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Analysis of Ice Supply Needs for Purse Seine Ship Operations in Kutaraja Ocean Fishing Port, Aceh Province

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ABSTRACT

This research was conducted in March 2022 at Kutaraja Ocean Fishing Port, Banda Aceh City, Aceh Province. The purpose of the study was to determine what factors determine the amount of ice carried for fishing operations on *purse seine* fishing gear, and how the relationship between these factors and the amount of ice carried. The method used in this research is the survey method. The data collected were statistically analyzed using the normality test, multicollinearity, ANOVA, Multiple linear regression, and T-Test. The results showed that the size of the ship (X1), the length of the trip (X2), and the amount of catch (X3) affect the amount of ice carried (Y) by purse seine vessels in the form of multiple regression equation Y = 2403.052 - 100.725 X1 + 294.378 X2 + 1.686 X3. The value of the determinant coefficient obtained is 59.4%.

Keywords: Purse Seine, Regression, Provisioning

1. INTRODUCTION

Kutaraja Ocean Fishing Port (PPS) is the largest type A fishing port located in Banda Aceh City and has a very strategic location, which is included in the fisheries management area of WPP 572 with a status that has been over-exploited for pelagic fish and fully exploited for demersal fish. Fleets based or moored at PPS Kutaraja include purse seine, gill net, and long line (UPTD PPS Kutaraja, 2020). Before conducting fishing operations, the fleet needs ice as a material for fishing supplies. Ice is used as a preservative for the fish caught. Ice brought by the fishing fleet based at PPS Kutaraja is obtained by fishermen from an ice factory located outside PPS this is because the PPS Kutaraja ice factory is not operating due to damage. The amount of ice carried by the purse seine fishing fleet as fishing supplies varies for each vessel (Mudjari, 2010).

Survey data on preliminary research shows that the purse seine vessel Km. Akila with a vessel size of 18 GT with a fishing trip length of 2 days and a total catch of 280 carrying 300 blocks of ice Km. Senangin 5 with a vessel size of 30 GT with a fishing trip length of 5 days and a total catch of 6976 carrying 900 blocks of ice and Km. Sehati Baroe with a vessel size of 60 GT with a fishing trip duration of 14 days and a catch of 1215 carrying 1,300 blocks of ice (Yunanda, 2018). From the data, it can be seen that the amount of ice carried by these vessels varies. It is suspected that the difference is caused by the size of the ship, the fishing trip, and the amount of catch.

2. RESEARCH METHODS

Time and Place of Research

The research was conducted in March 2022 at Kutaraja Ocean Fishing Port, Banda Aceh City, Aceh Province

Research Methods

The research method used in this study is the survey method. To observe the activities carried out during the filling of sea supplies using samples determined by purposive sampling, which is done by taking samples from the population based on certain criteria (Jogiyanto, 2008).

Data Analysis

Data analysis in this study used normality, Multicollinearity, ANOVA, Multiple Linear Regression, and T-Test.

Normality Test

The normality test used is the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov formula is as follows:

$$KD = 1.36\frac{\sqrt{n1+n2}}{n1\,n2}$$

Description:

KD = The number of Kolmogorov-Smirnov being sought
n1 = Number of samples obtained
n2 = Expected sample size

Data is said to be normal if the significant value is greater than 0.05 at (P>0.05). Conversely, if the significant value is smaller than 0.05 at (P<0.05), the data is said to be abnormal.

Multicollinearity Test

The multicollinearity test is a condition that indicates the existence of a correlation or strong relationship between one or more independent variables in a multiple regression model.

How to detect the presence of multicollinearity in the regression model used in this study is by looking at the Tolerance value and Variance Inflating Factor (VIF). If the Tolerance value <0.1 and VIF> 10 can indicate the presence of multicollinearity. Some experts use Tolerance < 0.2 and VIF > 5 in determining the presence of multicollinearity. This data processing was carried out using the SPSS version 24 application.

Multiple Linear Regression Test

The multiple regression mathematical model equation used in this study is as follows:

$$Y = a + b\,X + b\,X + b\,X_{112233}$$

Description:

Y = Quantity of ice carried (kg)
A = The amount of ice carried if the variables X_1, and X_2 are 0 (Zero)
b = Regression coefficient
X_1 = Ship Size
X_2 = Length of a fishing trip
X_3 = Total catch

ANOVA Test

The ANOVA test is used to see whether the size of the ship, the length of the fishing trip, and the catch (independent variables) jointly affect the amount of ice carried by purse seine vessels. Significant or not the effect of independent variables simultaneously on the dependent variable is done by looking at the probability of F count (Sig F value) of all independent variables at the test level α = 5% (Sulaiman, 2004).

T-test

The T-test is used to see if the independent variables (vessel size, length of time at sea, and total catch) partially affect the amount of ice carried. The T-test was conducted using the SPSS application by looking at the coefficients table (Steel & Torrie, 1990).

3. RESULT AND DISCUSSION

Purse Seine Fishing Gear

The Purse Seine fishing fleet at the Kutaraja Ocean Fishing Port (PPS) is a very dominating fleet with the largest number of fleets compared to other fleets and also contributes the most catches each year. The *Purse Seine* registered and available at PPS Kutaraja is on average a purse seine one boat system based on the Fishing Licence (SIPI) available at the syahbandar.

Ice Supply at PPS Kutaraja

The production of ice in PPS Kutaraja is provided by the block ice factory Karya Nusa Jaya and PT Aceh Lampulo Jaya Bahari. Karya Nusa Jaya is a factory that only produces block ice while PT Aceh Lampulo Jaya Bahari is a factory that produces various kinds of seafood and also produces block ice for fishing purposes. Initially, the provision of ice in PPS Kutaraja was only provided by Karya Nusa Jaya, but in 2014 PT Aceh Lampulo Jaya Bahari was established (Yunanda, 2018).

Analysis of Ice Supplies Needs for Purse Seine Vessel Operations at PPS Kutaraja

The results show that the size of the vessel, the length of the fishing trip, and the amount of catch and the amount of ice carried by the purse seine vessels are listed in the following Table 1.

Before looking at the relationship between factors, a normality test is carried out, the Normality Test aims to test whether, in the regression model, confounding or residual variables have a normal distribution. Based on the results of the Normality Test processed using the SPSS application, the significant

value obtained is 0.110, so the data can be said to be normal because the significant value is greater than 0.05 at (P>0.05).

Table 1. Ice supplies requirement for purse seine vessel operation

No.	Vessel Size Group	Ship Name	GT Vessel	Number of Trips/Month	Ice Requirement/ Trip
1.	**< 30 GT**	Km. Akila	18 GT	10-25	300 kg
		Km. Kambuna I	21 GT	10-25	300 kg
		Km. Bintang Kala	24 GT	15-25	12 tonnes
		Km. Shared ATM	29 GT	15-25	12 tonnes
2.	**30-60 GT**	Km. Senangin 5	30 GT	2-3	21 tonnes
		Km. Bintang Barat 1	35 GT	2-3	21 tonnes
		Km. Munawarah M	55 GT	2-3	21 tonnes
3.	**> 60 GT**	Km. Sehati Baroe	60 GT	3-4	24 tonnes
		Km. Sinar Jaya 77	90 GT	3-4	24 tonnes
		Km. Arjuna Asia	131 GT	3-4	24 tonnes
				Total	**72 tonnes**

The multicollinearity test results show that the highest tolerance value is 0.148 (vessel size) and the lowest is 0.117 (catch), meaning that if 0.1 > tolerance < 1.0, it means there is no multi-collinearity and the variance inflation factor (VIF) value ranges from 8.576 (catch) and 6.758 (vessel size), meaning there is no multicollinearity because the VIF value < 10.

After the Multicollinearity Test is carried out, the Multiple Regression Test is carried out. From the results of multiple regression tests, the relationship between data on ship size, length of time at sea, and catch with the amount of Ice demand obtained in the form of multiple regression equations can be seen in the multiple linear regression equation as follows:

$$Y = 2403.052 - 100.725\ X1 + 294.378\ X2 + 1.686\ X3$$

Description:

Y = Quantity of Ice (kg)
X1 = Ship Size (GT)
X2 = Length of time at sea (Days)
X3 = Catch (kg)

The multiple linear regression equation above can be explained as follows: a) The constant value of the number of ice (Y) has a positive value of 2403.052. The positive sign means that it shows a unidirectional influence between the independent variable and the dependent variable. b) The regression coefficient of the ship size variable (X1) is -100.725. c) The regression coefficient of the variable length of fishing (X2) is 294.378. d) The regression coefficient of the catch variable (X3) is 1.686.

Anova Test, F Test, and Coefficient of Determination (R^2)

Based on the results of the summary model output, the coefficient of determination (R^2) is 0.594 or 59.4%. The coefficient of determination (R^2) of 59.4% means that the presentation of the influence of the independent variables used in the model has an influence of 59.4% on the dependent variable and the remaining 40.6% is influenced by other variables not included in the model. Other factors that are thought to have an influence include external factors such as the environment, weather, and existing technology. Furthermore, the correlation coefficient R-value is 0.771 or greater than 0.5, which means that these factors have a strong relationship with the dependent variable or the amount of ice required to conduct fishing operations.

T-test

The T-test is a statistical test to test the correctness of the hypothesis proposed by the researcher in distinguishing the average. The T-test was conducted to test the research hypothesis regarding the effect of each dependent variable. The results of the T-test on the variables of ship size, length of time at sea, and the amount of catch partially show that two

variables are very partially influential on the amount of ice carried, namely the length of time at sea and the amount of catch.

4. CONCLUSIONS

The results concluded that the size of the ship (X1), the length of the trip (X2), and the amount of catch (X3) influenced the amount of ice carried (y) by purse seine vessels in the form of multiple regression equations Y = 2403.052 - 100.725 X1 + 294.378 X2 + 1.686 X3. The results showed a determinate coefficient of 59.4%. The results of the F test obtained show that factors such as ship size, length of time at sea, and catch simultaneously affect the amount of ice carried. while the results of the t-test show that only two variables are very influential, namely the length of time at sea and the amount of catch.

The need for the amount of ice on Purse Seine vessels in PPS Kutaraja needs to be considered by the government because the need can be said to be very large. Furthermore, the role of ice agents is needed in the distribution of ice so that fishermen do not need to come directly to the ice factory to order.

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