

Bioeconomy Of Ponyfish (*Leiognathus Sp.*) In Tegal Regency Waters

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Abstract : Ponyfish (*Leiognathus sp.*) in Tegal Regency Waters decreased due to increased fishing intensity. The aim of the research was to determine the bioeconomy of Ponyfish (*Leiognathus sp.*) in Tegal Regency. The research method used is bioeconomy analysis by calculating the Maximum Sustainable Yield (MSY) of Ponyfish. The result showed that caught of the ponyfishes in Larangan was to 3.186 kg/year/boat with a size of 1,6-6,9 cm and Suradadi was to 5.650 kg/year/boat with a size of 1,6-9,4 cm. The sustainable potential value of Ponyfish in Larangan is 202,16 kg/year/boat and Suradadi is 111,16 kg/year/boat.

Index Terms: Ponyfish, *Leiognathus sp.*, MSY, fishing , Tegal

1. INTRODUCTION

Tegal Regency has good fisheries prospect. Fisheries production in 2015 - 2016 of 411,5 – 479,2 ton. This production provides an opportunity for the community to develop fish processing industry activities. The damage to capture fisheries and processed fisheries business in Tegal Regency is focused on 2 locations that is TPI Munjung Agung, Larangan and TPI Suradadi One of the fisheries product in Tegal Regency is ponyfish. By Tegal this fish is included "rucah" fish category [1]. Rucah fish is trush fish category but it has a important function to second cath in coastal community. by some communities, this fish is processed into economically valuable fishery products such as salted fish and chips. Turnover of processed chips can produce about 100 million - 300 million rupiah/month. This condition causes the exploration of petek fish to increase. Changes in perception about the importance of the economic value of fish can drive an increase in the rate of fishing [2]. The catch of Ponyfish in the waters of Tegal regency is decreasing caused by environmental changes and increasing fishing rates. This decrease in catch is followed by a change in the size of the fish into smaller ones. Changes in the size of fish catches are an important indicator of the condition of Ponyfish. One of indicator that can be used in viewing the rate of utilization of Ponyfish through bioeconomic analysis. This analysis is used to look at organisms and their use from an economic standpoint. This aims of the research was to determine the bioeconomics of pet fish in the waters of Tegal regency so that it can be known the sustainable potential of Ponyfish and the environmental carrying capacity of the Tegal Regency Waters.

2 MATERIALS AND METHODS

2.1 Study Area Description

This research was conducted in Larangan and Suradadi Waters. Larangan waters has coral and mangrove vegetation but Suradadi just a mangrove vegetation. This is a reason for choosing a research location. This location is the center of fisheries activities in Tegal Regency and was identified

overfishing.

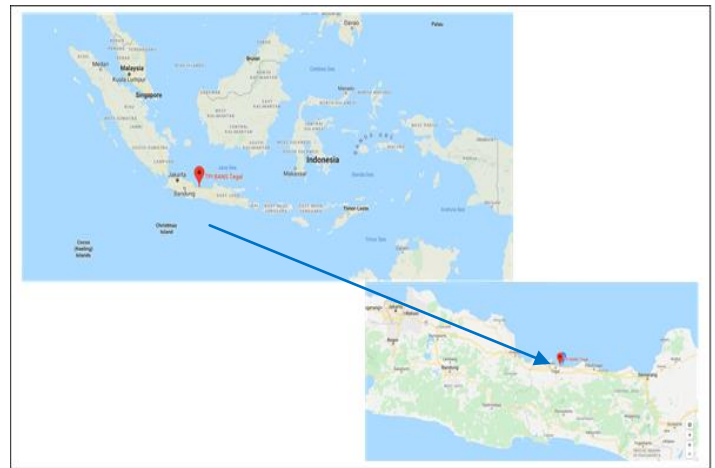


Fig. 1. Research Location

2.2 Material Collection

The research used Ponyfish from Larangan and Suradadi Waters and fish catches, cost per trip, fish prices and fishing grounds from obtained by structured interviews with fishermen used a questionnaire. Bioeconomic analysis was carried out using the Schaefer surplus production model approach to find out Maximum Sustainable Yield (MSY), E_{MSY} (sustainable potential) combined with the Gordon_Schaefer bioeconomic model to determine the carrying capacity of fisheries in economic activities (E_{MEY} , MEY dan E_{OA}) [3]. MSY is calculated using regression analysis between fishing effort (f) to Catch Per Unit Effort (CPUE) so the obtained of a and b values. MSY and CPUE are calculated by the formula:

$$MSY = -a^2/4b$$

Description:

a = intercept

b = slope of the trend line

$$CPUE = c/f$$

Description:

c = catch (kg)

f = effort (trip)

2.2 RESULT AND DISCUSSION

The result showed that caught of the ponyfishes in Larangan has a size of 1,6-6,9 cm and Suradadi size of 1,6-9,4 cm (Fig

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2). The difference in size can be due to several factors such as habitat and fishing habits. The catching area is that there are mangroves and coral reefs while in Surodadi there are only mangroves. The existence of coral reefs and mangroves supports the life of various types of marine life such as fish. Water quality has an important role for the life of basic aquatic organisms [4]. Ponyfhis that lives in groups and lives in muddy waters that use mangroves as a habitat for foraging [5]. Mangroves are referred to as nutrient recyclers because they can produce large amounts of organic material that originally consisted of leaves, twigs and others. Leaves and twigs fall and slowly become litter and eventually become detritus. Deciduous leaves are broken down into detritus, where these particles are a source of food for various marine animals such as Ponyfhis [6]. The fish caught around the Larangan are relatively smaller because the fishermen catching area is carried out around the orange coral area, while the suradadi fishermen catch outside the coral zone such as the waters around the mangrove. Ponyfhis caught in suradadi have a larger size can be caused by the habit of these fish migrating to the mangrove to look for food. Catching activities around these corals can cause coral damage and loss of habitat for organisms that live around the coral reef. changes in catch size become smaller become an indicator that the habitat has decreased carrying capacity for the life of the organism.

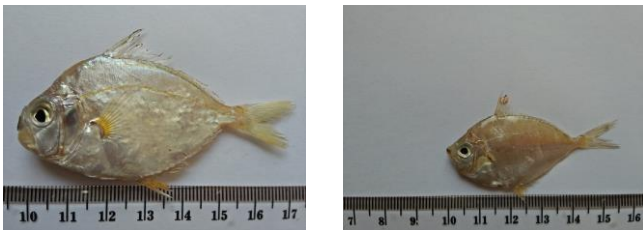


Fig 2. Ponyfishes (*Leiognagthus sp.*) in Tegal Regency Waters



Fig 3. Ponyfishes (*Leiognagthus sp.*) in Larangan Waters



Fig 4. Ponyfishes (*Leiognagthus sp.*) in Suradadi Waters

The result showed that caught of the ponyfishes in Larangan was to 3.186 kg/year/boat and Suradadi was to 5.650 kg/year/boat. The sustainable potential value of Ponyfhis in Larangan is 202,16 kg/year/boat and Suradadi is 111,16

kg/year/boat (Table 1). Even though the fishing effort in Larangan is bigger, the catch that is obtained is smaller. These results to indicate that the fishing effort is not directly proportional to the catch. This condition is an illustration of the rate of capture in these waters. Decreased productivity of fishing activities is an indicator that the effectiveness of fishing gear used in fishing activities has decreased [7]. This is indicated by the fluctuations in the monthly catch of fishermen where with the same effort the catches obtained tend to fluctuate. The results of interviews with fishermen showed that the decline in fishery product yields was not followed by an increase in the price of fishery products. The highest fish price in Suradadi occurred in 2007 with an average product price of Rp 4,932.00/kg, with a total production of 105,452 kg and then declined significantly until 2015, was to Rp 3,045.00/kg with a total production of 15,971/kg (Table 1). This showed that Ponyfhis are bycatch with low economic value. Fisheries activities in Tegal Regency are still oriented towards selling raw products. Fishermen have not taken advantage of opportunities in the sale of processed fish such as salted fish and chips so there needs to be a good approach to change people's perception of the fish marketing system. If this can be changed, the fishermen's bycatch will be additional income. The increase in fishing effort by fishermen cannot be separated from the demands of economic problems. Total prohibition of fishermen income from catching Ponyfhis is Rp. 2,993,200.00/year/ship and Surodadi Rp. 5,993,000.00/year/boat. The income of fishermen in Surodadi from the sale of Ponyfhis greater than Larangan even though the efforts of the Larangan fishermen are greater than that of the Surodadi fishermen. This shows that the fishing effort is not directly proportional to the results obtained.

**TABLE 1
BIOECONOMIC PONYFISHES IN TEGAL WATERS
REGENCY**

Description	Larangan	Surodadi
MSY	202,16 kg/year/boat	111,16 kg/year/boat
C	3.186 kg/year/boat	5.650 kg/year/boat
E	257 trip/year/boat	266 trip/year/boat
Total Price	Rp. 2.993.200,00 / year/boat	Rp. 5.993.000,00 / year/boat

The sustainable potential of the Larangan and Surodadi waters exceeds the sustainable potential of the waters so that they fall into the overfishing category. The decline in catches in the waters due to a decrease in the carrying capacity of the environment to the biota in these waters. This is sometimes not realized by fishermen because fishing activities are profit oriented. To overcome these problems, fishermen usually use adaptive strategies in the form of modification of fishing gear such as modification of fishing gear such as arad. Arad is often referred to as mini trawling or small trawling. In general, the arad work system is similar to trawling, which is a retractable bag net that traces the bottom of the waters. This fishing gear is dangerous because it has a mesh size below 1,5 inches so that the fishing gear can catch small fish. The smallest fish found in this is 1 cm which indicates that the fish caught is a fish that is not feasible to catch. The development of Arad fishing gear modification consisting of 3 kind net with 2-inch mesh size; 1.75 inches and 1.5 inches and a bag with a larger mesh size of 1.5 inches with this modification it is expected

that small size fish will not be caught [8]. Modification of fishing gear is one of the efforts to preserve fisheries resources. Good fishing activities should pay attention to the sustainable potential of the water so that it does not interfere with the carrying capacity of the waters to the life of the biota in these waters. Arad is one of the fishing gears that is prohibited by the government, but is still widely used by fishermen in fishing. One of the government's efforts to overcome this fishing problem is to issue Permen-KP No. 2 of 2015 concerning the prohibition of trawls and seine nets [9]. Prohibition of these tools is done to reduce the risk of damage to the ecological functions of various ecosystems, such as coral ecosystems. In fact, this prohibition will have a significant impact on Tegal fishermen who use cantrang as the main tool in fishing. Fisheries resource management should be carried out in an integrated and sustainable manner [10]. Top down fisheries management through legislation will usually have a big impact on the community, if there is no input from the community. Community participation is needed in overcoming the problem of decreasing fishery resources. One of the community participation activities in managing fisheries resources can be realized in fisheries resource management activities based on local wisdom. Local wisdom is part of the culture of society which is passed down for generations. Local wisdom is often found in Tegal, but its implementation has not been carried out optimally. Local wisdom is usually obeyed by many people because violations of local wisdom are usually in the form of customary or social sanctions. Thus the management of fish resources should run with the community, because the community is the actor and object so that the policy will be more targeted.

4 CONCLUSION

The results of bioeconomic analysis showed that the sustainable potential of pet fish in Larangan was 202.16 kg / year / ship and Surodadi was 111.16 kg / year / boat. This shows that the catch of petek fish in Larangan and Surodadi exceeds the sustainable potential of these waters.

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