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Short-Term Financial Analysis to Measure the Feasibility of Denish Seine Net Business in Brondong Nusantara Fishing Port, Indonesia

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ABSTRACT

The Danish seine net fishing business in Indonesia remains a subject of debate, facing both support and opposition. Various speculations and regulatory pressures have urged *cantrang* (a local term for Danish seine net) fishermen to cease operations. However, the government has a responsibility to uphold human rights and ensure the welfare of fishermen. As a result, there has been some regulatory relaxation in recent years. In Brondong, a key fishing hub, many Danish seine net fishermen continue to operate. The area is considered one of the largest trawl fishery bases in Indonesia. This research aimed to assess the business feasibility of the Danish seine net, which is regarded as a highly productive fishing method. Data were collected through surveys and interviews and analyzed using short-term financial analysis. The results show that the Danish seine net is a high-productivity fishing gear. The dominant species caught are demersal fish such as *Priacanthus tayenus*, *Loligo* sp., *Nemipterus nematophorus*, and *Upeneus sulphureus*. Financial analysis indicates that the Danish seine net is a viable business. For daily and weekly operations, the R/C (Revenue/Cost) ratio is 6.24 and 3.17 respectively. The Break-Even Point (BEP) for production is 211 and 2,154kg, while rentability is 15.81 and 7.32%.

INTRODUCTION

Economic growth is a phenomenon that aims to increase regional income, which will improve the welfare of society in general **(Aprenisia & Arka, 2021)**. Fisheries is one of the most important sectors of the Indonesian economy, contributing significantly to government revenue and the welfare of coastal communities. One of the fishing methods widely used by fishermen in Indonesia, particularly in North Java, is Danish seine net. Danish seine net is known as a highly productive fishing gear, especially for catching demersal and small pelagic fish.

Brondong Fishing Port, located in Lamongan Regency, East Java, is one of the largest fishing ports in Indonesia. The port is the center of fishing activities for Danish seine net fishermen, with a large number of vessels operating in the area. However, while

Danish seine net provides significant economic benefits, there are challenges faced by fishers and stakeholders in the industry.

One of the main challenges is the government policy that had banned the use of Danish seine net because it was considered not environmentally friendly. The dilemma faced by the government in Indonesia toward Danish seine net is quite interesting. Indonesia is known as an archipelago with a very large amount of water area which certainly has abundant fish resources. However, wisdom in exploiting fish resources is important to maintain the sustainability of these resources. On the one hand, the ban and even the reduction in the number of fleets affected the income of the fishermen to a great extent. Likewise, the government issued a relaxation policy on the use of Danish seine net, regulatory uncertainty is still a factor that affects the sustainability of fishermen's businesses.

Investments in fishing businesses, such as vessels and equipment, can increase productivity and income, although the impact varies by region **(Adani *et al.*, 2024)**. High operational costs, including fuel and maintenance, reduce profit margins for Danish seine net **(Nurfatiha & Oktawati, 2023)**. Access to subsidized diesel fuel can lower operational costs and increase profitability **(Sa'adah, 2024)**. In addition, fluctuations in fish prices affect the profitability of Danish seine net, which in turn affects the household income and welfare of trawl fishers.

Therefore, this study aims to analyze the feasibility of Danish seine net fisheries business in Brondong from short-term financial aspects. This analysis is needed to provide a clear picture of the sustainability of Danish seine net fisheries business and provide recommendations for fishermen, government, and related parties in more sustainable fisheries management considering its direct impact on the income and welfare of Danish seine net fishermen in Brondong. With this research, it is hoped that accurate data and information can be obtained about the profitability of the trawl business, the challenges faced by fishermen, and become the basis for making strategies that can be applied to improve the efficiency and sustainability of fishing businesses in Brondong.

MATERIALS AND METHODS

1. Location and time

The research was conducted at the Brondong Nusantara Fishing Port, located in the coastal area of Brondong District, Lamongan Regency, East Java, along the northern coast. This area falls within Fisheries Management Area (WPP) 712. The location was selected because Brondong Fishing Port is one of the main fishery hubs in East Java, where Danish seine net is the dominant fishing gear used.

The study was carried out over a period of two months, from January to February 2025. The duration of a research study can influence the quality of the data collected,

depending on the specific context being examined. In this research, the context is the feasibility of the Danish seine net business from a short-term financial perspective. The strength of the data lies in the substantial number of respondents sampled. Although the data collection period was relatively short, the robustness of the sampling method helps strengthen the validity of the conclusions **(Ludwig *et al.*, 2022)**.

2. Data collection

This study uses primary data, collected through structured direct interviews with selected respondents, namely the captains (skippers) of Danish seine net vessels operating at Brondong Fishing Port.

The sampling technique used was a type of non-probability random sampling, in which the population was self-selected by the researcher. This method was chosen because the exact number of Danish seine net vessels is not known, as not all vessels are currently operating due to regulatory issues. Furthermore, comprehensive and up-to-date data on Danish seine net vessels has been lacking since the implementation of the ban, primarily due to incomplete licensing documentation.

Respondents were stratified based on the duration of their fishing operations: daily and weekly Danish seine net trips. Sample size determination followed appropriate statistical considerations. For parameter estimation using the maximum likelihood estimation (MLE) method, the recommended sample size ranges from 100 to 200 respondents, with a minimum of 50. This study collected data from 130 vessels, with 130 respondents (one captain per vessel).

3. Data analysis

Financing

Production costs (total costs) in this study include both variable and fixed costs:

- **Fixed costs**: licensing, ship maintenance, engine maintenance, and fishing gear maintenance.
- **Variable (non-fixed) costs**: fuel, ice, provisions, and engine oil.

These costs were analyzed to evaluate the financial feasibility of Danish seine net operations under short-term business conditions. The financing analysis is calculated using the formula:

$$TC = TFC + TVC$$

Description:

TC : Total Cost

TFC : Total Fixed Cost

TVC : Total Variable Cost

Total revenue (TR)

Revenue can be calculated by multiplying the selling price per unit by the amount of product produced at harvest. In the capture fisheries business with Denish seine net, revenue can be obtained in every fishing operation or fishing trip carried out.

Systematically, the revenue of a product can be calculated using the following formula **(Tobing, 2020)**:

$$TR = Pq \times Q$$

Description:
TR: Total Revenue
Pq : Price/unit
Q : Total Production

Profit

Profit in fishing is basically the difference between the total revenue earned from fish sales and the total costs associated with fishing operations. These costs include expenses for labor, equipment, and maintenance costs **(Wijayanti & Fitri, 2012)**. The calculation of profit was conducted using the formula:

$$\pi = TR - TC$$

Description:
π : Profit (IDR/year)
TR : Total Revenue / total income (IDR/ year)
TC : Total Cost / total cost (IDR/ year)

With criteria:
If TR > TC, the business activity is profitable
If TR < TC, the business activity does not make a profit
If TR = TC, the business activity is at break-even point or the business does not get profit or loss.

Revenue cost ratio (RC Ratio)

R/C Ratio is defined as the ratio between total revenue and total cost **(Untari, 2014)**. This analysis measures how much revenue is generated for each unit of cost incurred. A higher R/C Ratio indicates a greater level of efficiency and profitability, as it shows that the business is able to generate more revenue per unit of costs incurred **(Fudjaja *et al.*, 2023)**. The calculation uses the following equation:

$$\frac{R}{C} = \frac{TR}{TFC + TVC}$$

With criteria:
If R/C > 1, the business activity is profitable
If R/C < 1, the business activity suffers a loss
If R/C = 1, the business activity does not make a profit / loss

Break event point (BEP)

BEP is a fundamental financial analysis tool in the business world, used to determine the point at which total revenue equals total costs, so that no profit or loss is generated **(Gaytán Cortés, 2023)**. BEP is also defined as the level of sales at which total revenue equals total costs, indicating that the business neither makes a profit nor incurs a loss. This metric is very important in financial management, as it helps businesses determine the minimum amount of sales needed to cover **(Maram *et al.*, 2024)**. BEP was calculated using the following formula **(Nurfitriana & Saputra, 2022)**:

- BEP based on production

$$\text{BEP(kg)} = \frac{\text{FC}}{\text{P} - \text{VC/S}}$$

- BEP based on sales (production value)

$$\text{BEP(Rp)} = \frac{\text{FC}}{1 - \text{VC/P}}$$

Description:

BEP	: Break Even Point (unit)
FC	: Fixed Cost
VC	: Variable Cost
P production	: Average selling price/kg
P sales	: Sales results
S	: Average income

Profitability

Profitability is defined as the ability of a business to make a profit from its operations, which shows how effectively and efficiently management utilizes existing resources **(Tantry & Armansyah, 2023)**. Profitability shows the ratio between profit and the assets or capital that produced the profit **(Viyanis *et al.*, 2023)**, and was formatted as follows:

$$\text{R} = \frac{\text{M}}{\text{L}} \times 100\%$$

Description:

R : Profitability (%)

L : Total profit earned during a certain period (Rp)

M : Capital used to generate profits (Rp)

Profitability Criteria:

0 - 25% = Low

26 - 50% = Medium

51 - 75% = High
76 - 100% = Very high

RESULTS AND DISCUSSION

1. Characteristics of respondents

This research was conducted through surveys and interviews with Denish seine net fishermen at Brondong Fishing Port. The fishermen selected were those who operate on a daily and weekly basis. The overall distribution of respondents' domicile in this study can be seen in Fig. (1). Data illustrate the dominance of respondents domiciled in Blimbing and Palang.

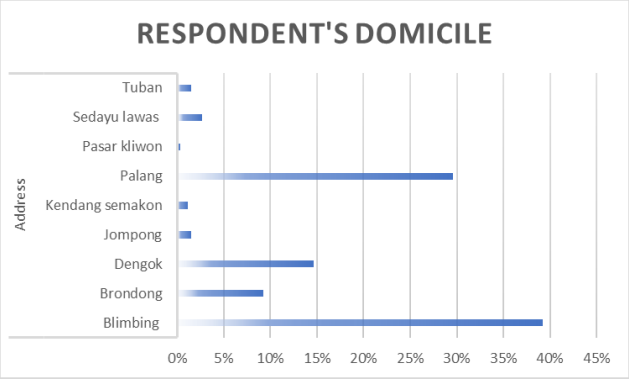

Fig. 1. Respondent's domicile

The age distribution of respondents in this study, as shown in Fig. (2), indicates that the dominant age group is 31–40 years. However, approximately 2% of respondents are underage, while 6% are nearing old age but still actively work as Danish seine fishermen at Brondong Fishery Port. Productive age is typically defined as between 15 and 64 years old, representing the demographic expected to contribute optimally to the economy **(Tjahyadi *et al*., 2022)**. Individuals aged 15 to 60 are considered part of the labor force **(Haloho & Saragih, 2021)**. This age group is increasingly dominated by millennials between 2020 and 2030 **(Simahendali *et al*., 2023)**. Internationally, the Food and Agriculture Organization notes that the majority of small-scale fishermen globally are within the productive age bracket, underscoring their crucial role in food security and economic resilience **(FAO, 2020)**. Similarly, studies in Japan reveal that the aging population in fisheries poses a threat to long-term sustainability due to the declining number of productive-age workers **(Macusi *et al*., 2015)**. In Southeast Asia and Africa, small-scale fisheries rely heavily on the energy and economic contribution of younger labor forces **(Pomeroy & Andrew, 2011)**. These findings reinforce the importance of maintaining a productive age structure among fishermen to ensure the continued viability of the sector **(Teh & Pauly, 2018)**.

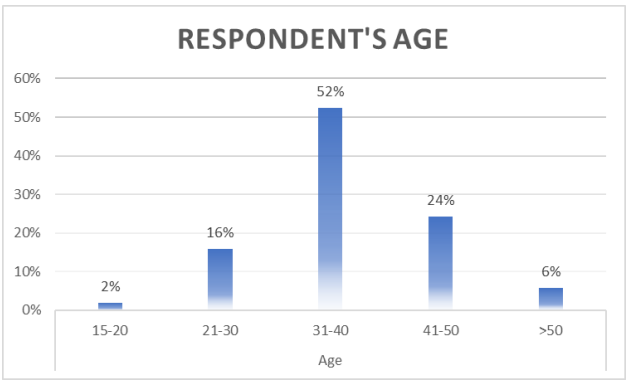

Fig. 2. Respondent's age

As indicated by the data, 95% of the respondents were married, with 48% having only completed a junior secondary education (Fig. 3). The prevalent low education levels and early marriage rates observed in fishing communities can be attributed to a combination of internal and external factors. Internal factors include a lack of motivation among children to engage in further education, whereas external factors pertain to unfavorable economic conditions, such as insufficient parental income and the challenges associated with covering educational costs **(Asmiati *et al.*, 2022)**. Furthermore, the inadequate educational infrastructure in coastal areas frequently exacerbates these difficulties, resulting in diminished household income and a reduced quality of life **(Husni & Nursan, 2023)**. Numerous families find themselves ensnared in precarious and high-risk occupations, thereby complicating the provision of sufficient educational opportunities for their offspring **(Rismadi *et al.*, 2021)**.

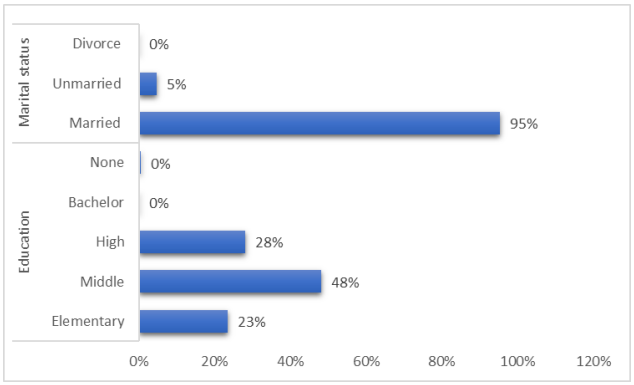

Fig. 3. Respondent's marital status and education

In a similar vein, the correlation between low education levels among fishers, as observed in Bangladesh, has a significant impact on their income, well-being, and capacity to manage fishery resources sustainably **(Uddin *et al.*, 2021)**. In Kenya, better-educated fishers tend to adopt more efficient and environmentally friendly fishing practices **(Tuda *et al.*, 2016)**. In Europe, local strategies emphasize integrating traditional ecological knowledge with sustainability education, especially for fishing communities

with lower educational levels **(Gelcich *et al.*, 2005)**. Although educational challenges among fishers represent a global issue, initiatives designed to enhance education must be customized to the unique context of each community. Therefore, the integration of both formal and informal education that is responsive to social, economic, and ecological conditions, in addition to active participation from fishing communities, is crucial in fostering sustainability and improving their overall quality of life **(Aletheiani, 2022)**.

2. Technical aspects

Denish seine net is a known fishing gear with high productivity. Denish seine net is a fishing gear operated on the bottom of the water with demersal fish targets **(Aji *et al.*, 2013)**. Denish seine net used by respondents consists of mouth, wings, body and bag (Fig. 4). The mouth consists of upper and lower net lips that have the same length. The body is the largest part of the net located between the bag and the wings. This part functions as a fish deterrent to enter the bag. The Denish seine net bag is made of waring. The construction varies in length, but the average size is approximately 70 meters, with a length of 6 meters. The mesh size of Denish seine net is 0.5-4.5 inches. The operation is carried out from 03.00 am to 13.00 pm.

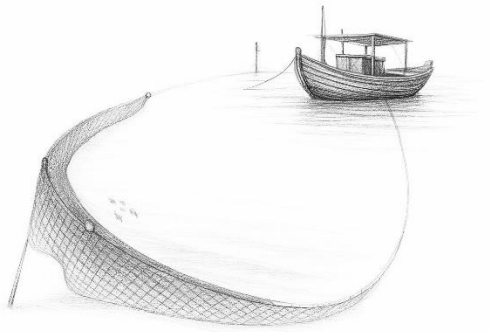

Fig. 1. Denish seine net image

Source: Government Regulation on Marine and Fisheries No. 18 of 2021

The Denish seine net operation method starts from the setting stage, namely the lowering of the mark buoy, followed by the right selambar rope with the direction of motion of the ship in a circle, then the net is lowered and followed by the left selambar rope until it meets the mark buoy, then the mark buoy is raised to the ship, followed by the withdrawal of the selambar rope. This withdrawal is assisted by the axle. In this process, the position of the ship is stopped, but the axle engine is still running; this stage is called hauling.

3. Fishing ground and catch season

Fishing grounds are areas of water that are capable of covering a variety of fishing methods such as inshore, coastal and lagoonal removable fishing **(Rafeeka & Kuraisiya,**

2017). Its function is to support a diverse fishing population. Denish seine net fishermen in Brondong Fishing Port fish mostly in the Masalimbu, Matasiri, Kramean and around Bawean waters (WPP-RI 712). While the duration of fishing operations at sea (trip) is 7-14 days, there are also daily (one day) fishing operations.

Based on Government Regulation No. 16 of 2007, concerning the classification of Fishing Ports with Type B classification, the minimum standard of fish landed is 30 tons per day, while the average fish landed at the Brondong Nusantara Fishing Port is 154 tons per day. It can be said that fish production is relatively high. In real terms, there has never been a fish famine in the research location, even though the current fishing season cannot be predicted. This also causes price stability at the Brondong Nusantara Fishing Port. The average price of fish at the fish auction site is quite high compared to other regions, ranging from Rp. 3000/ kg to Rp. 73,000/ kg.

The peak season for catch using Denish seine nets occurs from February to August, while the lean season is from September to January. At the time this research was conducted, fishermen were facing a lean season due to unstable weather; however, the results of the study indicate that the catches obtained by fishermen continued to yield profits. The composition of catches and discards using beach seine in the Istanbul Strait shows that the catch is more influenced by habitat characteristics and the biology of the captured species, and the season does not entirely dictate the catch results **(Uzer *et al.*, 2017)**. The catch rate is not always bound to time or season; instead, it is affected by fishing techniques and management techniques **(Anders *et al.*, 2022)**. The effectiveness of methods such as seine nets can be more stable regardless of catch season, due to a lack of strong seasonal influences on changes in exploitable biomass **(Mulimbwa *et al.*, 2019)**.

4. Catch

Denis nets catch fish up to the base layer, which can result in different species compositions in the catch compared to trawling catches **(Kim & Izmyatinsky, 2018)**. The existing demersal and small pelagic fish species vary widely and the dominant fish caught at the Port of Brondong Fisheries Nusantara based on production data in 2024 are mostly Swanggi/Purp lespot bigeye/priacanthus tayenus (13,166 tons/23%), Golden-threadfin bream/nemiptherus nemathophorus (10,479 tons/19%), Deepwater goatfish/upeneus sulphureus (5,479 tons/10%), and Common squid/loligo sp (4,980 tons/9%). According to previous research, the production factors that have a significant impact on the number and type of catch of denis nets are the length of the net, the length of the slinging rope, the amount of fuel, the number of settings, and the length of the draw **(Aji *et al*., 2013)**.

Table 1. Denish seine net catch production per type of fish in peak season and regular season in 2024

Dominant fish	The weight of the catch during peak season/trip	Price (IDR)	The weight of the catch during the regular season/trip	Price (IDR)
Purp lespot bigeye (*priacanthus tayenus)*	13167	15000	12004	18000
Golden- threadfin bream *(nemiptherus nemathophorus)*	11994	40000	10065	50000
Deepwater goatfish *(upeneus sulphureus)*	5561	5000	4897	7000
Common squid *(loligo sp)*	5062	50000	4862	65000
Sulphur goatfish *(upheneus spp)*	2629	13000	1876	15000
Starry triggerfish *(abalistes stellaris)*	2403	14000	1800	16000

Source: Production data from the Brondong Nusantara Fishing Port in 2024.

5. Economic aspects

a. Capital

Investment capital in the fisheries sector is crucial for ensuring both economic viability and sustainability **(Arida, 2019)**. The required amount of capital varies significantly, depending on the type and scale of fishing gear utilized. For example, purse seine fisheries necessitate considerable investment in vessels and equipment, yet they provide relatively swift returns, with a reported payback period of approximately 33 months **(Tanjov *et al.*, 2023a)**. The implementation of more efficient and sustainable fishing methods has also been demonstrated to increase community interest in augmenting investment **(Nwosu *et al.*, 2021)**. Nevertheless, capture fisheries remain highly susceptible to various risks, such as environmental hazards, weather conditions, and regulatory changes. As emphasized by **Mohsin *et al.* (2021)**, these risks especially those associated with climate change and natural disasters must be meticulously considered in investment planning within the fisheries sector. The amount of capital investment costs in Denish seine net is presented in Table (2).

Table 2. Average investment cost of Denish seine net business at Brondong Fishing Port

Capital	Life Span (Year)	Category	
		daily (IDR)	weekly (IDR)
Ship	30	137.291.666,67	1.050.566.037,74
Machines (Primary, backup, and differential)	7	34.083.333,33	118.584.905,66
Fishing gear	1	30.291.666,67	86.528.301,89

The operation of Danish seine net in the research location is divided into two main forms: daily and weekly operations, each displaying a marked difference in terms of vessel size and capital requirements. Daily operations typically employ smaller vessels since the catch is landed at the port on the same day, thus not requiring significant storage space. Conversely, weekly operations utilize larger vessels with sufficient storage capacity to maintain fish freshness during longer sea voyages, which in turn necessitates a larger capital investment.

A study by **Madsen *et al*. (2017)** examined the influence of fishing gear configurations and operational procedures on the efficiency of capture in Danish seine fisheries, and emphasized the importance of innovation in fisheries management to ensure the sustainability of operations. Meanwhile, the research findings by **Mugabe *et al*. (2021)** from the context of small-scale fisheries in Mozambique indicate that the use of less selective fishing gear can lead to serious socio-economic consequences. These findings underscore the significance of selecting the appropriate fishing gear as a key factor in enhancing efficiency, operational sustainability, and in formulating investment strategies in the fisheries sector.

b. Costs

Fixed costs

Fixed costs are one of the important components that must be managed properly by business actors. Fixed costs are expenditures that do not change regardless of the amount of production carried out, thus these costs must still be incurred even if production activities experience a decline or are non-existent. Based on the results of interviews conducted in this study, several types of fixed costs in the fisheries business of Denish seine net that need attention include the depreciation costs of fishing equipment, boats, and machinery used, as well as other fixed costs related to vessel operations. In this study, the fixed costs incurred by Denish =seine net fishermen at Brondong Fishery Port can be seen in Table (3).

Table 3. Average fixed costs of Denish seine net business at Brondong Fishing Port

Fixed Costs	Category	
	daily	weekly
Depreciation costs		
Ship	5.729.166,667	35.056.603,77
Machines (Primary, backup, and differential)	2.816.666,667	7.716.981,132
Fishing gear	15.291.666,67	36.528.301,89
loading and unloading	150.000	150.000
authorization	3.039.583,333	21.188.679,25

Any equipment used in the fishing process will depreciate over time. Thus, accurate depreciation calculations are needed to maintain financial health in fisheries businesses **(Djuharni & Bezaliel, 2020)**. The difference between daily and weekly Denish seine net fixed costs in this case is not too far, because the price of the engine and fishing gear is on average the same, the only difference is the quantity of engine units and fishing gear used. In general, weekly fishermen will bring more machines and Denish seine nets as a backup if at any time there is damage. Licensing fees in this case are calculated based on the GT size of the vessel, so weekly Denish seine nets that have a larger vessel GT size will have more expensive licensing fees than daily cantrang. In terms of loading and unloading, there is also a tariff charged by the port in accordance with existing government regulations, which is IDR 150,000 for each loading and unloading.

c. Non-fixed costs

In Denish seine net fisheries, there are several types of non-fixed costs (variable costs) that change along with the quantity of products produced and are not constant like fixed costs. Fuel is one of the main components of non-fixed costs in a fishery, especially in a Denish seine net fishery. Fuel costs are an important element that is a key factor affecting the cost per trip in capture fisheries **(Hardito *et al.*, 2021)**. Costs incurred for fuel can account for a significant proportion of total operational costs per trip **(Tanjov *et al.*, 2023b)**. In Brondong Fishing Port, the average weekly Denish seine net spent IDR 35,290,566 on fuel with an average logistics of IDR 59,113,207 while the daily Denish seine net spent IDR 970,833 on fuel & IDR 2,043,750 on logistics (Table 4).

Table 4. Average non-fixed costs per year of Denish seine net business at Brondong Fishing Port (IDR)

Non-fixed costs	Category	
	daily	weekly
Maintenance of vessels and fishing gear	1.335.416,67	17.635.849,06
Fuel	970.833,33	35.290.566,04
logistics	2.043.750,00	59.113.207,55

On average per year, the operational costs faced by non-fixed Denish seine net fishermen consist of daily and weekly expenditures, including fuel, crew wages, logistics, and maintenance of vessels and fishing gear. However, damage to fishing gear almost always occurs during each fishing trip due to the level of intensity of its use and the dynamic marine environmental conditions. Opportunities to increase profit margins can arise if cost management is carried out efficiently and the maximization of fish catch is aligned with the sustainability policies implemented in the fisheries sector today **(Fatahillah *et al.*, 2023)**. This is also reflected in the Mediterranean region, where fuel and maintenance costs are dominant components of small-scale fishermen's expenditures **(Vo *et al.*, 2013)**. A sustainable approach to fishery management not only has ecological implications but also strengthens economic and social aspects **(Pascual *et al.*, 2017)**. Effective management has been proven capable of maintaining fish stocks, minimizing equipment damage, and improving economic performance through operational efficiency and the utilization of technology **(Hilborn *et al.*, 2020)**. Thus, sustainability is not only a regulatory obligation but also a long-term business strategy in modern fisheries.

d. Revenue

Income from the Denish seine net business can be calculated by knowing the total catch and the selling price per unit of catch. This is important for analyzing fishermen's income **(Aprilia *et al.*, 2021)**. Market policies and economic conditions can affect the selling price of fish **(Nurlaili *et al.*, 2016)**. When looking at the amount of capital and operational costs incurred by weekly Denish seine net fishermen, the income earned is also commensurate with the average of IDR 262,109,090/trip (Table 5).

Table 5. Average income/trip Denish seine net business at Brondong Fishing Port (IDR)

Description	Category	
	daily	weekly
At Least	7.500.000	150.000.000
Maximum	350.000.000	1.000.000.000
Average	23.473.684,21	262.109.090,9

The daily Denish seine net actually has a fairly high income when calculated with the capital and operational costs incurred, but fishing activities are not carried out every day. Generally, fishermen in Brondong catch daily trawls a maximum of 6 times a month, but during bad weather they do not operate at all.

e. Profit of daily and weekly Danish seine net

The profits earned by weekly and daily Denish seine net fishermen can be seen in the Table (5). The average profit obtained by weekly seine net fishermen is 240,010,810 IDR

while daily seine net is 35,851,282 IDR. In terms of access to markets and improving business capabilities, the use of appropriate technology and good management systems in the seine net fishery can encourage increased competitiveness **(Cahyaningtias *et al.*, 2022)**. A focus on operational efficiency and the utilization of good accounting information will also further support the success of this business **(Megawati *et al.*, 2020)**.

Table 6. Average profit/trip of Denish seine net business at Brondong Fishing Port (IDR)

Description	Category	
	daily	weekly
Income	42.769.230,77	369.198.198,20
Total Cost	6.917.948,72	129.187.387,39
Advantage	35.851.282,05	240.010.810,81

f. Feasibility of Denish seine fishery

This study uses short-term financial analysis to see the feasibility of Denish seine net fisheries at Brondong Fishing Port. One important indicator in this short-term financial analysis is the calculation of the R/C (Revenue to Cost) Ratio value. In the context of fisheries in Indonesia, including Denish seine net fisheries, the R/C Ratio value is often used to evaluate the potential profitability of an investment. An R/C Ratio value above 1.0 indicates that the business generates more revenue than the costs incurred, which means the business is worth continuing. The results of the short-term financial analysis for Denish seine net business feasibility are presented in Table (7).

Table 7. Financial feasibility of Denish seine net

	Variable	Unit	Total
Denish Seine Net Daily	R/C Ratio		6,24
	BEP Production	Kg	211,29
	BEP Sales	IDR	4.388.485,20
	Profitability	%	15,81
Denish Seine Net Weekly	R/C Ratio		3,17
	BEP Production	Kg	2.154,37
	BEP Sales	IDR	53.537.134,83
	Profitability	%	7,32

From the table above, fishing activities using Danish seines show high productivity and significant profitability (Table 7). The Revenue-Cost Ratio (R/C Ratio) is recorded at 6.24 for daily scales and 3.17 for weekly scales, both of which are far above the threshold of economic viability (>1), indicating that this endeavor is economically profitable. These findings are consistent with several previous studies in various regions that have also shown R/C Ratio values supporting the viability of fishing enterprises. For example,

research by **Mangalle *et al.* (2023)** in the context of salted fish marketing indicated an R/C ratio of 1.73, suggesting efficiency and business viability. A similar finding was observed in the analysis of capture operations using set nets, which produced an R/C ratio of 1.31 **(Perangin-angin *et al.*, 2021)**. Thus, the R/C ratio is an important indicator in assessing the economic feasibility of various types of fishing enterprises, including Danish seine nets. However, the interpretation of this value must still take into account external factors such as resource sustainability, regulations on fishing gear, and the dynamics of the fishing market.

The use of Danish seine or cantrang fishing gear in Indonesia has become a controversial topic in the management of national fisheries. Although this gear is considered economically efficient by some fisheries operators, efficiency metrics such as the revenue-cost ratio (R/C ratio) must be placed within a broader framework. The assessment of business feasibility cannot be separated from external factors such as the sustainability of fish resources, government policies, and market dynamics. In practice, the Indonesian government has restricted the use of cantrang due to ecological and social considerations, in line with the precautionary principle and a commitment to sustainable fisheries management **(Trenggono, 2023)**.

The Danish seine fishing gear, especially when used intensively in shallow waters, can damage seabed habitats and result in high bycatch, thereby contributing to fish stock degradation **(Pauly *et al.*, 2002)**. These restrictions, although provoking protests from some fishing communities, particularly in the northern coastal regions of Java, aim to prevent exploitative fishing practices and restore the conditions of aquatic ecosystems. On the other hand, the success of implementing this policy largely depends on the preparedness for transition, the provision of environmentally friendly alternative fishing gear, and the protection of the socio-economic aspects of affected fishermen **(Amri *et al.*, 2023)**.

As a long-term solution, quota-based fisheries management has become a strategic alternative. This scheme has proven effective in various countries such as Iceland, New Zealand, and Norway in maintaining fish stocks and enhancing operational efficiency **(Hannesson, 2013)**. By establishing catch quotas and integrating fishing gear such as Danish seine into spatially controlled zones, the government can reduce overfishing and create more stable business conditions. This approach not only supports conservation but also provides long-term economic benefits through the stabilization of fish supply and prices **(Costello *et al.*, 2016)**.

The next analysis in this study is the Break Even Point (BEP), which in the Denish seine net fishery is an important tool to determine the level of production and sales needed so that the business does not experience losses. BEP consists of two aspects: Production BEP, which indicates the amount of output that must be produced to cover total costs, and sales BEP, which indicates the value of sales that must be achieved for revenues to cover costs incurred.

For the Denish seine net, the production BEP value may vary depending on factors such as fixed costs, variable costs, and selling price. A case study in Nagari Carocok Anau showed that the production BEP for set net was 6,125kg, which indicates how many fish must be caught to cover all costs **(Dharma *et al.*, 2023)**. In addition, the sales BEP value generated from the analysis provides a deeper understanding of the potential revenue that must be achieved to ensure business continuity. In the context of gillnet fisheries, it can also be seen that the average production BEP for a vessel of a given capacity is 2,636.47kg, while for the value of money to be sold (sales BEP) is approximately IDR 81,815,579. This indicates that a focus on efficient production and good cost management is essential in achieving profitability in the fisheries sector **(Firmansyah *et al*., 2022)**.

Furthermore, fisheries business feasibility analysis is not only limited to calculating the BEP, but should also consider additional factors such as resource management, environmental impacts, and government regulations that may affect costs and potential revenue. Sales pricing should also be considered, especially in terms of marketing strategies to ensure that revenue from sales can cover costs **(Juliani *et al*., 2019)**.

In addition, profitability, which shows the ratio between profit and assets, has a value of 15.81% for daily Denish seine net and 7.32% for weekly, which means that the business is able to provide profits. Rentability is usually measured using several indicators, including profitability ratios, R/C (Revenue to Cost) Ratio values, and analysis that shows the profitability of the fish catcher. A study on the profitability of Denish seine net business in Indramayu Regency shows that the most commonly caught types of fish include demersal fish, such as pepetek fish and jackfruit seed fish, which contribute greatly to the total catch **(Nurfitriana & Saputra, 2022)**. High profitability can be achieved if fishermen are able to manage their business well, including in terms of selecting fishing locations and determining the right time to catch fish. Profitability is also influenced by several external factors, including government policies that regulate the use of Denish seine net. For example, the prohibition on the use of fishing gear can limit fishermen's access to productive resources, which in turn can have a negative effect on profitability **(Artati, 2018)**.

CONCLUSION

From the results of the analysis of research data that has been carried out, it can be concluded that the Denish seine net business is feasible. The R/C ratio value obtained has a value of more than 1, indicating that the business is able to provide profits. The value of the Production and Sales BEP is also quite high for daily and weekly fishing activities, which has the potential to provide a lot of financial benefits. The dominant fish caught were demersal fish such as Big Eyes / Swangi (13,166 Tons / 23%), Kurisi (10,479 Tons / 19%), Jackfruit Seeds (5,479 Tons / 10%), and Squid (4,980 Tons / 9%).

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