Economic Valuation of Kampar River Capture Fisheries in Buluhcina Village, Siak Hulu District, Kampar Regency, Riau Province

Valuasi Ekonomi Perikanan Tangkap Sungai Kampar di Desa Buluhcina Kecamatan Siak Hulu Kabupaten Kampar Provinsi Riau

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Abstract

This study aims to estimate the potential of the Kampar River ecosystem in Buluhcina Village by analyzing the economic value of its utilization for capturing fisheries. This research was carried out in January 2022 at Kampar River, Buluhcina Village, Siak Hulu District, Kampar Regency, Riau Province. The research method used was a survey method, and the cost of respondents used a purposive sampling technique, with 48 respondents. The data needed in this research includes primary data and secondary data. The data analysis used is a resource economic valuation technique, namely the effect on production (EOP) technique. Based on the results of the research that has been done, it shows that the economic value of the Kampar River ecosystem in Buluhcina Village for the utilization of capture fisheries activities is IDR 34,567,921,433.8/year, with a consumer surplus value of IDR 805,779,054.4/year, and the total economic value of capture fisheries activities per m^2 is IDR 30,897.4/m^2/year.

Keywords: Economic Value, Kampar River; Capture Fisheries; Effect on Production

Abstrak

Penelitian ini bertujuan untuk mengestimasi potensi ekosistem Sungai Kampar di Desa Buluhcina dengan cara menganalisis nilai ekonomi dari pemanfaatannya terhadap perikanan tangkap. Penelitian ini telah dilaksanakan pada bulan Januari 2022 di Sungai Kampar Desa Buluhcina Kecamatan Siak Hulu Kabupaten Kampar Provinsi Riau. Metode penelitian yang digunakan adalah metode survey, dan penentuan responden mengunakan teknik *purposive sampling*, dengan responden sebanyak 48 orang. Data yang dibutuhkan dalam penelitian ini meliputi data primer dan data sekunder. Analisis data yang digunakan adalah teknik valuasi ekonomi sumberdaya, yaitu dengan teknik *Effect on Production* (EOP). Berdasarkan dari hasil penelitian yang telah dilakukan, menunjukan bahwa nilai ekonomi dari ekosistem Sungai Kampar di Desa Buluhcina untuk pemanfaatan kegiatan perikanan tangkap adalah sebesar Rp 34.567.921.433,8/tahun, dengan nilai surplus konsumen sebesar Rp805.779.054,4/tahun, dan nilai ekonomi total kegiatan perikanan tangkap per m^2 adalah sebesar Rp30.897,4/m^2/tahun.

Kata Kunci: Nilai Ekonomi, Sungai Kampar, Perikanan Tangkap, Effect on Production

1. Introduction

Capture fisheries resources are one of the important assets owned by Indonesia, this is because the potential of capture fisheries in Indonesia is so much that it has a high economic value which is useful to be the origin of economic development, a source of food namely animal protein, and can be a provision of employment (Rizal et al., 2018). The potential is owned if used properly so that it can produce high benefits (Sanger et al., 2019).

Riau Province has good potential for fisheries resources because it has waters that support the capture of fisheries resources, including the Kampar River. Kampar River in Riau Province has a river length of 414 km. Kampar River flows through Buluhcina village in the Siak Hulu sub-district. The Kampar River in Buluhcina Village is one of the rivers that starts from Bukit Barisan in West Sumatra Province and ends on the east coast of Sumatra Island in Riau Province. The Kampar River in Buluhcina Village has a length of approximately 5,000 m.

The river is utilized directly (direct use value) by the local community for a variety of purposes including capture fisheries. Capture fisheries is an activity that utilizes natural potential that can also support the national economy in the future. This is because fish has become an important group, not only in Indonesia but also in the world community (Hutagalung et al., 2018). Fisheries resources in Kampar River in Buluhcina Village have benefits for capturing fisheries activities. To increase fisheries production in Kampar District, the government pays attention to developing the fisheries sector in Buluhcina Village. Fish species found in Buluhcina Village are Asian redtail catfish (*Mystus nemurus*), selais (*Kryptopterus lais*), tapah (*Wallago leeri*), pantau (*Rasbora bornensis*), and motan (*Thynnichtys polylepis*). Buluhcina Village fishermen in catching fish usually use fishing gear such as Nets, fishing rods (rawai), bubu, and sempirai. In the process of catching fish fishermen still utilizes fishing transport, namely sampan oars, and pompong (Ramizan, 2013).

The existence of capture fisheries activities in the Kampar River of Buluhcina Village by using the river resources directly, then the economic value can be analyzed. An economic valuation is an economic tool used to calculate the value generated by natural resources and the environment in the form of money or monetary value of market or non-market (Hasibuan, 2014). Calculating economic value has the aim of measuring how much total economic value. Total economic value is the estimated value in the form of numbers that exist in natural resources, namely the value of benefits or functional value. The estimates obtained can be used as a reference in compiling and forming management rules for resources so that the distribution and alternative uses can be correct and appropriate. According to Khoirudin & Khasanah (2018), after obtaining an estimate of the resource, it can be used as a reference for resource managers so that they can form effective and efficient rules to preserve nature.

Economic valuation of utilized fisheries resources is conducted using the EOP approach. Effect on Production (EOP) is an approach that sees the natural resources of an ecosystem as a support for the final product and then utilized by many people against the potential of these resources that are assessed how much influence the benefits of natural resources of an ecosystem on the final product (Andrianto *in* Salim & Wardhani, 2014).

This research aims to analyze the economic value of the Kampar River in Buluhcina Village where natural resources and the environment are used for capture fisheries activities.

2. Material and Method

2.1. Time and Place of Research

This research was conducted in January 2022 in Kampar River, Buluhcina Village, Siak Hulu District, Kampar Regency, Riau Province. This location was chosen with the consideration of fisheries activities as a source of livelihood that utilizes the resources in the river.

2.2. Research Procedures

This research was conducted using a survey method, which is a research technique carried out with the basic aim of making a description and/or explanation of the situation to be studied according to the actual situation, by making observations and searching to obtain precise clarity of a particular problem in a particular area or location, or an effective study made to obtain the necessary information (Daniel, 2015). The data required consists of primary data and secondary data. Primary and secondary data are obtained through the process of observation, interviews, and documentation (Sugiyono, 2016). Primary data is obtained directly by interviewing sources, namely fishermen who utilize river resources using a questionnaire. Secondary data obtained in this study were obtained indirectly, namely data obtained from research reports and reports in the same location, from scientific writings, from local government agencies, non-governmental organizations in the location, and universities.

Respondents in this study were determined using the Slovin equation (Sugiyono, 2015), namely:

$$n = \frac{N}{1 + N(e)^2}$$

Description:

n   = Number of respondents
N   = Population
E   = Percentage of allowance for tolerable accuracy (10 - 20%)

2.3. Data Analysis

To estimate the total economic value by using the productivity approach or effect on production (EOP) approach. The EOP method is useful to provide an overview of the potential of fisheries resources by using the approach of the products obtained by fishermen (Romadhon, 2014). Analysis of the EOP method approach is carried out by classifying the characteristics of respondents based on age, education or education level, number of family members or number of dependents, and total income. Age is used as one of the factors in determining work performance because humans can work. In analyzing the total economic value of Kampar River resources in Buluhcina Village to the activities of capture fisheries using the effect on production method, the following steps were taken:

2.3.1. Estimating the demand function

The economic value of capture fisheries :
$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Description:
Y   = Fish catch (kg/year)
X_1 = Average selling price of caught fish (IDR/kg)
X_2 = Total household income (IDR/year)
X_3 = Years of education (Years)
X_4 = Number of family members (people)
X_5 = Age of respondent (years)

2.3.2. Transform the Demand Function into the Form of a Linear Price Equation (Ln Q transformation)
$$LnY = \beta_0 + \beta_1 LnX_1 + \beta_2 LnX_2 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5$$

2.3.3. Determination of the Value of Consumer Surplus (CS)

Determination of consumer surplus value using the demand curve. The steps to measure the value of consumer surplus are as follows:

Calculating the value of the area of the demand curve: $U = \int_0^V (fx)\, dx$

Calculating the average limiting price: $C = \left(\frac{v}{a}\right)^{1/b1}$

Calculating the area of the curve under the limit price: $R = V \times C$
Calculating consumer surplus value: $CS = U - R$

2.3.4. Calculation of Total Economic Value of Resources
$$NET = \frac{CS \times N}{L}$$

Description:
CS   =   Consumer surplus (IDR)
N   =   Number of fishermen
L   =   Land area (ha)
NET   =   Total economic value (ha/year)

3. Result and Discussion

Buluhcina Village is a village located in Kampar Regency, Siak Hulu District with coordinates 0^0 22'45.1" LU and 101^0 31'38.7" East. Buluhcina Village geographically has boundaries in the north bordering with Desa Baru, bordering on the east with Pangkalan Baru Village, bordering with Buluh Nipis Village in the south, and bordering with Tanjung Balam Village in the west. The Buluhcina Village area is divided into two areas by the Kampar River.

The Kampar River in Buluhcina Village has a beneficial value to its resources, which can be felt directly by the local community. This research calculates the value of benefits that are directly utilized by the community around the Kampar River in Buluhcina Village. The value the benefit or economic value calculated in this study is the utilization of the Kampar River in Buluhcina Village for capture fisheries activities. Capture fisheries can support the national economy in the future. This is because fish has become an important commodity, not only in Indonesia but also in the world community. Fisheries resources are limited although fisheries resources can be restored (Sari et al., 2014).

3.1. Respondent Characteristics

The characteristics of the respondents were obtained according to the results of interviews with fishermen in Kampar River, Buluhcina Village. The characteristics of respondents from fishermen can be seen in Table 1.

Table 1. Characteristics of Capture Fishery Respondents (Fishermen)

No.	Respondent characteristics		Total	Percentage
1	Age 27-36		9	18,75
	37-46		21	43,75
	47-56		17	35,4
	57-66		1	2,1
2	Education	SD	21	43,75
		SMP	13	27,08
		SMA	14	29,17
3	Gender	Male	48	100
		Women	0	0

3.2. Economic Value of Capture Fisheries

Fishing in the Kampar River in Buluhcina Village has become a livelihood for the local community because the results of natural resources and the environment have the potential to support the community's economy. Capture fisheries activities in Kampar River, Buluhcina Village depending on natural factors. Natural factors that affect fishermen's capture fisheries activities are the rainy season and the non-rainy season, and this also has an impact on the production of fish catches. Fishermen conduct capture fisheries using simple fishing gear in the form of nets or nets and bubu. Simple fishing gear is usually made by hand by the fishermen themselves. The types of fishing gear used by Buluhcina Village fishermen can be seen in Table 2.

Table 2. Type of fishing gear

Fishing Gear	Quantity (Unit)	Percentage (%)
Netting/networking	395	78,69
Bubu	107	21,3

Based on interviews at the research location, out of a total of 48 respondents, fishermen carry out the fishing process by utilizing fishing nets, which is around 78.69%, and using bubu fishing gear by 21.3%. For the type of transport or boat used by fishermen to go fishing, all fishermen have used a type of engine boat. The types of fish commonly caught by fishermen in Kampar River Buluhcina Village are Asian redtail catfish (*Hemibagrus nemurus*), tapah (*Wallago leeri*), motan (*Thynnichtys polylepis)*, kapiek (*Barbodes schawanefeldii),* selais (*Kryptopterus lais),* Pantau (*Rasbora bornensis).* The total fish catch by Buluhcina Village fishermen along the Kampar River in the village in a year is 35,724 kg/year. The catch differs based on the season, namely the flood or rainy season and the non-rainy or dry season. The total catch in one year can be seen in Figure 1.
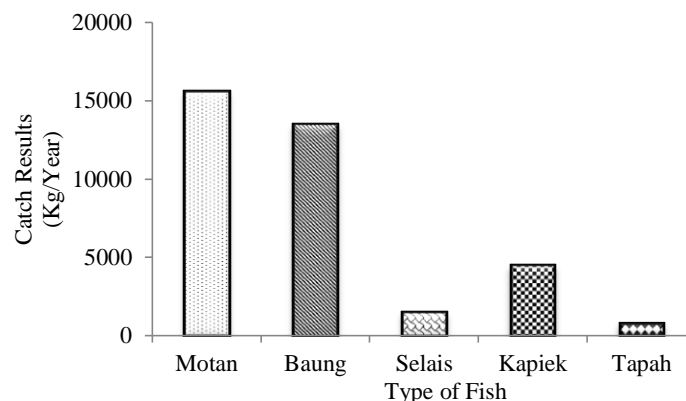

Figure 1. Catches in the Kampar River in Buluhcina Village

The calculation of economic value of fisheries resource utilization in river ecosystems is calculated using the productivity approach or Effect on Production (EOP) approach with multiple linear regression. In this study, linear regression was carried out to obtain the demand function and consumer surplus value of capture fisheries activities and then obtain the total economic value of capture fisheries using five variables that affect fishermen's catch. The linear regression results can be seen in Table 3.

Table 3. Multiple linear regression analysis results

No.	Variables	Coefficients	P-value
1.	Intercept	0,43243140	0,21232767
2.	Price	-1,02940207	0,00000000
3.	Revenue	0,99620467	0,00000000
4.	Education	-0,02667383	0,12483998
5.	Number of dependents	0,04624638	0,03585063
6.	Age	-0,01811094	0,62599416
	R^2		0,99401106
	Adj R^2		0,99329809
	F stat		1394,185454
	Sig. F		0,000000

The results of the calculation of the linear regression (Table 3) state that the relationship of all variables with fish production is indicated by the R-square value of 99.4%, which means that the variables have a significant effect, and the independent variables (average price of fish, income, education, number of dependents, and age) used in the demand function model can explain the elements of the dependent variable, which is the production of fish catches, which is 99.4%. The model of the demand function from the regression results obtained can also show an inversely proportional relationship between fish catch and fish price, education, and age. The negative sign in the demand model indicates that there is an opposite relationship between fish price, education, age, and fish catch production, meaning that if there is an increase in fish catch, the price of fish will decrease. However, the positive sign in the demand model shows the relationship between fish catch and income and the number of dependents, which means that if there is an increase in fish catch, income will also increase. According to Warningsih et al. (2016) in their research stated that the relationship between the price is negative for resource demand, meaning that if the price of a resource increases, the level of demand for a resource will decrease, and vice versa.

The total economic value is obtained after obtaining the consumer surplus value. Total economic value is used for consideration of land in the watershed that will be protected (Hidayat, 2016). The regression results that have been obtained are used to create a demand curve and obtain the consumer surplus value of capture fisheries in Kampar River, Buluhcina Village. The demand curve for capture fisheries can be seen in Figure 2.

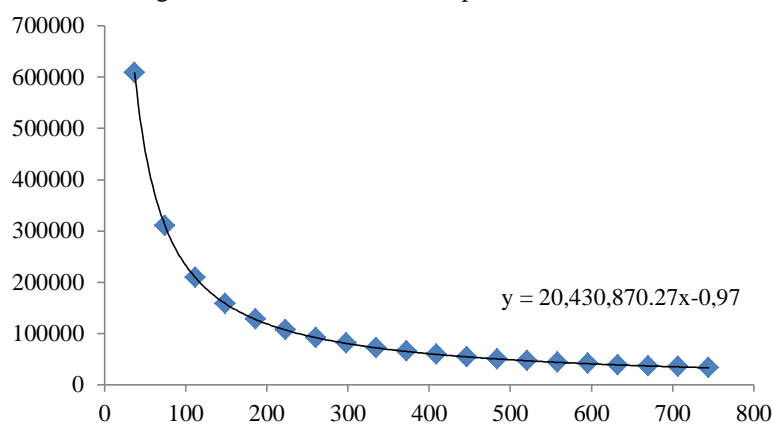$y = 20,430,870.27x^{-0,97}$

Figure 2. Demand curve for capture fisheries resources

The value of consumer surplus is obtained after the demand curve is built, thus obtaining a consumer surplus value of IDR 805,779,054.4 fisherman/year. Based on the amount of consumer surplus obtained, the total economic value of capture fisheries of Kampar River in Buluhcina Village will then be known by multiplying the value of consumer surplus by the number of fishermen divided by the area of Kampar River waters covering 1,119 km^2 in Buluhcina Village and obtained the total economic value of capture fisheries resources of Rp34,567,921,433.8 per year. The Walannae River, Ajangale District, Bone Regency, when compared to the economic value of capture fisheries in the Kampar River, Buluhcina Village, the economic value of capture fisheries is IDR 1,026,485,422 per year. The comparison of economic value is much lower than the Kampar River in Buluhcina Village which obtained Rp34,567,921,433.8 per year. This is influenced by the presence of high-value fish catches that support the increase in the economic value of capture fisheries in the Kampar River in Buluhcina Village.

4. Conclusions

Demand for the amount of fishermen's catch in Kampar River Buluhcina Village is influenced by the variables of price, income, education, number of dependents, and age. The total economic value of capture

fisheries in Buluhcina Village was IDR 34,567,921,433.8/year with a capture fisheries consumer surplus of IDR 805,779,065.4/year and with a total economic value of capture fisheries activities of IDR30,897.4/m^2/year.

5. Suggestion

This research is expected to be taken into consideration in formulating policies on the utilization of natural resources and the environment as well as optimum development costs as input for improving the quality of the Kampar River.

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