

Financial analysis of purse seine fisheries in Natuna waters, Indonesia

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Abstract. Purse seine is a fishing gear made from webbing sheets, which are generally rectangular. Fisheries production in Batam City has increased in the last two years, where the purse seine is the dominant fishing gear used in Natuna waters. Thus, it is necessary to know how far the purse seine fishing activity can still be carried out properly. The purpose of analyzing the financial aspects of a business project feasibility study is to determine the investment plan through the calculation of expected costs and benefits, by comparing expenses and revenues, such as the availability of funds, capital costs, the project's ability to repay the funds within the allotted time and assess whether the project will continue to develop. The present research was carried out from November 1, 2017 to March 6, 2018. Sampling was done by observing all of the purse seine operations. Data were taken from primary data and secondary data. Data were analyzed using financial analysis. The results of the present study indicate that purse seine fisheries in Batam meet proper requirements to be continued. Financial analysis results are as follows: Operating profit: 71,204.56 USD. Analysis of revenue and cost balance: 1.16 Value $\frac{R}{C} >$ means profitable, Payback period: 1 year 1.2 month, the investment capital can be returned. Return of investment: 90.62%.

Key Words: financial feasibility, Natuna Sea, catch composition, purse seine ships.

Introduction. Indonesia is a country that has a very wide sea area, about 2/3 of the country's territory is ocean (Nugraha & Mulyono 2017). Indonesia's fisheries resources are of Indonesian peoples without any interference from other countries (Sahabu et al 2015). According to Limbong et al (2013), the utilization of marine resources needs to be limited by controlling the amount of fishing effort and/or catches in order to avoid excessive effort, excessive capital investment or excess labor. Utilization of resources without control tends to be followed by a decrease in resources (stock), a decrease in catches per unit of effort (CPUE), as well as the depletion of the benefits obtained. The efficiency of a resource utilization arrangement can be achieved by catching up to the level appropriate to the level needed to obtain an optimal catch.

According to Nainggolan (2007), purse seine is a fishing device made from webbing sheets, which are generally rectangular. There are also those who classify them based on the type of fish they are fishing for so that they are known as small pelagic purse seine and large pelagic purse seine (Sudirman & Mallawa 2012). In tropical and sub-tropical waters, fish often gather in large numbers naturally, these fish are subject to capture using purse seine (Surur 2010). Determination of the fishing ground can be expected from the waters condition that is the habitat of a species (Nugraha et al 2020).

Indonesia's total fishery production in 2014 was 11.06 million tons with a total value of 9 billion USD. This figure was contributed by the capture fisheries and aquaculture sectors respectively 5.86 million tons and 5.20 million tons. In 2014, the export volume of fishery products was 802 thousand tons with a value of 2.6 billion USD (Sub Directorate of Data and Capture Fisheries Statistics 2014).

According to Kasmir & Jakfar (2008), the purpose of analyzing the financial aspects of a business project feasibility study is to determine the investment plan through the calculation of expected costs and benefits, by comparing expenses and revenues, such as the availability of funds, capital costs, the ability of the project to pay back these funds within the allotted time and assess whether the project will continue to grow.

According to Widodo et al (2005), types of production costs and calculations can be divided into two: short term production costs and long term costs. Analysis of business income aims to determine the magnitude of profits derived from a business activity carried out (Febrianto 2008). This analysis (Revenue-Cost Ratio) aims to determine the extent of the benefits derived from business activities during a certain period. Revenue cost analysis is carried out to find out how far each value of revenue is benefited. The most profitable business activities have the highest Revenue-Cost Ratio (R/C).

Febrianto (2008) stated that payback period (PP) is the period required to recoup investment expenditure (initial cash investment) using cash flow. The calculation of Return of Investment (ROI) is carried out to find out the amount of profit gained compared to the amount of profit obtained compared to the amount of investment (Hutajulu et al 2019).

Material and Method. The financial analysis method was used to analyze data obtained at MV. Sumber Jadi belongs to Hasil Laut Sejati co.ltd, especially data relating to operational costs and the sale of fish catches.

Data analysis related to financial aspects is as follows:

1. Business Revenue Analysis is an analysis that aims to find out the magnitude of profits derived from a business activity carried out (Djamin 1984). The calculation of operating income is done by using the equation:

$$\pi = TR - TC$$

Where:

π = profit

TR = total revenue

TC = total cost

With criteria:

- If TR > TC, business activities have benefit
- If TR < TC, business activities do not benefit or loss benefit
- If TR = TC, business activities are at the break-even point or the business has no profit or loss profit.

2. Revenue-Cost Ratio Analysis is an analysis that aims to determine the extent of the benefits derived from business activities during a certain period (Sugiarto et al 2002). Revenue-cost analysis is carried out to find out how far each value of revenue is benefited. The most profitable business activities have the biggest R/C. The calculation uses the following equation:

$$\frac{R}{C} = \frac{TR}{TC}$$

Where:

$\frac{R}{C}$ = Business activities

TR = Total revenue

TC = Total cost

With criteria:

- If R / C > 1, business activities benefit
- If R / C < 1, business activities approach a loss
- If R / C = 1, business activities has no profit or loss profit

3. Payback Period (PP) is the period required to recoup investment expenditure (initial cash investment) using cash flow (Umar 2003). The formula used is:

$$PP = \frac{\text{Investment Value}}{\text{Profit}} \times 1 \text{ Year}$$

4. Return of Investment (ROI) is the ability of a business to generate profits. The calculation of ROI is performed to find out the amount of profit gained compared to the amount of profit obtained compared to the amount of investment (Hutajulu et al 2019). Formula used:

$$ROI = \frac{\text{Profit}}{\text{Investment}} \times 100$$

With criteria:

- > 25 % : Good
- 15 – 25 % : Fair
- 5 – 15 : Bad
- < 5 % : Worse

Results. The purse seine ship used in the present study was MV. Sumber Jadi belongs to Hasil Laut Sejati, Co. Ltd as shown in Figure 1.



Figure 1. Kapal Purse seine (original).

Production. Total catches for 3 trips were 92,191 kg. Details of fish species and fish weight are presented in Table 1.

Table 1

Catches for three trips

No.	Common name	Scientific name	Total catch per 3 trips (kg)	Percentage (%)
1	Scad	<i>Decapterus</i> spp.	72,295	78
2	Yellowstripe scad	<i>Selaroides leptolepis</i>	8,863	9
3	Mackerel tuna	<i>Euthynnus affinis</i>	2,748	3
4	Bigeye scad	<i>Selar crumenophthalmus</i>	2,682	3
5	Short mackerel	<i>Rastrelliger brachysoma</i>	2,551	3
6	Bali sardinella	<i>Sardinella lemuru</i>	1,549	2
7	Squid	<i>Loligo</i> sp.	1,503	2
Total catching			92,191	100

Fish catchment production from 4 November 2017 to 30 January 2018 was 92,191 kg. The catchment comprised: *Decapterus* spp. 72,295 kg, *Selaroides leptolepis* 8,693 kg, *Euthynnus affinis* 2,748 kg, *Selar crumenophthalmus* 2,682 kg, *Rastrelliger brachysoma* 2,551 kg, *Sardinella lemuru* 1,549 kg, *Loligo* sp. 1,509 kg. Graphical representation of catch composition for three trips is displayed in Figure 2.

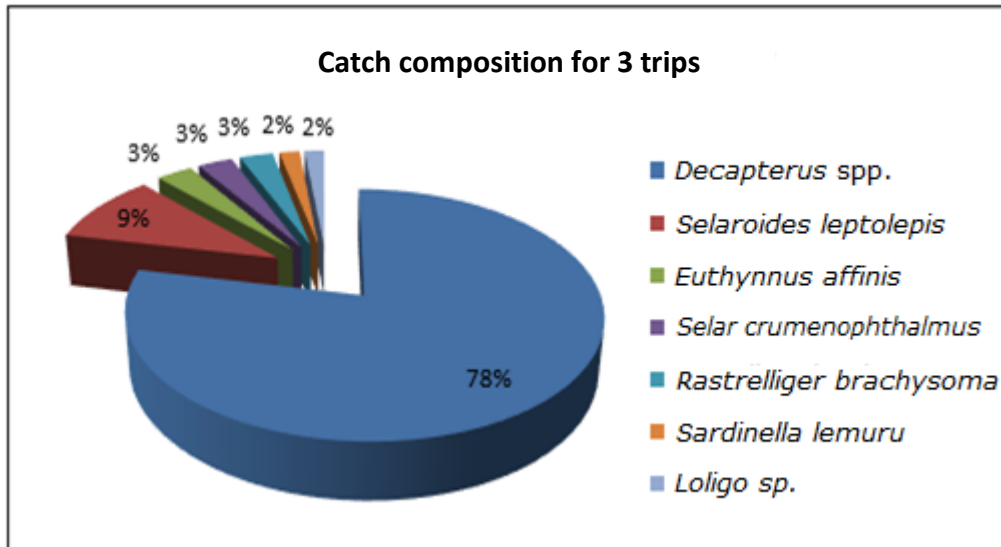


Figure 2. Catch composition for three trips.

While the catches in each trip have different composition, the Table 2 explains that catches are not similar in each month due to season and weather factors. Catches composition per trip is presented in Table 2 and Figure 3.

Table 2

Total catch per trip

No.	Trip	Amount (kg)
1.	Trip I	40,951
2.	Trip II	29,720
3.	Trip III	21,520

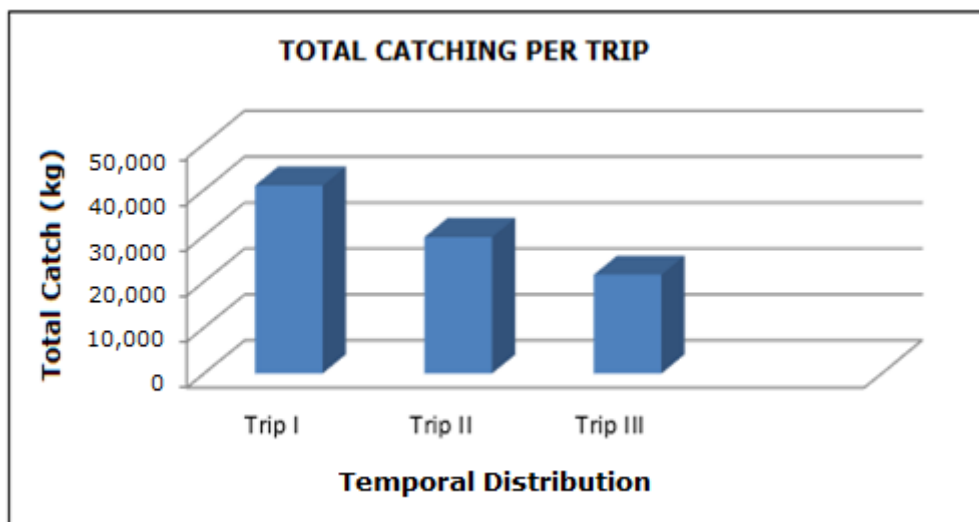


Figure 3. Graphical representation of catches per trip.

From Figure 3, it can be concluded that the catch per trip is uneven. From the first trip to the third trip the catch has decreased. In November it got quite results due to the high number of settings and favorable weather conditions, while in December the number of settings decreased due to the unfavorable weather conditions, in January the number of settings decreased even more and the weather conditions also turned to worse accompanied by strong waves.

Marketing and sales results. The marketing and sale of caught fish is performed by companies that have cold storage facilities and the merchandise will be sold when fish prices rise or when consumers demand increase. For the highest selling prices companies usually sell fish to the local market for the purchase price from the catching company. The amount of fish caught during three trips can be seen in Table 3.

Table 3

The fish catches capitalization for three trips

No	Species	Price/kg (USD)	Weight (kg)	Total (USD)
1	<i>Decapterus spp</i>	1.43	72,295	103,381.85
2	<i>Selaroides leptolepis</i>	2.14	8,863	18,966.82
3	<i>Euthynnus affinis</i>	1.43	2,748	3,929.64
4	<i>Selar crumenophthalmus</i>	1.43	2,682	3,835.26
5	<i>Rastrelliger brachysoma</i>	2.14	2,551	5,459.14
6	<i>Sardinella lemuru</i>	1.07	1,549	1,657.43
7	<i>Loligo sp.</i>	2.14	1,503	3,216.42
Total		-	92,191	140,446.56

Total catches sold as a whole during three trips get a yield of 140,446.56 USD, catches during 2017 can be assumed with a total yield for three trips divided by 3 then multiplied by a year (10 Trips) with a result of 468,155.2 USD.

Investment. Investment is a cost that is required to meet the infrastructure or supporting facilities in the initial stages of a business. Investment is also a fixed cost in the form of depreciation and maintenance costs. Bigger is the fishing boat, greater is the investment value and the depreciation.

The capital that must be owned by a fishing company is in one fishing boat and its equipment, as well as fishing gear, and also its engine. One fishing boat unit amounting to 78,571 USD. Details of the investment value are listed in Table 4.

Table 4

Investment cost

No	Investment type	Unit	Price (USD)	Economic age	Value (USD)
1	Fishing boat	1	42,857	8	42,857
2	Purse seine gear	1	28,571	3	28,571
3	Main engine	1	2,857	4	2,857
4	Auxillary engine	2	2,143	4	4,286
Investment amount					78,571

Fixed cost. Fixed costs are costs derived from several factors, namely based on depreciation, maintenance, document fees and taxes. Depreciation costs are calculated according to the shelf life of the economic goods or according to its feasibility and economic life of the object and the acquisition value and the residual value of the object.

Based on the depreciation calculation, the amount of depreciation costs consisting of ships, ring trawl nets and generator engines which is 15,000 USD year⁻¹.

Maintenance costs are costs incurred for ship maintenance, netting maintenance, engine maintenance, dock and overhead while the ship is still operating. Details of maintenance costs are listed in Table 5.

Table 5

Fixed costs

No.	Cost	Per trip (Rp)	1 Year (USD)
1	Cost of depreciation	1,500	15,000
2	Maintenance costs	257.14	2,571.4
3	Tax costs	372.33	3,723.3
4	Dock & Overhead	714.28	7,142.8
	Total	2,843.75	28,437.5

Variable cost

Operating costs. Fishing operation activities require specific equipment that must be available, to meet these needs the company spent 274,882.1 USD, as it is detailed in Table 6.

Table 6

Variable cost

No	Item	Volume	Unit	Price/unit (USD)	Amount per trip (USD)	Amount per 3 trips (USD)
1	Fresh water	15,000	L	1.43	21,428.57	64,285.71
2	Gasoline	140	L	0.50	70.00	210.00
3	Rice	15	sack	17.86	267.86	803.57
4	Seasoning	2	Pack	3.57	7.14	21.43
5	Ice	2,000	kg	0.11	214.29	642.86
6	Salt	3	Pack	5.00	15.00	45.00
7	LPG gas	2	tube	14.64	29.29	87.86
8	Sugar	3	sack	33.57	100.71	302.14
9	Kitchen goods	-	-	-	68.57	205.71
10	Deck & engine parts	-	-	-	107.14	321.42
11	Coffee	10	Pack	0.71	7.14	21.43
12	Fried oil	100	L	0.86	85.71	257.14
13	Medicines	-	-	-	7.14	21.42
14	Liquid oil	200	L	2.14	428.57	1,285.71
15	Fuel oil	10,000	L	0.46	4,642.86	13,928.57
16	Tea	1	Pack	8.21	8.21	24.64
	Total cost				27,488.21	82,464.62
	Total cost per 1 year (USD)					274,882.1

Labor costs. The results of work on the ship are calculated by profit sharing per trip, also based on position and length of service to the company. The amount of the premium depends on the catch, while for the salary system, it is calculated to be 20% of the sales proceeds while 80% for the company. The following results of the distribution of salaries per trip were evidenced: 468,155.2 USD x 20%= 93,631.04.

Total costs. The total cost of fishing operations for one year amounted an overall of 396,950.64 USD. With the breakdown of fixed costs of 28,437.5 USD, in these costs are included the maintenance costs, which are incurred annually, and salary costs. The variable costs amounted 368,513.14 USD; the details of these costs are listed in Table 7.

Table 7

One year total costs

No.	Cost category	1 Trip (Rp)	1 year (USD)
(A) Fixed cost			
1	Cost of depreciation	1,500	15,000
2	Maintenance costs	257.14	2,571.4
3	Taxes	372.33	3,723.3
4	Dock & Overhead	714.28	7,142.8
Total (A)		2,843.75	28,437.5
(B) Variable			
4	Operational cost	27,488.21	274,882.1
5	Salary (labor costs)	9,363.1	93,631.04
Total (B)		34,615.71	368,513.14
Total costs (A+B)		-	396,950.64

Discussion

Business revenue analysis. Analysis of operating income aims to find out the magnitude of the benefits derived from the fishing. The calculation of operating income was performed by using the equation:

$$\pi = TR - TC$$

Where:

π = Profit

TR = Total revenue

TC = Total costs

$$\pi = 468,155.2 - 396,950.64$$

$$\pi = 71,204.56$$

The data considers operation for 10 trips (1 year), where in the calculation of the results levies and taxes are already included so that business profits are obtained after taxes deduction.

Analysis of revenue and cost balance. Revenue-cost ratio analysis aims to determine the extent of the benefits derived from fishing business activities during a certain period. It is performed to find out how far each rupiah value of costs used in the most profitable business activities has the highest $\frac{R}{C}$. The calculation used the following formula:

$$\frac{R}{C} = \frac{TR}{TC}$$

$\frac{R}{C}$ = Business activities

TR = Total revenue

TC = Total cost

$$\frac{R}{C} = \frac{468,155.2}{396,950.64} = 1.18$$

$R/C > 1$ means that business activities are beneficial

Value of $\frac{R}{C} >$ can be interpreted that fishing using MV. Sumber Jadi as financially viable sources.

Payback period (PP). Payback period is a comparison between the investment value and profits multiplied by 1 year. Payback period is useful to find out in what time the business can return the investment. Fast return of investment is a good indicator of the company.

$$PP = \frac{\text{Investment Value}}{\text{Profit}} \times 1 \text{ year}$$

$$PP = \frac{78.571}{71,204.56} \times 1 \text{ year}$$

$PP = 1,10$ are same with 1 year 1.2 month

It can be interpreted that the capital will return in 12 months (very profitable).

Return of investment (ROI). Return of investment is the ratio between profit and investment value multiplied by 100. ROI is used to determine the benefits obtained in every rupiah of investment. ROI from a small pelagic fishing business unit using trawl was obtained in the following manner:

$$ROI = \frac{\text{Profit}}{\text{Investment}} \times 100$$

$$ROI = \frac{71,204.56}{78.571} \times 100$$

$$ROI = 90.62\%$$

ROI in fishing using the ring trawl can return 90.62% capital; twice a year.

Conclusions. According to the obtained results, the present study, concerning the financial analysis, concluded the followings:

- 1) Operating profit: 71,204.56 USD.
- 2) Balance and revenue analysis: 1.16. Value $\frac{R}{C} > 1$, means beneficial.
- 3) Payback period: in 1 year and 1.2 month the invested capital can be returned.
- 4) Return of investment: 90.62%.

So it can be concluded that the operation of purse seine on MV. Sumber Jadi is a viable source.

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