Maritime Technology and Society
Vol. 1(2): 64-69, June 2022
Doi: https://doi.org/10.62012/mp.v1i2.21955

Analysis Of Restriction Rules Of Gross Tonnage Fishing Ship On The Sunda Sea Coast

***Hasdinar Umar**

Departement of Ocean Engineering, Hasanuddin University, Indonesia
*Correspondence author: hasdinar.umar@unhas.ac.id; Tel.: +62 812-4420-9266
Received 04 April 2022; Received in revised form 12 April 2022; Accepted June 2022

Abstract

The Sunda Strait has a significant enough fishery potential in Indonesia. Fish catches from the Sunda Strait are landed in Pandeglang Regency, one of which is at the Labuan Coastal Fishing Port. The types of fish that are targeted for catching are mackerel and tuna. The high selling price of fish causes fishing operations to continue to be improved. Fishing operations that continue to increase can lead to a scarcity of fishery resources. Therefore, it is necessary to study the rate of fish resource utilization to determine their status. This study aimed to evaluate the rate of exploitation of tuna in the Sunda Strait based on fish catch data on 30 GT vessels and analyze it using policies issued by the Indonesian government. In this study, a simple linear regression method was used. Result of analysis, in 2025, the fish stock is only 21,682, while the number of fish taken is 66,497, which means that in 2025 there will be no more fish because the fish stock has run out and cannot meet the number of fish that needs to be taken

Keywords: Tuna, Gross Tonnage Ship, Sunda Strait

1. Introduction

Fishing boats have long been used in Indonesia to catch fish at sea. The fishing vessel is oneof the essential aspects of fishing operations because it is one of the techniques that determine the success of fishing operations. It can be seen from the catch, both in quality and quantity. Therefore, the ship's ability to catch large amounts of a catch is the fishing effort capacity of the fishing vessel. Currently, the calculation of fishing business capacity in capture learning in Indonesia is continually reviewed based on the Gross Tonnage (GT) [1][2].

The importance of information on GT fishing vessels for fisheries management strategies in Indonesia. Many agencies are interested in the GT information of fishing vessels, so studying the measurement and use of the GT of ships in catch is necessary. Gross tonnage (GT) is a measurethat shows the volume of ships to accommodate the results of fishing in the context of utilizing fishery resources. There is a significant difference between the GT of the ship before and after the re-measurement by the Ministry of Transportation.

As a result, some fishermen reject the measurement results because a higher number than before will impact ship operating costs. The Indonesian government, through the Ministry of Maritime Affairs and Fisheries (KKP) and the Ministry of Transportation (KEMENHUB), is actively conducting vessel data collection to determine the exact capacity of fishing businesses operating in Indonesia and to control fishing vessels operating in Indonesia [3].

Most measurements made by the Ministry of Sea Transportation through the Harbormaster and Port Authority (KSOP) showed that most ships had decreased from the actual size.

E-ISSN: 2828-6669; P-ISSN: 2828-7010

Fig. 1. Fishing vessel of 30 GT [4]

GT or vessel volume is closely related to capturing fisheries management. Therefore, good ship GT size data is needed by the government so that the government is right in making decisions in carrying out capture fisheries management activities in Indonesia. Real physical GT or so-called markdown. This is still homework for the relevant agencies. The existence of this markdown issue is very detrimental to the government. It can be in the form of inaccurate data and losses in Non- Tax State Revenue. It is determined from the size of the GT listed in the ship's document. In addition, losses are experienced by the ship owner, losses in the form of assistance, insurance receipts and when the ship owner makes a loan with the ship as collateral. Assistance, insurance and collateral depend on the amount of GT in the documents they have [4].

Sea Transportation has officially issued circular No. UM.003/47/16/DJPL regarding verification or re-measurement of fishing vessels. The circular letter requires ship owners to re-measure their ships to correct the ship's GT in the document. The problem that can be caused is that at the time of measurement, there are three elements of GT dimensions, namely length (L deck), width (B), and depth (D) which are not physical, causing GT results that are not by the actual physical ship. This circular regulates that all permits for fishers with vessels under 30 GT are handed over to the province. In the previous regulation, the government limited the maximum size of fishing vessels to 150 Gross Tonnage (GT) and transport vessels to 200 GT to provide equal business opportunities for small fishers [5].

1.1. Gross tonnage

GT is a measure that shows the ship's volume to accommodate the cargo of goods to be brought to the destination. It is the total volume of the space under the deck (under deck) and the enclosed spaces above it (over deck), plus the contents of the room and all enclosed spaces, including the enclosed space located above the top deck (superstructure). The calculation of gross tonnage can be read in Regulation 3 Annex 1 of The International Convention on Tonnage Measurement of Ships, 1969. This gross tonnage depends on two variables, namely: V is total volume of the ship (m^3) and K1 is multiplier factor based on the volume of the ship.

This K1 variable affects the percentage of ship volume, which is expressed as gross tonnage. Small ships show a smaller K1 value, while large ships show a more considerable K1 value. The formula for calculating K1 is as follows [6]:

$$K_1 = 0.2 + 0.02 \log_{10}(V) \tag{2}$$

Calculate the gross tonnage using the equality:

$$GT = K_1 V \tag{3}$$

Net tonnage is expressed in tons obtained from the reduction of gross tonnage (GT) with the contents of the crew's residence rooms, such as the captain's and officers' rooms, engine compartments, and other rooms. It is the size of the ship's space for transporting cargo.

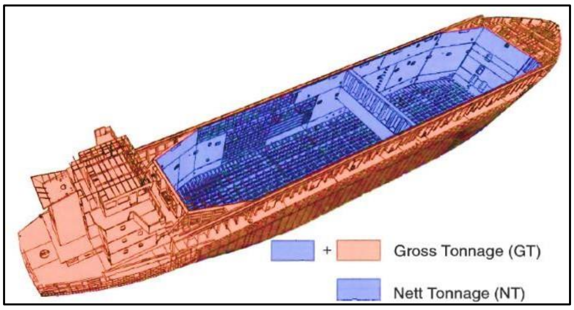

Fig. 2. Difference between GT and NT [2]

E-ISSN: 2828-6669; P-ISSN: 2828-7010

1.2 Indonesia's fish resource potential

Fish resources are very abundant, but only half can be utilized. In addition, lifting the restrictions can prevent illegal, unreported, unregulated (IUU) fishing, especially in border areas. To be able to operate in that area, large capacity fishing vessels are needed. After the regulation is revoked, the regulation of the fishing vessel issue must be fully regulated by the Minister of Capture Fisheries Business.

This policy is also applied in the Philippines, Vietnam, and China (trial period). Loss or damage to fish resources from exploitation activities can be done through depletion assessment. This assessment is important because it can determine with certainty the damage or decline in the quality of resources. Depletion of fish resources is a condition where the level of utilization of fish resources exceeds the limits set as happened in the Sunda Strait, which is a waters that has a large enough fishery potential in Indonesia [5].

The see of the Sunda Strait are part of the fisheries management area (WPP-RI) 572. The Sunda Strait is one of the waters that has great fishery potential in Indonesia, both pelagic and demersal fisheries. The catch of fish from the Sunda Strait lands in Pandeglang Regency, Banten. The largest Fish Landing Place (TPI) in Pandeglang Regency is the Coastal Fishery Port (PPP) Labuan. One of the species that is the target of the catch is tuna.

Fig. 3. Indonesia's fish resource potential of tuna [3]

2. Materials and Methods

This research was conducted using a simple linear regression method with the data obtained from literature in the library and on the Internet by accessing articles on fish and ship data at the Coastal Fishery Port (PPP) Labuan, in Pandeglang Regency, Banten.

Simple linear regression is a statistical model used to explain the relationship between two variables in functional terms. The two variables are the dependent variable (y), the response variable, and the independent variable (x) or the predictor variable or explanatory variable. The data scale used in simple linear regression is interval or ratio.

It is a statistical method that tests the extent of the causal relationship between the Causing Factor Variable (X) and the Effect Variable. The causal factor is generally denoted by X, also known as the Predictor, while the Effect Variable is denoted by Y or Response. Simple Linear Regression, often abbreviated as SLR (Simple Linear Regression), is also one of the statistical methods used in production to forecast or predict quality and quantity characteristics.

The general form of simple linear regression is written as follows:

$$Y = a + bX \tag{4}$$

Where, Y is acute point Y, b is coefficient of variable X, Y is dependent variable, X is independent variable. To assess the value of fish resource losses resources due to the size of fishing vessels conducted in Indonesia.

3. Result

3.1. The Problem of Fishing Vessels in Indonesia

Fishing vessels are part of fishing units that have an essential role in supporting the success of fishing operations. Indonesia has a total of 625,633 fishing vessels, so the Indonesian government needs to regulate these fishing vessels with this number. The government regulates fishing vessels by requiring fishing vessel owners to register their vessels with the relevant agencies.

The registration system functions to obtain data on

E-ISSN: 2828-6669; P-ISSN: 2828-7010

Indonesian fishing vessels. One of the most critical data and information about fishing vessels is to know one of them. The vessel size in question is gross tonnage (GT).

GT or vessel volume is closely related to capturing fisheries management; often, a markdown is found. The existence of this markdown issue is very detrimental to the government. It can be in the form of inaccurate data and losses in Non-Tax State Revenue.

The Director General of Capture Fisheries rules on limiting the GT size of fishing vessels. This circular regulates that all permits for fishers with vessels under 30 GT are handed over to the province. In the previous regulation, the government limited the maximum size of fishing vessels to 150 Gross Tonnage (GT) and transport vessels to 200 GT to provide equal business opportunities for small fishers.

A 150 GT fishing vessel will over-exploit fish in Indonesian waters. The ban on large fishing vessels is also intended to protect small fishermen. Susi still allows boat sizes up to 200 GT, but that only applies to transport vessels, not fishing vessels. Most fishermen in Indonesia do have boats under 150 GT. Many large fishing vessels above 150 GT do not report their catch, so there is a substantial loss of state revenue from fishery product levies.

Fig. 4. Foreign ships that catch fish on Indonesian seas.

Exploitation is related to the size of the fishing gear, where the size of the fishing gear used by the ship is regulated. The size of the ship has to do with how far the ship can go to sea. Therefore, ships above 100 GT may only catch in the EEZ and the sea off. the revocation of the regulation does not interfere with small fishermen because the path for fishing has been arranged. The regulation prevents fishing vessels from going to the sea off and ZEEI, it is hoped that wider investment opportunities will open up in the utilization of fishing areas in the ZEEI (Indonesian Exclusive Economic Zone). In addition, the sea off require a larger ship size in anticipation of traveling long distances and the threat of higher sea waves. Revocation of the regulation can increase capture fisheries business and fish production in Indonesia.

3.2. Analysis of the availability of tuna in Pandeglang

The Sunda Strait is one of Indonesia's seas with the most considerable cob fish potential. The catch is landed at the largest Fish Landing Place (TPI) in Pandeglang Regency. The data obtained is located from 2010 to 2020, then forecasted using simple linear equations. The forecast results can be seen in the following table.

Table. 1. The results of the analysis of the availability of tuna

Year	Available fish (*Ton*)	Ships (*Unit*)	Taken fish (Year/Ton)
2010	7180	367	2862
2011	6172	365	3086
2012	7422	308	3711
2013	7276	292	3638
2014	8382	314	4191
2015	6778	1302	3389
2016	8298	1346	4149

E-ISSN: 2828-6669; P-ISSN: 2828-7010

Year	Available fish (*Ton*)	Ships (*Unit*)	Taken fish (Year/Ton)
2017	6654	1346	3327
2018	22979	232	11490
2019	34232	946	17116
2020	14546	173	7273
2021	16564	847	6602
2022	17417	890	6943
2023	18270	934	56031
2024	19123	977	58648
2025	19976	1021	61264
2024	20829	1065	63880
2025	21682	1108	66497

Based on the table above, the catch of tuna in 2010 using a 30 GT vessel which in 2 months can carry 10 tons of fish. So one 30 GT vessel can catch 60 tons of fish in a year. In 2010 the number of fish was 7,180, with the number of fishing vessels 367, and the number of fish taken according to the data was 2,862. In 2022 the number of fish available is still 17,417, and the number taken is 6,943. However, in 2025 the number of fish available is only 21,682, and the number of fish taken is 66,497. This figure shows that the number of fish available cannot meet the number of fish taken. The fish caught have exceeded the value of the number of catches allowed per year. The effort to catch tuna in 2025 exceeded the optimum effort of 66,497 tons.

These results indicate that the average and actual effort have exceeded the value of the optimum fishing effort. Therefore, it can be assumed that the tuna in the Sunda Strait have been overfished. The size of the catch is influenced by the abundance of fish in the seas. The high and low catch of tuna in waters is influenced by the number and efficiency of fishing units, theduration of fishing operations, and environmental conditions. The utilization of tuna in Sunda Strait waters has exceeded the optimum exploitation rate. The tuna fish observed during the study had a size less than the length at first maturity and was dominated by fish that had grades I and II. Therefore, it is suspected that the tuna caught in the Sunda Strait had experienced growth overfishing, meaning that the tuna was caught before the fish had time to grow and develop. The high activity of tuna fishing will affect the availability of tuna stocks in the Sunda Strait waters.

The average and actual fishing effort have exceeded the optimal fishing effort. Thus, tuna fishing in the Sunda Strait waters is thought to have experienced overfishing. Management plans can include limiting the number of fishing units operating in the Sunda Strait waters that do not exceed the optimum effort, as well as paying attention to the size of the ship's GT as the study results, which only used 30 GT.

It is necessary to do further research on the stock of tuna in the Sunda Strait, which represents all seasons. This research aims to provide complete information on tuna stocks in these seas to determine alternative sustainable tuna fish management. The high selling price of fish has also led to improved fishing operations. Operations that continue to increase can lead to scarcity of fishery resources. Restrictions on fishing need to be implemented to maintain the number of fish stocks in the sea. Revoking the regulation requires an in-depth evaluation because the government must also maintain the sustainability of the marine ecosystem.

4. Conclusions

Based on the results of data analysis, in 2025, the fish stock is only 21,682, while the number of fish taken is 66,497, which means that in 2025 there will be no more fish because the fish stock has run out and cannot meet the number of fish that needs to be taken.

References

[1] “Ship data and fish production.” https://statistik.kkp.go.id/home.php?m=kapal&i=5#panel-footer
[2] “Revocation of GT Rules for fishing vessels.” https://kkp.go.id/djpt/article/23347kkpunplug-

E-ISSN: 2828-6669; P-ISSN: 2828-7010

aturan-cepat-size-kapal-pengangkut-ikan
[3] "Population of fish in the Sunda Strait." https://www.solopos.com/berangkatkan-1-kapal- nelayan-tegal- need-minimal-rp1-miliar-1122201
[4] "The size of the ship by the number of fish caught."https://www.solopos.com/berangkatkan-1- kapal-nelayan-tegal- need-minimal-rp1-miliar-1122201
[5] “Simple linear regression formula.” https://www.rumusstatistik.com/2020/05/regresi-linear- simplified.html
[6] S. V. A. Harvard, Ship Resistance and Propulsion. Dept Of Ocean Eng. The Technical university of Denmark Lyngby, 1992. [7] N. (1987),
[7] “NORDFORSK (1987) -Seakeeping Criteria,” p. 1987, 1987.

E-ISSN: 2828-6669; P-ISSN: 2828-7010