

Food Access Ability and Performance of Fishing Fisheries in Bengkulu City, Indonesia

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ABSTRACT

Bengkulu City is located along the west coast of Sumatra Island where most of its population work as fishermen by utilizing existing resources in the coastal and marine areas. Fishermen beside produce fishery products, they also need other food which are not produce by themselves to fulfill their daily need. This study aims to determine the condition of household food access ability and to analyze their fishing performance in Bengkulu City. The research was carried out in three sub-districts which are fisheries centers, namely Malabero, Pondok Besi and Pasar Bengkulu. Primary data are collected from 114 respondents while secondary data come from formal institutions such as Statistics Indonesia and fisheries department in Bengkulu. Data analysis using proportional income expenditure to show family food access ability, meanwhile, fishing benefit, RC ratio and return of investment value are used to show fishing performance. The results of this study show that on average fishermen family in Bengkulu City have not food access ability because of their proportional expenditure is less than 60% (59.06%). But, total fishermen family who are in good food access ability are 57.02 % or more than total fishermen family who have food access ability (42.98%). Besides that, on average, fishing performance in Bengkulu City are quite good. That is show by their income that is around IDR 3,695,664 per trip, its RC ratio as high 6.2 (more than 1) and its return of investment value is 7.36%.

Keywords: *coastal, fishermen, insecurity food, expenditure, income*

1. INTRODUCTION

Fishermen are a low-income group, contributing directly to food access ability among fishermen who are highly dependent on fishing activities as their primary economic source and do not have adequate livelihoods [1]. The study of the fishermen's households has been carried out show that the majority of fishermen's households have been found to be living in poverty and food access ability. The bulk of their money is spent on food so they can only spend a limited amount of their money on other basic needs. Much of the fishermen are poor in the core community and have poor food intake. This is shown by research that if fishermen's households are able to raise their income, they will raise their educational qualifications, obtain more opportunities for farming other than fishing, reduce family size and ensure good health facilities, increase calorie intake and boost their food resilience [2].

According to [3], the symptoms of fisherman poverty in Bengkulu City are not much different from those of Indonesian fishermen in general, namely a low degree of welfare. Besides that, according to [4], the wealth of marine resources in the city of Bengkulu has not been enormously created. The rewards and value added of managing these fishery products have not been earned by fishers [5]. There are currently many problems facing the fisheries sector, such as improving the market quality of

fish and the degree to which traditional fishermen participate in government-sponsored programs [6]. Observations indicate that traditional anglers are becoming older; many have limited levels of schooling, limited alternative job opportunities, and the need for more modern equipment to be used [6].

In addition, an unpredictable climate is the biggest problem faced by fishermen in the conduct of fishing activities. Some of the efforts that can be made to mitigate these problems according to [7] include: (1) a variety of fisheries policy options for climate change; (2) to establish risk and vulnerability assessments and management adaptation decision-making frameworks; and (3) to outline potential climate adaptation strategies and tactics. The importance of implementing fisheries management plans at local level will reduce the effects of climate change while increasing the resilience of marine habitats, which must be a priority for scientists and policymakers before having a significant effect on the lives of millions of people [8].

Base on those background above such as, poverty, income unequal, low education and skill and limited job opportunity ([1]; [3]; [6]; [9]), the goal of this research is therefore to determine the level of food access ability and fishing performance of fishermen in Bengkulu City.

2. RESEARCH METHODOLOGY

2.1 Location

The location of the research was selected in the City of Bengkulu as a fishing center in three villages, namely Malabero, Pondok Besi and Pasar Bengkulu. Choosing of those village because of some reasons. First, those are village which a lot of urban village problem such poverty, income inequality and limited job alternative. Then, those are also located government program not only at local but central level in pursuing poverty reduction. The indicator of good government program can be show by ability of fisher family access to food.

2.2 Sources of data

The data used to carry out this research was primary and secondary. Preliminary data were collected from fishing communities in fishing center areas in the town of Bengkulu, which have been identified as data collection areas. The approach used to collect primary data is to use the observation method and to perform interviews using a questionnaire (list of questions) that has already been prepared. Secondary data was derived from formal institution related to this study.

2.3 Samples

The total number of fishers in Bengkulu City are 8480. Meanwhile, the number of samples in this study was 114 fisherman's households which chosen purposely. In doing so there are 38 samples in each village.

2.4 Analysis of data

2.4.1 Capture the efficiency of fisheries

Costs

According to [10], the loss is an expense that is lost or used to gain money. The business costs referred to in this study shall be borne by the fishermen, including fixed fees and variable costs. The formula for the calculation of total expenditure is as follows:

$$TC = TFC + TVC \dots\dots\dots (1)$$

Where:

- TC : Total Cost (Rp)
- TFC : Total Fixed Cost (Rp)
- TVC : Total Variable Cost (Rp/Trip)

Revenue

Calculation of revenue, i.e. by multiplying the amount of output per trip (one time in fishing activities) by the Kg unit price with the formula:

$$TR = P \times Q \dots\dots\dots (2)$$

Where :

- TR : Fishermen Receipt (Rp / Trip)
- P : Production Price (Rp / Kg)
- Q : Production (Kg)

Income

Calculation of the profit or income of fishermen, namely by measuring the difference between profits and business costs, proposed as follows :

$$\Pi = TR - TC \dots\dots\dots (3)$$

Where :

- Π : Fishermen's Income (Rp/ Trip)
- TR : Fishermen Receipt (Rp / Trip)
- TC : Total cost of business (Rp / Trip)

RC Ratio

The system used to assess fisherman's efficiency in the fisheries sector uses a formula [11]:

$$RC \text{ Ratio} = \text{Revenue} / \text{Cost} \dots\dots\dots (4)$$

From the formula above, it can be seen that the criteria for the R / C Ratio are as follows:

- If the RC Ratio > 1 : the business is said to be efficient
- If the RC Ratio = 1 : the business experiences BEP (Break-even Point)
- If the RC Ratio < 1 : then the business is said to be inefficient.

ROI value

Return on investment (ROI) relates to income from the fishing industry with the sum of investment or assets used to produce profits [12]. The following is the formula for ROI:

$$ROI (\%) = (\text{Net Profit} / \text{Investment}) \times 100 \dots\dots (5)$$

2.4.2 Food access ability

The overall expenditure of the fishermen's households can be calculated by measuring the food and non-food costs. The formula used is as follows:

$$TP = Pp + Pn \dots\dots\dots (6)$$

Where :

- TP : Total fishermen household expenditure (Rp)
- Pp : Food expenditure (Rp)
- Pn : Non-food expenditure (Rp)

The estimation of the proportion of food expenditure in total household expenditure can be made using the following formula [13]:

$$PF = PP / TP \times 100\% \dots\dots\dots (7)$$

Where :

- PF : Proportion of food expenditure (%)
- PP : Food Expenditure (Rp)
- TP : Total household expenses (Rp)

Table 1 Criteria for Share of Food Expenditure

Share of Food Expenditure	
Low ($\leq 60\%$ Total Expenditure)	High ($\geq 60\%$ Total Expenditure)
Secure of Food	Vulnerable to Food

Source: [14]

3. RESULTS AND DISCUSSION

3.1 Characteristics of respondents

Age

The population is rated as a productive time if it is between 18 and 50 years of age [15]. On the basis of Figure 1, it can be seen that anglers with the highest percentage of age are between 41 and 50 years of age at a rate of 23.6 percent, where they are rated as a productive age in carrying out their work activities. Apart from the age group of 41-50 years, some fishermen are 15.3 percent of 31-40 years of age and 11.1 percent of 20-30 years of age in the wide age range. It is at this moment that the anglers are at the height of their activities. So that the fishermen in the town of Bengkulu are included in the productive age.

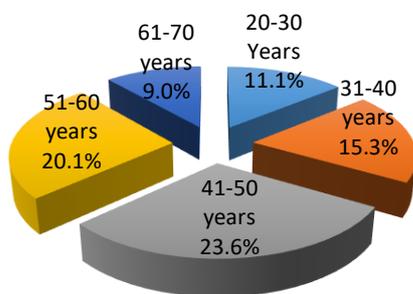


Figure 1 Age Characteristics of Fishermen

However, the results of the study found that there was a relatively large percentage of unproductive fishermen, namely between 51 and 60 years of age at 20.1% and between 61 and 70 years of age at 9.0%. This age group is the age of no longer active and poor physical ability for carrying out work activities. This is thought to be due to economic factors that need to be resolved in such a way that fishermen of old age continue to work as fishermen. The older the guy, the more difficult it is to embrace change [16].

Educational level

The level of formal education is something that can help the performance of fishermen in the fisheries sector, with a good level of education, and fishermen will be more sensitive or more open to innovation [17].

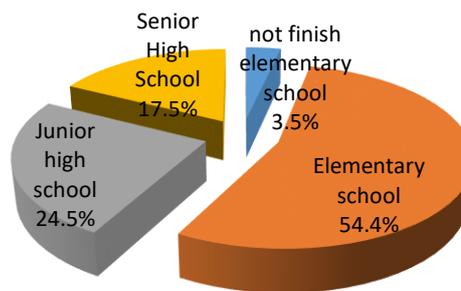


Figure 2 Percentage of fishermen's formal education

On the basis of Figure 2, it is understood that the largest number of anglers has an elementary education average of 54.4%. Fishermen with a junior high / equivalent education level of 24.5 percent, a senior high school / equivalent of 17.5 percent, and the lowest are fishermen who have not graduated from elementary school with a percentage of 3.5 percent. However, the number of anglers who have not graduated from elementary school is just 3.5 percent, more than 50 percent of fishermen who have only primary education.

Experience

The fishermen of the town of Bengkulu have a total of 25 years of fishing experience with the information shown in Figure 3 below.

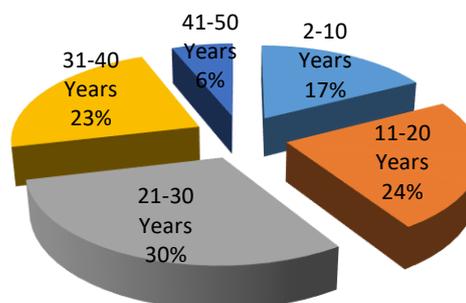


Figure 3 Fishermen's experience

On the basis of Figure 3 above, it can be seen that the fishermen in Bengkulu City who have the most experience of being fishermen for 21-30 years are 30%. Meanwhile, anglers with the most comprehensive experience, namely 41-50 years of age, are just 6%. This is because the average age of anglers in Bengkulu City is 46 years, so the experience of anglers ranges from 21 to 30 years. Some fishermen start fishing in their teens. Fishermen with ample experience will find it easier to catch them because an experienced fisherman will know where they gather and catch them with their skill [18].

Number of members of the family

The number of family members in this sample is that of all the people who work with the fishermen.

Fishermen have an total of 5 dependents and are in the medium group. According to [19], the number of dependent fishermen is in the moderate range, namely five individuals, suspected of having a relatively high birth rate in coastal communities. Details of the number of family members held by the fishermen are as follows:

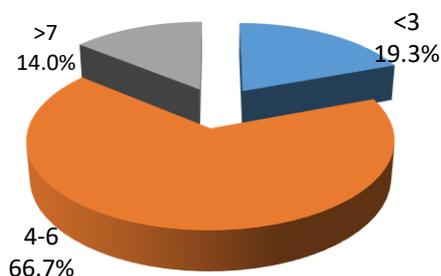


Figure 4 Percentage of respondents' families

Figure 4 above indicates that fishers have the highest number of family members, with 4-6 individuals at 66.7 percent. As many as 19.3 percent of anglers have 3 or <3 family members and 14.0 percent of anglers have many family members > 7. This indicates that the rate of birth in the fishing communities is still relatively high. This is also closely linked to the degree of education and culture that fishers have, where most anglers agree that many children can have a lot of sustenance.

3.2 Capture the efficiency of fisheries

The results of this analysis are calculated in three analyzes, namely the revenue estimation, the R / C ratio and the ROI. In order to achieve this economic efficiency, it is important to estimate the costs incurred by the fishing sector. These costs are in the form of fixed and variable costs.

Table 2 Capture fisheries performance cost components

No.	Value Cost Component	Value
1.	Fixed Costs	
	– Maintenance costs	IDR 130,113
	– Depreciation fee	IDR 48,866
2.	Variable Costs	
	– Operational costs	IDR 531,980
	Total	IDR 710,959

Variable costs are the highest costs borne by fishermen on a single fishing trip, i.e. 74,83 percent, with IDR 531,980 of them. The amount of variable costs shall be determined by the length of the journey taken by the fishermen to do business. Thus, if the longer the journey takes place, the operating costs incurred would be more important. The estimated running costs are the expense of gasoline, consumption, ice cubes and cigarettes.

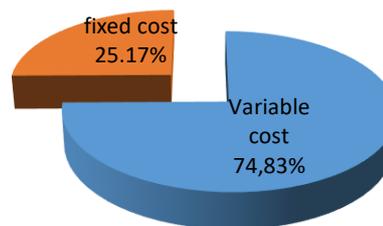


Figure 5 Percentage of cost to go to sea per trip

This analysis is in line with the study carried out in [20], where the overall variable costs have a higher competitive value than the fixed costs incurred by fish in fishing.

Table 3 Capture fisheries performance analysis

No.	Analysis component	Value
1.	Revenue	IDR 4,406,623
2.	Income	IDR 3,695,664
3.	RC Ratio	6.20
4.	Return of Investmen (ROI)	7.36

The income from the fishing business carried out by the fishermen is extracted from the calculation of the number of catches per trip and the average selling price. Most fishermen catch fish on a trip in just one day. Some fishermen, however, catch fish on a 5-15 day journey. Based on the data in Table 3 above, it is shown that the average total revenue of the fisherman's catch is IDR 4,406,623 of them. This revenue was extracted from the catch volume of 159 kg, with an average price of IDR 29,215

The benefit earned by the fishermen is a deduction from the actual cost of the benefit. Table 3 indicates that the total income of fishermen is IDR 3,695,664. Several factors have an effect on the income received by fishermen, one of which is the unfavorable climate. There are times when it's hard to find fish, even when there's a bad season.

The measurement of the RC ratio is used to calculate the productivity of the fisherman's fishing company. Using this study, it can be seen whether or not the fishing business carried out by the fishermen is effective. Based on Table 3, it is understood that the ratio R / C has a value of 10.14. This value can be explained by the fact that the fishing business carried out by the fishermen can be said to be effective since the RC ratio has a value of > 1.

The ROI value calculation shall be carried out in order to assess the potential to produce income from the assets used for each fishing trip by the fishermen. The ROI value is calculated from the ratio between the sum of profits and the investment expense multiplied by one hundred percent. The ROI value for the fishing company carried out by the fishermen is 7.36%. This means that the

ability to generate returns from the investment value used in fisheries is 7.36%.

3.3 Food Access Ability

Expenses of the family

Total household expenditure is calculated on the basis of the amount of food and non-food expenses. The following table shows the total spending of fishing households for one month, as shown in Table 4.

Table 4 Total Average Household Expenditure

No	Type of Food Expenditure	Average Total Expenditure (IDR / month)
1.	Food Expenditure (PP)	1,529,966
2.	Non-Food Expenditure (PN)	1,060,773
Total		2,590,738

Based on the above results, it can be shown that the total average household expenditure for one month is IDR 2,590,738 of them. The largest average household expenditure is food spending of IDR 1,529,966. And the rest of it is IDR 1,060,773 are used for non-food expenditures.

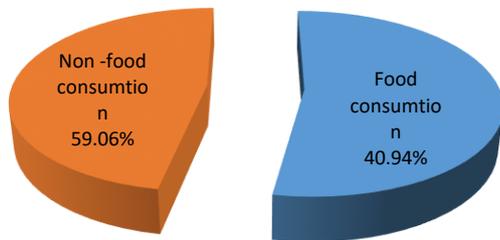


Figure 6 Household Expenditure

Food expenditure is slightly higher, i.e. 59.06 percent compared to non-food consumption, 40.94 percent. The findings are the same as shown in this study at 37.06 percent of non-food expenditure and at 62.94 percent of average food expenditure [21]. Most of the income of fishermen is expended on food needs with low nutritional value and spends only a limited amount of their income on other basic needs [2]. The high-quality households would meet their needs not only for food but also for non-food items. Key household consumption expenditure on fishers is influenced and positively linked to the level of income; this is also affected by the number of household members and human condition [22]. The poverty is a major cause of food shortages and a good predictor of nutritional risk [23].

The share of household spending

The proportion of food consumption expenditure in [13] is the amount of total food expenditure relative to total household expenditure. The share of food expenditure

is one measure of food access ability; the higher the share of food expenditure means less food access ability. The following is the proportion of household spending on household consumption.

Table 5 Proportion of household food expenditure

No	Type of Expenditure	Average Expenditure (IDR / month)
1.	Food Expenditure (PP)	1,529,966
2.	Total Household Expenditure (TP)	2,590,738
Proportion of food expenditure		59.06%

Based on the above data, it can be concluded that fisherman households are categorized as food-resistant households. Since, according to current standards, if the proportion of food intake is < 60 percent of the total, the family is considered to be food resistant. Even then, if we look at it as a whole, there are still many people who are exposed to food, with overall food intake accounting for more than 60 % of total household expenditure. The higher the welfare of society in a region, the smaller the share of the population's food expenditure and vice versa [24].

As many as 56.98 percent of households are classified as food susceptible and 43.02 percent are classified as food resistant. The same study using the share of food expenditure shows that 16.67 percent of farmers' food access ability is adequate, 53.33 percent is food insecure, 10 percent is food deficient, and 20 percent is not food resistant [21]. Other research on household food access ability indicates that 19 percent of households are food resistant, 74 percent are food resistant, and 7 percent of households are food resistant [25]. [2] found that most fishing households are living in poverty and food insecurity.

4. CONCLUSION

1. The fishing community in Bengkulu City is listed as food-resistant because it has a food expenditure share of 59.06 percent of total household expenditure. Where the food expenditure ratio is ≤ 60 percent of total household expenditure, the household can be considered to be food resistant. According to the household category, 56.98 percent of households are classified as food insecure and 43.02 percent are classified as food resistant.
2. The economic output of the fishermen in Bengkulu City is financially efficient; the fishermen can earn IDR 3.695.664 in one fishing trip and have an RC ratio value of 6.2, which means that the fishing business carried out by the fisherman is productive because of the RC value. The ratio ≥ 1 to the rate of the Return of Investments is 7.36%.

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