ANALYSIS OF FACTORS AFFECTING ARTISANAL FISHERS INCOME IN TEGAL CITY

Analisis Faktor-Faktor yang Mempengaruhi Nelayan Artisanal di Kota Tegal

by:

Abdul Kohar Mudzakir[1]*, Herry Boesono[1], Husnul Yaqin Harahap[2]

[1] Capture Fisheries Department, Faculty of Fisheries and Marine Sciences, Diponegoro University, Jl.Prof. Sudarto, SH, Tembalang, Semarang, Central Java – 50275. akohmud@gmail.com

[2]Fisheries Socio-Economic Study Program, Matauli College of Fisheries and Marine Affair, Jl. KH. Dewantara No.1, Sibuluan Indah, Kec. Pandan, Central Tapanuli Regency, North Sumatra 22538. herryboesonos@lecturer.undip.ac.id; husnulyaqin@gmail.com

* Correspondence: akohmud@gmail.com

ABSTRACT

Fisheries activities in Tegal City are concentrated in the Tegalsari Coastal Fishing Port (CFP) where the majority of the businesses are small fishers. Small fishers or artisanal fishers generally live below the poverty line. Based on data from the Department of Marine Affairs and Fisheries of Tegal City in 2014, almost 12,589 people worked as fishers, consisting of 630 people as ship owners and 11,959 as fishers workers or crew members. The purpose of this study was to analyze the factors that affect the income of small fishers in Tegal City. Data used in this study were primarily collected from fishers using questionnaires and some other were collected from statistic report of the fishing port as well as relevant literature studies. As many as 140 respondents were chosen purposively. The regression model was used to analyze the effect of the independent variables, namely age, education, number of dependents, and total expenditure on the total income. The results showed that 2 out of 4 independent variables (number of dependents and total expenditure) significantly influenced the income level of small fishers in Tegal City.

Keywords: *Artisanal Fishers, Income, Tegal City.*

ABSTRAK

Aktivitas perikanan di Kota Tegal terkonsentrasi di Pelabuhan Perikanan Pantai (PPP) Tegalsari yang mana mayoritas pelakunya adalah nelayan kecil. Nelayan tradisional yang merupakan nelayan kecil (artisanal) pada umumnya hidup di bawah garis kemiskinan. Berdasarkan data Dinas Kelautan dan Perikanan Kota Tegal tahun 2014, hampir mencapai 12.589 orang yang berprofesi sebagai nelayan, yang terdiri dari 630 orang sebagai juragan atau pemilik kapal dan 11.959 sebagai buruh nelayan atau anak buah kapal (ABK). Rendahnya penghasilan nelayan tradisional merupakan masalah yang sudah lama, namun masih belum dapat diselesaikan hingga sekarang. Tujuan penelitian ini adalah untuk menganalisis faktor-faktor yang mempengaruhi pendapatan nelayan kecil di Kota Tegal. Jenis data yang digunakan dalam penelitian ini adalah data primer yang diperoleh dari hasil pengisian kuesioner oleh responden dan data sekunder berupa data perikanan tangkap dari PPP Tegalsari serta studi literatur yang relevan dengan penelitian. Responden dalam penelitian ini ditentukan dengan menggunakan purposive sampling yaitu sebanyak 140 responden. Analisis data dalam penelitian ini menggunakan analisis regresi linier berganda. Model regresi digunakan untuk menganalisis pengaruh antara variabel independent yaitu, Umur, Tingkat Pendidikan, Jumlah Tanggungan, dan Pengeluaran terhadap variabel dependent yaitu Tingkat Pendapatan. Hasil penelitian menunjukkan bahwa 2 dari 4 variabel bebas yang diteliti

(jumlah tanggungan keluarga dan total pengeluaran) secara signifikan mempengaruhi tingkat pendapatan nelayan kecil di Kota Tegal.

Kata kunci: Nelayan Artisanal, Pendapatan, Kota Tegal

INTRODUCTION

Artisanal fisheries are closely related to various issues such as low incomes, health, and malnutrition (Nenadovic and Epstein 2016; Rousseau *et al.* 2019, Dannenberg *et al.* 2022). This sector represents 90% of employment in capture fisheries worldwide (FAO 2015). Small-scale artisanal fisheries have the unique potential to drive changes in methods, by whom, and for whom fishery products are produced and distributed (FAO 2022). Despite their high potential, small-scale fisheries face unique and complex challenges. They do not only face threats from other sectors, but also from within the fisheries sector itself. Habitat degradation, IUU fishing, and overfishing is a major challenge that jeopardizes the basic ecosystems on which they depend. Economically, small-scale fisheries often face imbalances in obtaining adequate social services such as health, education, housing, financial welfare, and legal services.

Traditional fishers who are artisanal fishers generally live below the poverty line. This is due to their inherent characteristics, i.e. subsistence business conditions, small capital, simple technology, and one-day fishing (Schuhbauer *et al.* 2017; Kittinger *et al.* 2013; Kleiber *et al.* 2015). Furthermore, Fauzi (2003) said that fishing technology which is still simple leads to low income for fishers. The low income of traditional fishers is a problem that has been around for a long time, but has not been resolved until now (Agunggunanto 2011).

The city of Tegal is located on the north coast of Central Java, with coastal and marine areas bordering Tegal Regency by the Ketiwon River in the east and Brebes Regency by the Gangsa River in the west (Tegal Statistics 2021). The coastal area of Tegal City is one of the areas in Central Java that has a large potential resources in fisheries sector. In addition, as it has other functions as industrial areas, fisheries, tourism, settlements, ports and waste disposal sites. One of the factors that accelerate the progress of coastal areas is the existence of fishery and industrial activities in the coastal areas of Tegal City. The results of fisheries and industry have encouraged the optimization of resources in coastal areas, including as a top priority for Tegal City's income. So it is not surprising that the City of Tegal can develop rapidly towards a new economic order and the progress of industrialization. The location of the coastal area of Tegal City, which is strategically located on the northern coast of the north coast, greatly supports the rapid marketing of catches or fish processing products. This profitable marketing of marine products is due to the increasing need for market share and the availability of raw material stocks for fishery products. The strategic role and potential of the coastal area of Tegal City to advance national development is experiencing obstacles that are feared to threaten the capacity of the sustainability of coastal area in supporting the sustainability of national development.

The fisheries sector, especially capture fisheries, is the leading sector in Tegal City. The fishery sector is concentrated in the Tegalsari Coastal Fishery Port (PPP). Thus, most of the people work as fishermen, based on data from the Department of Maritime Affairs and Fisheries of Tegal City in 2014, almost 12,589 people who work as fishermen, consisting of 630 people as skippers or ship owners and 11,959 as fishermen or crew members. (ABK). A large number of fishing workers makes the need for good management so that the welfare of fishermen can be improved. Tegalsari Village and Muarareja Village are 2 villages with the majority of the population making a living as fishermen. Based on the explanation above, research is needed to analyze the factors that influence the income of artisanal fishermen in Tegal City to be able to improve the welfare of fishermen. The purpose of this study is to explain the income factors of artisanal fishermen in Tegal City using the variables of age, education level, number of family members, and total expenditure.

METHODS

This research was carried out at the Tegalsari Coastal Fishing Port in Tegal City from March-July 2022. The detailed research location can be seen in Figure 1 below.

Descriptive research method was used in this study with quantitative approach. Descriptive research method is a method of researching status, a group of people, an object, a set of conditions, a system of thought or a class of events in the present. A survey is an investigation conducted to obtain facts from existing symptoms and to seek factual information, both about social, economic, or political institutions of a group or an area.

The types of data used in this study are primary data and secondary data. Primary data were collected by using a questionnaire to respondents, namely artisanal fishermen with the criteria for vessel ownership under 30 GT. Primary data in the form of data on age, last education, number of family members, and total expenditure. The respondents in this study were determined using the snowball sampling method. Respondents taken are owner fishermen and skippers on small-scale vessels/or less than 30 GT and permanently domiciled in the research location. The number of respondents is 140 people which is taken from the population as many as 1.782 people. Meanwhile, secondary data was collected through the desk study method in journals, articles, and books related to the data that supports this research. Secondary data were obtained from the Department of Marine Affairs and Fisheries of Tegal City, CFP Tegalsari, BPS Tegal City,

The data analysis used in this research is qualitative and quantitative analysis. Qualitative analysis was carried out using descriptive statistical analysis to describe the results of respondents' answers. Meanwhile, quantitative analysis was carried out using multiple linear regression analysis to analyze the factors that influence the total income of artisanal fishermen in Tegal City. Respondents' answers related to age, education, number of family members, and total expenditure was categorized based on certain criteria (Table 1).

The results of the categorization are then carried out by linear regression analysis using independent variables in the form of age, education, number of family members, and total expenditure, with total income as the dependent variable. The regression equation model in this study is as follows:

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

....
(1)
Where:
Y   = Total Income
X1   = Age
X2   = Education
X3   = Number of Family Member
X4   = Total Expenditure
β   =Regression coefficient
e   = Error

To test the hypothesis, the t-test and F-test were carried out with a significance level of 5%, which means that if the significance number is $<\alpha = 0.05$, the research hypothesis is proven / significant. and if the significance number $> = 0.05$ then the research hypothesis is not proven / not significant.

Figure 1 Research Location in CFP Tegalsari, City of Tegal
(Source: Mudzakir and Boesono 2022)

Table 1 Scoring Criteria

No	Level of Education	Age Category	Member of Family	Expenditure	Income	Score
1	Did not finish elementary school	17-25	0-2	IDR 0-IDR 500,000	IDR 0-IDR 2,000,000	1
2	Graduated elementary school	26-45	3-4	IDR 500,000-IDR 2,000,000	IDR 2,000,000-IDR 4,000,000	2
3	Graduated from junior high school	46-65	5-6	IDR 2,000,000-IDR 4,000,000	IDR 4,000,000-IDR 6,000,000	3
4	High school graduate/equivalent	>65	>6	> IDR 4,000,000	> IDR 6,000,000	4

RESULTS

Artisanal fisheries in Tegal City are dominated by fishing boats in size of 5-10 GT with cantrang fishing gear until 2019. In 2020 fishermen began to switch to using trammel nets which were also accompanied by a decrease in the use of cantrang fishing gear. This year, due to the Covid-19 pandemic, the number of fishermen in Tegal City has also decreased become 27,590 people. Artisanal fishermen in Tegal City live below the poverty line, where at the time this research was carried out, in 2022, the income of the majority of artisanal fishermen was in the range of IDR 0 – IDR 2,000,000. This value is below the value of the Tegal City Minimum Wage, which is IDR 2,145,012. Variables suspected of influencing the low level of income are education level, age, number of family dependents, and total expenditure. These variables were given an assessment by the research respondents and the results are presented in the Table 2.

Tegal City Artisanal Fisheries Overview

a. Number of Fishing Vessels

Fishing vessel is a vessel, boat, or other floating equipment used to catch fish, support fishing operations, fish transportation, fishery training, and fishery research/exploration. CFP Tegalsari divides the number of vessels based on Gross Tonage (GT) size. The following is the number of vessel sizes by size in CFP Tegalsari in Figure 2.

Based on the data in Figure 2, it can be seen that the number of vessels under 30 GT in 2019 was 359 units, this was an increase from the previous year but decreased by 1,614 units compared to the number of ships in 2016 which was 1,973 units.

b. Fishing Gear

Fishing gear is the means and equipment or other objects used to catch fish. Fishing gear has different characteristics and ways of use.

The use of fishing gear will certainly affect the capital and type of ship to be used. The catch to be targeted is also influenced by the fishing gear where the results will determine how much profit and the length of the fishing trip in a fishery business. The following is a list of fishing gear available at CFP Tegalsari which is presented in Figure 3.

Based on Figure 3, the majority of fishing gear in CFP Tegalsari is Cantrang. Cantrang is used because it is considered effective and can bring abundant catches. The use of Cantrang has been in use since the trawling ban. The use of cantrang is considered to be able to provide great benefits because this fishing tool has high productivity with a relatively short fishing time. In addition, in fishing activities, these fishing gear can be carried 2 or 3 at a time as a backup. According to Adhawati et al. (2017) Cantrang is a fishing tool resembling a large, increasingly conical bag that is operated at the bottom of the waters with the target of catching demersal fish. Cantrang is a modification of the trawler type of fishing gear.

c. Fisher

Fishermen are people who carry out fishing activities in the waters. Fishermen in Tegal City are divided based on the fishing gear used. The fishing gear in Tegal City is Cantrang, Trammel Net and Mini Purse Seine. The following is the number of fishermen in Tegal City based on data from CFP Tegalsari in Figure 4.

Based on Figure 4 above, it can be seen that the number of fishermen is divided based on the fishing gear used. The dominance of cantrang fishermen is still very strong because it is considered that cantrang fishing gear is more profitable. The ship's fleet is dominated by 80 GT vessels. Cantrang is used by local fishermen because they catch more types of fish, but the main target of cantrang in Tegal is squid. The

largest number of fishermen was in 2018 and the least in 2019. The large number of fishermen is influenced by data collection from the Port and TPI.

Table 2 Summary Description of Respondents' Answers

| No	Categorization	Number	Percentage
Education Level			
1	Did not graduate ES	54	38,57%
2	Graduate ES	80	57,14%
3	Graduate JHS	5	3,57%
4	Graduate SHS	1	0,71%
	TOTAL	140	100,00%
Age			
1	17 – 25	6	4,29%
2	26 – 45	65	46,43%
3	46 – 65	66	47,14%
4	>65	3	2,14%
	TOTAL	140	100,00%
Number of Family Member			
1	0 – 2	48	34,29%
2	3 – 4	74	52,86%
3	5 – 6	11	7,86%
4	>6	3	2,14%
	TOTAL	140	100,00%
Total Expenditure			
1	Rp 0 – Rp 500.000	73	52,14%
2	Rp 500.000 – Rp 2.000.000	37	26,43%
3	Rp 2.000.000 – Rp 4.000.000	19	13,57%
4	> Rp 4.000.000	11	7,86%
	TOTAL	140	100,00%
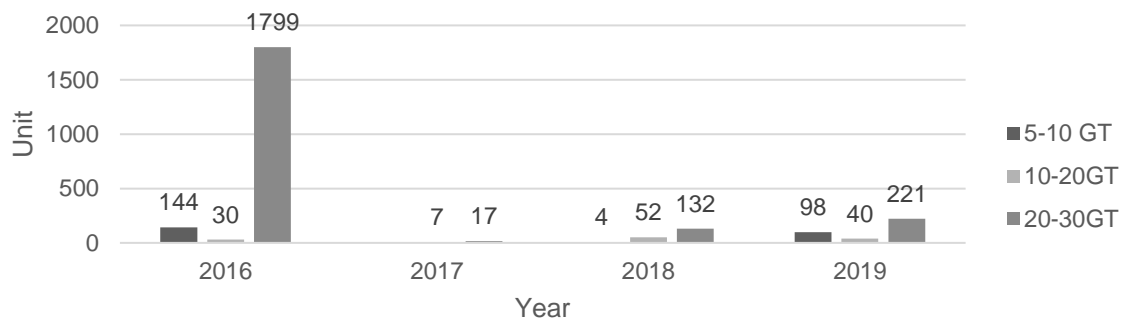
Figure 2 Number of Vessels by Gross Tonage (GT) in CFP Tegalsari
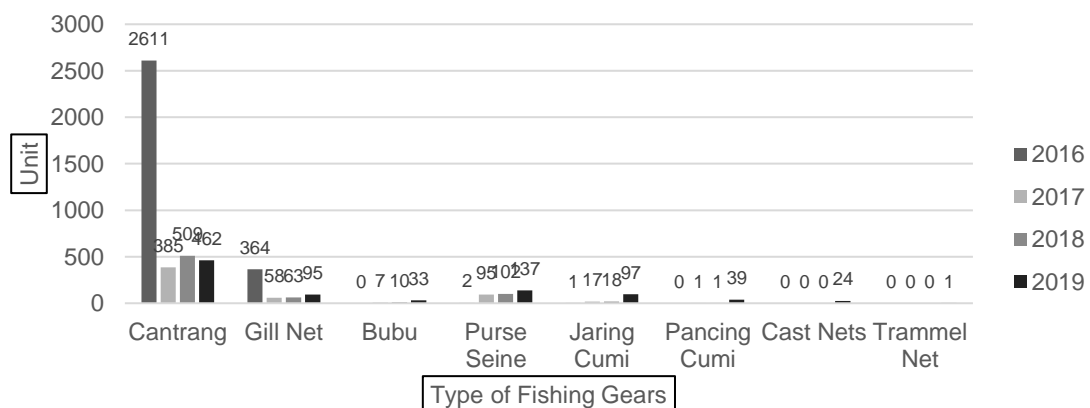Source: CFP Tegalsari 2020

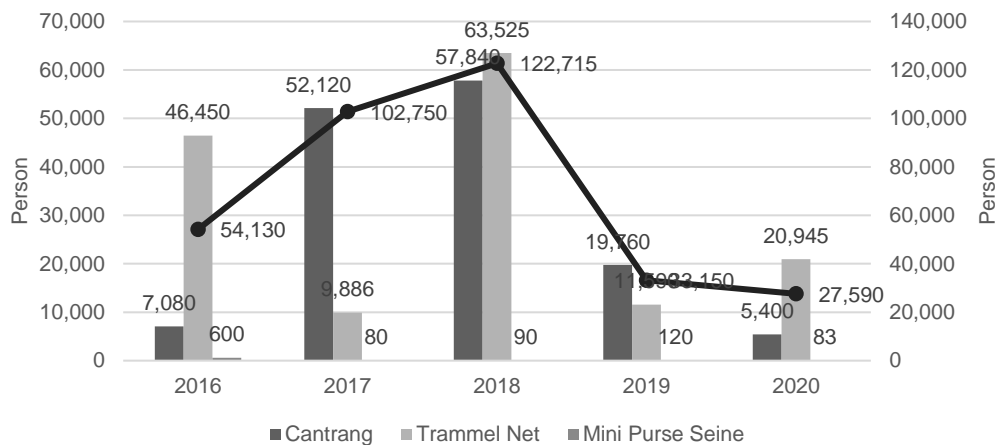Figure 3 Graph of Fishing Equipment in CFP Tegalsari 2016-2019
Source: CFP Tegalsari 2020

Figure 4 Number of Fishermen in CFP Tegalsari 2016-2020
Source: CFP Tegalsari 2020

Socio-Economic Aspect

a. Education

The level of education in this study is categorized into 4 levels, namely not completing elementary school/equivalent, graduating from elementary school/equivalent, graduating from junior high school/equivalent, and graduating from high school/equivalent. It is obtained that the respondents who did not graduate from elementary school/equivalent were 54 people or equal to 38.57% of the total respondents. Graduated from elementary school/equivalent became the highest level with a total of 80 people or 57.14%. Meanwhile, 5 people graduated from junior high school/equivalent or 3.57% and only 1 person graduated from high school/equivalent or 0.71%.

This shows that small fishermen in Tegal City still have not received proper education, as indicated by most respondents who only graduated from elementary school, where the minimum level of education taken is at the high school level/equivalent. This is a challenge for the government to advance the education of small fishermen in Tegal City. There are several factors why fishermen are reluctant or unwilling to continue their higher education, due to cost (economic) and socio-cultural factors.

b. Age Group

Lamp protector tube (casing) with a The age group in this study was categorized into 4 groups, namely 17-25 years, 26-45 years, 46-65 years, and >65 years. It was found that the respondents who belonged to the age group of 17-25 years were as many as 6 people or the equivalent of 4.29% of the total respondents. The age group of 25-45 years was 65 people or the equivalent of 46.43%. The majority age group is in the range of 46 – 65 years, which is 47.14%. Meanwhile, only 3 respondents aged >65 years or 2.14%.

c. Number of Family Members

The number of family members in this study were categorized into 4 groups, namely the number of members 0 – 2 people, 3-4 people, 5-6 people, and > 6 people. It is known from the data obtained that respondents who have a number of members 0-2 persons are as many as 48 respondents or 34.29%. Respondents with 3 – 4 members are the majority category with 74 respondents or 52.86%. The number of members of 5-6 people there are as many as 11 respondents or 7.86%. While respondents who have family members of more than 6 people are 3 people or 2.14%.

Based on Figure 7, it can be seen that the number of family members of small fishing families in Pekalongan is classified as a small number of family members because the majority only have 3-4 family members (smaller than 5). The number of family members is related to the consumption pattern of the family which leads to the level of welfare of the family.

d. Total Income

The total income in this study is categorized into 4 categories, namely Rp. 0 – Rp. 2,000,000, Rp. 2,000,000 – Rp. 4,000,000, Rp. 4,000,000 – Rp. 6,000,000, and more than Rp. 6,000,000. Based on the data obtained, respondents who have a total income of Rp. 0 - Rp. 2,000,000 are as many as 63 respondents or the equivalent of 45.00%. Families with a total income of IDR 2,000,000 - IDR 4,000,000 were 43 respondents or 30.71%. Furthermore, the

category of total income of Rp. 4,000,000 - Rp. 6,000,000, there were 26 people or 18.57%. While respondents who have a total income of more than IDR 6,000,000 there are 8 people or 5.71%.

Based on Figure 8, the total income of small fishermen in Tegal City is known to be still below the UMK of Tegal City, which means that the Tegal City Government needs to pay special attention to increasing the income of small fishermen in Tegal City so that the minimum can be equal to the UMK.

e. Total Expenditure

The total expenditure in this study is categorized into 4 categories, namely Rp. 0 – Rp. 500,000, Rp. 500,000 – Rp. 2,000,000, Rp. 2,000,000 – Rp. 4,000,000, and more than Rp. 4,000,000. It is obtained that 73 respondents have a total expenditure of Rp. 0 - Rp. 500,000 or the equivalent of 52.14%. Respondents with the total expenditure of Rp. 500,000 – Rp. 2,000,000 are 37 respondents or 26.43%. Furthermore, the total expenditure of Rp. 2,000,000 - Rp. 4,000,000 are 19 respondents or 13.57%. While respondents who have a total expenditure of more than IDR 4,000,000 are 11 people or 7.86%.

Based on Figure 9, the total expenditure of small fishermen in Tegal City is known to be still low, which means that the purchasing power of small fishermen in Tegal City is also low. This means that the Tegal City Government needs to pay special attention to increasing the purchasing power of small fishermen in Tegal City.
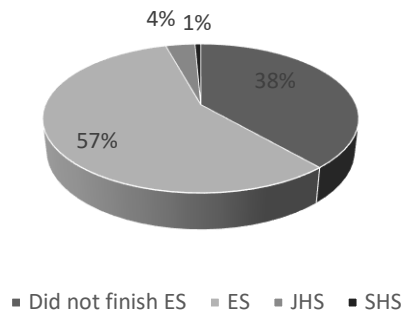

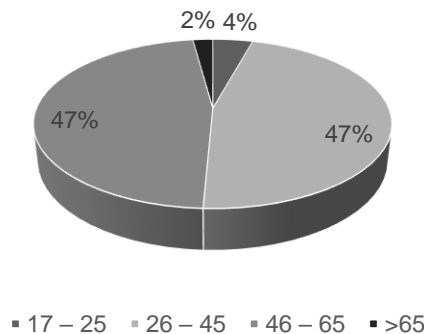Figure 5 Graph of Education Level of Artisanal Fishermen in Tegal City

Figure 6 Graph of the Age Group of Small Fishermen in the City of Tegal
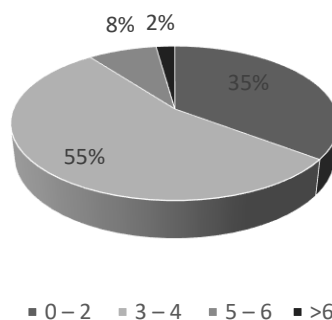

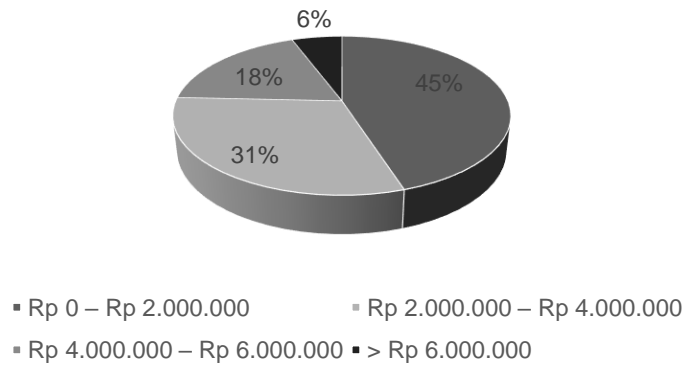Figure 7 Graph of Family Members of Small Fisher Families in Tegal City

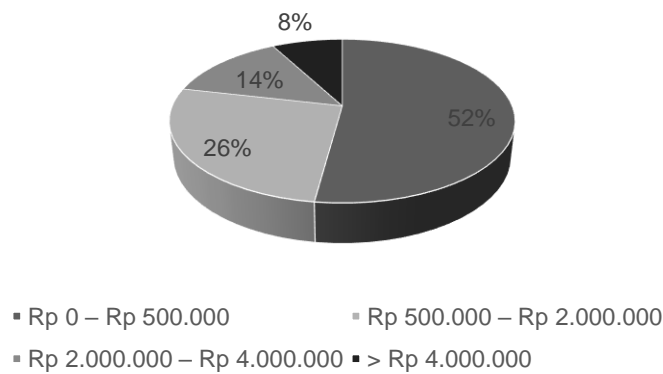Figure 8 Graph of Total Income of Small Fishermen in Tegal City

Figure 9 Graph of Total Expenditure for Small Fishermen in Tegal City

Multiple Linear Regression Analysis

In analyzing the factors that affect the income of artisanal fishermen in Tegal City, several tests were carried out, namely the coefficient of determination test, F test, and t test. The respondent data used were 140 respondents with the application of SPSS version 22 software which officially licensed with licence number of AUB5UQ9H3EL7H6ACZH3WQDL5EE8F98 UOLVZQBCH2OKXG9PHJ5BPSNS9LN52P Z8TJ9XX9Q2XAJOAINOIWZ4.

a. Coefficient of Determination

To find the magnitude of the model's ability to explain the total income (Y) which is influenced by the variables of age, education, number of family members, and total, it can be seen from the magnitude of the coefficient of determination. The value of the coefficient of determination can be seen from the value of the Adjusted R Square of the multiple regression model.

Based on the calculation results of the SPSS Version 22.0 program, an Adjusted R Square value of 0.662 was obtained, which means that 66.2% of the variation in the variables of age, education, number of family members and expenses was able to explain the variation in the dependent variable, namely total income. While the remaining 23.8% of the variation in the dependent variable is influenced by variations of other variables that are not included in this study. The value of the coefficient of determination test results obtained a value of 66.2%, can be categorized as medium. These results can be interpreted that the variables used in this study are quite appropriate to be used to explain the total income.

b. F Test (Simultaneous)

The F statistic test was conducted to prove whether the independent variables simultaneously had an effect on the dependent variable. Ghozali (2016) explained that the F test was carried out with the aim of testing all independent variables, independently with a significance level of 0.05. The results of the F test in this study were to examine the effect of the variables of age, education, number of family members, and total expenditure on the dependent variable, namely total income. The results of the F test can be seen in Table 4.

Based on the results of the analysis, the significance value is 0.00 and the value is smaller than 0.05. This shows that the total income of artisanal fishermen in Tegal City is influenced simultaneously by the independent variables in the model. Thus, it is assumed that the total income of fishermen in Tegal City is influenced by age, education, number of family members, and total expenditure.

c. t test (Partial)

The t-test was conducted to analyze the partial effect of each independent variable on the dependent variable in this study. The t-test can also test the research hypothesis either to accept or reject the research hypothesis. The results of the t test in this study are presented in Table 5.

1. Effect of Age on Total Income (H1)

Based on the calculation of the SPSS Version 22.0 program, it is known that the age variable has a coefficient of -0.042 and the significance number of the influence of Age (X1) on Total Income (Y) is 0.587 $>\alpha= 0.05$ so it is not significant. Thus, it means that age has a negative and insignificant effect on the total income of artisanal fishermen in Tegal City.

2. Effect of Education on Total Income (H2)

Based on the calculation of the SPSS Version 22.0 program, it is known that the education variable has a coefficient of -0.060 and a significant number of the influence of Age (X1) on Total Income (Y) of 0.476 $>\alpha= 0.05$ so it is not significant. Thus, it means that education has a negative and insignificant effect on the total income of artisanal fishermen in Tegal City.

3. Effect of Number of Family Members on Total Income (H3)

Based on the calculation of the SPSS Version 22.0 program, it is known that the number of family members has a coefficient of 0.121 and a significant number of the effect of number of family members on Total Income of 0.048 $<\alpha= 0.05$ so it is significant. Thus, the number of family members has a positive and significant effect on total income.

4. Effect of Total Expenditure on Total Income (H4)

Based on the calculation of the SPSS Version 22.0 program, it is known that the total expenditure variable has a coefficient of 0.763 and the significance number of the influence of Total Expenditure on Total Income is 0.000 $<\alpha= 0.05$ so it is significant. Thus, total expenditure has a positive and significant effect on total income.

d. Multiple Linear Regression Model

Multiple linear regression can be used to determine the magnitude of the influence between the independent variables on the dependent variable. The multiple linear regression model is as follows:

$$Y = a + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \beta_4 X4 + e \ldots\ldots\ldots(2)$$

Where:
Y = Total Income of Fishermen
a = Constant
$\beta_1, \beta_2, \beta_3$ = Multiple linear regression coefficient
X1 = Age
X2 = Education
X3 = Number of Family Members
X4 = Total Expenditure
e = error

Based on the calculation results of the SPSS Version 22.0 program, the following model is obtained:

$$Y = 0.474 - 0.042 X1 - 0.060 X2 + 0.121 X3 + 0.763 X4 \ . (3)$$

1. The regression coefficient for the age variable is 0.042 (with a negative sign), this means that if age increases by one unit, the income level will decrease by 0.042.

2. The regression coefficient of the education variable is 0.060 (with a negative sign), this means that if education increases by one unit, it will reduce total income by 0.060.

3. The regression coefficient for the variable number of family members is 0.121, this means that if the number of family members increases by one unit, it will increase the total income by 0.121.

4. The regression coefficient for the total expenditure variable is 0.763, this means that if age increases by one unit, it will increase total income by 0.121.

Table 3 Coefficient of Determination Test Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.820a	.672	.662	.535
a. Predictors: (Constant), Expenditure, Education, Dependents, Age				

Source: research results 2022

Table 4 F Test Results

				ANOVAa			
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	79,192	4	19,798	69.139	.000b
	Residual	38,658	135	.286		
	Total	117.850	139			

a. Dependent Variable: Income

b. Predictors: (Constant), Expenditure, Education, Dependents, Age

Source: research results 2022

Table 5 t test results

		Coefficientsa				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.474	.277		1,709	.090
	Age	-.042	.078	-.028	-.544	.587
	Education	-.060	.084	-.038	-.715	.476
	Dependent	-121	.061	.103	1995	.048
	Expenditure	.763	.048	.797	15,787	.000

a. Dependent Variable: Income

Source: research results 2022

DISCUSSION

The average age of small fishermen in Tegal City is 44.9 years. In general, the average age is still in the productive age group for work, which means that the respondent is still able to produce goods or services. The results showed that age had a negative and insignificant effect on total income. This influence can be interpreted that any increase in age that occurs in small fishermen in Tegal City will reduce productivity in their livelihood as fishermen.

According to Pakpahan *et al.* (2006), fishermen around the age of 30 are in their productive age. Because of their great physical abilities, they are able to develop to their full potential by prioritizing the success of their families, especially to meet the needs of their children. According to International Labor Organization (ILO) Convention No. 199 of 2007 on Professional Fisheries, 16 to 18 years of age facing arrest must have at least 8 hours and at least 40 hours of occupational safety practice per day. Must be trained hours a week. Also, do not work overtime unless it is unavoidable for safety reasons. This study result is in line with the research conducted by Putri and Setiawina (2013) who also suggested that the age variable had no effect on income. This is also in line with research conducted by Wiyasa and Dewi (2017), which states that age harms income.

According to Butarbutar *et al.* (2019), the fact that fishermen operate intermittently, often interrupted to look for alternative sources of income, and thus they require more appropriate rules compared to conventional management. The policies and type of management should be those that encourage and enable fishers to act only part of their time. Hence, fishers look for strategies to guarantee family sustenance using so-called "freelance" at temporary activities. This is the case mainly with employees in small-scale fisheries. If temporary fishing proves to be a way to ensure a more reasonable level of exploitation while promoting income generation for families, policies in this sector will encourage those who practice it in this way. As for insurance, for example, currently only fishermen engaged in this activity are entitled to monthly payments when the fishery is closed. If the return for capital protection is positive, it would compensate government investment by maintaining the benefit for all fishers, including those who do not engage in the activity full-time. In this case, other criteria should be established, such as an appropriate minimum working time in the fishery to receive the benefit (de Oliveira Estevo *et al.* 2021).

The second variable is education where the answer results show that the majority of small fishermen in Tegal City are elementary school graduates. Meanwhile, based on hypothesis testing, it is known that education

has a negative and insignificant effect on total income. The results of this study are also in line with research conducted by Rahim *et al.* (2022), which states that education has a negative effect on income. Education is not a direct factor in increasing a fisher's income. It is this fisher's education that affects their poverty level. Because fishermen do not know how to save and improve their children's education.

Fishermen are more likely to turn to middlemen to borrow money (Velentina 2018; Vibriyanti 2019). Fishermen tend to spend more on cigarettes and petrol than they do on the needs of school (Sriyono *et al.* 2021). In addition, the average education of fishermen is elementary school, and some of them do not attend school. According to the interview results, it is not necessary to be highly educated to become a fisher, it is enough to study with a fisher parent.

Furthermore, it is related to the effect of the number of family members on total income. The average number of family members of artisanal fishermen in Tegal City is 3 people. The more the number of family members means that they have to have a lot of income to meet the needs of their family life. So that families with more dependents have to spend more time looking for income. The results showed that the number of family members had a positive and significant effect on the total income of artisanal fishermen in Tegal City. From this it can be concluded that the greater the number of family members, the greater the willingness of a person to do a job. The effect of the number of family members on total income are in line with research conducted by Dewi and Dewi (2018) which states that the number of family members has a positive and significant effect on the income of workers in Denpasar. The expenditure variable has a positive and significant effect on total income. This means that the greater the expenditure in a family, the greater the income that comes in. The results of this study are in line with Iskandar's research (2017) which explains that total family income has a positive and significant effect on spending patterns.

CONCLUSION

Based on the results of this study, it can be concluded that the total income of artisanal fishermen in Tegal City is significantly influenced by 2 factors, namely the number of family members and total expenditure. These two factors have a very close relationship

where the number of family members in the family will be correlated with the total expenditure in the family. The greater number of family members means that they have to have a lot of income in order to meet the needs of their family life which also increase the expenditure. The increase in income along with the increasing number of families is also due to the increasing number of people working which then contributes to the family income. To be able to increase the income of artisanal fishermen in Tegal City, one of the programs that can be implemented is to reduce the level of fishermen's expenditure in the form of subsidies and other assistance.

SUGGESTION

Based on the findings, the government intervention in case of lowering the fishers' expenditure can be an alternative solution. The intervention such as petrol subsidies will impact on the capital needed to go on a fishing trip. In addition, the education is also important to improve that fisher can manage finances in household consumption expenditures, earn additional income, and manage household members (children). For this reason, learning programs are needed to increase knowledge, skills, and creative attitudes, such as empowerment in the form of knowledge, technology, and family management.

ACKNOWLEDGEMENT

REFERENCES

Adhawati SS, Baso A, Malawa A, Arief A. 2017. Social Study of Cantrang (*Danish Trawl*) Fisheries Post Moratorium at Makassar Straits and Bone Gulf, South Sulawesi Province, Indonesia. *AACL Bioflux.* 10(5): 1140-1149.

Agunggunanto EY. 2011. Analysis of Poverty and Family Income of Fishermen Cases in Wedung District, Demak Regency, Central Java, Indonesia. *Journal of*

Development Economics Dynamics. 1(1): 21-32

Butarbutar DNP, Sintani L, Harinie LT. 2019. Peningkatan Kesejahteraan Ekonomi Masyarakat Pesisir Melalui Pemberdayaan Perempuan. *Journal of Environment and Management*. 1(1): 31-39.

CFP Tegalsari. 2020. *CFP Tegalsari Annual Report 2019*.

Dannenberg A, Diekert F, Händel P. 2022. The Effects of Social Information and Luck on Risk Behavior of Small-Scale Fishers at Lake Victoria. *Journal of Economic Psychology*. 90: 102493. https://doi.org/10.1016/j.joep.2022.102 493.

de Oliveira Estevo M, Lopes PFM, de Oliveira Júnior JGC, Junqueira AB, de Oliveira Santos AP, da Silva Lima JA, Malhado ACM, Ladle RJ, Campos-Silva JV. 2021. Immediate Social and Economic Impacts of a Major Oil Spill on Brazilian Coastal Fishing Communities. *Marine Pollution Bulletin*. 164: 111984. https://doi.org/10.1016/j.marpolbul.202 1.111984.

Dewi MAL, Dewi NPM. 2018. The Effect of Age, Education and Number of Family Dependents on the Income of Women Workers in the Informal Sector in Denpasar City. *E-Journal of Development Economics*. 7(1): 1-211.

[FAO] Food and Agriculture Organization of the United Nations. 2015. Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries. Rome, Italy.

_____. 2022. *International Year of Artisanal Fisheries and Aquaculture 2022 Global Action Plan*. Rome, Italy.

Fauzi A. 2003. Assessment of Depreciation of Fishery Resources as Consideration for Determining Fisheries Development Policies. *Coastal and Ocean Journal*. 4(2): 36-49.

Ghozali I. 2016. *Application of Multivariate Analysis with IBM SPSS 23 Program (8th Edition)*. VIII Printing. Semarang: Diponegoro University Publishing Agency.

Iskandar I. 2017. The Effect of Income on Expenditure Patterns of Poor Households in Langsa City. *Ocean Economics Journal*. 1(2): 127-134.

Kittinger JN, Finkbeiner EM, Ban NC, Broad K, Carr MH, Cinner JE, Gelcich S, Cornwell ML, Koehn JZ, Basurto X, Fujita R, Caldwell MR, Crowder LB. 2013. Emerging Frontiers in Social-Ecological Systems Research for Sustainability of Small-Scale Fisheries. *Curr. Opinion. Environment. Sustain*. 5(3-4): 352–357. https://doi.org/10.1016/j.cosust.2013.0 6.008.

Kleiber D, Harris LM, Vincent ACJ. 2015. Gender and Small-Scale Fisheries: a Case for Counting Women and Beyond. *Fish and Fisheries*. 16(4): 547–562. https://doi.org/10.1111/faf.12075.

Mudzakir AK, Boesono H. 2022. Strategi Pengelolaan Perikanan Artisanal di Kota Tegal. [Laporan Penelitian]. FPIK Undip. 122 hlm.

Nenadovic M, Epstein G. 2016. The Relationship of Social Capital and Fishers' Participation in Multilevel Governance Arrangements. *Environmental Science & Policy*. 61: 77–86. https://doi.org/10.1016/j.envsci.2016.0 3.023.

Pakpahan HT, Lumintang RWE, Susanto D. 2006. The Relationship between Work Motivation and Fisher Behavior in Capture Fisheries Business. *Extension Journal*. 2(1): 26-34.

Putri AD, Setiawina D. 2013. The Effect of Age, Education, Employment on the Income of Poor Households in Burdendem Village. *E-Journal of Development Economics*. 2(4): 173-225.

Rahim A, Hastuti DRD, Bado B, Astuty S. 2022. Are social conditions important to increase household income? The case of coastal fishers in Makassar City, Indonesia. *Journal of Socioeconomics and Development.* 5(2): 179-189. https://doi.org/10.31328/jsed.v5i2.3832 .

Rousseau Y, Watson RA, Blanchard JL, Fulton EA. 2019. Defining Global Artisanal Fisheries. *Marine Policy Journal*. 108: 103634.

Schuhbauer A, Chuenpagdee R, Cheung WWL, Greer K, Sumaila UR. 2017. How Subsidies Affect the Economic Viability of Small-Scale Fisheries. *Mar. Policy Journal.* 82: 114–121. https://doi.org/10.1016/j.marpol.2017.05.013.

Sriyono S, Dewi SR, Handayani P. 2021. Meningkatkan Kesejahteraan Masyarakat Nelayan Di Era New Realiti Melalui Model Pembiayaan Inklusif: Prespektif Al Mudharobah. *Jurnal Ilmiah Ekonomi Islam.* 7(1): 81-89. http://dx.doi.org/10.29040/jiei.v7i1.1697

Tegal Statistics. 2021. *District of West Tegal in Figures 2020.* 146 pp.

Velentina RA. 2018. Financing Policy for Traditional Fishermen. *Legal Matters.* 47(3): 184-197.https://doi.org/10.14710/mmh.47.3.2018.184-197.

Vibriyanti D. 2019. Descriptive Analysis of Socio-Economic Factors Affecting Capture Fisherman's Household Income (Case Study: Kendari City). *Journal of Marine and Fisheries Socio-Economic Policy.* 9(1): 69-78. https://doi.org/10.15578/jksekp.v9i1.7440.

Wiyasa IBW, Dewi MHU. 2017. Factors Affecting Income Through Working Hours of Housewives Bamboo Craftsmen in Bangli Regency. *Pyramid.* 13(1): 27-36.