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Feasibility of Skipjack *Katsuwonus Pelamis* Fishing Unit Business in the Flores Sea

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Abstract

The present research determines the financial practicality of skipjack tuna (Katsuwonus pelamis) fishing unit establishments located in the Flores Sea portion of South Sulawesi. A survey-based research project took place between September and December 2024 to obtain data from Bulukumba and the Selayar Islands regencies through random sampling procedures. The research relied on interview sessions together with questionnaires and observations as well as literature review for data collection. The financial assessment performed a cost breakdown followed by income evaluation using NPV with IRR and Net B/C and PP calculations. The skipjack tuna fishing businesses employing purse seine gear in the Flores Sea operate at a profitable level. Financial analysis demonstrates profitability and sustainability potential because the regencies achieved positive NPV and IRR exceeding interest rates together with Net B/C Ratio values higher than one and PP that lasts for less than three years. The research results validate ongoing support for the skipjack tuna fishing industry throughout the region.

Introduction

Flores Sea waters are one of the Fisheries Management Areas of the Republic of Indonesia (WPP-RI 713) whose waters are rich in large pelagic fish resources and one of them is skipjack tuna (Katsuwonus pelamis). Skipjack tuna is an important fishery commodity with high economic value and has been utilized for a long time using various fishing gear and varying levels of technology such as purse seine, huhate (pole and line), hand line, trolling line, and surface gill nets that use fish aggregating devices or hunt schools of fish (Asruddin, 2018; Mallawa et al., 2017; Dueri et al., 2016; Catarci, 2001; Rahim et al., 2024; Indra & Sinaga, 2022).

Fish production skipjack tuna (Katsuwonus pelamis) the biggest in Flores Sea South Sulawesi Wrong the only one is in Regency Bulukumba And Regency Selayar Islands (Carda, 2022; Mallawa et al., 2014; Fathinah, 2024). Regency Bulukumba is Wrong One regency Which very potential from the aspect marine and fisheries with wide region 1,154.67 km 2 and long beach around 128 km with production fishery catch as big as 53,612.3 tons.

The problems faced by fishermen in general are that their income cannot be predicted because production or catches are not fixed (Mozumder et al., 2022; Cunningham, 1994; Elanda & Alie, 2021; Prayetno & Rosyadi, 2022; Astina, 2017; Saiyati, 2023). Another problem for fishermen is the condition of the fishing area which cannot be utilized throughout the year. This condition has a major impact on business sustainability. With thus analysis eligibility business important to evaluate the extent to which the business being run provides a decent profit for the fishermen or as information for decision making before investing (Adigwe et al., 2023; Xu et al., 2023; Kouaib & Amara, 2022; Supadma, 2025; Aris et al., 2020). This is important because all

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investment decisions with large enough funds have the hope of making a profit in the long term. Therefore, before making a decision on whether or not an investment will take place, one of the most important requirements is to examine financial aspects (Rahabeat et al., 2019; Sood et al., 2025; Zhao & Zhang, 2021; Park & Jang, 2021; Block et al., 2021).

In business activities, the financial aspect is the core of all aspects analyzed. The financial aspect is related to the analysis of costs and income, business feasibility and others (Hendra et al., 2021; Bansal, 2023; Dewanti et al., 2022; Arvanitis & Estevez, 2018). The financial aspect concerns the comparison between spending money and income in a business activity. In financial analysis we calculate both the benefits and costs of the company for the benefit of individuals or companies. Business feasibility analysis needs to be done to find out whether business which is run more profitable If invest money on fishing activities or is it better to invest money in other business sectors (Waileruny & Dinatonia, 2015).

Methods

This research was conducted in September – December 2024. This research was conducted in the Flores Sea Waters. The areas included in the Flores Sea Waters include parts of Takalar Regency, Jeneponto Regency, Bantaeng Regency, Bulukumba Regency, Selayar Islands Regency, and part of Sinjai Regency. This study will use regional representation including Bulukumba Regency and Selayar Islands Regency as research locations. The selection of research locations (Regencies/Cities) was carried out purposively (intentionally) on the grounds that the selected Regency could describe the Flores Sea Waters as a whole where Bulukumba Regency was chosen because it was seen from the aspect of the highest skipjack tuna production in the Flores Sea Waters of South Sulawesi as much as (3,664.0 – 6,465.9) tons in 2011 - 2020. For the selection of the location, Selayar Islands Regency was chosen with the consideration that it is the outermost region among the other regencies and in terms of skipjack tuna production as much as (357.2 - 2,010.8) tons in 2011 – 2020.

Research methods

Method study Which used is method survey. According to Rea & Parker (2014) survey research is research conducted on large or small populations, but the data studied is data from samples taken from the population, so that relative events, distributions, and relationships between sociological and psychological variables are found.

Sampling Method

The sampling method used in this study is *cluster sampling*. *The cluster sampling* in question is *a cluster* based on the research area in the Flores Sea. Sampling in this study was by grouping samples based on areas in several cities or districts in the Flores Sea to draw research samples from the representativeness of the research population in the area and the criteria used were the effort of the skipjack tuna fishing unit with a *purse seine fishing gear* with a size above 20 GT and has a fishing permit.

Based on data from the Maritime Affairs and Fisheries Service, the number of skipjack tuna fishing units using *purse seine fishing gear* who has a fishing permit in Regency Archipelago the Screen as much as 20 unit And Bulukumba Regency as many as 193 units. In accordance with the statement (Suharsimi, 2014) that if the subject is less than 100 people, it is better to take all of them, if the number of subjects is large or more than 100 people, it is better to take 10-15% or 20-25% or more. For more details, see the following table:

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Table 1. Population and Sample Business Unit Arrest Fish Skipjack Tuna

No	Regency	Population	%	Sample
1	Archipelago the Screen	20	100	20
2	Bulukumba	193	10	19
	Total Respondents			**36**

Data collection technique

The data collection techniques used in this study were interviews, observation, documentation, literature studies and questionnaires. The data sources used in this study are primary data and secondary data.

Data analysis

Regarding the feasibility of the skipjack tuna fishing business First, a cost and income analysis is carried out to determine the flow of costs, income, and revenue. To determine the costs and income in the *purse seine unit business,* the following analysis is used. To find the total cost of this *purse seine fishing gear business* using quantitative descriptive analysis:

TC = TFC + TVC

Where:

TC = *Total Cost* /Total Cost (Rp)
TFC = *Total Fixed Cost* /Total Cost Still (Rp)
TVC = *Total Variables Cost* /Total Cost Variables (Rp)

purse seine fishing gear business, use the following analysis:

$\pi = TR - TC$
$TR = PQ$

Where:

π = Profit Business (*Profit*)
TR = Reception Total (*Total Revenue*)
TC = Total *Cost*
P = Price sell
Q = Amount fish for sale

After the cost and revenue analysis is carried out, the next step is to conduct a financial analysis which is used to compare costs and benefits to determine whether a business will be profitable during the life of the business. To analyze the feasibility of the financial aspects of business development, there are several financial analysis tools/methods used, namely. To determine the feasibility of a *purse seine unit business* using the following analysis. Net Present Value (NPV) can be formulated as as follows (Saeri, 2018):

$t = n$

$$NPV \sum = \frac{Bt - Ct}{(1 + r)^{t}}$$

$t = 0$
$t = n$

Or

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$NPV = \sum(B\ t - C\ t)(DF)$

t =0

Description:

Bt = income dirty annual
Ct = Annual gross cost
$(1+r)^t$ = *discount factors (DF)*
t = level ethnic group flower bank

Net benefit-Cost ratio (Net B/C) can formulated as following (Saeri, 2018):

$$Net\ B/C = \frac{\sum_{t=0}^{t=n} NPV\ (+)}{\sum_{t=0}^{t=n} NPV\ (-)}$$

Description:

NPV (+) = NPV which is positive
NPV (-) = NPV which worth negative

Internal Rate of Return (I RR) can formulated as as follows (Saeri, 2018):

$$IRR = \frac{i' + (NPV')(i'' - i')}{NPV' - NPV''}$$

Where:
i ' = Interest rate level that produces positive
NPV i" = Interest rate level that produces negative
NPV NPV ' = NPV at interest rate level i '
NPV " = NPV on floor tribe flower "i "

Payback period can formulated as following (Saeri, 2018):

$$PP = \frac{I}{Bt}$$

Where:

PP = Payback Period
I = Number Investment
B_t = Net Benefit average each year

Results and Discussion

Analysis Income Business Unit Arrest Fish Skipjack Tuna

Investment

Table 2. Mark Average Investment Business Unit Arrest Fish Skipjack Tuna Using Purse Seine Fishing Gear

No	Type of Investment	Selayar Islands Regency average value (Rp)	Bulukumba Regency average value (Rp)
1	Boat	753,200,000	791,684,210
2	Machine Main	82,250,000	91,578,947

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3	Machine Puller	24,800,000	27,368,421
4	Machine Servant	48,500,000	53,947,368
5	Machine Generator	2,825,000	2,868,421
6	Light	849,500	1,189,473
7	Tool Catch	128,050,000	144,447,368
8	Anchor	4,912,500	5,215,789
9	fish aggregating device	9,340,000	10,842,105
10	Coolbox	1,949,750	1,873,684
	Total	**1,056,676,750**	**1,131,015,789**

Investment is the investment of capital for one or more assets owned and usually has a long term with the hope of getting profits in the future. In every business, there are different investment goods needs depending on the type of business being run (Kimilaha et al., 2021; Purnomo, 2017).

Based on Table 2, it shows that the investment value in skipjack tuna fishing activities in the Flores Sea waters using purse seine fishing gear has a different average value in each district, where the investment used with purse seine fishing gear is in the form of ships, several types of engines and the purse seine fishing gear itself. Overall, the investment value of the skipjack tuna fishing business unit using purse seine fishing gear with its completeness for Selayar Islands Regency with an average value of Rp. 1,056,676,750 and Bulukumba Regency with an average value of Rp. 1,131,015,789.

The investment value for skipjack tuna fishing activities using purse seine in the Flores Sea waters is indeed very large because the main components of the business have quite high value. For example, the price Ships, engine prices, fishing gear prices and several other supporting equipment have quite high prices.

Cost Still

Table 3. Mark Average Cost Still Business Unit Arrest Fish Skipjack Tuna Using Purse Seine Fishing Gear

No	Type of Investment	Selayar Islands Regency average value (Rp)	Bulukumba Regency average value (Rp)
1	Boat	61,354,441	64.113.022
2	Machine Main	7,587,272	9,953,216
3	Machine Puller	2,298,426	3,594,924
4	Machine Servant	6,425,099	7,351,190.
5	Machine Generator	622,500	627,631
6	Light	424,750	594,736
7	Tool Catch	10.102.097	10,395,040
8	Anchor	671,383	709,868
9	fish aggregating device	4670.000	5,421,052
10	Coolbox	974,875	936,842
	Total	**95,130,846**	**103,697,526**

Fixed costs are costs whose amount does not depend on the amount of output produced, while variable costs are costs that are influenced by the amount of output produced (Seine, 2018).

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Based on table 3, it can be seen that the types of fixed costs used in skipjack tuna fishing activities using purse seine fishing gear in the Flores Sea waters require different costs. One of the things that affects the amount of fixed cost expenditure is the level of damage to the ship's fishing gear, main engine, towing engine, generator, auxiliary engine, anchor, coolbox, fish aggregating devices, and lights. It can be seen that the average value of fixed costs obtained by the Selayar Islands Regency is Rp. 95,130,846 and Bulukumba Regency Rp. 103,697,526.

The average value of fixed costs is the depreciation of each type of investment with a variety of technical ages. From the results of the study, it was found that ships and engines are types of investments that require quite large costs but have a fairly long economic life. This is because the type of ship and engine is a type of investment that has a long service life so that with a fairly long economic life, the depreciation cost will be smaller.

Cost Variables

Table 4. Mark Average Cost Variables Business Unit Arrest Fish Skipjack Tuna Using Purse Seine Fishing Gear

No	Type of Investment	Selayar Islands Regency average value (Rp)	Bulukumba Regency average value (Rp)
1	Solar	121,176,000	147,978,947
2	Gas	23,155,200	23,570,526
3	Wages	100.800.000	108.000.000
4	Es Balok	47.232.000	21.600.000
5	Rokok	12.672.000	19.800.000
6	Air	11.520.000	14.400.000
7	Makan	28.800.000	18.568.421
	Total	**345.355.200**	**353.917.894**

Variable costs are costs that are used up in one production, costs that are not fixed in amount because they are influenced by the size of the production volume obtained (Yapanto et al., 2021).

From Table 4 shows the average value of variable costs of fishing activities in the Flores Sea waters using purse seine fishing gear in one year where the Selayar Islands Regency has an average variable cost of Rp. 345,355,200 and Bulukumba Regency has an average variable cost of Rp. 353,917,894. The variable costs incurred depending on the length of time for one trip times where Selayar Islands Regency with an average of 1 day per trip and Bulukumba Regency 5-7 days per trip for each purse seine business. The results of the study found that the length of time used in one trip of purse seine fishermen affects the amount of operational costs.

Cost Total

Table 5. Mark Average Cost Total Business Unit Arrest Fish Skipjack Tuna Using Purse Seine Fishing Gear

No.	Regency	Mark Average (Rp)/Year
1	Regency Archipelago The Screen	440,486,046
2	Regency Bulukumba	457,615,421

The total cost incurred by each respondent in the skipjack tuna fishing business unit in the Flores Sea waters using purse seine fishing gear in a year is the sum of the fixed costs and variable costs incurred each year. Based on table 5, it shows the average total costs incurred by

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each skipjack tuna fishing unit in the Flores Sea waters using tool catch purse seine in a year in Regency Selayar Islands has an average value of Rp. 440,486,046 and in Bulukumba Regency it is Rp. 457,615,421.

The high total cost incurred in the skipjack tuna fishing unit business in the Flores Sea waters using purse seine fishing gear is due to the high variable costs incurred. Variable costs are not fixed or change during each season according to the fishing period calculated based on the average fishing trip. The goal of fishermen in running their business is to obtain large profits from their catch by maximizing fishing and sales and minimizing costs. But in reality, fishing efforts often fish only based on the principle that the business can run smoothly but less attention to the amount of costs, income, profits and efficiency of the business, so that income cannot be guaranteed, but depends on the amount of catch as well as the results of the sales he made.

Reception

Table 6. Average Value of Fishermen's Income in Skipjack Tuna Fishing Unit Business Using Purse Seine Fishing Gear

No.	Regency	Mark Average (Rp)/Year
1	Regency Archipelago The Screen	902,747,500
2	Regency Bulukumba	1,043,477,221

Revenue is the result of multiplying the amount of production produced by the selling price of the product. Business revenue is obtained from the price multiplied by the amount of production produced (Septiawan et al., 2017). Based on Table 6, it shows the average value of revenue from skipjack tuna fishing activities in the Flores Sea waters using fishing equipment. purse seine catch where Selayar Islands Regency is Rp.902,747,500 and Bulukumba Regency is Rp.1,043,477,221. Purse seine business revenue is the gross sales value of the catch. The revenue value can be influenced by production results and selling prices, but abundant production does not necessarily generate large revenues but is influenced by the determination prices and costs incurred. This is in accordance with the statement (Niar, 2022) which states that the amount of revenue is determined by the amount of production with the selling price value determined by the market.

In addition to being influenced by the amount of production and selling prices determined by the market, total revenue can also be influenced by the season which will affect the frequency of going to sea and the amount of catch. This is reinforced by the opinion of (Kimilaha et al., 2021) that fishermen's catch in the form of Skipjack tuna is highly influenced by the season. The frequency of going to sea depends on the fishing season and the less fishing season as well as the availability of capital and labor.

Income

Table 7. Average Value of Fishermen's Income in Skipjack Tuna Fishing Unit Business Using Purse Seine Fishing Gear

No.	Regency	Mark Average (Rp)/Year
1	Regency Archipelago the Screen	462.261.453
2	Regency Bulukumba	585,861,799

Income or profit is the net result obtained in a business by subtracting the total amount of revenue from the total costs incurred during the running of the business (Yapanto et al., 2021). Based on table 7, it shows the average value of income from skipjack tuna fishing units in the

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Flores Sea waters using fishing equipment. purse seine catch in one year consisting of Selayar Islands Regency with a value of average income of Rp.462,261,453 and Regency Bulukumba with an average income of Rp. 585,861,799.

The income of the skipjack tuna fishing unit in the Flores Sea waters using purse seine fishing gear is the net income obtained from the total income minus the total costs. The income of the skipjack tuna fishing unit in the Flores Sea waters using purse seine fishing gear is quite large because it is influenced by the clear market potential of skipjack tuna and is the main commodity fish for the community to consume daily. The average value of the business income of the skipjack tuna fishing unit using purse seine in the Flores Sea waters obtained by Bulukumba Regency appears to be greater than the average value of income of Selayar Islands Regency, this is because the catch in Bulukumba Regency Bulukumba is more abundant and has a high economic value compared to other agricultural products. catch Regency Archipelago The screen.

Analysis Financial Business Arrest Fish Skipjack Tuna

Table 8. Financial Analysis Results of Skipjack Tuna Fishing Business in the Flores Sea Using Purse Seine Fishing Gear

Analysis District	NPV (Rp)	Net B/C	IRR	PP (Years)
Kepulauan Selayar	1.968.844.520	2,86	43,51%	2,29
Bulukumba	2.683.893.961	3,37	44,55%	1,93

Source: Data secondary after processed, 2024.

The total income obtained from skipjack tuna fishing activities in the Flores Sea waters using purse seine fishing gear is not a measure of the success of the business to be maintained or have a fairly good continuity. Therefore, in this study after the income analysis, the economic aspect was continued with a financial analysis of the business to see the ability of the skipjack tuna fishing business to have continuous feasibility or will have losses in a certain year. In the feasibility analysis of the business In this study, we used measurements by calculating business feasibility indicators consisting of Net Present Value (NPV), Net B/C Ratio, IRR and Payback Period.

Based on Table 8, it can be seen that the activity of catching skipjack tuna in the Flores Sea waters using purse seine fishing gear is financially feasible to implement. This can be seen from the Net Present Value (NPV) value of each of the two districts which has a positive number (more than greater than zero) at the prevailing interest rate of 12 percent, which means that the business will make a profit with a positive residual value at the end of the year of activity, with a project period of 10 years plus the income and revenue index at this time using South Sulawesi's economic growth was 3.24% in the third quarter of 2021. The NPV value of skipjack tuna fishing in Selayar Islands Regency was IDR 1,321,960,402 and in Bulukumba Regency the NPV value was IDR 2,854,855,232. Thus, skipjack tuna fishing production activities in the Flores Sea waters have good continuity value so that they are worthy of being continued.

In the Net Benefit-Cost Ratio (Net B/C Ratio) analysis obtained from the comparison of positive net benefits and negative net benefits is the value of benefits that will be obtained from every one rupiah of costs (cost) incurred during the life of the business at an interest rate of 12% per year. In Selayar Islands Regency, the Net B/C value is 2.86, which means that every Rp. 1 spent will add benefits of Rp. 2.86 and in Bulukumba Regency, it has the highest Net B/C Ratio value of 3.37, meaning that every Rp. 1 spent will provide benefits of Rp. 3.37.

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The internal rate of return of a business is used to show the level of business capability. pay flower loan business during age activity business, analyzed using IRR (Internal Rate of Return). In the skipjack tuna fishing business in Selayar Islands Regency, the IRR value was 43.51% and in the skipjack tuna fishing business in Bulukumba Regency, it was 74%. This shows that the two regions that represent the Flores Sea have the ability to pay interest on loans if this business is developed using credit from formal financial institutions.

For criteria period return capital investment or payback period (PP), shows that the skipjack tuna fishing business activity in the Flores Sea waters has a relatively normal capital return period because all are less than 3 years, namely: Selayar Islands Regency 2 Years 3 Months and Bulukumba Regency, namely 1 Year 9 Months. From mark the payback period can be said that the skipjack tuna fishing business in the Flores Sea waters has a rate of return on investment that is included in the fast category, because it appears to have a payback period value of less than 3 years or a time shorter than the maximum payback period provisions. The faster the return on investment of a business, the better the business pattern because the smoother the capital turnover. So the skipjack tuna fishing business in the Flores Sea waters is feasible to run based on the calculation of the length of the return on capital. This is related to the opinion of (Wiratama et al., 2017) which explains that if a business activity with a suitable payback period can be selected to be used as a business activity.

Based on all the financial analysis that has been carried out, it can be concluded that the skipjack tuna fishing business using purse seine fishing gear in The waters of the Flores Sea are feasible to be run based on several criteria that have been explained above, where it has an NPV value > 0, Net B/C Ratio > 1, IRR > interest rate, and Payback Period < 3 years can be said to be relatively normal.

Conclusion

The skipjack tuna (Katsuwonus pelamis) fishing unit business which operates from the Flores Sea within South Sulawesi has proven itself to be financially feasible and offers promising prospects for sustainable development according to financial analysis in this research. The financial indicators used in this research establish a valid conclusion. The Net Present Value calculation in Selayar Islands and Bulukumba regencies showed positive results which means the investment creates more value than its operational span. The business achieves financial success through Internal Rate of Return (IRR) rates which substantially surpass normal interest rates in both regions. The analysis showed that since Net Benefit-Cost Ratio equalled more than 1 the investment generated better benefits than expenses during the business period. Both districts reached their capital investment recovery point within three years which demonstrates excellent financial efficiency of the business.

Skipjack tuna fishing operations in the Flores Sea based on purse seining methods prove to be profitable and positions well for investment sustainability. Additional support features including infrastructure development combined with access to financial resources and institutional coordination would strengthen the sustainability and productivity of this industry sector which caters to increasing skipjack tuna demand in a region abundant with natural resources. Research findings provide essential knowledge for decision makers who want to expand sustainable fisheries within the region.

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