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ECONOMIC VALUE OF SEA GRAPES (*Caulerva racemosa*) IN MAPUR ISLAND, BINTAN PESISIR DISTRICT, KEPULAUAN RIAU PROVINCE

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ABSTRACT

The purpose of this study was to determine the economic value and benefits of sea grapes in Mapur Village, Bintan Pesisir District, Kepulauan Riau. This research was conducted in September 2021 in Mapur Village, Bintan Pesisir District, Kepulauan Riau. The method used was field observations and direct interviews with the local government and the community around Mapur Village. The results showed that the Mapur Village marine grape ecosystem has an area of 44,200 ha, and there are benefits to the value of the existence of IDR 208,896,000/year. Factors that influence the willingness to pay (WTP) of the community around the waters of Mapur Village in the form of the respondent's income level, the respondent's education level, the respondent's gender, the respondent's age, and the respondent's family dependents. With the benefits of the value of the existence of Mapur Village, it can be used as a basis for decision-making by the local government and the surrounding community in policy management and utilization of sea grapes in maintaining and preserving the distribution of sea grape ecosystems for future sustainability. With the results obtained in knowing the existence of the value function of a sea grape ecosystem, it can produce the formulation of sea grape conservation reserve areas in the waters of Bintan Pesisir, especially Mapur Village.

Keywords: Valuation Economics, Existence Value Benefits, Sea Grape.

1. INTRODUCTION

Seaweed is one of the leading commodities that have potential as a functional food. Seaweed is rich in fiber, vitamins, and minerals and is a source of natural antioxidants that are easily available and quite abundant. One potential type of seaweed is sea grape (*Caulerva racemosa*). *C.racemosa* is one type of sea grape from the green algae group that lives spread in several Indonesian waters. Algae varieties of *C.racemosa* include species that have been cultivated and commonly consumed as vegetables or fresh vegetables by people in tropical areas such as Indonesia.

Based on several studies that have been conducted, *C.racemosa* produces secondary metabolites that function as antioxidants. Chew[1] states that *C.racemosa* can counteract free radicals because it contains folic acid, vitamins, and ascorbic acid. *C.racemosa* also contains caulerpenin which shows bioactivity against other human cells and has anti-cancer properties.

Seagrape species *C.racemosa* is now a new potential commodity in the world of fisheries, this type of culture is being intensively carried out with a variety of different development models. Even the type of sea grape *C.racemosa* is now an export commodity as a food product, medicine, cosmetics, and other products[2]. *Cracemosa* sea grape is a type of green marine algae Chorophyta with amino acid

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and protein content, so it is being developed into a superior product. This species has been developed as a cultivation commodity in Japan and the Philippines[3].

Mapur Island is one of the islands in the Bintan Pesisir Regency, Kepulauan Riau Province. Administratively, Mapur Island is in the area of Mapur Village which has a land area estimated at around 44 $km^{2,}$ while the ocean area is approximately 442 km^2 equivalent to 44,200 Ha. The livelihood of the population on Mapur Island is generally as a fisherman because Mapur Island is rich in marine products and coral reefs that are still well preserved. Given that the importance of the economic value of *C.racemosa* sea grapes has the potential to be an export commodity, the authors are interested in researching the economic value and benefits of sea grapes (*C.racemosa)*

2. RESEARCH METHOD

Time and Place

This research was conducted in September 2021 in Mapur Village, Bintan Pesisir District, Kepulauan Riau Regency.

Methods

The method used is field observation and direct interviews with the local government and the community around Mapur Village.

3. RESULT AND DISCUSSION

Direct Benefit Value

Direct benefit value, is the value resulting from the direct use of resources in the form of biota associated with the sea grape ecosystem, such as fish, crabs, feather clams, cuttlefish, gonggong, and ranga. This direct utilization can be interpreted as fishermen in Mapur Village utilizing the sea grape as an area to catch economically valuable biota in the sea grape. Several sea grape biotas utilized by fishermen were obtained, as shown in Table 1.

Table 1. Types of marine vine biota of Mapur Island

No	Catch Results		
	Local Name	Scientific Name	Name of Fishing Gear
1	Crab	*Portunus plagicus*	Bubu, quote
2	Cuttlefish	*Loligo sp*	Cuttlefish Fishing
3	Feather Shells	*Anadara antiquata*	Quoting
4	Gonggong	*Strombus ganurium*	Quoting
5	Ranga	*Lambis sp.*	Quoting
6	Pinang-Pinang	*Upeneus sulphureus*	Net, Fishing Line
7	Dingkis Fish	*Siganus javus*	Net, Fishing Line
8	Puput Fish	*Charcharinus sp*	Net, Fishing Line
9	Todak Fish	*Tylosurus sp*	Net
10	Lebam Fish	*Siganus guttaus*	Net

Based on the research results, the biota associated with the seagrape ecosystem is very diverse; this can be seen from the various types of biota used by fishermen. In addition, the types of fishing gear used by fishermen are also quite diverse such as nets, fishing rods, and diving glasses. Different fishing activities, both from the type of fishing gear and the amount obtained, will certainly contribute to the economic value of the sea grape ecosystem.

The value of this contribution is in the form of an assessment of direct benefits by fishermen on the number and type of biota caught. For more details about the direct benefits of the seagrape resource ecosystem in the waters of Mapur Village can be seen in Table 2.

Table 2. The benefit value of seagrape waters in Mapur Village

No.	Benefits	Value (IDR/year)	Percentage (%)
1	Crab	231.382.500	21,26
2	Cuttlefish	212.730.833	20
3	Feather Shells	124.767.917	11,46
4	Gonggong	122.456.250	11,25
5	Ranga	13.121.300	1,206
6	Pinang-Pinang Fish	26.708.333	2,45
7	Dingkis Fish	220.800.000	20,29

No.	Benefits	Value (IDR/year)	Percentage (%)
8	Puput Fish	43.612.083	4,008
9	Todak Fish	37.171.917	3,41
10	Lebam Fish	55.188.000	5,07
	Total	1.137.830.383	100

Table 2 describes the direct benefit value of biota associated with sea grapes, which is the catch of fishermen who conduct fishing activities in the Mapur Village seagrape area. It can be seen the value of direct benefits per biota, this value is the value of direct benefits in rupiah for each month and each year.

The economic value of the area as a tourist and beach recreation area is carried out using the travel cost method. Based on the analysis of suitability and carrying capacity, the water area on Mapur Island is suitable for snorkeling and beach recreation activities. The carrying capacity of the area for snorkeling tourism is very good. The amount of travel costs per person for recreational activities in the Mapur Island area varies with an average of IDR 99,867 per person. Thus, the economic value of the area as a tourism provider can be calculated at IDR 83,888,000 per year. The direct benefit value of sea grapes is as a tourist attraction and beach recreation in the waters of Mapur Island.

From these results it can be seen that the value of direct benefits per individual is different, this value is the value of direct benefits in rupiah for each month and each year, for an explanation of the value of direct benefits obtained, the total income per year is IDR 83,888,000.

The people of Mapur Village are more familiar with this seagrape with the name Lawi-lawi/ Latok. Some of the people of Mapur Village work as seaweed and lawi-lawi collectors and are sold in the Tanjung Pinang market, as can be seen in Table 3.

Table 3. The direct benefit value of sea grapes

extensive	410,25	Ha
number of sea grape seekers	20	People
collector frequency	10	per month
catch	3	kg/person/day
number of collector results	125	kg/year
The average price of Sea Grapes	320.500	IDR/kg
Economic Value of Sea Grapes	801.250.000	IDR/year
The economic value of sea grapes per ha	18.127.828	IDR/ha/year

Based on Table 3, shows that the direct benefit value of lawi-lawi is the catch of fishermen who conduct fishing activities in the waters of Mapur Island. These results can be seen that the value of direct benefits per individual is different, the total income per year is IDR 810,250,000/ year with the economic value of seagrapes per ha IDR18,127,828/year.

Indirect Benefit Value

Fishermen in the Mapur Village area are highly dependent on the seagrape ecosystem to fulfill their daily needs. The seagrape ecosystem in Mapur Village is a place to play, spawn and find food as well as a shelter from predators for aquatic biota associated with sea grapes. According to Kordi *in* Amran[4], the sea grape ecosystem is a spawning ground, nursery ground, and feeding ground.

According to Fauzi[5], the assessment of indirect benefits is obtained using the Contingent Valuation Method (CVM) approach technique, which is a valuation technique based on a direct survey by

asking directly about the willingness to accept payment or WTA (Willingness to Accept) if there is damage due to human activities such as coastal reclamation for making jetties, making resorts on the beach that limit the access of fishermen to the sea and things that make a decrease in ecological function or damage to marine wine resources. This assessment is obtained directly from respondents expressed verbally or in writing[5].

The value of indirect benefits is obtained from the average value of indirect benefits from each fisherman in a year and then multiplied by the number of RTP (Fishery Households) in Mapur Village, which are 85 people. From the research results, the average value of indirect benefits from each fisherman is IDR 3,808,000/month or around IDR 45,696,000/year.

The value of indirect benefits is the value of compensation to fishermen who use sea grape resources in the Mapur Village area if the future the area occurs coastal reclamation activities such as port development, resort or hotel development in coastal areas interfere with the sustainability and ecological functions of sea grapes in the area so that fishermen are not harmed as a result of parties who have an interest in coastal reclamation in the area.

Option Benefit Value

The value of optional benefits can be obtained by using the biodiversity value of the sea grape ecosystem. This is due to the awareness of the community to give a price or value to a sea grape ecosystem. The method used to calculate the value of the benefits of the sea grape option, is the benefit transfer method, which is by assessing estimates of benefits from elsewhere, then transferred to obtain a rough estimate of the benefits of the environment under study. This method is known for calculating the value of biodiversity in the ecosystem[4].

Based on the results of the analysis using ArcGIS 10.3 software, it is known that the area of the Mapur Village Sea Wine area is 410.24 ha, these results are obtained through the digitization method, namely mapping using ArcGIS 10.3 software with Google Earth 2016 spot images and direct field checking using the Global Position System (GPS) to minimize errors. The amount of biodiversity value is US15/ha/year Ruitenbeck *in* Agustina[6], from this statement then to obtain the value of choice obtained by the formula of multiplying the value of biodiversity reserves with a known Sea Grape area of 44,200 ha, while the value of US1 on 12 January 2022 is IDR 14,441. Then it can be calculated that the value of the benefits of choice from the Sea Grape resource is IDR 9,554,493,000/year.

The value of the benefits of choice will be greater depending on the area of sea grapes obtained and the dollar to the rupiah exchange rate. It can be concluded that the value of the benefits of choice can illustrate that the state of the Sea Grape ecosystem in an area is in good condition.

4. CONCLUSION

Based on the results of the study obtained Sea Grape species in Mapur Village Beach, namely *C.racemosa* found in the intertidal area and attached to coral reef substrates. *C.racemosa* is widely spread in the waters of Mapur Village Beach by 410.24 ha. The use value of seagrapes in Mapur Village is IDR 1,973,077,133/ year by calculating the value of water benefits, the value of beach recreation or tourism objects, and the value of sea grape seekers in Mapur Village. The total economic value of seagrapes in Mapur Village is IDR 11,013,596,333/year

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