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Analysis of Production and Income of Fishermen Fishing Tools at Kepenghuluan Sungai Bakau, Sinaboi Sub-District, Rokan Hilir Regency, Riau Province

Analisis Produksi dan Pendapatan Nelayan Alat Tangkap Pukat Tarik di Kepenghuluan Sungai Bakau Kecamatan Sinaboi Kabupaten Rokan Hilir Provinsi Riau

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Abstract

This research was conducted from November to December 2022 to analyze how much influence production factors influence the catch of trawl fishermen and know the income of fishermen who use trawl fishing gear in the Penghuluan Sungai Bakau, Sinaboi District, Rokan Hilir Regency Riau Province. The method used in this study was a survey that determined the sample using the total sampling or census method. The number of samples taken was 32 fishermen who used trawl fishing gear. The results of this study are the size of the ship and the length of time at sea affect the production of fishing trawler catch haul. In contrast, the number of crew members and experience at sea has no significant effect on fishing production with trawl fishing gear. The total net income or profit earned by fishermen is calculated for 20 trips/month, fishermen using 2 GT vessels amounting to IDR 25.496.044 and those using 3 GT vessels amounting to IDR 22.258.057 in peak season. In the middle season, fishermen's income is calculated for 20 trips/month using 2 GT vessels of IDR15.014.933 and those using 3 GT vessels of IDR12.386.628.

Keywords: Income, Production, Trawl Fishermen.

Abstrak

Penelitian ini dilaksanakan pada November sampai Desember 2022, bertujuan menganalisis faktor-faktor produksi yang mempengaruhi hasil tangkapan nelayan dan mengetahui pendapatan nelayan yang menggunakan alat tangkap pukat tarik di Kepenghuluan Sungai Bakau Kecamatan Sinaboi Kabupaten Rokan Hilir Provinsi Riau. Metode yang digunakan dalam penelitian ini adalah survei dengan penentuan sampel menggunakan metode total *sampling* atau sensus. Jumlah sampel yang di ambil sebanyak 32 orang nelayan yang menggunakan alat tangkap pukat tarik. Hasil penelitian ini adalah ukuran kapal dan lama melaut berpengaruh terhadap produksi hail tangkap nelayan pukat tarik, sedangkan jumlah ABK dan pengalaman melaut berpengaruh tidak nyata terhadap produksi penangkapan alat tangkap pukat tarik dan total pendapatan bersih atau keuntungan yang diperoleh nelayan dihitung selama 20 trip/bulan, nelayan yang menggunakan kapal 2 GT sebesar Rp25.496.044 dan kapal 3 GT sebesar Rp22.258.057 pada musim puncak. Pada musim sedang pendapatan nelayan dihitung selama 20 trip/bulan yang menggunakan kapal 2 GT sebesar Rp15.014.933 dan kapal 3 GT sebesar Rp12.386.628.

Kata kunci: Pendapatan, Produksi, Nelayan Pukat.

1. Introduction

The Mangrove River Management has enormous potential in terms of the fishery and non-fishery sectors. The business sector carried out by residents is generally engaged in the marine and general fisheries sectors, which still use traditional equipment (Briston, 2010). Most of the people in Kepenghuluan Sungai Bakau make a living as fishermen using trawl fishing gear, and this is because the area is close to the coast or even the sea, which makes them able to work as fishermen only.

Based on data from the DKP Rohil (2022), the production of marine capture fisheries in Sinaboi District in the last five years from 2017 was 7,429.00 tons, in 2018 was 8,613.00 tons, in 2019 was 8,967.77 tons, in 2020 it will be 8,614.00 tons, and in 2021 it will be 8,657 tons. It can be seen that in 2021, production increased by 43 tons, and in 2020, production decreased by 353.77 tons due to several factors that affect the catch of fishermen, one of which is using trawl fishing gear.

Drag trawling is coded net with a pair of beaver planks or a netting opening. The main catches are giant prawns, tiger prawns, dogger prawns, lobster prawns, and centipede prawns. By-catch from trawl fishing gear are crabs, gulamah, tapah, clams, and pelagic fish (Firdaus, 2010). The catches of the trawl fishermen in the Bakau River Penghuluan are shrimp, gulamah, and crabs. Fishing activities require factors of production to obtain maximum catches. Therefore, in this study, it is necessary to know the effect of production factors on the catches of drag trawling gear in the Penghuluan Sungai Bakau.

Other factors that affect production (input) in the field of fishing include fishing experience, number of crew members (ABK), net size, and fishing area (Picaulima, 2012). Efficient management of production factors will result in an optimal increase in production. The factors above can result in a decrease in production, which affects fishermen's income by trawling. Regarding the explanation that has been explained this study aims to analyze the production and income of fishermen by trawling in the Sinaboi District, Rokan Hilir Regency, Riau Province.

2. Material and Method

2.1. Time and Place

This research was conducted from November 22, 2022, to December 09, 2022, at Kepenghuluan Sungai Bakau, Sinaboi Rokan Hilir District, Riau Province.

2.2. Methods

Using a survey method by directly observing objects in the field and collecting data through direct interview techniques with trawl fishermen. In this study, the sample is determined using total sampling or census. It is hoped that using this sampling method will cause the results to be closer to the real value and minimize errors or deviations from the population value (Usman & Akbar, 2017)

2.3. Procedures

The number of samples taken was 32 fishermen who used trawl fishing gear. To answer the objectives of this study, then using data analysis as follows: Soekartawi in Lagaronda (2016) explains that data analysis to answer the first objective uses the Cobb-Douglas function with the formula:

$$Y = boX\ 1b1.\ x2b2.\ X3b3\ .\ X4b4\ .\ X5b5\ .\ eE0$$

The estimation is done by transforming the equation into multiple linear regression using natural logarithms so that the equation is as follows:

$$In\ Y = Ln\ b0 + b1\ Ln\ X1 + b2\ Ln\ X2 + b3\ Ln\ X3 + b4\ Ln\ X4 + b5\ Ln\ X5 + E$$

Information:

Y = production (kg)
X1 = number of crew members (people)
X2 = Ship size (GT)
X3 = sea experience (years)
X4 = Sea Time (hours)
B0 = Intercept (constant)
b1 – b5 = Regression parameters
E0 = Interrupt error

Sugiyono (2017), states multiple linear regression is a linear regression model involving more than one independent variable or predictor. This analysis is used to determine the direction of the relationship between the independent variables and the dependent variable, whether each independent variable is positively or negatively related, and to predict the value of the dependent variable if the value of the independent variable increases or decreases. Bhokaleba & Laki (2019), the formula used to calculate fishermen's income is:

$$Pn = TR\text{-}TC$$

Description:

Mr = Revenue of trawl fishing gear fishermen (IDR)
TR = Total revenue (IDR)
tc = Total cost (IDR).

3. Result and Discussion

The geographical location of the Penghuluan Bakau River is between, namely, to the north: the Malacca Strait; South District of Sei Sembilan; West: Penghuluan Raja Bejamu; East: Sinaboi Principality. The Kepenghulun Sungai Bakau has a population of around 4,386 people; the dominant sex in the Kepenghulun Sungai Bakau is male, with a percentage of 50.63 and a total population of 2,221. Trawl fishermen in the Bakau River Penghuluan have different characteristics, which can be seen from the fisherman's age, level of education, and fishing experience. The trawl fishermen use several parts (Amry et al., 2017): Wings. Trawl nets have two parts of the wing: the left wing and the right wing.

The construction of upper and lower parts of the wings are of different sizes, and the wing material is made of PE material. The bag (cod end) is a gathering place for netted fish. The top and bottom rises are used to attach or hang the body of the net. The top line is installed under the buoy line, while the bottom line is installed above the weighted rope, a towing dance (Selambar). Buoy serves to produce buoyancy force on the dragnet. Buoy rope is the rope used to attach the buoy. Ballast rope is the rope used to install ballast. Ballast serves to produce gravity on the dragnet. Arrest preparation is one of the activities that support fishermen's fishing activities and assists in preparing for fishing activities and the fishing process. In fishing activities, it is necessary to prepare supplies that must be met, such as filling in diesel fuel, oil, and ice, and the basic needs of fishermen when going to sea, such as food, drink, cigarettes, and other needs.

Fishermen in the Penghuluan Sungai Bakau carry out fishing operations in one month on as many as 20 trips; fishing operations are carried out one-day fishing using 2 GT and 3 GT boats with fishing areas as far as 12 hours to 14 hours long at sea. In fishing activities, it is necessary to prepare supplies that must be met, such as filling in diesel fuel, oil, and ice, and the basic needs of fishermen when going to sea, such as food, drink, cigarettes, and other needs. Fishermen in the Kepenghuluan Sungai Bakau fishing operations in one month, as many as 20 trips. Fishing operations are carried out one day using 2 GT and 3 GT boats with fishing areas as far as 12 to 14 hours long at sea.

3.1. production function Analysis

The effect of each independent variable (X) on the dependent variable (Y) partially (separately) can be used in the t (t-student) test by looking at the value of the regression coefficient. More details regarding the influence of variable X on variable Y partially can be seen in (Table 1)

Table 1. Analysis of the factors affecting catches of fishermen of gear fishermen for trawling trawlers in Kepenghuluan Sungai Bakau, Sinaboi District, Rokan Hilir Regency, Riau Province.

Description	Regression Coefficient	Standard Error	tcount*	P-values
Intercepts	58,705	4,715	12,450	0.000
Number of the crew (person)	-0.744	0.772	-0.963	0.344
Ship Size (GT)	3,489	0.943	3,699	0.001
Seafaring Experience (Year)	0.105	0.055	1,902	0.068
Sea Time (Hours)	0.846	0.260	3,248	0.003
multiple R	0921			
R Square	0.848			
Adjusted R Square	0.825			
Standard Error	1.52261			
Observations (N)	32			

Note:* significant at α level of 5%: ns non-significant

The overall regression analysis results show that the Adjusted R^2 value or the coefficient of determination is 0.825, which means 82.5%. This figure identifies that fishermen's catch can be predicted by the number of crew members, ship size, experience at sea, and the remaining 17.5% of the length of time at sea by other variables not examined in this study. The effect of each input on the production of dragnet fishermen is as follows:

Mastu et al. (2021) concluded that ABK is the main component in fishing activities, but in research, more or less ABK does not affect catches because, during the setting and towing process, the garden machines work a lot. From the results of the analysis, it can be seen that the larger the size of the ship used when making arrests, the more catches will be obtained.

The catches of fishermen with nine years of fishing experience are not much different from those with 34 years of fishing experience. The work experience factor of more experienced fishermen at sea can increase their income because experienced people can know where the fish are congregating at a particular time. The longer the fishing experience, the greater the chance of catching more. Meanwhile, based on research results, experience does not affect the catch of fishermen because fishermen tend to be monotonous from year to year,

and there is no government role in building technological infrastructure in the form of fish detection devices to more easily find the location of fish to be caught to increase catch production. As a result, in the absence of technology to support fishing activities for fishermen and the lack of the government's role in seeing the social conditions of fishermen, they tend to follow traditional methods so that the resulting fish production does not increase.

The analysis results show that the longer the fishing takes, the more catches are obtained and the farther the fishing distance is. The results of this study are relevant to Rahim (2013), who describes the length of time at sea for fishermen who use motorized boats to have a positive and significant effect on fish catch (production). This is because the longer the fishermen go to sea, the fishermen will have the opportunity to catch more fish to get more and more fish compared to fishermen who have little time to go to sea. This research is also supported by Rahayu & Tisnawati (2014), who states that the duration of a person's work will affect production results (output). It can be interpreted that the longer a person's working hours, the more the output or production produced will increase and indirectly increase one's income.

3.2. Trawling Fisherman's Investment

Fishing business investment is capital owners invest to build a fishing business using trawlers. Investment costs are all costs incurred to start, move, or expedite a business, starting from procuring business support equipment so that the business can carry out the production process. The capital issued by the business owner consists of the fixed capital of the 2 GT vessels amounting to IDR 41,028,111.11 and the fixed capital of the 3 GT vessels amounting to IDR 50,614,000. Meanwhile, the working capital of the 2 GT vessels amounted to IDR 1,099,826.67, and the working capital of the 3 GT vessels amounted to IDR. 1,239,445.71. So the investment for a 2 GT ship is IDR 42,127,937.78, and an investment for a 3 GT ship is IDR. 51,853,445.71.

Table 2. Average fixed capital in fishing trawling business

No	Component	Average Fixed Capital (IDR)	
		2GT ship	3GT ship
1	Boat	30,888,888.89	38,714,285.71
2	Machine	4,222,222.22	5,178,571.429
3	Bubu Net	2,432,000	2,578,285,714
4	Box	400,000	800,000
5	Lights (2 Pieces)	90,000	90,000
6	Ballast Stone	1,830,000	1,967,142,857
7	Chain	1,165,000	1,285,714,286
Total cost		41,028,111.11	50,614,000

Table 3. Average working capital for trawling fishing business

No	Component	Average Working Capital (IDR)	
		2GT ship	3GT ship
1	Solar	252,377.7	276,457.14
2	Ice	50,000	100,000
3	Consumption (cigarettes, drinking water, coffee, sugar, food)	169,444	267,857
4	Crew wages	628,004.4	595,131
Amount		1,099,826	1,239,445,714

3.3. Production of Trawl Fisherman

The catch of the Bakau River Penghuluan fishermen is influenced by the length of fishing and also the fishing season. Generally, there are three fishing seasons: peak, medium, and lean.

Table 4. Trawl fishermen's catch per trip

Fish Type	Catch			
	2GT ship		3GT ship	
	Peak	Currently	Peak	Currently
Shrimp	41.72	24.38	48.14	28.92
Gulamah	18	12	20	14
Crab	15	10	15	10
Amount	74.72	46.38	83.14	52.92

3.4. Trawling Fishermen's Income

The gross income (GI) fishermen receive depends on the number of catches multiplied by the prevailing fish price. The price of shrimp is IDR 15,000/kg, gulamah is IDR 12,000/kg, and crab is IDR 80,000/kg. The number of fishermen's catches highly depends on when the fish is not in season. Net income is the reduction between gross income and the total costs incurred per fishing trip. In this case, the total costs incurred are fixed and

variable. Fixed costs are relatively fixed costs and must be incurred even if the results of fishing activities obtained are large or small (Table 6).

Table 5. Average gross income per month

Fish Type	2GT ship		3GT ship	
	Peak (IDR)	Medium (IDR)	Peak (IDR)	Medium (IDR)
Shrimp	12,516,666	9,755,540	13,842,857	11.571420
Gulamah	4,320,000	3,600,000	4,800,000	4,200,000
Crab	24,000,000	17,000,000	24,000,000	17,000,000
Amount	40,836,666	30,355,540	42,642,857	31,771,420

Table 6. Average net income per month of fishermen in peak season

No	Description	Vessel 2 GT (IDR/Month)	Ship 3 GT (IDR/Month
1	Reception	40,836,666.67	42,642,875.14
2	A. Fixed costs		
	- shrinkage	4,487,511.111	5,794,942,857
	- Maintenance	1,416,666,667	1,703,571.429
	B. Variable costs		
	- Solar	5,047,555.556	5,529,142.858
	- Ice cube	1,000,000	2,000,000
	- Consumption	3,388,888,888	5,357,142.858
Amount		15,340,622.22	20,384,800
3	Net income (1-2)	25,496,044.45	22,258,057.14

Table 7. Average net income per month of fishermen in medium season

No	Description	Vessel 2 GT (IDR/Month)	Ship 3 GT (IDR/Month
1	Reception	30,355,555.56	32,771,428.57
2	A. Fixed costs		
	- shrinkage	4,487,511.111	5,794,942,857
	- Maintenance	1,416,666,667	1,703,571.429
	B. Variable costs		
	- Solar	5,047,555.556	5,529,142.858
	- Ice cube	1,000,000	2,000,000
	- Consumption	3,388,888,888	5,357,142.858
Amount		15,340,622.22	20,384,800
3	Net income (1-2)	15,014,933.34	12,386,628.57

4. Conclusions

Ship size and time at sea affect the production of catches by trawl fishermen. In contrast, the number of crew members and experience at sea has no significant effect on fishing production by dragnet trawlers in Kepenghuluan Sungai Bakau, Sinaboi District, Rokan Hilir Regency, Riau Province. The total net income or profit obtained by the respondents for trawling fishing gear in the Bakau River Penghuluan, Sinaboi District, Rokan Hilir Regency, Riau Province, calculated per month (20 trips) for fishermen using 2 GT vessels are IDR. 25,496,044, and those using 3 GT vessels are IDR 22,258,057 in peak season. In the middle season, the income of fishermen per month (20 trips) using 2 GT vessels is IDR 15,014,933, and those using 3 GT vessels are IDR 12,386,628.

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