

BUSINESS ANALYSIS OF MUD CRAB (*SCYLLA SPP.*) FISHING IN BANDENGAN WATERS KENDAL REGENCY

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ABSTRACT

Kendal Regency is one of the areas in northern Central Java which has potential resources for mud crabs (*Scylla spp.*). Communities in Kendal Regency use folding traps and gill nets to catch mud crabs (*Scylla spp.*). The catching activities of mud crabs in Bandengan waters Kendal are carried out all the time, without providing a recovery period on the ecosystem cycle at the fishing location. This study aims to analyze the technical and financial feasibility of mud crabs fishing using folding traps and gill nets. The method used in this research is descriptive method with a survey approach. Data collection methods used are direct observation, interviews, literature and documentation. The analytical method used is break even point analysis, R/C ratio, B/C ratio, and payback period. The results showed that folding traps and gill nets are feasible to run because folding traps have a BEP value of IDR 43,286 (<sale price); production BEP value of 333 kg/year (<production/year); value of R/C ratio 1.38 (> 1); the B/C ratio value is 0.38 (> 0); PP value for 1 year 7 months while gill net has a BEP value of IDR 41,480 (<sale price); production BEP value of 313 kg/year (<production/year); value of R/C ratio 1.45 (> 1); the B/C ratio value is 0.45 (> 0); PP value for 1 year 6 month. Gill nets is more feasible to run than folding traps because it has a higher R/C ratio and B/C ratio than folding traps. Then the BEP and PP values is lower if it as compared with folding traps.

Keywords: : financial; folding trap; gill net; mangrove crab

INTRODUCTION

Kendal Regency is one of the regencies in Central Java which is located in the north of Central Java. The capture fisheries area of Kendal Regency covers the waters of the North Coast of Java which includes seven sub-districts namely: Kendal District, Kaliwungu District, Patebon District, Brangsong District, Rowosari District, Cepiring District, and Kangkung District. One of the sub-districts that has mangrove areas is Kendal District. The existence of this mangrove area can provide various benefits from economic and ecological aspects. Ecologically, the mangrove area can be a habitat for various types of living things, one of which is mud crabs (*Scylla spp.*).

Mud crabs (*Scylla spp.*) can be found in areas such as estuaries, mangrove forests and offshore areas that have muddy bottom substrates. There are four types of mud crabs (*Scylla spp.*) that can be found in Indonesia which are considered to have market potential, including *Scylla serrata*, *Scylla olivacea*, *Scylla paramamosain* and *Scylla transquebarica*. According to Hia *et al.* (2013), mud crabs (*Scylla spp.*) are one of the potentials found in mangrove forests. Mud crabs (*Scylla spp.*) are coastal fishery resources that have important economic value and have quite large market opportunities for both the domestic market and foreign markets (Fish Quarantine Agency, Quality Control and Safety of Fishery Products 2020; Hapsari *et al.*, 2022).

Mud crabs (*Scylla spp.*) are caught and widely traded by coastal communities in Kendal Regency to meet economic needs. In general, mud crabs (*Scylla spp.*) are caught using folding traps and gill nets because these fishing gears are easy

to operate and the catches are of high quality due to the minimum mortality or damage to body parts caught. Gill nets and folding traps fishing gear used by fishermen in Kendal Regency waters are included in the category of environmentally friendly fishing gear (Firdaus *et al.*, 2017). Information regarding the capital and costs required for the production process, income, profits and the feasibility of fishing for mud crabs (*Scylla spp.*) in Kendal Regency is needed so that the business can generate sustainable profits (Yanuarto *et al.*, 2013). Uncertainly in the fishing effort for mud crabs (*Scylla spp.*) is influenced by several things, such as the fishing season and the uncertainly of the selling price in the market, so it is necessary to analyze the fishing business.

Fishing business is an economic activity that utilizes fishery resources with the aim of making a profit. The continuation of a fishing business is based on economic considerations such as costs that need to be incurred and income earned so that the business being carried out can generate profits. Business feasibility analysis needs to be done to assess the benefits that can be obtained in doing a business. Determining the feasibility analysis for fishing mud crabs (*Scylla spp.*) in Kendal Regency waters is reviewed from two aspects, namely technical aspects and financial aspects. Technical aspects include fishing gear construction, fishing gear operating methods, fishing fleets, and fishing areas while financial aspects include Break Even Point (BEP) analysis, Revenue Cost Ratio (R/C Ratio).

Fishermen in Kendal Regency generally use folding traps and gill nets to catch Mud crabs (*Scylla spp.*). However, there are several obstacles experienced by business actors in the ongoing fishing business for mud crabs (*Scylla spp.*), such

as the less than optimal catches obtained and the lack of information regarding prices and criteria for mud crabs (*Scylla spp.*) that are allowed to be caught so that it is difficult for fishermen to obtain optimal income from the fishing effort carried out. Therefore, it is necessary to analyze the technical and financial conditions of fishing for mud crabs (*Scylla spp.*) in Bandengan waters, Kendal Regency to find out whether the business is profitable to be continued. Analysis of technical and financial conditions will provide information whether the business being run is feasible or not.

RESEARCH METHODS

This research was carried out on January 1 – February 1 2023 in Bandengan Village, Kendal District, Kendal Regency. The research method used is a descriptive method with a survey approach. The descriptive method was carried out by analyzing the technical and financial aspects of the mud crab (*Scylla spp.*) fishing business. A direct survey approach in the field was carried out using observations, interviews and documentation related to the fishing business for mud crabs (*Scylla spp.*) in Bandengan Village, Kendal Regency. The sampling method used was snowball sampling. The sample used in this research took 50 fishermen consisting of 25 people for each fishing gear, folding traps and gill nets. The data collection methods used in this research are the observation method, interview method, documentation method, and literature study method. The data used in this research consists of primary data (business investment, production costs, depreciation costs, weight of catch, fishing production value, fishing fleet, fishing area, and method of operating fishing gear) and secondary data (number of fishing fleets, number of fishing gear catch, production amount and production value), especially mud crabs (*Scylla spp.*) in Kendal Regency over the last 5 years, starting from 2017 to in 2021.

Method of Data Analysis

Analysis of Technical Aspects

Data relating to technical aspects of capture fisheries businesses were analyzed descriptively. This analysis describes technical fishing conditions which include: fishing gear construction, fishing gear operating methods, fishing fleet, and fishing areas.

Analysis of Financial Aspects

Data covering economic aspects is analyzed as follows:

1. Investment costs incurred by the mud crab (*Scylla spp.*) fishing business unit include the costs of purchasing boats, engines and fishing equipment;
2. Total costs consisting of fixed costs (depreciation and maintenance costs) and variable costs (operational costs). According to Wati and Primyastanto (2018), the total cost of fishing for mud crabs (*Scylla spp.*) can be calculated using the following formula:
 $TC = FC + VC$(1)

Description: TC = Total Cost; FC = Fixed Cost; VC = Variable Cost

3. Income is obtained from the number of catches per trip then multiplied by the selling price. Calculation of income from fishing for mud crabs (*Scylla spp.*) according to Wati and Primyastanto (2018), can be calculated using the following formula:
 $TR = \sum Q \times P$ (2)

Description: TR = Total Revenue; Q = Quantity; P = Price

4. Profits are obtained from reducing income from total costs calculated for one year. According to Wati and Primyastanto (2018), the profit calculation for fishing for mud crabs (*Scylla spp.*) can be calculated using the following formula:
 $\pi = TR - TC$ (3)

Description: π = profits from fishing efforts; TR = production value of the catch; TC = allocated input value

Business Feasibility Analysis

The business feasibility analysis was carried out using several indicators including Break Even Point (BEP), Revenue Cost Ratio (R/C Ratio), Benefit Cost Ratio (B/C Ratio) and Payback Period (PP).

1. Break Even Point (BEP)

Break Even Point is a condition in which the income generated by a business is equal to the total costs incurred, so that the business does not suffer losses and does not make a profit. According to Saparinto (2014), Break Even Point (BEP) can be calculated using the formula:

$Break\ Even\ Point\ (BEP)\ production = \frac{TC}{P}$ (4)

$Break\ Even\ Point\ (BEP)\ IDR = \frac{TC}{Production}$ (5)

Description: TC = Total Cost; P = Selling Price Per Unit

Criteria:

- If Production BEP < total production, then the business is in a profitable position
- If Production BEP = total production, then the business is in a breakeven position (no profit/no loss)
- If Production BEP > total production, then the business is in an unprofitable position.

The price BEP criteria are as follows:

- If BEP price < selling price, then the business is in a profitable position
- If BEP price = selling price, then the business is in a breakeven position (no profit/no loss)
- If BEP price > selling price, then the business is in an unprofitable position

2. Revenue Cost Ratio (R/C Ratio)

R/C ratio is a value that shows the comparison between business income and total costs. According to Wati and Primyastanto (2018), the Revenue Cost Ratio (R/C Ratio) can be calculated using the formula:

$R/C\ Ratio = \frac{Total\ Revenue}{Total\ Cost}$ (6)

Criteria:

If $R/C > 1$, the business is profitable and feasible to continue
 If $R/C < 1$, the business suffers a loss and is not feasible to continue

If $R/C = 1$, break even business (no profit and no loss)

3. Benefit Cost Ratio (B/C Ratio)

The B/C ratio is a comparison between the level of profit generated and the total costs incurred by a business. According to Rahardi and Hartono (2003), to calculate the Benefit Cost Ratio (B/C Ratio) you can use the formula:

$$B/C \text{ Ratio} = \frac{\text{Profit Rate}}{\text{Total Cost}} \dots\dots\dots (7)$$

Criteria:

If the B/C Ratio > 0 , then the business is feasible

If the B/C Ratio < 0 , then the business is not feasible

4. Payback Period (PP)

Payback period is an analysis used to determine the payback period. According to Muhfizar and Poltak (2020), the Payback Period formula that is used if the cash flow per year is the same is:

$$\text{Payback Period} = \frac{\text{Investment Value}}{\text{Net Cash Inflow}} \dots\dots\dots (8)$$

Description: If $PP < 3$ = Fast returns; If $3 < PP < 5$ = Moderate returns; If $PP > 5$ = Slow returns

RESULT AND DISCUSSION

Technical Aspects of Mud Crab (*Scylla spp.*) Fishing Business

Folding Traps

Folding Traps Construction

The folding traps fishing gear used by fishermen in Bandengan Village, Kendal Regency has several construction parts such as the body of the trap, the mouth of the trap, and the trap door. The folding traps measures 45 cm long, 31 cm wide and 9 cm high. The frame of the trap is made of iron and the net is made of a type of PE (polyethylene multifilament) material. There are also other parts such as branch lines, main lines, marking buoy lines, and marking buoys on the trap.

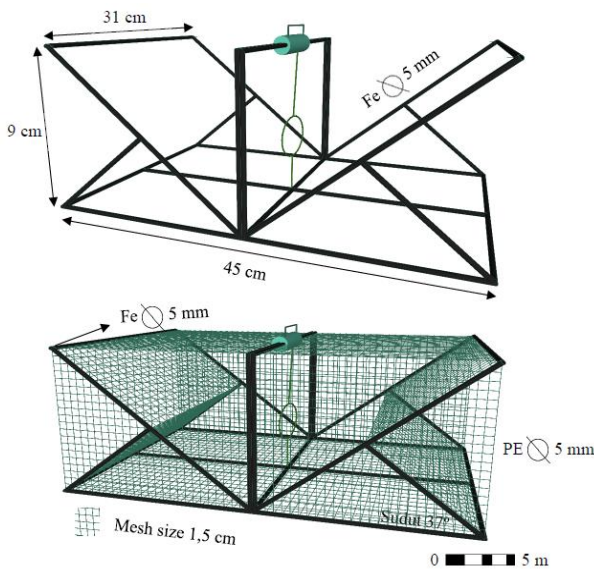


Figure 1. Folding Traps Construction

Folding Traps Operation Method

The operation of the folding traps begins with preparations for departure to the fishing ground. Some of the preparations made include refueling, preparing supplies, and preparing bait to be attached to folding traps. Fishing trips usually start at 19.00 – 07.00 WIB. The stages of operating the folding traps include:

1. Settings

Settings is an activity of lowering folding traps into the waters which begins with the installation of bait first. After the bait is installed, the folding traps is attached so that the trap can be closed and then the trap can be lowered to the bottom of the water. The setting process takes about 40 minutes for 40 units of folding traps.

2. Immersing

The next stage of the process is immersing, which is the immersion of the folded trap at the bottom of the water. The immersing process takes about 10 hours from setting. It is at this stage that the target will enter the folding traps with the bait that has been placed in the hope of being able to attract the target to enter and get stuck in the folding traps.

3. Hauling

This stage begins with lifting the sign buoy, buoy line, main line, branch line, and folding traps. After the folding traps is lifted, the fishermen will take the catch they get and collect it in the basket. In the hauling process, it takes approximately 30 minutes to lift 40 units of folding traps.

Folding Traps Catches

The catches obtained using folding traps are demersal fish including mud crabs (*Scylla spp.*). The catches of mud crabs (*Scylla spp.*) caught using folding traps are presented in Table 3.

Table 3. Specifications for Catching Mud Crab (*Scylla spp.*) Per Season Using Folding Traps

Number of Catches (kg)	Information
• Peak Season	5 kg
• Regular Season	3.6 kg
• Famine season	2.5 kg
Catch Size (cm)	Information
• Minimum Total Length	4.8 cm
• Maximum Total Length	11.2 cm
Weight Per Head (kg)	Information
• Minimum Weight	0.05 kg
• Maximum Weight	0.21 kg

The catches of mud crabs (*Scylla spp.*) are different in each season. The highest number of catches is an average of 5 kg/trip during the peak season (November-February) while the lowest number of catches is an average of 2.5 kg/trip during the lean season (July-October). The total catch in the normal season (March-June) is an average of 3.6 kg/trip. The minimum weight of mud crabs (*Scylla spp.*) caught is 0.05 kg while the maximum weight is 0.21 kg. The maximum total length of mud crabs (*Scylla spp.*) caught was 11.2 cm while the minimum total length was 4.8 cm.

According to the Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 16 of 2022 mud crabs (*Scylla spp.*) which may be caught have a carapace width of over 12 cm, so that mud crabs

(*Scylla spp.*) caught by folding traps are not suitable for catching because they have a carapace width below 12 cm. According to Hapsari *et al.* (2021); Panatar *et al.* (2020), variations in carapace width are thought to be influenced by fishing time related to the reproductive period, where the mud crab reproductive period lasts throughout the year and peaks in January – May (Hapsari *et al.* 2020). This is due to the high productivity of coastal waters occurring during the rainy season. Mud crabs (*Scylla spp.*) caught during the rainy season have the largest carapace width. The catch of mud crabs (*Scylla spp.*) is divided into several types of sizes (grading) based on their weight. This is aimed at determining the price for each type of mud crab (*Scylla spp.*). The grading of mud crabs (*Scylla spp.*) is presented in Table 4.

Table 4. Classification of Mud Crab (*Scylla spp.*) Based on Weight (January, 2023 Prices)

No.	Type	Information	Purchase Price (IDR)	Selling Price (IDR)
1.	TL 250	Female size > 250 gr (eggs > 80%)	240,000	350,000
2.	TL 200	Female size 200 – 250 gr (80% eggs)	220,000	280,000
3.	TLK	Female size 150-199 gr (80% eggs)	200,000	225,000
4.	SP 1	Male size > 250 gr	190,000	250,000
5.	SP 2	Male size 200-249 gr	160,000	215,000
6.	KK	Male size 100-149 gr	120,000	140,000
7.	BC	Sissy (Females do not lay eggs > 150 gr)	100,000	120,000
8.	STI	Half Content, not too fat (1kg content 7-8 tails)	60,000	75,000
9.	KRO	Males and females < 120 gr	40,000	55,000
10.	CMT	Males and females < 70 gr	30,000	45,000

In general, there are ten types of mud crabs (*Scylla spp.*) based on their body weight (Hapsari *et al.*, 2022). The TL 250 type is the heaviest type of crab with a buying price of IDR 240,000/kg and a selling price of IDR 350,000/kg while the CMT type is the type of crab with the lowest weight with a buying price of IDR 30,000/kg and a selling price of IDR 45,000/kg. Most of the mud crabs (*Scylla spp.*) caught by fishermen in the Bandengan Village are relatively small in size, namely the kroyo (KRO) and cermet (CMT) types. According

to Tiurlan *et al.* (2019), the factor causing the reduced size of crabs caught is due to high fishing pressure on mud crab resources in the waters. The effects of over-exploitation are reflected in a decrease in the average size of mud crabs caught and landed (Côrtes *et al.*, 2019; Jumawan *et al.*, 2021).

Gill Net

Gill Net Construction

The gill net fishing gear used by fishermen in Bandengan Village, Kendal Regency has several construction parts such as buoys, buoy lines, overhead lines, net bodies, bottom line, weight lines and weights. Gill Net fishermen in Bandengan Village use an average of 10 pis of nets with a length of 40 meters per piece, so that the total length of the net is 400 meters in one fishing trip. The net body has one sheet of net body with a mesh size of 4 inches which is made of polyamide (PA) material.

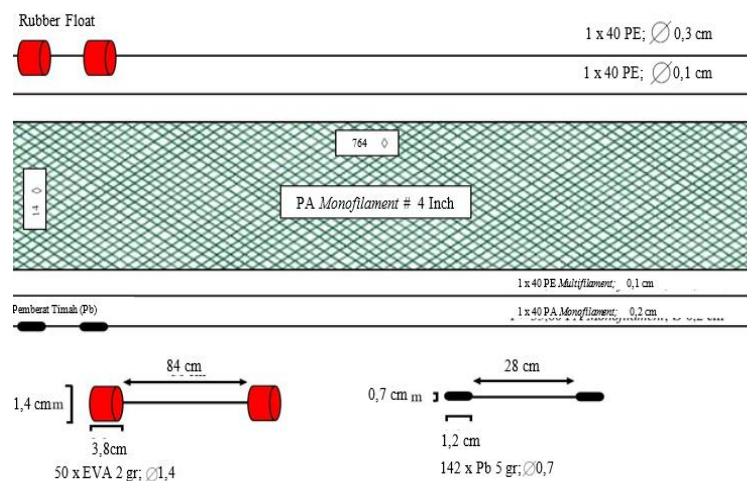


Figure 2. Gill Net Construction

Gill Net Operation Method

The operation of the gill net begins with preparations for departure to the fishing ground. Several preparations were made including checking the condition of fishing gear, preparing supplies, and refueling. The length of the fishing trip is approximately 7 hours starting from 20.00 – 03.00 WIB. Stages of operation of fishing gear *gill net* namely:

1. Settings

After arriving at the fishing ground, the fishermen arrange the nets to make it easier to lower and spread the nets. The lowering of the net begins with lowering the ballast, then the net body, and finally the float. The condition of the boat was running slowly so that the net body can be installed perfectly. The net lowering process (setting) lasted for 25 minutes and was carried out 3 times in one fishing trip.

2. Immersing

After the setting stage, then the immersing process is carried out. The average immersing process is carried out for 1 hour but can be faster when it is raining and high waves. In the immersing process, fishermen take advantage of this time on the boat to rest and consume supplies. The immersing process is carried out 3 times in one fishing trip.

3. Hauling

The hauling process is carried out by pulling the net body which begins with pulling the float first followed by lifting the ballast. The withdrawal process is carried out by two people. One person pulls the net into the boat and then another fisherman takes the catch that gets entangled in the body of the net. Furthermore, the catch obtained is placed in the basket. The hauling process takes an average of 35 minutes but can take longer if there are a large number of catches. The hauling process is carried out 3 times in one fishing trip.

Gill Net Catches

The catch of mud crabs (*Scylla spp.*) obtained using gill net fishing gear varies depending on the season. The catch of mud crabs (*Scylla spp.*) caught using gill nets are presented in Table 5.

Table 5. Catch Specifications for Mud Crabs (*Scylla spp.*) per Season Using Gill Net Gear

Number of Catches (kg)	Information
• Peak Season	4.8 kg
• Regular Season	3.5 kg
• Famine season	2.4 kg
Catch Size (cm)	Information
• Minimum Total Length	5.2 cm
• Maximum Total Length	10.8 cm
Weight Per Head (kg)	Information
• Minimum Weight	0.06 kg
• Maximum Weight	0.18 kg

The catches of mud crabs (*Scylla spp.*) are different in each season. The highest number of catches is an average of 4.8 kg/trip during the peak season (November-February) while the lowest number of catches is an average of 2.4 kg/trip during the lean season (July-October). The total catch in the normal season (March-June) is an average of 3.5 kg/trip. The minimum weight of mud crabs (*Scylla spp.*) caught is 0.06 kg while the maximum weight is 0.18 kg. The maximum total length of mud crabs (*Scylla spp.*) caught was 10.8 cm while the minimum total length was 5.2 cm. According to the Regulation of the Minister of Maritime Affairs and Fisheries of the Republic of Indonesia Number 16 of 2022 mud crabs (*Scylla spp.*) which may be caught have a carapace width of over 12 cm, so that mud crabs (*Scylla spp.*) caught by gill net fishing gear are not suitable for catching because they have a carapace width below 12 cm. According to Hapsari *et al.* (2021); Farhaby (2017), the difference in the size of the carapace width is thought to be caused by the migration carried out by mud crabs. The young crabs travel to the mangrove forest area in the estuary as well as in the pond area. The quantity and quality of the aquatic environment in the area the young crabs travel to the mangrove forest area in the estuary as well as in the pond area (Karniati *et al.*, 2021). The quantity and quality of the aquatic environment in the area is thought to be ideal for the development and growth of young mud crabs, so that in this area many individuals are found in the young phase (Sara *et al.*, 2014).

Financial Aspect Mud Crab (*Scylla spp.*) Fishing Business Capital

Investment capital is the initial cost incurred to start a business. The amount of capital required depends on the scale of business being carried out. The capital needed by folding traps and gill net fishermen in the business of catching mud crabs (*Scylla spp.*) in Bandengan Village, Kendal Regency is presented in Table 6.

Table 6. Average Business Capital for Fishing Mud Crab (*Scylla spp.*) Using Folding Traps and Gill Net

No.	Type of Investment (IDR)	Type of Fishing Gear	
		Folding Traps	Gill Net
1.	Fishing Gear	891,600	1,434,000
2.	Boat	16,900,000	18,320,000
3.	Machine	6,520,000	6,540,000
4.	Flashlight	27,600	27,600
5.	Bucket	17,200	17,000
Total		24,356,400	26,338,600

Based on Table 6, the average capital required in fishing for mud crabs (*Scylla spp.*) with folding traps is IDR 24,356,400 while gill net fishing gear is IDR 26,338,600. The average capital required in fishing for mud crabs (*Scylla spp.*) using gill net is greater when compared to folding traps because generally the price per unit of gill net fishing gear is more expensive than folding traps.

Cost

Cost is an expenditure that needs to be incurred in a business. The cost of fishing effort is divided into 2 variable costs and fixed costs. The total cost can be obtained by adding up the variable costs and fixed costs. The fixed costs incurred in fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets are presented in Table 7.

Table 7. Average Fixed Cost of Fishing for Mud Crab (*Scylla spp.*) Using Folding Traps and Gill Net

No.	Average Fixed Cost (IDR/Year)	Type of Fishing Gear	
		Folding Traps	Gill Net
1.	Administrative costs	25,000	25,000
2.	Cost of depreciation		
	Fishing Gear	347,800	947,000
	Fishing Fleet	1,263,333	1,094,667
	Machine	644,000	647,333
	Flashlight	11,400	11,667
	Bucket	7,100	6,933
3.	Maintenance costs		
	Fishing Gear	768,000	668,000
	Fishing Fleet	610,000	566,000
	Machine	490,000	512,000
	Flashlight	0	0
	Bucket	0	0
4.	Marine Alms Fees	200,000	200,000
Total Fixed Costs (IDR/Year)		4,416,633	4,728,600

Fixed costs are costs that do not depend on production activity. The average fixed costs incurred in fishing for mud crabs (*Scylla spp.*) with folding traps is IDR 4,416,633 while gill net is IDR 4,728,600.

In addition to fixed costs, there are variable costs incurred in the mud crab (*Scylla spp.*) fishing business. The variable costs incurred in fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets are presented in Table 8.

Table 8. Average Variable Cost of Fishing Mud Crab (*Scylla spp.*) Using Folding Traps and Gill Net

No.	Variable Costs (IDR/year)	Type of Fishing Gear	
		Folding Traps	Gill Net
1.	Fuel Oil	25,958,560	25,592,384
2.	Bait	1,089,360	0
3.	Consumption	3,556,000	3,678,000
4.	Drinking water	1,813,440	1,818,240
5.	Cigarette	4,310,720	4,169,440
6.	Oil	130,800	132,000
7.	String of raffia	180,000	180,000
8.	Labor costs	8,527,791	6,585,555
Total Variable Costs (IDR/Year)		45,566,671	42,155,619

Variable costs are costs that can change according to changes in production levels. The average variable costs incurred in fishing for mud crabs (*Scylla spp.*) with folding traps is IDR 45,566,671 while gill net is IDR 42,155,619.

The total cost is the overall cost of a business unit. The total cost is obtained from the sum of variable costs and fixed costs. The total costs incurred in fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets are presented in Table 9.

Table 9. Average Total Cost of Fishing Mud Crab (*Scylla spp.*) Using Folding Traps and Gill Net

No.	Total Cost (IDR/year)	Type of Fishing Gear	
		Folding Traps	Gill Net
1.	Fixed cost	4,416,633	4,728,600
2.	Variable cost	45,566,671	42,155,619
Total Cost (IDR/year)		49,983,305	46,884,219

Based on Table 9, the average total costs incurred in fishing for mud crabs (*Scylla spp.*) with folding traps is IDR 49,983,305 while gill net is IDR 46,884,219.

Income

Revenue from fishing for mud crabs (*Scylla spp.*) is derived from the sale value of the catch obtained during the fishing operation. The average income earned in fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets is presented in Table 10.

Based on Table 10, the income obtained from fishing for mud crabs (*Scylla spp.*) using folding traps is IDR 67,690,926 while gill net is IDR 66,427,224. Income derived from crab fishing business mangrove (*Scylla spp.*) with folding traps is greater than gill net because the catches obtained by folding traps is greater than gill net.

Table 10. Average Income of Mud Crab (*Scylla spp.*) Fishing Using Folding Traps and Gill Net

Description	Income (IDR/Year)	
	Folding Traps	Gill Net
Minimum	54,592,000	60,624,900
Maximum	80,861,800	78,962,800
Average	67,690,926	66,427,224

Profit

Profits in a fishing business are the result of reducing the amount of income and the total costs incurred to conduct a fishing business. The profits obtained in fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets are presented in Table 11.

Table 11. The Average Profit of Fishing for Mud Crabs (*Scylla spp.*) Using Folding Traps and Gill Nets

Description	Income (IDR/Year)	
	Folding Traps	Gill Net
Total Cost	49,983,305	46,884,219
Income	67,690,926	66,427,224
Profit	17,707,621	19,543,005

Based on Table 11, the average profit of fishing for mud crabs (*Scylla spp.*) with folding traps is IDR 17,707,621 while gill net is IDR 19,543,005. The profit earned in the fishing effort catching mud crabs (*Scylla spp.*) with gill net greater than folding traps because the total cost incurred in operating folding traps is much greater than gill net even though the income earned by folding traps is greater than gill net.

Business Feasibility Analysis

Business feasibility analysis is a criterion for investing over a certain period of time to find out how a business will develop in the future. Business feasibility analysis is used to determine whether a business is feasible or not, especially from an economic point of view. Determining the feasibility analysis of businesses that have a project of less than 5 years is included in the undiscounted criteria. Therefore, the Break Even Point (BEP), Revenue Cost Ratio (R/C Ratio), Benefit Cost Ratio (B/C Ratio) and Payback Period (PP) are used as indicators. The BEP, R/C Ratio, B/C Ratio, and PP from fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets is presented in Table 12.

Table 12. Value of BEP, R/C Ratio, B/C Ratio, and Payback Period for Fishing Business of Mud Crab (*Scylla spp.*) Using Folding Traps and Gill Net

No.	Business Feasibility Analysis	Type of Fishing Gear	
		Folding Traps	Gill Net
1.	Break Even Point		
	Production BEP (Kg)	333	313
	BEP Price (IDR)	43,286	41,480
2.	R/C Ratio	1.38	1.45
3.	B/C Ratio	0.38	0.45
4.	Payback Period	1.60	1.51

Break Even Point (BEP)

Break Even Point (BEP) or what can be called the break-even point is a situation where the income earned and the costs incurred are in the same position. Based on Table 12, fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets is a profitable business because the BEP value for folding traps production (333 kg/year) and BEP for gill net production (313 kg/year) smaller than the total production of folding traps (1149 kg/year) and gill net (1125 kg/year) while BEP folding traps prices (IDR 43,286) and BEP gill net prices (IDR 41,480) are smaller than the selling price of mud crabs (*Scylla spp.*) in three different seasons, namely peak season with a selling price of IDR 124,427, regular season with a selling price of IDR 141,045, and famine season with a selling price of IDR 175,147.

The production BEP value and price BEP for gill net are lower than those for folding traps. Production BEP and gill net price BEP respectively 313 kg/year and IDR. 41,480 while the BEP for production and BEP for the price of folding traps are respectively 333 kg/year and IDR. 43,286. This shows that gill net faster to return capital than folding traps.

R/C Ratio

Revenue Cost Ratio (R/C ratio) is the ratio of the comparison between total revenue (total revenue) and total cost (total cost). Based on Table 12, the R/C ratio for fishing gear with folding traps and gill nets is 1.38 and 1.45 respectively, so that fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets can be said feasible to be continued because the value of R/C ratio is greater than 1. The R/C ratio value of gill net is greater than folding traps so that gill net has better business feasibility than folding traps.

B/C Ratio

Analysis of the benefit cost ratio (B/C ratio) is a way to measure the feasibility of a project by comparing the net benefits received with the costs incurred. Based on Table 12, the B/C ratio of folding traps and gill nets is respectively 0.38 and 0.45, so that fishing for mud crabs (*Scylla spp.*) using folding traps and gill nets can be said feasible to be continued because the value of the B/C ratio is greater than 0. The B/C ratio value of gill net is greater than folding traps so that gill net has better business feasibility than folding traps.

Payback Period

Payback period is a method used to calculate the period of time needed to repay the money that has been spent on investment costs. Based on Table 12, the payback period values for folding traps and gill nets are 1.60 (1 year 7 months) and 1.51 (1 year 6 months) respectively. The payback period value of less than 3 years is included in the fast return on investment category. The payback period value of gill net is smaller than folding traps so that gill net has better business feasibility than folding traps.

The total cost per year for folding trap fishing gear is greater than gill net fishing gear, namely IDR 49,983,305 while the gill net fishing gear amounted to IDR 46,884,219. The annual income from trap fishing gear is greater than gill net fishing gear, namely IDR 67,690,926 while gill net fishing gear is IDR 66,427,224. This is because the number of catches of mangrove crabs (*Scylla spp.*) obtained by the folding trap fishing gear is greater than the gill net fishing gear. Gill net fishing gear has greater profits when compared to the profits

generated by folding traps, namely IDR. 19,491,205/year, while folding traps only generate profits of IDR. 17,539,132/year. Based on BEP and payback period calculations, it shows that the income and time required to return investment in the gill net fishing gear business is faster when compared to folding trap fishing gear. This is because the business profits obtained by gill net fishing gear are greater when compared to folding trap fishing gear. This is in line with the results of studies by Firdaus et al (2017), Atmajaya et al (2021), Hapsari et al (2022); Sanjaya et al (2023) and Mubarak et al (2023), that for waters around mangroves (including lagoons and river mouths), Gill net fishing gear is more efficient and profitable, but if fishing is carried out in deeper littoral zones then fishing with The trap fishing gear has the potential to be more profitable because it will catch mud crabs that are large in size or in the final stage of gonad maturity (laying eggs) (Novita et al, 2013; Jamal et al, 2018; Hapsari et al, 2022). In addition, folding trap fishing gear has the advantage of better capture selectivity (Firdaus et al, 2017), with the ability to select targeted fish species. Traps also tend to reduce the risk of unwanted bycatch (Mubarak et al, 2023).

CONCLUSION

Conclusions that can be drawn are the construction of traps consists of folding traps, main lines, branch lines, buoy lines, and marking buoys while gill net construction consists of net bodies, buoy lines, top ropes, bottom line ropes, weight ropes, weights and buoys. There are three stages in the method of operating folding traps and gill nets, namely setting, immersing and hauling. The average catch of mud crabs (*Scylla spp.*) caught using folding traps is 5 kg (peak season), 3.6 kg (regular season), and 2.5 kg (famine season) while the gill net is 4.8 kg (peak season), 3.5 kg (regular season), and 2.4 kg (least season); the results of the financial analysis of the feasibility of fishing for mud crabs (*Scylla spp.*) in the Bandengan Village, Kendal Regency show that the fishing business is feasible with a production BEP value 333 kg/year and a BEP price of IDR 43,286; the R/C ratio value is 1.38; the B/C ratio value is 0.38; PP for 1 year and 7 months for folding traps, while for gill net the production BEP value is 313 kg/year and the BEP price is IDR 41,480; the R/C ratio value is 1.45; B/C ratio value of 0.45; PP for 1 year 6 months. Fishing for mud crabs (*Scylla spp.*) using gill net fishing gear is more feasible than using folding traps because it has a higher R/C ratio and B/C ratio and lower BEP and PP than folding traps.

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