

## **FACTORS INFLUENCING THE WELFARE OF RAJUNGAN FISHERMEN IN THE EASTERN COASTAL WATERS OF LAMPUNG PROVINCE**

### **Faktor-Faktor yang Mempengaruhi Kesejahteraan Nelayan Rajungan di Wilayah Perairan Pesisir Timur Provinsi Lampung**

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#### **ABSTRACT**

The objective of this study is to identify the factors influencing the welfare of blue swimming crab fishermen in the eastern coastal region of Lampung Province. The study was conducted in three regencies: East Lampung, Central Lampung, and Tulang Bawang, with a sample of 100 blue swimming crab fishermen. Daily fishermen use boats with a capacity of 1-2 GT, while babangan fishermen use boats with a capacity of more than 2 GT. The average catch for daily fishermen ranges from 1.99 to 3.18 kg per trip during the east season and from 9.08 to 10.33 kg per trip during the west season. Babangan fishermen catch an average of 74 kg per trip during the east season and 222 kg per trip during the west season. The factors influencing the welfare of fishermen during the east season are income level (X1), number of family dependents (X4), housing conditions (D1), ease of access to education (D3), and ease of access to transportation (D4). During the west season, the influencing factors are income level (X1), education level (X3), number of family dependents (X4), age of the head of the family (X5), ease of access to healthcare services (D2), and ease of access to education (D3).

Keywords: Rajungan Fishermen, Rajungan, Welfare Level

#### **ABSTRAK**

Tujuan penelitian ini adalah untuk mengidentifikasi faktor-faktor yang mempengaruhi kesejahteraan nelayan rajungan di pesisir timur Provinsi Lampung. Penelitian dilakukan di tiga kabupaten: Lampung Timur, Lampung Tengah, dan Tulang Bawang, dengan sampel 100 nelayan rajungan. Nelayan harian menggunakan kapal 1-2 GT, sementara nelayan babangan menggunakan kapal lebih dari 2 GT. Rata-rata tangkapan nelayan harian berkisar antara 1,99-3,18 kg/trip pada musim timur dan 9,08-10,33 kg/trip pada musim barat. Nelayan babangan menangkap rata-rata 74 kg/trip pada musim timur dan 222 kg/trip pada musim barat. Faktor-faktor yang mempengaruhi kesejahteraan nelayan pada musim timur adalah tingkat pendapatan (X1), jumlah tanggungan keluarga (X4), keadaan tempat tinggal (D1), kemudahan akses

pendidikan (D3), dan kemudahan akses transportasi (D4). Pada musim barat, faktor-faktornya adalah tingkat pendapatan (X1), tingkat pendidikan (X3), jumlah tanggungan keluarga (X4), usia kepala keluarga (X5), kemudahan akses pelayanan kesehatan (D2), dan kemudahan akses pendidikan (D3).

Kata Kunci: Nelayan Rajungan, Rajungan, Tingkat Kesejahteraan

## INTRODUCTION

Crab as an export commodity in Indonesia should be able to support the welfare of fishermen, but there is still a lot of data showing the low welfare of fishing communities including crab fishermen. According to Ginting (2018), compared to other community groups in the agricultural sector, fishermen (especially fishing laborers and traditional fishermen) can be classified as the poorest and least prosperous social class, although it cannot be said that all fishermen are poor. According to Shalichaty *et al.* (2019), based on an assessment of 12 welfare indicators, fishermen who work as ABK have a low level of welfare, this is because the profit-sharing process between the boss and ABK is more profitable for the boss as the owner of the largest capital.

Dependence on resources also causes differences in the socio-economic conditions of fishermen who may not be able to achieve their goals, so that it is impossible to create optimal socio-economic conditions (Ramadhan *et al.*, 2017). The results of research observations by Valentina *et al.* (2020), in Margasari Village, Labuhan Maringgai District, East Lampung also explained that economic conditions based on economic income are highly dependent on the catch in 3 specific seasons. There are two crab fishing seasons, namely the west season (peak harvest season), this season lasts from late November to early May. The catch is quite a lot in this season, but when the crab stock is abundant, the price in this season is very cheap. Then there is the east season (famine season) which lasts from late May to October, during this season it is usually difficult for fishermen to get crabs and when the crab stock is low, the price of crabs will increase significantly (Ridha, 2017).

Therefore, fishermen usually still force themselves to go to sea even though the catch is small. In addition, during the east season if the results of the crab are not suitable, crab fishermen will prefer to catch other commodities such as squid, shrimp and several types of fish. The seasonal conditions cause the income of crab fishermen to fluctuate, if averaged over a period of months. Therefore, in the results of the study by Valentina *et al.* (2020), explained that the economic conditions of the visible physical, in general the people in Margasari Village who depend on marine products such as crabs are still classified as low-income.

Crab fisheries in the eastern coastal areas of Lampung are still mostly small-scale and their production volumes fluctuate. This is thought to be due to the availability of stock and decreased productivity and recruitment capacity of the exploited stock, especially when associated with high levels of exploitation in their distribution areas. The distribution of crabs on the eastern coast of Lampung covers shallow coastal waters to offshore waters (Kurnia *et al.*, 2014). According to Zairion *et al.* (2015), the number of fishermen involved in crab fishing activities in this area is increasing, around 4,000 people and could still increase. Fishermen in this location have a high dependence on crab fishing efforts, this results in exploitation of crab resources without paying attention to the balance of habitat and recruitment, therefore it is feared that it will cause a decrease in stock and threaten the sustainability of crab resources. This can affect the economy such as the risk of financial difficulties which ultimately affect the welfare of fishermen in the area (Huda *et al.*, 2021).

The development of the fisheries sector, especially for the purpose of improving the welfare of small-scale crab fishermen, requires a multidisciplinary approach such as cross-

scientific and of course requires more attention from various cross-sectors (Yuerlita, 2022). Making the welfare of fishing communities a priority in management is one form of resource management that considers the symptoms, phenomena, characteristics of nature, and human behavior that utilizes it. As a prioritized aspect, the main variables must emphasize important aspects such as aspects of human behavior patterns as managers, social aspects of fishing communities, and economic aspects that are used as welfare indices for fishing communities.

Seeing the low welfare conditions of crab fishermen, a study is needed on the factors that influence the level of welfare of crab fishermen in the coastal areas of East Lampung located in East Lampung, Central Lampung, and Tulang Bawang in order to determine the level and condition of their welfare as the main agents of crab resource utilization in Lampung Province.

## RESEARCH METHODS

This research was conducted in August - October 2023 in the eastern coastal area covering three districts: East Lampung, Central Lampung, and Tulang Bawang. The research locations include Muara Gadingmas Village in Labuhan Maringgai District, Cabang Village in Bandar Surabaya District, and Kuala Teladas, Sungai Burung, and Kuala Seputih Villages in Dente Teladas District. The selection of these areas was based on the high concentration of crab fishermen who live there.

Data processing was carried out using tabulation. Meanwhile, to analyze the factors that influence the welfare of crab fishermen using statistical analysis using EViews v.10 software to facilitate calculations and analysis. And using a binary logistic analysis regression model. The sample in this study consisted of respondents, namely crab fishermen who use traps or nets. The data was processed using tabulation, while the analysis of factors that influence the welfare of crab fishermen was carried out using statistical analysis using EViews v.10 software. The research sample consisted of crab fishermen who use traps or nets using a binary logistic analysis regression model.

The sample of respondents was selected using the purposive sampling method, which is suitable for quantitative research. The location and respondents were previously determined with the respondents being 100 crab fishermen divided into three locations. The determination of respondents used the Slovin equation with a tolerance limit of 10% (Sugiyono, 2017). The level of accuracy or trust desired depends on the available funding sources, time, circumstances, and manpower.

In determining the sample, researchers used the Slovin formula (Korompis *et al.*, 2017), namely:

$$n = \frac{N}{1 + N e}$$

$$n = \frac{4000}{1 + 4000 (0,10)^2}$$

$$n = 97,56$$

$n = 98$  adjusted by the researcher to 100 respondents.

Data analysis used to determine the factors that influence the welfare of crab fishermen in the eastern waters of Lampung province, then using a binary logistic analysis regression model. This analysis is used to determine the variables that influence the welfare of crab fishermen (Mudzakir *et al.*, 2019). These variables include income level, consumption or expenditure level, education level, number of family dependents, Age of Head of Family, Condition of residence, ease of obtaining health services, ease of entering children into education, ease of obtaining transportation facilities.

The binary logistic model can be written as follows (Winarno, 2007):

$$P_i = F(Z_i) = F(\alpha + \beta X_i)$$

$$P_i = 1/(1+e^{-Z_i})$$

$$P_i = 1/(1+e^{-(\alpha + \beta X_i)})$$

If both sides of the equation are multiplied  $1+e^{-Z_i}$  then obtained:

$$(1+e^{-Z_i}) P_i = 1$$

$$e^{-Z_i} = 1 / P_i - 1 = \frac{P_i}{1-P_i}$$

Because  $e^{-Z_i} = 1 / e^{Z_i}$  then:

$$e^{-Z_i} = \frac{P_i}{1-P_i}$$

Factors that influence the level of welfare of crab fishermen use logistic regression analysis with the following model:

$$Z_i = \ln \frac{P_i}{1-P_i} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \delta_1 D_1 + \delta_2 D_2 + \delta_3 D_3 + \delta_4 D_4 + \delta_5 D_5 + \delta_6 D_6 + e$$

Description:

$P_i$  = Opportunity for crab fishermen to obtain welfare

$Z_i$  = Opportunity for crab fishermen  $i$  at the level of welfare:

( $Z=1$ ) : Prosperous

( $Z=0$ ) : Not prosperous

$\alpha$  = Intercept

$\beta, \delta$  = Coefficient of independent variables

$X_1$  = Income level

$X_2$  = Consumption or expenditure level

$X_3$  = Education level

$X_4$  = Number of family dependents

$X_5$  = Age of Head of Family

$D_1$  = Condition of residence

$D_1$  = 0 (Non-permanent)

$D_1$  = 1 (Semi-permanent)

$D_1$  = 2 (Permanent)

$D_2$  = Ease of obtaining health services

$D_2$  = 0 (Poor)

$D_2$  = 1 (Enough)

$D_2$  = 2 (Good)

$D_3$  = Ease of entering children into education

$D_3$  = 0 (Difficult)

$D_3$  = 1 (Easy)

$D_4$  = Ease of obtaining transportation facilities.

$D_4$  = 0 (Difficult)

$D_4$  = 1 (Easy)

$e$  = error

## RESULT

Factors affecting the welfare of crab fishermen were analyzed using a binary logistic regression model. The dependent variable (Y) is the level of welfare, with a score of 0 for low

and medium welfare, and a score of 1 for high welfare. The independent variables (X) include income level (X1), expenditure level (X2), education level (X3), number of family dependents (X4), age of the head of the family (X5), living conditions (D1), ease of obtaining health services (D2), ease of enrolling children in education (D3), and ease of accessing transportation (D4). The first step is to test the goodness of fit of the model (Homser Test). The following are the results of the goodness of fit of the model presented in Table 1.

Table 1. Results of the goodness of fit model test

Description	East Season	West Season	Value of Prob.Chi-sq	East Season	West Season
<i>H-L Statistic</i>	0.4146	1.4927	Prob. Chi-Sq(8)	0.9999	0.9928
<i>Andrews Statistic</i>	22.5315	26.8122	Prob. Chi-Sq(10)	0.0126	0.0028

The next step is to test the coefficient of determination value to measure how far the model's ability to apply variations in dependent variables. The value used is the Mc.Fadden R-Squared value. The Mc.Fadden R-Squared value that is getting closer to 100% will describe the variation of the dependent variable produced will be better. After the coefficient of determination value is obtained, the model accuracy test is carried out using the Expectation-prediction evaluation test presented in Table 2.

Table 2. Model accuracy test

Estimated Equation	East Season			West Season		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
E(# of Dep=0)	79.55	4.44	83.99	73.84	3.93	77.78
E(# of Dep=1)	4.45	11.56	16.01	4.16	18.07	22.22
Total	84	16	100	78	22	100
Correct	79.55	11.56	91.11	73.84	18.07	91.91
<b>% Correct</b>	<b>94.7</b>	<b>72.25</b>	<b>91.11</b>	<b>94.67</b>	<b>82.12</b>	<b>91.91</b>
% Incorrect	5.3	27.75	8.89	5.33	17.88	8.09
Total Gain*	10.7	56.25	17.99	16.67	60.12	26.23
Percent Gain**	66.87	66.96	66.91	75.77	77.08	76.43

After getting the Correct value that can predict correctly, a simultaneous test is carried out looking at the Prob value (LR statistic) to see the results of the parameter estimation of the equation of factors that influence the welfare level of crab fishermen in Lampung Province (Table 3).

Table 3. Parameter estimation of the equation of factors that influence the welfare level of crab fishermen in Lampung Province

Variable	Musim Timur			Musim Barat		
	Coefficient	Prob.	OR	Coefficient	Prob.	OR
C	-77.25***	0.01	0.00	-137.01***	0.01	0.00
Income Level (X1)	4.94**	0.03	139.64	6.46**	0.02	637.65
Expenditure Level (X2)	-0.57	0.52	0.56	1.37	0.24	3.93
Education Level (X3)	3.71**	0.06	40.68	5.26**	0.03	193.39
Number of Family Dependents (X4)	0.06	0.81	1.06	0.58**	0.03	1.79
Age of Head of Family (X5)	-0.32	0.39	0.73	1.57*	0.05	4.79
Residence Condition (D1)	1.20**	0.03	3.32	0.72	0.21	2.06
Ease of Obtaining	-0.73	0.13	0.48	2.68**	0.01	14.65
Health Services (D2)	3.39**	0.03	29.80	2.64**	0.02	13.98

Ease of Access to Transportation (D4)						
2.49***						
0.01						
12.04						
-0.95						
0.49						
0.38						
Description	East Season	West Season	Description	East Season	West Season	
McFadden R-squared	0.6914	0.7569	Mean dependent var	0.1600	0.2200	
S.D. dependent var	0.3685	0.4163	S.E. of regression	0.2236	0.2079	
Akaike info criterion	0.4713	0.4562	Sum squared resid	4.4995	3.8900	
Schwarz criterion	0.7319	0.7167	Log likelihood	-13.5671	-12.8086	
Hannan-Quinn criter.	0.5768	0.5616	Deviance	27.1342	25.6172	
Restr. Deviance	87.9340	105.3816	Restr. log likelihood	-43.9670	-52.6908	
LR statistic***	60.7998	79.7644	Avg. log likelihood	-0.1357	-0.1281	
Prob(LR statistic)	0.0000	0.0000				

## DISCUSSION

Interpretation of the Prob. Chi-square value of the H-L Statistic is if the Prob. Chi-square value of the H-L Statistic is more than alpha (0.05) then H0 is accepted and the model is fit (Astuti, 2023). Table 1 shows the results that the Prob. Chi-square value of the H-L Statistic is 0.9999 in the east season and 0.9928 in the west season so that the value is more than alpha (0.05). This means that the model used in the factors influencing the welfare of crab fishermen in Lampung Province is fit both in the east and west seasons. Table 2 shows that the Correct values obtained are 94.70 and 94.67. This value means that the percentage of model accuracy can predict correctly by 94.70% and 94.67%.

Based on Table 3, the Mc.Fadden R-Squared value is 0.6914 in the east season and 0.7569 in the west season. This means that 69.14% and 75.69% of the variation in the welfare level of crab fishermen can be explained by the variables of income level (X1), expenditure level (X2), education level (X3), number of family dependents (X4), age of head of family (X5), living conditions (D1), ease of obtaining health services (D2), ease of entering children into education (D3), ease of obtaining transportation access (D4) while the remaining 30.86. in the east season and 24.31% is explained by other variables that are not included in the model. In line with the research of Restu P, (2019) which obtained an R-squared value of 84.1% that the value obtained is getting closer to 100%. The value obtained is greater when compared to the research of Yuerlita (2022) that the R-squared value obtained was only 22.7% which means that the model used in this study is better. It can be concluded that the selection of variables used in this study is good because it can represent 74.07% and 76.48% of the variables from the model of factors influencing the welfare level of crab fishermen in Lampung Province.

Simultaneous test is seen in the Prob value (LR statistic) in Table 16 produces a value of 0.000 in both the east and west seasons. This value means that together the variables of income level (X1), expenditure level (X2), education level (X3), number of family dependents (X4), age of head of family (X5), living conditions (D1), ease of obtaining health services (D2), ease of entering children into education (D3), ease of obtaining transportation access (D4) have a significant effect with a confidence level of 99% on the level of welfare of crab fishermen in Lampung Province in the east and west seasons.

Partial test of variables that affect the level of welfare of crab fishermen in Lampung Province is seen in the prob value of each variable. The variables that affect the level of welfare with a confidence level of 99% are the variable of ease of obtaining transportation access (D4) in the east season and the variable of ease of obtaining health services (D2) in the west season. The variables that have a real influence with a confidence level of 95% are the variables of income level (X1), number of family dependents (X4), living conditions (D1) and ease of access to education (D3) in the east season while in the west season are income level (X1), number of family dependents (X4), age of the head of the family (X5) and ease of access

to education (D3). And the variable that has a real influence of 90% on the level of welfare of fishermen's households is the variable of the age of the head of the family (X5) in the west season. The detailed explanation is as follows:

#### **Household income level variable (X1)**

Table 3 shows that the variable of household income level of fishermen has a significant positive effect on fishermen's welfare with a confidence level of 99%. The coefficient value shows a positive value, which means that the influence given is a positive influence with a value of 4.94 in the east season and 6.46 in the west season. The resulting odd ratio values are 139.64 and 637.65. This means that if the income level of fishermen's households increases by Rp 1, the opportunity for increasing the welfare of fishermen's households is 139.64 times in the east season and 637.65 times in the west season. Research by Kusumayanti *et al.* (2018), shows that fishermen's household income is influenced by social capital. Social capital has the greatest impact on welfare, especially through compliance with the norms of the fishing community, such as not polluting coastal areas. This significantly improves the health of fishermen living in coastal areas.

#### **Household expenditure level variable (X2)**

The variable of fishermen's household expenditure level does not have a significant effect on the welfare level of fishermen's households in both the east and west seasons. The prob value obtained is 0.52 in the east season and 0.24 in the west season. This value indicates that the level of confidence in the expenditure level variable is less than 90% in both the east and west seasons.

#### **Education level variable (X3)**

The Education level variable has a prob value of 0.06 in the east season and 0.03 in the west season. The prob value shows that the Education level variable has a significant effect on the welfare level of crab fishermen's households with a confidence level of 90% in the east season and 95% in the west season. The coefficient value of 3.71 in the east season and 5.26 in the west season and is positive indicates that the resulting influence is a positive influence in both seasons. The odd-ratio value of 40.68 in the east season and 193.39 in the west season means that if the education level of crab fishermen increases by 1 year, the opportunity to increase the welfare of crab fishermen's households is 40.68 times in the east season and 193.39 times in the west season. Research (Mudzakir & Suherman, 2019) shows that the influential variable is the variable of ease of entering children into education. Low levels of education will impact thought patterns, insights and lifestyle patterns (Muflikhati, 2010).

#### **The variable of the number of family dependents (X4)**

The variable of the number of family dependents also has a significant effect on the level of welfare of crab fishermen's households with a confidence level of 95% (prob value of 0.03) in the west season, while in the east season the variable of family dependents has no effect on the level of welfare of fishermen's households. The coefficient value produced is 0.58 with a positive sign, which means that the resulting influence is a positive influence. The odd-ratio value obtained is 1.79, which means that if the number of family dependents of crab fishermen's households increases by 1 person, the chance of increasing the welfare of crab fishermen's households is 1.79 times. Pradana's research (2014) shows that the number of family members affects the welfare of fishermen's households. In the west season, the supply of crabs is abundant, so many family members help clean the nets, speeding up the preparation of sea equipment.

### **Head of household age variable (X5)**

The head of household age variable has a significant effect on the welfare of fishermen's households in the west season (prob = 0.05), but not in the east season (prob = 0.39). The confidence level of this variable is 90%. In the west season, a coefficient of 0.58 indicates a positive effect of the head of household age on the welfare of fishermen's households. The odds ratio of 4.79 indicates that every 1 year of additional age for the head of household increases the chances of welfare of crab fishermen's households by 4.79 times. This is related to longer experience at sea, which is expected to increase the number of catches and more effective fishing strategies, so that the welfare of fishermen's households increases.

### **Housing condition variable (D1)**

The housing condition variable has a significant effect on the welfare level of fishermen's households in the east season with a confidence level of 95% (prob = 0.03). The coefficient value obtained is 1.20 with a positive sign, which means that the housing condition has a positive effect on the welfare level of fishermen's households. The odd-ratio value obtained is 3.32, which means that if the permanent housing condition can increase the welfare level of fishermen by 3.32 times.

### **Ease of obtaining health services variable (D2)**

The ease of obtaining health services variable has a significant effect on the level of welfare of fishermen's households in the west season with a confidence level of 99% (prob = 0.01). The coefficient value obtained is 2.68 with a positive sign, which means that the condition of the residence has a positive effect on the level of welfare of fishermen's households. The odd-ratio value obtained is 14.65, which means that the easier it is for fishermen's households to obtain health services, the higher the level of fishermen's welfare by 14.65 times. This is in line with the results of Mudzakir's study (2019) which shows that the Health variable of family members has a significant effect on the level of welfare of fishermen's households. The health of fishermen's family members is influenced by factors such as distance to the nearest hospital, distance to the pharmacy, drug disposal, prices of drugs and contraceptives (Sugiharto *et al.*, 2007), as well as the availability of health services at the Health Center, affordable medical costs, and drug prices (Novitasari *et al.*, 2017).

### **Ease of entering children into education (D3)**

The ease of entering children into education has a significant effect on the welfare level of fishermen's households in the east and west seasons with a confidence level of 95% (prob = 0.03 and 0.02). The coefficient values obtained are 3.39 and 2.64 with a positive sign, meaning that the ease of entering children into education has a positive effect on the welfare level of fishermen's households. The odd-ratio values obtained are 29.80 and 13.98, meaning that the easier it is for fishermen's households to enter children into education, the higher the level of fishermen's welfare by 29.80 times in the east season and 13.98 times in the west season.

### **Ease of access to transportation variable (D4)**

The ease of access to transportation variable has a significant effect on the welfare level of fishermen's households in the east season with a confidence level of 99% (prob = 0.01). The coefficient value obtained is 2.49 with a positive sign, which means that ease of access to transportation has a positive effect on the welfare level of fishermen's households. The odd-ratio value obtained is 12.04, which means that the easier it is for fishermen's households to get access to transportation, the higher the level of fishermen's welfare by 12.04



times. These results indicate that the importance of transportation facilities can affect fishermen's welfare. Easy access to transportation will make it easier for fishermen to sell their catch, reduce transportation costs, and make it easier for fishermen and the community in general to carry out daily activities.

### CONCLUSION

Factors that influence the welfare level of crab fishermen in Lampung Province are the variables of income level (X1), number of family dependents (X4), living conditions (D1), ease of access to education (D3), ease of access to transportation (D4) in the east season. While in the west season are income level (X1), education level (X3), number of family dependents (X4), age of head of family (X5), ease of access to health services (D2) and ease of access to education (D3).

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