



Analysis of Capture Fisheries Business Using Gillnet Fishing Gear Case Study in Cilamaya Wetan District, Karawang Regency, West Java

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Abstract

Gillnet is one of the fishing gear used by fishermen in the District of Cilamaya Wetan, Karawang Regency. This study aims to analyze financial feasibility of fishing efforts at sea using gillnet and analyze the level of welfare of fishermen in the District of Cilamaya Wetan, Karawang Regency. This research was conducted using the case study methods and the methods of sampling use purposive sampling. The results indicated that analysis of fishing efforts at sea using gillnet in the district of Cilamaya Wetan, Karawang Regency are the profit value of IDR. 50,433,333 / year, profitability 59.64%, R/C 1.60, payback period 4.6 months, the fishing business using gillnet in the District of Cilamaya Wetan, Karawang Regency is feasible to be developed. Monthly income of IDR. 4,202,777 <Regional Minimum Wage, the fishermen in the District of Cilamaya Wetan, Karawang Regency are less prosperous because their income is below than the Regional Minimum Wage.

Keywords: capture fisheries, gillnet, business feasibility, small fishermen

1. Introduction

One area on the North Coast of West Java that has considerable fishing potential is Karawang Regency. According to Statistics of the Department of Fisheries and Maritime Affairs of West Java Province, capture fisheries production in Karawang in 2016 recorded 4,588.30 tons or 2.25% of the total capture fisheries production in the North Coast of West Java. Compared to regencies and cities in the North Coast of West Java, capture fisheries production in Karawang Regency ranks 4th. Bekasi has a potential of 2,151.10 tons/year, Cirebon City 4,378.10 tons/year, Karawang 4,588.30 tons / year, Subang 23,428.30 tons/year, Cirebon Regency 30,128.40 tons/year and Indramayu 139,048.20 tons/ year ^[1]. Karawang Regency is geographically located between 107°02' - 107°40' BT and 5°56' - 6°34' LS. The total area of Karawang Regency is 1,753.27 km² or 3.73% of the area of West Java Province. Karawang Regency, administratively consists of 30 subdistricts, 297 villages and 12 villages ^[2]. Cilamaya Wetan Subdistrict is an area in Karawang Regency which has a large enough capture fisheries potential of around 2,419.2 tons ^[3]. With this production, Cilamaya Wetan District ranks second in Karawang Regency.

Gillnet a fishing gear that is most widely used by fishermen in the District of Cilamaya Wetan after purse seine and seine net. The types of gillnet fishing gear used in Karawang Regency is 996 units or 80.7% of the total fishing gear in Karawang Regency. Whereas the amount of fishing gear from the gillnet in the District of Cilamaya Wetan is 278 units or 27.9% of the total amount of fishing gear from the gillnet in Karawang Regency. In addition to the large number of fishing gear units, the number of fishermen is also quite large ^[4]. Gillnet is a fishing gear whose

construction is very simple. The term gillnet is based on the idea that fish caught in this fishing gear tend to be entangled or entangled in the gills so that this type of fishing gear is called a gillnet.

Most of the fishermen who use gillnet in Karawang are small fishermen, namely fishermen with 5 gross tonnage. Small-scale fishermen are generally fishermen with low income and welfare levels (below the Regional Minimum Wage) who need special attention from the government in terms of empowerment. The Regional Minimum Wage of Karawang Regency in 2019 amounted to IDR 4,234,010 ^[6].

2. Methods

2.1 Research Method

The research method used in this research is the case study method. Data and information were collected from respondents through questionnaires.

2.2 Data Sources and Types

The data collected consists of primary data and secondary data. Primary data in the form of direct data collected through interviews with respondents and using a tool that is a list of questions (questionnaire). The data includes components of revenue and expenditure of fishing business using a gillnet, the technical and economic analysis of the fishing business activities using a gill net and the problems and obstacles encountered. Secondary data sourced from the data of the West Java Fisheries Department, Karawang Regency Maritime Fisheries Office, Central Statistics Agency, and literature sourced from related agencies. The data are in the form of data on the general condition of the area, the number of fishermen, the type and number of fishing gear, and production.

2.3 Sampling Method

The sampling method is done by using the purposive sampling method. Sample criteria taken are:

1. Fishermen who are respondents are fishermen who operate in Cilamaya Wetan District, Karawang Regency
2. The fishermen who are respondents are fishermen who have a gillnet.
3. Fishermen used as respondents are fishermen who operate with outboard motorboats.

In the sample data in this study were from a population of 458 fishermen in the District of Cilamaya Wetan and those who worked as fishermen for a gill net were taken as many as 30 respondents or 6.5% of the total number of fishermen using a fishing gear for a gillnet with a boat outboard.

2.4 Analysis Method

The data analysis methods used in this research is descriptive quantitative analysis. Data analysis consists of benefit cost analysis, financial analysis and fishermen welfare analysis.

1. Benefit Cost Analysis

Benefit cost analysis is used to calculate the cost and revenue components resulting from the fishing effort using a fishing net by conducting a previous interview. The cost components used are investment costs and operational costs. The revenue component is the value of sales of products. If a project shows positive net benefit, then the project plan can be continued. If the opposite is negative, then the project plan is terminated [7].

2. Financial Analysis

Profit Analysis

Mathematically the analysis of business profits can be formulated as follows [8]

$$\pi = TR - TC \tag{1}$$

Information

π	:	profit
TR	:	total revenue
TC	:	total cost

Profitability Analysis

Profitability is the ratio between the profits from fishing efforts using a gillnet with the total cost expressed as a percentage. Mathematically can be formulated as follows:

$$\text{Profitabilitas} = \frac{\pi}{TC} \times 100 \tag{2}$$

Information

π = The benefits of fishing using gill net
 TC = The total cost of fishing using gill net

The Balanced Revenue And Cost (R /C)

The balanced revenue and cost (R/C) analysis is a comparison in which total revenues are divided by total costs expressed by the equation [8]

$$R/C = \frac{TR}{TC} \tag{3}$$

Information

TR	:	total revenue
TC	:	total cost

Payback Period Analysis

Payback period is used to measure the length of return on investment from the benefits received [9] :

$$PP = \frac{1}{\pi} \tag{4}$$

Information

I	:	investment
Π	:	profit

3. Fisherman Welfare Analysis

Welfare analysis aims to determine the level of welfare of fishermen with gillnet fishing gear in the District of Cilamaya Wetan. Fishermen welfare analysis will compare fishermen income with prevailing Regional Minimum Wage in Karawang Regency.

3. Results and Discussion

3.1 Geographical Location and Regional Condition of Kecamatan Cilamaya Wetan Karawang Regency

Geographically, Cilamaya Wetan Sub-District is one of the coastal sub-districts located in the East of Karawang Regency which has an area of approximately 6,5158.95 Ha or 61,599 Km2. Cilamaya Wetan Subdistrict consists of 12 villages, 4 of which are coastal villages namely, Muara Village, Muara Baru Village, Rawagempol Village and Sukakerta Village.

The boundary of the Cilamaya Wetan District in the North is the Java Sea while in the South it is bordered by the Banyusari District. East of Cilamaya Wetan District is bordered by Subang Regency while in the West it is bordered by Cilamaya Kulon District. The Cilamaya Wetan Sub-District area has a beach length of 10.6 Km and has a potential increase of 912 hectares with a total of 253 Fisheries Households. The highest potential of capture fisheries is in three villages, namely in Muarabaru Village, Sukakerta Village, and Muaralama Village.

There are several locations used as sampling points in the District of Cilamaya Wetan including karang pulau pasir, karang pulau gede, karang sendulung, karang ketapang dan karang temiang.



Fig 1: Karawang Regency

3.2 Overview of Respondents

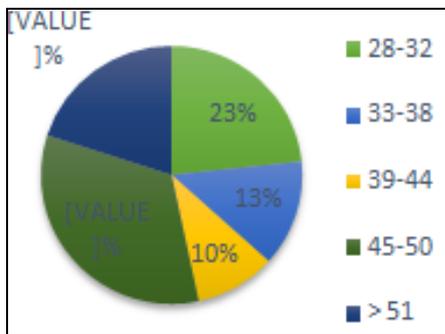


Fig 2

A. Age

Based on the age characteristics of the respondents, it can be seen in the largest group in the fishing business using a gillnet in the District of Cilamaya Wetan, Karawang Regency namely the age group of 45-50 years (33%). This shows that the age group of 45-50 years is classified as productive age in the fishing effort in Cilamaya Wetan District, Karawang Regency. The age level affects a person's ability to carry out activities and concepts. This is seen from the strong physical condition and more experience compared to the young age [10].

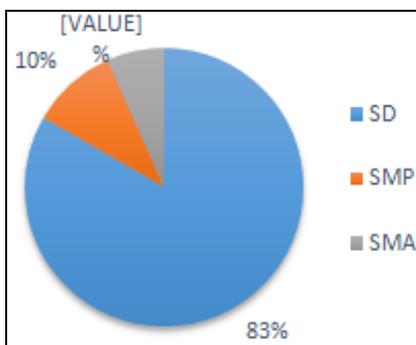


Fig 3

B. Education

Based on the identification results, it can be seen that respondents who have an elementary school level of

education are 83%, junior high schools (10%), and senior high schools (7%). From the identification results it can be seen that the level of education of respondents is very minimal. This shows the social and economic factors in the environment affect the neglect of education. The low level of education is caused by past economic conditions that do not support getting a long education [11].

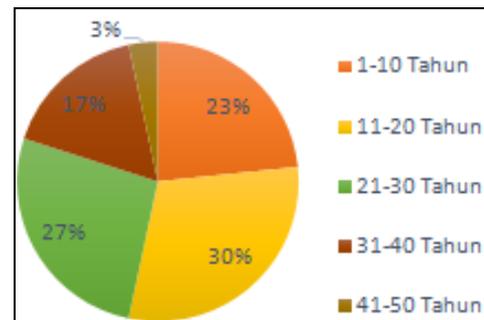


Fig 4

C. Work Experience of Respondents

Based on the identification results it can be seen that respondents who have 1-10 years working experience is 23%, 11-20 years work experience is 30%, 21-30 years work experience is 27%, 31-40 years work experience is equal to 17% and work experience of 41-50 years which is equal to 3%. From the results of this identification it can be seen that the fishermen who make arrests by means of a gillnet in the District of Cilamaya Wetan, Karawang regency, the majority have experience of fishing for 11-20 years. The influence of fishermen's experience on income is related to the length of the fishermen in the effort to catch fish in the sea so that control over the types of fishing gear and the area of operation will lead to higher productivity of fish catches at sea [12].

3.3 Benefit Cost Analysis

Investment Cost

Investment costs are costs incurred before the implementation of operational activities. The following equipment is needed to carry out fishing business (Table 1).

Table 1: Investment Costs in a Fishing Business Using Gill Net for 1 Year

No.	Type of Investment	Amount (Unit)	Unit Price (IDR)	Total (IDR)	Cost Proportion (%)	Technical Age (Year)
1	Ship (5x2m, 5 GT)	1	12,000,000	12,000,000	61.54	5
2	Machines (16 PK)	1	5,000,000	5,000,000	25.64	3
3	Gill Net (2 inch)	1	1,500,000	1,500,000	7.69	1
4	Ice Box	1	1,000,000	1,000,000	5.13	1
Total				19,500,000	100.00	

Source: Primary data processed (2019)

Based on table 1, the investment costs required in the fishing business with a gillnet is IDR. 19,500,000 consisting of boats, engines, fishing gear for boiled nets and ice crates. The investment cost component has a technical age with an average price of (1) The average technical age of the boat is 5 years at a price of IDR. 12,000,000; (2) The average technical life of a machine is 3 years with a price of IDR. 2,000,000; (3) The average age of a gill net fishing gear is 1 year at a price of IDR. 1,500,000; and (4) The average age of ice crates is 1 year with a price of 1,000,000. Equipment and investment are the initial capital used during fishing production. Each equipment has its own function that cannot be replaced with other tools, besides the technical age and number of tools depends on the usage requirements.

Production Cost

Production costs are all costs incurred to produce production, which consists of fixed costs and variable costs. Production costs are divided into two namely fixed costs and variable costs [8].

1. Fixed Costs

Fixed costs in the fishing business are maintenance costs and depreciation costs. Maintenance costs in the fishing business using a gillnet in the form of boat maintenance, engine maintenance, maintenance of the gill net and maintenance of the ice box. Boat maintenance includes patching and painting, netting covers patching of torn nets, engine maintenance includes oil changes and ice cube maintenance includes patching of leaking parts. Depreciation costs from the results of the study found that the economic life of the boat in general for 5 years, 3-year-old machine, fishing gear, 1 year old gillnet and 1 year old ice cube. Pools and 16 PK machines are types of investment that experience shrinkage due to the performance of the engine every year decreases. The value of depreciation is the value resulting from the reduction in the purchase price with the use price divided by the length of use in years (technical age). The total fixed costs incurred for fishing business using a gillnet per year is IDR. 6,566,667 [13].

2. Variable Cost Variable costs are costs that vary with the size and output level of an activity [14]. The details of variable costs (Table 2).

Table 2: Variable Costs for Fishing Business Using Gill Nets per trip.

Cost Type	Unit	Volume	Unit Price	Cost
Solar	liter	4	7,500	30,000
Ice cubes	block	2	20,000	40,000
Oil	liter	5	30,000	150,000
Consumption	package	1	30,000	30,000
b	unit	1	10,000	10,000
Total			97,500	260,000

Source: Primary data processed (2019)

Variable costs or operational costs in this fishing business include fuel costs (diesel), ice cubes, oil costs, consumption costs and bucket costs. The cost of fuel (diesel) is influenced by how long it takes and distance traveled. The fishers usually need 4 liters of fuel a day in the process of fishing. The type of fuel used is diesel which is sold retail by residents around IDR. 7,500 / liter. Ice cube costs are costs incurred for the supply of ice cubes whose function is to maintain the quality of fish in good condition and fresh. Oil costs are costs incurred for maintenance of ship engines for a day in fishing operations, the type of oil that is commonly used is bulk oil and in a day requires 5 liters of oil at a price of IDR.30,000 / liter. Consumption costs represent costs incurred for one day of consumption in fishing operations (food and cigarettes). Consumption costs are the primary need in production activities, this illustrates the activity of fishing during the production period. Bucket costs are costs incurred for the needs of the place of fish before being put into the hold, in 1 boat usually has 1 to 2 medium-sized buckets at a price of IDR. 10,000 / fruit. The total variable costs (operational) incurred to carry out fishing activities per trip amounted to IDR.260,000, while in 1 year the costs incurred were IDR.78,000,000.

Revenue

Revenue is the product of the number of catches (kilograms) and the price per kilogram (rupiah) from the sale of catches. The details of catch revenue for 1 year (Table 3).

Table 3: Variable Costs for Fishing Business Using Gillnet per trip.

Seasonally Reception	Price of Fish (IDR / kg)	Catches (Kg)	Total (IDR)
East Season	20,000	4,500	90,000,000
Wester Season	20,000	2,250	45,000,000
Total		13,500	135,000,000

Source: Primary data processed (2019)

Based on Table 3, the total revenue obtained in the fishing business using a gillnet in the District of Cilamaya Wetan, Karawang Regency per year is IDR. 135,000,000. Receipt in one cycle (one year) the catch consists of two seasons, namely the dry season (east) and rainy (west). When the production of catches has peak during the dry season, where the catch per day reaches 30-35 kg with a selling price of IDR. 20,000 / kg. whereas in the rainy season the yield of catches decreases. The catches obtained range from 10-15 kgs, with the selling price per kg of IDR. 20,000.

3.4 Financial Analysis

Profit

Profit is the total revenue minus the total costs incurred [15]. The following benefits of fishing business (Table 4).

Table 4: Benefits of Catching a Fishing Business Using Gillnet for 1 Year.

No.	Cost component	Total (IDR / year)
1	Revenue	135,000,000
2	Fixed Cost	6,566,667
3	Variable Cost	78,000,000
Profit (Year)		50,433,333
Profit (Month)		4,202,777

Source: Primary data processed (2019)

The value of profits is obtained by reducing total revenue and total production costs. The total income of fishing business using a gillnet in the District of Cilamaya Wetan per year is IDR.135,000,000, with annual total costs (fixed costs plus variable costs) of IDR.84,566,667 will generate a profit of IDR.50,433. 333 / year or IDR.4, 202,777 / month, this shows that the profit is positive, which means that fishing efforts using a gillnet in the District of Cilamaya Wetan, Karawang Regency is profitable.

Profitability

Profitability is the company's ability to make a profit in relation to sales, total assets and own capital [16]. The following is the profitability of the fishing business using a gill net (Table 5).

Table 5: Profitability in Fishing Business Using Gillnetfor 1 Year.

Description		Profitability (%)
Profit (IDR)	Total Cost (IDR)	
50,433,333	84,566,667	59,64

Source: Primary data processed (2019)

The percentage of profitability generated was 59.64% in the fishing effort using the gill net. In the calculation of the resulting profitability is > 0, which means profitable and is caused by the value of capital needed in a fishing business using a gillnet and the resulting profits.

Revenueand Cost Ratio

Revenue and Cost Ratio(R/C) is a comparison between revenue and cost. This analysis is used to find out whether the business is profitable or not and deserves to be developed. If the result of R/C>1, the business is profitable, whereas if the result of R/C = 1, the business is said to break even and if the result of R/C<1, the business suffers a loss [17]. The following R/C from the fishing business using a gillnet (Table 6).

Table 6: R / C in the Fishing Business Using Gillnet for 1 Year

Description	Price (IDR)
Income	135,000,000
Total Cost	84,566,667
R/C	1.60

Source: Primary data processed (2019)

From Table 6 above, it is known that the feasibility of fishing business using a gillnet is the profit sharing between revenue and production cost of IDR. 135,000,000 divided by IDR. 84,566,667: 1.60. R/C value of 1.60 shows that fishing business using a gillnet in Cilamaya Wetan District, Karawang Regency is feasible.

Payback Periods

Payback periods (PP) is the period of return of investment that has been issued, through profits obtained from a planned business. Payback periods is used to measure the length of return on investment from the profits received by the owner [9]. Following payback periods from fishing efforts using a gill net(Table 7).

Table 7: Payback period for fishing using a Gillnet for 1 year.

Cost Type		PP (Year)
Investation (IDR)	Income (IDR)	
19,500,000	50,433,333	0.39

Source: Primary data processed (2019)

Payback periods is obtained by dividing investment costs by profits per year investment costs incurred by the fishing business using a gillnet in the District of Cilamaya Wetan Karawang Regency in the amount of IDR. 19,500,000. 50,433,333, the investment payback period is 4.6 months. This shows the investment costs incurred is smaller than the total income received by fishermen in one year. These benefits are beneficial for venture capital. The greater the value of payback period, the longer the return on capital, and the smaller the value of payback period, the faster the return on capital from the business [18].

3.4 Welfare Analysis

By comparing the Regional Minimum Wage of Karawang Regency and the average income received by catchers with fishing gear for gillnet in the District of Cilamaya Wetan, the Regency of Karawang, it will be seen the level of welfare of the gillnet in the District of Cilamaya Wetan, Karawang. Karawang Regency Regional Minimum Wage in 2019 is IDR. 4,234,010 while the average fishing income is IDR. 4,202,777 / month, so that fishermen with gillnet fishing gear are at a less prosperous level because the average income of fishermen is less than the Karawang Regency Regional Minimum Wage.

4. Conclusion

Based on the results of the study it can be concluded, that fishing efforts using a gillnet in the District of Cilamaya Wetan, Karawang Regency is feasible to run, which is indicated by fulfilling the eligibility requirements of several parameters, profitability ratios, R/C and payback period. Judging from the eligibility criteria, profitability is 59.64%, R/C <1.60 and payback periods is less than 1 year (4.6 years). Based on the analysis of the level of income by comparing the income of fishermen with the Karawang Regency Regional Minimum Wage, it is indicated that it is less prosperous because the income is less than the Karawang Regency Regional Minimum Wage that has been determined.

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