its benefits (Wibowo & Sabet, 2022). In this study, the economic valuation of the mangrove ecosystem was carried out in Balang Baru Village, Tarowang District, Jeneponto Regency or "Mangrove Ra'ra". The assessment of the economic benefits of the mangrove ecosystem in this study consists of direct benefit value, indirect benefit value, optional benefits, existence benefits (ME), and legacy benefits. Based on the results of primary data processing, the annual utilization of fish, shrimp, crabs, and shellfish by the community in Balang Baru Village is 2,556, 6,930, 768, 1,260 kg/year, respectively.

Table 1. Economic Value of Direct Benefits of Mangrove Forest in Balang Baru Village.

No	Utilization	Total Economic Value (IDR/year)	Average Economic Value (IDR/ha/year)
1	Fish	45.700.000,00	2.661.619,10
2	Shrimp	415.800.000,00	24.216.656,96
3	Crab	34.560.000,00	2.012.813,05
4	Clams	15.120.000,00	880.605,71
Total		**511.180.000,00**	**29.771.694,82**

Source: Primary data processing, 2023

Table 1 shows the total economic value of direct benefits of mangrove forests in Balang Baru Village is worth Rp. 511,180,000.00/year or Rp. 29,771,694.82 /ha/year. The largest benefit value is from the capture/cultivation of shrimp amounting to Rp. 415,800,000.00,-/ year or Rp. 24,216,656.96,-/ha/year.

Indirect benefits of mangrove forests as a nursery ground, feeding ground, and spawning ground, as an erosion barrier and protective ponds. Widiyanto et al. (2013) in his research to calculate the economic value of the mangrove ecosystem as a nursery area, feeding area, and spawning area can be calculated by multiplying the mangrove forest land area in the research location by US $ 142.64 then multiplied by the Rupiah exchange rate.

Based on this, the indirect benefit value of mangrove forests as a nursery ground, feeding ground, and spawning ground is 17.17 x 142.64 x 15,323 = Rp. 37,528,000.60,- / year. Based on the calculation of the economic value of utilization as a mangrove nursery ground, feeding ground, and spawning ground area of Rp. 37,528,001, - / year.

According to Amal et al. (2019) one of the ecological functions of mangrove ecosystems is a protective/retain land from abrasion and protect ponds from coastal abrasion. The cost required for making river embankments is estimated at Rp. 1,029,000. The average embankment is 3 meters high, 0.5 meters wide, 11,249 meters long (p x l x t) and the durability of the embankment is 10 years. The length of the coastline of Tarowang sub-district is 11,249 m. Direct benefit value = 16,873.5 m3 x Rp. 1,029,000, -. = Rp. 17,362,831,500, -/year.

Based on the results of quantification of indirect benefits (nursery ground, feeding ground, and spawning ground, as well as retaining soil erosion / pond cover) mangrove ecosystem in the village of Balang Baru, then obtained the total value of indirect benefits as a whole of Rp.37,528,001-/year + Rp.17,362,831,500,-/year = 17,400,359,501-/year.

The option value was obtained by multiplying the biodiversity value by the

Rupiah exchange rate against the Dollar at the time of the study, which was Rp. 15,323. To get the value of the option value, the value of US $ 15 per hectare per year multiplied by Rp.15,323 per US $ and multiplied by the area of mangrove forest where the area of mangrove forest in Tarowang District amounted to 17.17 ha. Based on this, the benefits of choice amounted to 15 x Rp 15,323 x 17.17 = Rp 3,946,439,- / ha / year. The benefits of existence (existence value) of mangrove forests in Balang Baru Village can be seen in the following table 2. The calculation of the inheritance value of mangrove ecosystems uses an estimated inheritance value that is not less than 10% of the direct benefit value of mangroves.

Thus the benefits of mangrove forest heritage in Balang Baru village are 10% x IDR. 511,180,000 = 51,118,000-/year.

Table 2. Benefits of Mangrove Forest Existence in Balang Baru Village.

No.	WTP (IDR)	Number of Respondents	Total of WTP (IDR)
1	0	11	0
2	50.000	17	850.000
3	100.000	6	600.000
4	1.000.000	2	2.000.000
Total		**36**	**3.450.000**

Source: Primary data processing, 2023

The total of economic value (TEV) of the mangrove ecosystem in Balang Baru village can be seen in Table 3

Table 3. Total Economic Value (TEV) of the mangrove ecosystem in Balang Baru Village.

No	Type of Benefit	IDR/ha/year	IDR/year	%
1	Direct benefits	29.771.694,820	511.180.000	2,845
2	Indirect benefits	1.013.416.394,933	17.400.359.501	96,830
3	Preferred benefits	229.845,020	3.946.439	0,022
4	Existence benefits	200.931,858	3.450.000	0,019
5	Legacy benefits	2.977.169,482	51.118.000	0,284
Total		**1.046.596.036,113**	**17.970.053.940**	**100**

Source: Primary data processing, 2023

The results of the study of the total economic value of mangrove ecosystems in Balang Baru Village amounted to Rp.17,970,053,940 / year or Rp. 1,046,596,036.113 / ha / year with the largest percentage of benefits contained in the type of indirect benefits (96.830%) then direct benefits (2.845%), inheritance benefits (0.284%), choice benefits (0.022%), and existence benefits (0.019%). Assessment of community perceptions of mangrove area management is strongly influenced by the level of education and knowledge of the community (Nanlohy et al., 2014).

The level of community knowledge is influenced by the level of education and the positive impacts felt by the community (Permata et al., 2021). Community perceptions of economic and ecological function services of mangrove ecosystems can be seen in the following table 4.

Table 4. A number of respondents based on the perception answer that mangroves can produce economically valuable products.

Statement	Answer	Number (Soul)	Respondents (%)
Mangroves can produce various types of products of economic value Strongly Agree	Strongly Agree	4	11,11
	Agree	32	88,89
	Undecided	0	0
	Disagree	0	0
	Strongly Disagree	0	0
Total		**36**	**100**

Source: Primary data processing, 2023

Based on table 4, shows that 32 people, or 88.89% answered agree and 4 people or 11.11% answered strongly agree. The economic mangrove products in question are fish, shrimp, crabs, and shellfish. Mangrove areas seen from the ecological function of the mangrove ecosystem have a very important meaning (Nanlohy et al., 2014).

Knowledge or understanding of the ecological function of the mangrove ecosystem by the community towards mangrove forests is an important factor that influences the community's perspective and the community's adaptive capacity (Permata et al., 2021). The community in Balang Baru Village has a fairly good understanding of the ecological function of the mangrove ecosystem. The community knows that the mangrove ecosystem is a protector from coastal abrasion and holds back strong winds from the sea to land.

The community has a good understanding of the ecological function of the mangrove ecosystem because the ecological function of the mangrove ecosystem has often been conveyed by both the local government and the head of the mangrove group. In addition, this knowledge is obtained based on the personal experience of the respondents. Community perceptions of the ecological functions of mangrove ecosystems can be seen in the following table 5.

Table 5. Number of respondents is based on the perception that mangrove ecosystems function as coastal protectors from abrasion.

Statement	Answer	Number (Soul)	Respondents (%)
Mangrove ecosystems serve as coastal protection from abrasion	Strongly Agree	19	52,78
	Agree	17	47,22
	Undecided	0	0
	Disagree	0	0
	Strongly Disagree	0	0
Total		**36**	**100**

Source: Primary data processing, 2023

Based on table 5, it shows that there are 19 people or 52.78% answered strongly agree and there are 17 people or 47.22% answered agree related to mangrove ecosystems functioning as coastal protectors from abrasion. Overall, respondents in the study already knew the benefits of mangrove ecosystems as coastal protectors from abrasion.

Table 6. A number of respondents based on the perception answer that the mangrove ecosystem serves to withstand strong winds from sea to land

Statement	Answer	Number (Soul)	Respondents (%)
Mangrove ecosystems serve to withstand strong winds from sea to land	Strongly Agree	19	52,78
	Agree	17	47,22
	Undecided	0	0
	Disagree	0	0
	Strongly Disagree	0	0
Total		**36**	**100**

Source: Primary data processing, 2023

In the table above shows there are 19 people or 52.78% answered strongly agree and 17 people or 47.22% answered agree about mangrove forests function to withstand strong winds from sea to land. Community participation in mangrove ecosystem management can be seen in the following table:

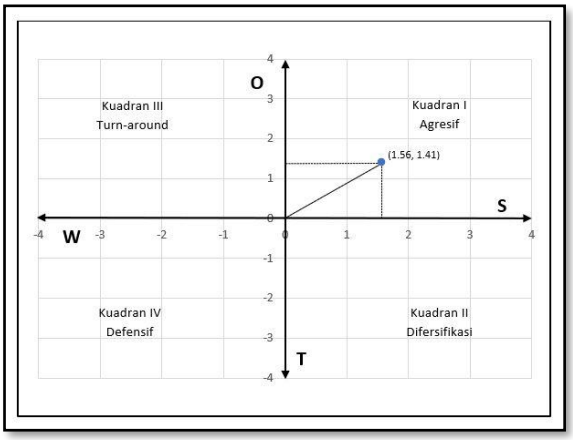
Table 7. Number of respondents based on answers to participation in mangrove planting activities

Statement	Answer	Number (Soul)	Respondents (%)
Participate in mangrove planting activities	Always	22	61,11
	Often	3	8,33
	Sometimes	1	2,78
	Rarely	1	2,78
	Never	9	25
Total		**36**	**100**

Source: Primary data processing, 2023

From Table 7, it is known that of the 36 respondents, 22 people or 61.11% answered always, 9 people or 25% answered that they never participated in mangrove planting activities, and the remaining 5 people were divided into the categories of often, sometimes and rarely participating in mangrove planting activities. Community interaction with mangrove forests is influenced by the availability of time owned by the community, people who work as fishermen spend more time at sea (Permata et al., 2021).

SWOT analysis is used to analyze community empowerment strategies in utilizing the economic and ecological functions of mangrove ecosystems. SWOT analysis in this study includes the identification of internal factors, external factors, IFAS and EFAS values, SWOT matrix, alternative strategies, development, and development recommendations. Identification of internal factors and external factors is the first stage carried out by finding what factors are influential in the research location. The second stage is to calculate the rating obtained from the weighting which will be described in the SWOT matrix then the last stage is to formulate a strategy. The results of the calculation of the IFAS value at the research location are 1.56 which consists of the number of strengths (strengths) of 2.16 and weaknesses (weaknesses) of 0.60. The EFAS value obtained is 1.41 which consists of the number of opportunities (opportunities) of 2.22 and threats (threats) of 0.81. Based on these calculations, it is obtained that the strategic quadrant is located in quadrant 1 or an aggressive strategy.



***Picture 3**. SWOT analysis quadrant*

The strategies that can be used are contained in the SWOT analysis matrix which clearly illustrates how the opportunities and threats (external) faced can be adjusted to the strengths and weaknesses (internal) owned.

Table 8. SWOT Analysis Matrix

Internal Factors / **External Factors**	**Strengths**	**Weaknesses**
Opportunities	1) Developing the potential of sustainable and economically valuable mangrove resources through environmentally friendly aquaculture and fishing businesses.	1) Improving the quality of human resources to support efforts to utilize mangrove ecosystems

	2) Improve information, facilities, and infrastructure needed that can support community empowerment activities and facilitate access for parties who care about the mangrove ecosystem. 3) Increase promotion of ecotourism through online media 4) Implementation of conservation area policies and utilization of mangrove ecosystems 5) Increase mangrove planting activities by involving various parties 6) Increase training activities for working groups as a form of effort to empower local communities in the management and conservation of mangrove ecosystems	2) Empowerment to the community by making mangrove resource-based MSMEs 3) Providing counseling and training to the community to increase community understanding of the management and conservation of mangrove ecosystems
Threat	1) Increase the role of NGOs, private sector, and various interested parties to assist to the community in the management and conservation of mangrove ecosystems. 2) Providing non-formal education in the form of training to the community related to good and correct planting methods 3) Empowering the community to be able to process garbage and wood carried by sea currents into recycled objects 4) Optimizing the existence of a service center to provide information to visitors regarding the rules that apply while in the mangrove area	1) Improve the quality of human resources through the provision of non-formal education and training in the management and utilization of mangrove ecosystems. 2) Empowering local communities by providing training to manage mangroves into products of economic value 3) Providing information to the community in the form of counseling related to the management and utilization of mangrove ecosystems

Source: Primary data processing, 2023

From the results of the IFAS and EFAS analysis contained in the quadrant location chart, the S-O strategy is a strategy that has a high priority to be implemented. The strategies in question are, developing the potential of sustainable and economically valuable mangrove resources through environmentally friendly cultivation and fishing businesses, improving information, facilities, and infrastructure needed to support community empowerment activities and to facilitate access for parties concerned about mangrove ecosystems, increasing promotion of ecotourism through online media, implementing policies on conservation areas and utilization of mangrove ecosystems, increasing mangrove planting activities by involving various parties, increasing training to working groups as a form of local community empowerment efforts in the management and conservation of mangrove ecosystems

CONCLUSION

The area of mangrove forests in Jeneponto Regency in 2023 through the analysis of LandSat 8 imagery is 158.14 Ha spread across several sub-districts. The total

economic value of mangrove forests is Rp.17,970,053,940 / year or Rp. 1,046,596,036.113 / ha / year. Community perceptions of mangrove ecosystems are influenced by the level of knowledge and education of the community. Community participation includes being involved in the utilization and management of mangrove ecosystems. In the management of mangrove ecosystems, a community empowerment strategy is needed to optimize the utilization of the economic and ecological functions of mangrove ecosystems.

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