Original Research Article

Feasibility of Fishing Business with Purse Seine in Gentuma, North Gorontalo, Indonesia

ABSTRACT

The Purse Seine becomes a fishing gear commonly used by fishermen in Gentuma, North Gorontalo. A business feasibility analysis needs to be carried out to assess business opportunities to consider whether the business is feasible to continue or not. The components analyzed include Payback Period, Revenue Cost Ratio, Break Even Point and Return on Investment. This study aims to analyze the feasibility of the business of fishing for purse boats in North Gorontalo Gentuma. This research is based on a case study on MV. Inka Mina 730 operating in Gentuma waters, North Gorontalo. Based on the calculation of financial analysis indicators on MV. Inka Mina 730, obtained profit/loss analysis results of Rp. 388,287,988, R/C Ratio obtained 1.46, Payback Period analysis results of 4,12 means that to return the investment value it takes an interval of 4,12 years, while the BEP value is Rp. 3.220,383,810, then also obtained a BEP (kg) value of 236,382kg, and a ROI (Return on Investment) calculation of 24%. The purse seine fishing business in Gentuma, North Gorontalo, Indonesia is feasible and profitable based on the NPV, IRR, and B/C ratio, with return on capital included in the fast return on capital category.

Keywords: Business Feasibility, Fishing, Gorontalo, Purse Seine

1. INTRODUCTION

Fishermen of Gentuma - North Gorontalo generally catch fish using purse seine vessels. One of the target fish caught by Gentuma fishermen is *Decapterus ruselli*(Rüppell, 1830). This type of fish is a fish that has important economic value in the Gentuma Fishery Port, North Gorontalo. In 2018 it was recorded that 2,261,319 kg of fish were successfully landed in Gentuma with the most catches were *Euthynnus affinis*(Cantor, 1849) with 1,223,092 kg, *Katsuwonus pelamis* (Linnaeus, 1758)with 1,212,902 kg, and *Decapterus ruselli* (Rüppell, 1830)with 23,320 kg.The size of the seine net plays an important role in determining the ability to catch fish. The principle of catching fish with a seine net is to go around the school of fish and then pull the line to trap the school fish, so the size is very important, especially in seine nets that do not use tools to operate[1].

Purse seine fisheries generally catchpelagic fish[2–8]. Fish that are the target of the purse seine fishery are pelagic fish that form schools that gather on fishing aids(fish agregating device of iron pontoons).The targets caught by Gentuma fishermen are*Decapterus ruselli*(Rüppell, 1830), *Euthynnus affinis* (Cantor, 1849) and *Katsuwonus pelamis* (Linnaeus, 1758). When catching fish with purse seine, the principle is that the fish are surrounded by a net that forms a vertical net in such a way that the horizontal movement of the fish is

prevented. The bottom of the net is then compacted so that fish cannot escape to the bottom of the net. The fishing vessels used are usually made of wood and the sizes are as follows (tabel 1):

Table 1. Categories of Purse Seine Vessels in Gentuma, North Gorontalo, Indonesia

No	Category	GT	Engine Power (HP)
1.	Small	10-30	20
2.	Currently	30-50	120
3.	Big	50-100	300-360

The financial feasibility assessment of the fishing industry development plan has the objective of assessing whether the activity is feasible to be developed from an economic and business standpoint [9]. According to [10], a business feasibility analysis needs to be carried out to provide an overview of the feasibility of a fishing effort by comparing the benefits and costs including the value of profit and loss, revenue cost ratio (R/C), Payback Period (PP), Return on Investment (RoI) and Break Even Point (BEP). This study aims to analyze the feasibility of fishing using purse seine vessels in Gentuma, North Gorontalo. This research is a case study on MV. Inka Mina 730, which carried out fishing operations in Gentuma waters, North Gorontalo.

2. MATERIAL AND METHODS

The method used in this research is descriptive. While the analysis used to assess the feasibility of fishing effort is financial analysis in the form of income, profit, Revenue Cost Ratio (R/C), Payback Period, Return on Investment (RoI) and Break Even Point [11–16].

3. RESULTS AND DISCUSSION

3.1 Investment Capital

Investment costs are costs that must be incurred to buy or maintain an investment. These fees can include transaction fees such as brokerage fees, settlement fees, and administration fees. In addition, investment costs can also include costs to maintain investments, such as investment management fees, monitoring fees, and storage fees. Investment costs can significantly affect investment returns, because the higher the investment cost, the lower the return on investment that will be obtained. Therefore, it is important for investors to take into account investment costs when making investment decisions and choose investments with affordable costs and high returns on investment. Business capital/fishery business investment is the cost required to start a business in the fishery sector. These costs depend on the size of the ship's gross tonnage, the larger the ship, the higher the working capital costs that must be incurred. According to [17], the investment costs of fishermen's fishing activities include the cost of purchasing boats, engines, fishing gear and other fishing aids.

Investment capital is the initial capital that must be issued to start a business. The amount of capital placed in MV. Inka Mina 730 Rp. 1,530,175,000 consisting of boats, fishing gear and other equipment. Details of investment costs can be seen in table 2.

Table 2. Investment Capital

No	Type	Units	Economic age	Price/Unit (Rp)	Total Price (Rp)
1	Viber ship	1	10 years	1,000,000,000	1,000,000,000
2	Fishing Gear	1	5 years	200,000,000	200,000,000
3	Main engine	1	5 years	150,000,000	150,000,000
4	Capstan	1	5 years	8,000,000	8,000,000
5	Generator	1	5 years	3,200,000	3,200,000
6	GPS	1	5 years	8,000,000	8,000,000
7	Radio	1	5 years	12,530,000	12,530,000
8	Compass	1	5 years	235,000	235,000
9	Portable VHF	2	5 years	740,000	1,480,000
10	Speed boat	1	5 years	7,500,000	7,500,000
11	FAD	7	5 years	30,000,000	210,000,000
Investment amount					1,600,945,000

3.2Fixed Cost

Fixed costs are costs that for a certain period of time have a fixed value that does not depend on the output produced. Fixed costs are types of costs incurred during one year of work, the amount remains unchanged and does not change [18]. Depreciation costs are costs incurred to reduce the value of productive assets in accounting. Productive assets such as buildings, machinery, vehicles and company equipment have a limited useful life and will decrease in value over time. Depreciation is the process of allocating the cost of productive assets to the proper accounting period by systematically reducing the value of productive assets over their useful life. Each accounting period, a portion of the value of productive assets is deducted from the company ledger and charged to the income statement as depreciation expense.

The depreciation methods used by companies may vary, such as the straight-line method, units of production method, or declining balance method. Depreciation charges can affect a company's financial statements, including income statements, balance sheets, and cash flow statements, so it is important for companies to properly account for depreciation charges in their accounting. Calculation of depreciation costs on MV. Inka Mina 730, namely the investment cost per unit divided by the economic life so that the depreciation value in one year is Rp. 184,041,000 (table 3).

Table 3. One Year Depreciation Expense

No	Type	Price per unit (Rp)	Depreciation 1 year
1	Viber ship	1,000,000,000	100,000,000
2	Fishing Gear	200,000,000	40,000,000
3	Main Machine	150,000,000	30,000,000
4	Capstan	8,000,000	1,600,000
5	Generator	8,000,000	640,000
6	GPS	8,000,000	1,600,000
7	Radio	12,530,000	2,506,000
8	Compass	235,000	47,000
9	VHF	740,000	148,000
10	Speed boat	7,500,000	1,500,000
11	FAD	30,000,000	6,000,000
Total		1,420,205,000	184,041,000

Ship maintenance costs are costs incurred with the aim of repairing or treating damage to ships, engines and fishing gear. Treatment performed on MV. Inka Mina 730 every four months. This maintenance is very routinely carried out to prevent damage to the ship so that it can support fishing operations, but the maintenance period for the engine cannot be predicted. Following are the maintenance costs incurred (table 4).

Table 4. Maintenance Costs

No	maintenance type	Cost per 1 Year (Rp)
1	Fiber ship	7,500,000
2	Fishing Gear	15,000,000
3	Main Machine	5,000,000
4	Generator	2,000,000
5	Speed boat	1,000,000
6	FAD	4,000,000
Total Maintenance Cost		**34,500,000**

Costcare is needed to maintain the continuity of the work of all fishing gear units so that fishing can be carried out without encountering any obstacles. MV. Inka Mina 730 performs maintenance 3 times a year with a total annual maintenance cost of Rp. 34,500,000,-.

Fishery Levy Fee is a state levy on the right to exploit or exploit fish resources that must be paid to the government by every person carrying out a business of catching fish or transporting fish. There are several fisheries levies, namely Fisheries Business Fees (PPP)

and Fishery Product Levies (PHP). The amount of fishery fees is regulated based on Government Regulation of the Republic of Indonesia Number 38 of 2015. The following is fishery fees for MV. Inka Mina 730 can be seen in table 5.

Table 5. Cost Of Tax Collection

No	Type of Fee	Fisheries Fee (Rp)
1	PPP (41.650XGT)	1,332,800
2	PHP=(5%) x Ship productivity x HPIxGT (PP 38 PERMEN KP 2015)	2,500,224
Total		**Rp. 2,857,024**

From the description above, the amount of fishery fees in one year on MV. Inka Mina 730 is Rp. 2,857,024,-

3.3Total Fixed Costs

Fixed costs are incurred regularly, either immediately or unsolicited, whereas routine operating expenses must be requested. Fixed costs include total depreciation costs and capital costs, while variable costs include total costs, maintenance costs, auction costs and labor costs [17]. The details of the total costs are described in Table 6.

Table 6. Total Fixed Costs

No	Fee Type	Total Cost/Year (Rp)
1	Cost of depreciation	184,041,000
2	Maintenance costs	34,500,000
3	Fishing fees	2,857,024
Total Fixed costs		**221,398,024**

So the total fixed costs incurred by MV. Inka Mina 730 in a period of one year is Rp. 221,398,024.

3.4. Variable Cost

Variable costs or variable costs are costs that depend directly on the amount of output produced. Variable costs are a type of cost that fluctuates (varies) with the amount of activity. Variable costs include operating or deployment costs, tender costs and labor costs [18]

3.4.1. Operating costs

The operating costs of a fishing company depend on the size of the vessel, the length of the planned voyage and the number of crew members, the larger the vessel the longer the voyage, the higher the operational costs and vice versa. According to [17], operational costs are costs incurred to meet operational needs such as diesel, fuel, fresh water and others from preparing the ship on land until the ship returns to shore to load and unload the catch.

zero operating costs on MV. The Ink Mina 730 that is issued is not always the same. Following are the operational costs incurred for one year with a total of 30 trips. details of operational costs can be seen in table 7.

Table 7. One Year Operational Costs

No	Types of goods	Total fees/trip(IDR)	Total Cost/1 year (Rp)
1	Solar	2,800,000	10,500,000
2	Oil	640,000	19,200,000
3	Freshwater	350,000	10,500,000
4	Ice Cube	1,500,000	45,000,000
5	Water gallon	30,000	900,000
6	LPG 5.5	170,000	5,100,000
7	Rice	500,000	15,000,000
8	Salt	30,000	900,000
9	Amprak Money	1,200,000	36,000,000
10	Gasoline	350,000	10,500,000
11	Supplies	300,000	9,000,000
Total Operating Costs		7,870,000	236,100,000

Operational costs per trip incurred by MV. Inka Mina 730 is Rp. 7,870,000 then multiplied by the number of trips per year, then the operational costs per year are incurred by MV. Inka Mina 730 is Rp. 236,100,000,-.

3.4.2. Crew Sharing Costs

The salary/wages earned by the crew of the MV. Inka Mina 730 is divided by a profit sharing system. The size of the crew's profit sharing depends on the income from the catch. The more the catch, the greater the profit for the crew. Crew profit sharing system on MV. Inka Mina 730 is divided after sales proceeds deducted by operational costs. After the results are obtained, then the results are distributed to ship owners and crew members(24 person). Where the owner of the ship gets 50% and the crew gets 50% of the sales results minus the operational costs. After knowing the income for one year or 30 trips, which is Rp. 761,257,976, - then one year's income is divided into two,50% for ship owners and 50% for ship crew.

Based on the calculations, it can be seen that the profit sharing for the crew of MV. Inka Mina 730 for one year or 30 trips is getting Rp. 380,628,988,-. After the profit sharing is received, the crew members' profit sharing will be distributed according to the position held.

Table 8. Total Variable Costs

No	Fee Type	Total Cost (Rp)
1	Operating costs	236.100.000
2	Crew Wages	380,628,988
Total Cost Not fixed		**616,728,988**

The total variable cost ofMV. Inka Mina 730 which is assumed to last one year or 30 tripsis Rp. 616,728,989 can be seen in table 8.

3.5. Total Cost

The total cost of purse seine fishing is strongly influenced by fixed and operational costs both before and after fishing. According to [17],total cost is obtained from the total cost resulting from the sum of fixed costs (fixed costs) and operational costs (variable costs). Total cost is the total cost incurred by business units during one year of production. Total costs include fixed costs and variable costs. Total cost of fishing business in MV. Inka Mina 730 received for a year or 30 trips is Rp. 838,127,012.

3.6. Income

According to [17],income from the purse seine fishery is unpredictable. Income from capture fisheries is highly uncertain due to changing environmental conditions. Unlike other companies, catch revenues are highly uncertain due to changing water conditions. Fishermen's income is the value of money generated from the sale of fish production.

The total catch of MV. Inka Mina 730 during the research or 12 trips totaled 37,333 kg with total sales of Rp. 490,566,000.- Following are the details of MV's catch. Inka Mina 730 for 12 trips, can be seen in table 9.

Table 9. Catch Results

No	Month	Price (Kg)	MarkProduction (kg)
1	January 2021	14,000	35,784,000
		14,000	93,898,000
2	February 2021	12,000	97,200,000
		12,000	137,640,000
3	March 2021	14,000	78,092,000
		16,000	37,152,000
		18,000	4,500,000
4	April 2021	18,000	6,300,000
Total number		37,333	490,566,000

Total sales results as a whole for 4 months 12 trips get a result of Rp. 490,566,000. One year's sales results can be assumed to be the total catch for 4 months or 12 trips divided by the number of trips during the study then multiplied by one year which is assumed to be 30 trips so it has a value of Rp. 1,226,415,000.

3.7. Business Feasibility Analysis

The faster a company's investment costs are amortized, the more profitable the business and the smoother the capital cycle [19]. Financial analysis is an analysis to evaluate the profitability of a company in MV. Inka Mina 730 includes Profit and Loss Analysis, Benefit Cost Ratio (R/C), Break Even Point and Payback Period and calculates Return on Investment.

3.7.1. Profit and loss

Profit/loss analysis is the process of evaluating a company's financial performance by analyzing the income statement for a certain period of time. The income statement includes

information about the company's revenue, operating expenses, interest expenses, income taxes, and the net profit or loss made by the company during the period. The purpose of an income analysis is to evaluate a company's financial performance, identify trends and patterns in revenues and expenses, and measure a company's ability to generate profits and meet financial obligations.

Several financial ratios that can be used in profit and loss analysis include profitability ratios, profit margin ratios, operating cost to revenue ratios, efficiency ratios, and return on investment ratios. Income analysis can also involve a comparison of a company's financial performance with competitors in the same industry or with industry standards. Good profit and loss analysis can help company management to make the right decisions in managing company finances and improve overall financial performance.

Total sale ofMV. Inka Mina 730 for one year of Rp. 1,226,415,000 while the total costs incurred for one year with 30 trips amounted to Rp. 838,127,012. Mathematically used for the analysis of business income [19] it is known that sales for one year minus total costs get a net profit for 1 year of Rp. 383,287,988.

3.7.2. Revenue Cost Ratio(R/C)

In research([20–24], calculate the Revenue Cost Ratio, namely the balance between the results of operations with the total cost of production. Based on the results of the calculation of the Revenue Cost Ratio, a result of 1.46 is obtained which is the result of the division of the sale of catches for one year divided by the total cost for one year which is greater than 1, so this business is feasible to run.

3.7.3. Payback Period (PP)

The payback period is a simple method in investment analysis to calculate how long it will take for an investment project to generate net cash flow equal to the amount of the initial capital invested. In its calculations, the payback period is calculated by dividing the initial investment by the annual cash flow generated by the project. In this way, we can find out how long it will take to generate sufficient net cash flow to pay off the initial investment. The payback period can be used as a tool to select investment projects that return capital more quickly. The faster a project returns capital, the faster investors will benefit from their investment. However, The payback period also has the disadvantage of not considering the time value of money and future profits, so it does not provide a complete picture of investment performance. Therefore, it is best used together with other methods of investment analysis. Based on the calculation, the PP value is 4,12. Based on the results of these calculations, it can be concluded that the investment issued by MV. Inka Mina 730 can return if it catches fish for 4,12 years (the value criterion is below 5 years, then business capital gains are moderate).

3.7.4. Break Even Point (BEP)

The break even point is a sales level where the revenue from sales equals the total costs or expenses. In other words, at the break-even point, a business produces neither profit nor loss. In its calculation, the break even point is calculated by dividing the total fixed costs by the contribution margin per unit. The contribution margin is the difference between the selling price per unit and the variable cost per unit. The break even point is an important tool in financial management because it helps management to know the minimum sales level needed to start generating profits. By knowing the break-even point, management can determine the right selling price, make better investment decisions, and plan effective sales

and marketing strategies. Based on the results of the Break Even Point analysis, it can be seen that the breakeven point value at MV.Inka Mina 730 is at Rp. 3,220,382,810 for income BEP and 236,382 kg for kg BEP.

3.7.5. Retrun on Investment (RoI) Analysis

ROI is an analysis used to calculate the amount of profit earned in a business compared to the amount of investment issued. From the results of calculating ROI on MV.Inka Mina 730, a value of 24% is obtained, it can be concluded that the fishing effort using the Purse Seine on MV.Inka Mina 730 obtains 24% profit from the large value of the investment issued, so that fishing using the Purse Seine is classified as quite good because the ROI that is obtained is more than 19%. The results of this study are in line with the research conducted[10,25]which shows that fishing with purse seine in North Gorontalo and Yogyakarta Indonesia are feasible.

4. CONCLUSION

The purse seine fishing business in Gentuma, North Gorontalo, Indonesia is feasible and profitable based on the NPV, IRR, and B/C ratio, with return on capital included in the fast return on capital category.

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