The Impact of the Implementation of the Minister of Marine Affairs and Fisheries Regulation Concerning the Prohibition of Trawls and Seine Nets on the Production and Income of Traditional Fishermen in Aceh Province

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***Abstract*—The impact of the implementation of the minister of marine affairs and fisheries regulation concerning the prohibition of trawls and seine nets is based on the decreasing number of fish resources that can threaten sustainability, so it is necessary to prohibit the use of drag nets and drag nets The purpose of this study was to examine and analyze the implementation of the Minister of Marine Affairs and Fisheries Regulation No. 2 of 2015 on the average production and income of traditional fishermen in Langsa City. This type of research is descriptive comparative. Determination of the sample using purposive sampling method. The research sample consisted of 151 traditional fishermen in West Langsa, East Langsa sub-district and sub-district. Data were collected by giving questionnaires to respondents. Data analysis used a sign test (sign-test). The results showed that the impact of the implementation of the Regulation of the Minister of Maritime Affairs and Fisheries increased the average production and average income of traditional fishermen in Langsa City.**

Keywords—regulation, production, income

I. INTRODUCTION

Geographically, Aceh Province is located at the tip of the island of Sumatra which is surrounded by the sea, namely the Malacca Strait, the Indian Ocean and the north coast is bordered by the Bengal Strait. Aceh Province has the potential to develop the fisheries sector as the mainstay of the regional economy. The development of the fisheries sub-sector is one part of agricultural development which aims to increase people's income, self-sufficiency in animals, increase foreign exchange and create productive employment opportunities. The development of the fisheries sub-sector is directed at efforts to increase fishery production which includes marine fisheries, aquaculture, and other public waters. The coastal area of Aceh has a coastline of 1,660 km^2 with an area of 295 marine waters, 370 km^2 consisting of the territorial sea (territorial waters and archipelagic waters) 56,563 km^2 and the Exclusive Economic Zone (EEZ) 238,807 km^2 [1]. Coastal and marine areas are generally influenced by the intersection of currents and movements of the Indian Ocean, the Strait of Malacca and the South China Sea which interact with the mainland of the island of Sumatra, the Malacca Peninsula, the Andaman and Nicobar Islands, thus indicating that the marine ecosystem along the coast of Aceh is very suitable for the life of biota. sea.

Referring to the population of Aceh which is around 55%, Aceh is still dependent on this sector both directly and indirectly [2]. Thus, the development of the fishery sector must be one of the development priorities in Aceh Province in order to have a positive impact on Aceh's economic development. Various problems of violations arise in fisheries management in Indonesia in general and this also occurs in Aceh, including the problem of using types of equipment that can damage the habitat and marine ecosystem used by modern fishermen. Efforts to preserve marine life have been carried out by issuing various regulations governing the capture system of marine biota. Based on data obtained in Aceh Province,

First, the capture of a tiger trawl at the end of the Perling area by a group of fishermen from Seuriget Village, West Langsa District, Langsa City on January 21, 2008. The trawler violated Presidential Decree no. 39 of 1980 [3]. Second, the burning of 1 trawler named Camar PU with serial number 1100PPA from Belawan and the arrest of 10 crew members, on December 19, 2008 by 50 traditional fishermen on 6 traditional boats. According to reports, as many as eight trawling boats have been operating since 8 December 2008 in the waters of Kuala Peunaga, Sungaiyu District, Aceh Tamiang [4]. Third, the arrest of 20 vessels using tiger trawls by dozens of

traditional fishermen in the waters of Suak Seumaseh, Samatiga Regency, West Aceh on Saturday, December 27, 2008 [5]. Fourth, catching 15 boats belonging to local fishermen using trawls on Sunday, January 4, 2009 by hundreds of traditional fishermen from Meureubo Regency, West Aceh [6]. Fifth, dozens of traditional fishermen from Lhok Meulaboh almost clashed with a trawler from Lhok, Tapak Tuan for allegedly using a trawler [7].

The Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 aims to preserve marine biota ecosystems in the short term and the advancement of the fisheries sector in the long term and not to kill the livelihoods of traditional fishermen. On the other hand, the issuance of this regulation aims to save 3.5-4.5 million tons of fish from Indonesian waters.

Regulations on marine and fisheries existed before this regulation was issued, but have not been implemented properly. The Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 was issued on the basis of a decrease in the quantity of marine resources and damage to marine resources caused by the use of trawlsandseine nets in the Fisheries Management Area of the Republic of Indonesia. [8].

In an effort to equalize and reduce social inequality and reduce conflicts between fishermen, the government regulates fishing routes according to the equipment used and the capacity of the fleet used (Table 1).

TABLE I. FISHING ROUTES

Route	Distance from the beach	Fleet Capacity
Line I	0-3 Mil	Traditional boat without motor
	6-12 Miles	Outboard motorboat > 12 meters > 5GT
Line II	6-12 Miles	Motorboat > 60 GT
Line III	12-200 Mil	Motorboat > 200 GT

Source: Minister of Marine Affairs and Fisheries Regulation No. 18 of 2013 [9]

The regulation of fishing lanes is regulated in the Regulation of the Minister of Maritime Affairs and Fisheries Number 18 of 2013 concerning Fishing Paths and the Placement of Fishing Equipment and Fishing Aids in the Fisheries Management Area of the Republic of Indonesia which is the third amendment to the Regulation of the Minister of Fisheries of the Republic of Indonesia. Minister of Marine Affairs and Fisheries Regulation No. 2 of 2011. The division of the catchment area is not only based on the size of the vessel and engine capacity, but also based on the fishing gear to be used. The placement of fishing gear and fishing aids on the fishing line is adjusted to the type of 1. fishing gear, 2. size selectivity, 3. fishing gear size, 4. fishing aids, 5. fishing vessel size, 6. route [9]. The area of fishing operation (fishing ground) in the sea develops from near-shore waters to the open sea. This regulation is also applied by other countries in marine and fishery management. Therefore, the creation of fishing zones is in accordance with the conditions of the fishing fleet.

In the short term, the enactment of this regulation will have a negative impact, namely the impact that will reduce fish catches, then reduce income levels caused by lack of catch and will reduce the level of employment in the marine sector due to restrictions on the use of fishing gear. In the long term, the implementation of this regulation will have a positive impact. Fishermen's adaptation to fishing gear technology has progressed far beyond the government's ability to regulate fishing gear types through this provision, as has continued since the enactment of this regulation [10].

The ability of fishermen to catch fish is not only influenced by the type of fishing gear used, the factors that affect the catch of fishermen. First, socio-economic factors that consist of other than cost, number of workers, experience, and distance traveled and there are three other factors that influence the increase in fishermen's income, namely: fishing technology, age, education, experience, equipment, participation in fishermen's organizations, and season. . factors that affect the production of fishermen [11]. Second, natural factors. Changes The gradual increase in temperature that occurs globally results in changes in biophysical aspects such as changes in extreme weather, sea level rise, changes in food webs, and changes in reproductive physiology will have an impact on socio-economic aspects. fisheries [12].

There are two extreme phenomena to the oceans due to global climate change, namely the increase in sea water temperature and sea level. The increase in sea water temperature affects the coral reef ecosystem which is a fishing area and a breeding ground for fish that live in the area. Fish that live in coral areas will experience a decline in population. Meanwhile, sea level rise has a broad impact on the activities of pond fishermen in coastal areas. Fishermen's productivity is estimated to decrease by 60% due to climate anomalies characterized by high rainfall and large waves, making fishing activities dangerous.

Langsa City consists of 5 sub-districts, namely Langsa Kota District, West Langsa District, East Langsa District, Langsa Lama District and Langsa Baroe District with an area of 262.41 Km^2 with an area of 262.41 Km^2. the total population is 176,811 people. The length of the coastline of Langsa City and the extent of the swamp area that has been used by the community as a job opportunity for coastal communities with various available resources. The number of traditional fishermen who depend on the marine and fisheries sector for their livelihoods is 4,388 people with an annual fishery production of 11,902 tons. The types of fishing gear used by traditional fishermen in collecting their catch consist of ring nets, drift gill nets, trammel nets, and fishing rods.

The problem of fishing is more of a major issue that occurs in several fishing areas which states that fish resources are generally open access, meaning that anyone can participate without having to own these resources [13]. Therefore, uncontrolled capture fisheries will now lead to economic overfishing. Based on the data and description above, the main purpose of this study is to analyze the impact of the

implementation of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 on the average production and income of traditional fishermen in Langsa City.

II. THEORETICAL BACKGROUND

A. Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015

This regulation regulates the types of fishing gear that can be used by all fishermen in Indonesia in the process of catching fish at sea [14]. In general, the types of fishing gear that are prohibited in this regulation are drag trawls and drag trawls, furthermore on hela trawls it is clarified by grouping them into three main groups, namely hela trawls, basic trawlers and mid trawls. While the drag trawls are grouped into two main groups, namely trawls and ship trawlers.

B. Production

Production is the end result of a process or economic activity by utilizing several inputs or inputs. For fishermen, production is the number of catches that can be caught by fishermen using various fishing methods. Production is also influenced by various factors, both internal and external.

C. Fisherman's Income

Total revenue is defined as the product of various unit prices multiplied by the quantity demanded [15]. Revenue (revenue) is the inflow during the period derived from the manufacture of goods, the delivery of services, or from other activities which are the main activities of the business entity. Profit or profit is the total value of the company's income minus the total costs incurred by the company [16]. So that the income of fishermen is the income obtained after deducting the costs for fishing.

III. METHODS

This study discusses the impact of the implementation of the Minister of Maritime Affairs and Fisheries Regulation Number 2 of 2015 on 151 traditional fishermen from a total of 341 traditional fishermen spread across 13 coastal villages in Langsa City. The method used is descriptive analysis with a comparative approach. Determination of the research sample refers to fishermen who carry out fishing activities on lane 1 (0-3 miles of fishing distance from the coast). Data was collected by distributing questionnaires that included data on the production and income of traditional fishermen. Furthermore, the results of the questionnaire were analyzed using the Sign-Test (sign test) method with the help of SPSS software.

IV. RESULTS AND DISCUSSION

A. Descriptive Test Results of Production Mark Test Statistics

Based on the results of the statistical sign test using IBM SPSS software version 22 are as follows (Table 2).

TABLE II. SIGN TEST STATISTICAL DESCRIPTIVE TEST CATCH PER MONTH

	Before	**After**
Total Data (N)	151	151
Average (Average)	131.60	124.71
Standard Deviation	51.43	36.76
Minimum	50.4	55.00
Maximum	312.5	287.5

Statistical test results The sign test shows the average value (Mean) of production after the implementation is smaller than the average value of production before the implementation of the regulation. The value of the standard deviation of fisherman catch production per month before the implementation is 51.43 and after the implementation of the regulation is 36.76. The standard deviation of the data set equals a number indicating that all values in the set are equal. A larger deviation value will mean that individual data points are far from the mean [17].

The minimum value of fisherman production after the enactment of the regulation is higher than before the enactment of the regulation. The maximum production value of traditional fishermen in Langsa City before the enactment of the regulation is higher than after its implementation.

B. Statistic Descriptive Test Results Income Test Sign

The results of the statistical sign test of the income level of traditional shrimp fishermen per month before and after the enactment of the Regulation of the Minister of Maritime Affairs and Fisheries.

TABLE III. DESCRIPTIVE TEST STATISTICAL SIGN-TEST MONTHLY INCOME.

	Before	**After**
Total Data (N)	151	151
Average (Average)	2836740.00	2896679.84
Standard Deviation	1364310.31	1110826,10
Minimum	3220000.00	786500.00
Maximum	66087000.00	6877500.00

Statistical test results sign test shows that the difference in numbers is not too significant (Table 3). This shows that the average production value after the implementation is greater than the average production value before the implementation of the regulation. The standard deviation value of the income of traditional fishermen per month before the implementation is 1.364.310.31 and after the implementation of the regulation is 1.110.826.10. With the enactment of the Minister of Marine Affairs and Fisheries Regulation No. 2 of 2015, it means that the value in the production association is almost the same. The standard deviation of the data set equals zero indicating that all values in the set are equal. A larger deviation value means that individual data points are far from the mean [18].

TABLE IV. COMPARISON OF INCOME OF TRADITIONAL FISHERMEN BEFORE AND AFTER IMPLEMENTATION

	Before		Sign	After	
	Income per fishing	***Income per month***		***Income per fishing***	***Income per month***
Lowest	14000	322,000	<	35750	786500
Highest	314700	6608700	<	327500	6877500

Based on table 4, the lowest income from fishing before implementation is lower than the lowest income after going to sea after implementation. The lowest income of traditional fishermen per month before the enactment of the regulation is lower than the lowest income of traditional fishermen per month after its implementation.

The highest income from fishing for traditional fishermen before the regulation was enacted was lower than the highest income after it was implemented. The highest monthly income before the enactment of the regulation is lower than the highest monthly income after the enactment of the regulation. Based on the exposure according to the results of the descriptive analysis test, it can be seen that the implementation of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 has a positive impact on the traditional fishermen of Langsa City.

C. Result of Sign Test Frequency of Production and Revenue

Based on the processed data, the frequency table can be displayed as a sign test as follows (Table 5).

TABLE V. FREQUENCY SIGN-TEST

	After Implementing Regulations - Before Implementing Regulations	
	Production	***Income***
Negative	70	58
Positive	78	93

The results of the different test results on the comparison of production data and income of traditional fishermen before and after the enactment of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015. The results of the production sign test before and after the enactment of the regulation. For the negative sign (-) there are 70 fishermen respondents and for the positive sign (+) there are 78 fishermen respondents. Meanwhile, the Association consists of 3 respondents, which means that there are 3 respondents with the same difference value or zero (0) between before and after the implementation of the Ministry of Maritime Affairs and Fisheries Number 2 of 2015, the total value is 151.

The results of the sign test of traditional fishermen's income before and after the implementation of the Minister of Maritime Affairs and Fisheries Regulation Number 2 of 2015 showed a negative sign (-) as many as 58 fishermen respondents and a positive sign (+) as many as 93 respondents. This shows that as many as 58 people gave 'disagree' responses to the implementation of the Maritime Affairs and Fisheries Regulation Number 2 of 2015. While 93 fisherman respondents gave 'agree' responses to the implementation of the Maritime Affairs and Fisheries Ministerial Regulation Number 2 of 2015.

Based on the explanation according to the results of the sign test frequency, it can be explained that the ratio of the numbers of each positive and negative sign between production and income is not the same. The number of positive signs is greater in fishermen's income than the production of traditional fishermen in Langsa City, thus it is known that the enactment of regulations increases the production and income of fishermen and the highest increase is with the enactment of the Minister of Trade Regulation. and fisheries are the income of traditional fishermen in Langsa City.

D. Results of Statistical Test Results of Signs of Production and Revenue

TABLE VI. STATISTICAL TEST SIGNS-TEST

	After Regulation Implementation – Before Regulation Implementation	
	Production	***Income***
Exact. Sig. (2-tailed)	0,565	0,004
Point probability	0,053	0,001
= 0.05		

Exact sign-test statistical test results. Signature. (2-tail) (Table 6). The production mark test value is 0.565 = 0.05. The income sign test value is 0.004 < = 0.05. The production probability point is 0.053 > = 0.05, this indicates that there is no significant difference between before and after the enactment of the Minister of Marine Affairs and Fisheries Regulation No. 2 of 2015. The income probability point is 0.001 < = 0.05 which means that there is a significant difference. significantly between before and after the enactment of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015.

E. Discussion

The implementation of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 is a bold and innovative political decision in an effort to use marine resources in a sustainable manner and is related to sustainability. Marine resources are common property which allows new fishermen to enter fishing areas, which will increase fishing intensity. This proprietary nature (open access) means that no one has special rights or prevents others from exploiting the resource.

The amount of potential marine waters is limited and it takes time to increase production due to natural processes to increase the potential of marine resources. On the other hand, in an effort to increase the catch of marine biota, fishermen will continue to strive to increase their fishing capacity by increasing the number of fishing gear and maximizing the ability of fishing gear, if this happens it will result in overfishing (biological). overfishing) and overinvestment (economic overfishing) [19].

The results showed that the average production of catches of traditional fishermen per month before the implementation was greater than the production after the implementation of the regulations. The implementation of these regulations has

reduced the average catch of traditional fishermen. The production of catches of traditional shrimp fishermen before the enactment of the Regulation of the Minister of Maritime Affairs and Fisheries Number 2 of 2015 was 129.98 Kg and the production of catches of traditional shrimp fishermen after the enactment of the Regulation of the Minister of Maritime Affairs and Fisheries Number 2 of 2015 was 125.44 Kg. Seen further, the difference in the production of traditional fishermen's catches before and after implementation based on the research results is very small.

The results of the statistical test of the sign test indicate that the test value is exact. Signature. (2-tail). The production mark test value is 0.565 = 0.05, which means that the implementation of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 increases the average production of traditional fishermen in Langsa City. The income variable shows that the average monthly income of traditional fishermen before the enactment of the Minister of Maritime Affairs and Fisheries Regulation Number 2 of 2015 is smaller than the income of traditional shrimp fishermen after the enactment of the Minister of Maritime Affairs and Fisheries Regulation. Fisheries Number 2 of 2015. The average monthly income of traditional shrimp fishermen before the enactment of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 was Rp 2,836,740. 00 and the income of traditional shrimp fishermen after the enactment of the Minister of Marine Affairs and Fisheries Regulation No. 2 of 2015 was 2,896,679.84. the difference in income after implementation is Rp. 59,939.84. The increase in the average income of traditional fishermen is due to the increase in the price of the catch of traditional fishermen.

The results of the income sign test statistic show that the test value is Exact. Signature. (2-tailed) is 0.004 < = 0.05, meaning that the implementation of the Minister of Marine Affairs and Fisheries Regulation Number 2 of 2015 increases the average income of traditional fishermen in Langsa City. The results of this study contradict the results of research conducted by Andryana in 2016 which concluded that in the economic aspect, the ban on cantrang has a negative impact on the lives of fishermen who use cantrang. The ban on cantrang will have an impact on decreasing the income level of cantrang fishermen. The low level of income will affect the welfare level of fishermen, most of whom have incomes below the provincial minimum wage.

V. CONCLUSION

The conclusions of this study are as follows:

- The impact of the implementation of the Minister of Maritime Affairs and Fisheries Regulation Number 2 of 2015 to increase the average production of catches of traditional shrimp fishermen is acceptable.
- The impact of implementing the regulation of the Minister of Marine Affairs and Fisheries Number 2 of 2015 to increase the income level of traditional shrimp fishermen in Langsa City is accepted.

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