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Feasibility Analysis of Gill Net Capture Business in Pekan Tua Village, Kempas Sub-District, Indragiri Hilir District, Riau Province

Analisis Kelayakan Usaha Alat Tangkap Jaring Insang (Gill Net) di Desa Pekan Tua, Kecamatan Kempas, Kabupaten Indragiri Hilir Provinsi Riau

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Abstract

The success of the fishing business is determined by several factors, including the fishing ground, the fishing fleet (fishing boat), the skills of the fishermen (skill), and the fishing gear itself. In this case, fishing gear is the basic construction material that determines the purpose and efficiency of new fishing results advancing toward specifications. This study analyses the investment, production, income, and business feasibility of gill net fishing gear in Pekan Tua Village, Kempas District, Indragiri Hilir Regency, Riau Province. The research method used is the survey method. The type of data collected includes primary data and secondary data. The results of this study are as follows: 1) Total investment of IDR0,931,500 with fixed capital of IDR 40,750,000 and working capital of IDR 181,5000. 2) The average catch of gill net fishermen in Pekan Tua Village in a year in the peak season is 1,413.7 kg /year, in the medium season in a year 1416.9 kg/year, and in the lean season in a year 473.80 kg year. The total catch of fishermen per year is 3,116.36 kg /year. The average net income fishermen earn based on the peak season is IDR 31,796,127, and the medium season IDR 32,650,170. The lean season IDR 5,004,336 3) Revenue Cost of Ratio (RCR) obtained a value of 2.19, Financial Rate of Return (FRR) of 169.68%, and in the Payback Period of Capital (PPC) analysis obtained a result of 0,59 or 6 months. So, based on this feasibility analysis, the gill net fishing gear business in Pekan Tua Village follows existing criteria/provisions, and it can be concluded that this business is profitable and feasible to run.

Keywords: Investment, Income, Business Feasibility, Gill Net, Fishermen

Abstrak

Keberhasilan suatu penangkapan ikan ditentukan oleh beberapa faktor antara lain: daerah penangkapan (*fishing ground*), armada penangkapan *(fishing boat),* keterampilan nelayan *(skill),* dan alat penangkapan itu sendiri *(fishing gear*). Alat penangkapan dalam hal ini bahan dasar konstruksi menentukan tujuan dan efisiensi hasil penangkapan baru yang semakin maju ke arah spesifikasi. Penelitian ini bertujuan untuk mengalisis investasi, hasil tangkap (produksi) dan pendapatan serta untuk mengalisis kelayakan usaha alat tangkap jaring insang *(Gill net)* di Desa Pekan Tua Kecamatan Kempas Kabupaten Indragiri Hilir Provinsi Riau. Metode penelitian yang digunakan dalam penelitian ini adalah metode survey. Hasil penelitian ini yaitu : 1) Total investasi sebesar Rp 40.931.500 dengan bagian modal tetap sebesar Rp 40.750.000 dan modal kerja

sebesar Rp 181.5000. 2) Rata-rata hasil tangkap nelayan jaring insang Desa Pekan Tua dalam setahun pada musim puncak 1.413,7 kg/tahun, pada musim sedang dalam setahun 1416,9 kg/tahun, dan Pada musim paceklik dalam setahun 473,80 kg/tahun. Maka total hasil tangkap nelayan pertahun sebesar 3.116,36 kg/tahun. Rata-rata pendapatan bersih yang diperoleh oleh nelayan berdasarkan musim puncak sebesar Rp 31.796.127, pada musim sedang Rp 32.650.170, dan pada musim paceklik Rp 5.004.336 3) *Revenue Cost of Ratio* (RCR) memperoleh nilai sebesar 2,19, *Financial Rate of Return* (FRR) sebesar 169,68% dan pada analisis *Payback Period of Capital* (PPC) mandapatkan hasil sebesar 0,59 atau 6 bulan. Sehingga berdasarkan analisis kelayakan ini pada usaha alat tangkap jaring insang di Desa Pekan Tua sudah sesuai dengan kriteria/ketentuan yang sudah ada dan dapat diambil kesimpulan bahwa usaha ini menguntungkan dan layak untuk dijalankan.

Kata kunci: Investasi, Pendapatan, Kelayakan Usaha, Jaring Insang, Nelayan

1. Introduction

Indragiri Hilir Regency is one of the regencies in Riau Province that has the first most significant fisheries potential among the regencies in Riau Province. The fisheries potential in the regency is 48,364.18 tonnes. Indragiri Hilir has a river that stretches with a length of ± 415 km, crossing several districts in Riau Province. The potential of fisheries in Indragiri Hilir Regency includes marine fisheries, freshwater aquaculture, and marine fish farming. The potential of capture fisheries in Indragiri Hilir Regency is quite significant when compared to Siak Regency in 2019, with the potential of capture fisheries in Indragiri Hilir Regency with a capture fishery potential of 48,364.18 ton, more critical than that of Siak Regency with a capture fishery yield of 2,270.00 ton. Several sub-districts in Indragiri Hilir have enormous marine fisheries potential, including the Kempas sub-district.

Pekan Tua Village is in the administrative area of the Kempas District of Indragiri Hilir Regency, Riau Province. The number of fishermen in Pekan Tua Village is 68 people. There are several types of fishing gear operated by fishermen in Pekan Tua Village, including gill nets with 253 units, then splints with 31 units, and longline with 20 units. Gill net is the dominant fishing gear fishermen use in Pekan Tua Village. A Gill or gill net is rectangular with floats, weights, and upper and lower risers. The mesh size is the same throughout the body of the net or adjusted to the target fish being caught. The principle of capture is to block the direction of movement of fish swimming in groups or one by one. Installed below the surface of the water by being washed away or anchored to the bottom of the water. Fish are caught because they are entangled (gilled) in the gill cover hole (operculum), entangled or twisted or twisted (entangled) in the mesh (Istiqomah et al., 2019).

In fishing operations, gill nets usually consist of several pieces of net that are joined together to form one long net unit, the length of which depends on the number of tints to be operated. This fishing gear can be operated by drifting, installed permanently in a body of water, looping, or sweeping the bottom (Istiqomah et al., 2019). The success of a fishing effort is determined by several factors, including the fishing ground, the fishing fleet (fishing boat), the skills of the fishermen (skill), and the fishing gear itself. In this case, the primary construction material of fishing gear determines the purpose and efficiency of new fishing results that are increasingly advancing toward specifications (Risnawati et al., 2019).

This research aims to determine the total investment, production yield, and business feasibility. So that it is feasible to develop and in line with technical, social, and economic aspects in the Pekan Tua Village area, Kempas District, Indragiri Hilir Regency.

2. Material and Method

2.1. Time and Place

This research was conducted in Pekan Tua Village, Indragiri Hilir Regency, Riau Province, from August to September 2023. The research location was determined purposively because this area has people who earn a living as fishermen.

2.2. Methods

The survey method was used in this research. According to Sugiyono (2018), the survey method is a quantitative research method used to obtain data that occurred in the past or the present about beliefs, opinions, characteristics, and behavioral relationships and to test several hypotheses about social and psychological variables from samples taken from specific populations, data collection techniques with observations (interviews or questionnaires) that are not in-depth, and research results tend to be generalized.

2.3. Data Analysis

2.3.1. Investment

Investment is defined as the expenditure or expenditure of planting capital to buy capital goods and equipment. In contrast, the capital used is divided into two parts, namely working capital and fixed capital, where working capital is used, such as capital, rent, food, wages, and credit. In contrast, fixed capital such as ships, engines, fishing gear, and ship maintenance costs are used. Fixed assets can be resold and reused before their useful life ends (Amura & Pirhel, 2021).

$$TI = MT + MK$$

Description:

TI = Total investment
MT = Fixed Capital (IDR)
MK = Working Capital (IDR/trip)

2.3.2. Gross Revenue

Gross revenue is the total revenue (TR) and *total* cost (TC). A business can be considered profitable if TR minus TC is positive. Conversely, if TR minus TC is negative, business can be regarded as detrimental. With the following formula (Syarif et al., 2016):

$$\pi = TR - TC$$

Description:

π = profit
TR = total *revenue*
TC = total *cost*

With business criteria: TR > TC = profitable business; TR < TC = business loss; and TR = TC = business at the point of balance (break-even point)

2.3.3. Revenue-Cost Ratio (R/C)

This analysis aims to determine how far each rupiah value of costs in business activities can provide a specific revenue value as a benefit. Total revenue, or gross receipts or gross sales, is a business's revenue from all sales before deducting business costs and expenses. Meanwhile, the total cost is the company's fixed and variable costs. Usually, companies calculate it per unit sold and multiply it by the number of items produced (Ayu et al., 2018). The formula used to calculate R/C is:

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

With the criteria: R/C > 1: profitable business; R/C < 1 : business loss; R/C = 1 : break-even business

2.3.4. Financial Rate of Return (FRR)

The financial rate of return is the profit percentage compared with the total investment invested. Data analysis determines the efficiency of capital use in business (Grasia et al., 2020). With the following formula:

$$FRR = \frac{\pi}{TI} \times 100\%$$

Description:

FRR : Financial Rate of Return
л : Profit (IDR)
TI : Total Investment (IDR)

Decision criteria: If the FRR value > deposit interest rate, then it is better to invest in the business; if the FRR value < deposit interest rate, then otherwise no investment is made in the business).

2.3.5. Payback Period of Capital (PPC)

The payback period of capital is a method that measures how quickly an investment can be returned in units of years. Analysis of the payback period of capital is needed to determine how long the business being done can return the investment. The faster the return on investment costs of a project, the better the project because the smoother the capital turnover (Nainggolan, 2018). The calculation of the payback period of capital is as follows:

$$PPC = \frac{TI}{NI} \times \text{period}$$

Description:

PPC : Payback period of capital
TI : Total investment
NI : *Net income* or net income

With criteria: If the value of the payback period > economic life, the investment is rejected. Suppose the value of the payback period < economic life, then the investment is accepted. So, the assessment criteria in this payback

period method are that if the payback period is smaller than the maximum time required, the project is accepted, and vice versa. The investment is rejected if the payback period is more significant or longer than necessary.

3. Result and Discussion

3.1. Location and General Condition of Desa Pekan Tua

Pekan Tua Village is located in Kempas Sub-district, Indragiri Hilir Regency, Riau Province. Pekan Tua Village is located in an administrative area including Kempas District, Indragiri Hilir Regency because it is located on the edge of the provincial road that connects Indragiri Hilir Regency to Riau Province. The administrative boundaries of Pekan Tua Village are bordered by several surrounding areas, which include the north bordering Harapan Jaya Village, Tempuling Subdistrict, the south bordering Kulim Jaya Village, Kempas Subdistrict, then the west bordering Bayas Jaya Village, Kempas Subdistrict and the east bordering Kempas Village, Kempas Subdistrict. Pekan Tua Village has an area of 152.81 km, comprising five hamlets, 10 RW and 20 RT. The distance between the village and the sub-district capital is 30 km, and between the town and the regency capital is 60 km.

The distance between the village and the sub-district capital is 30 km, and between the town and the regency capital, it is 60 km to reach Pekan Tua Village. It can be reached by land using a motorbike or public transport. The climate in Pekan Tua Village has an average rainfall of 1885 mm, while the number of seasons has two seasons: (6 months of summer and six months of rainy season). The average daily temperature ranges from 23-32, while the height of the place from sea level is in the range of 3 masl. The soil color is (mostly) yellow, peat, and sandy clay.

3.2. Total Investment in Fishing Using Gill Net Fishing Equipment

The average fixed capital spent by fishermen of Pekan Tua Village on the fleet is believed to be on the average ship. The capital spent is IDR 34.800.000, where the average capital used to purchase this ship is in new condition. Fixed capital for boat engines averaged IDR 5.300.000, where this price was used to buy boat engines with engine power of 5-6.5 PK. For fishing gear, an average of IDR 650.000 was used.

Table 1. Fixed capital of gill net fishermen in Pekan Tua Village

Description	Fixed Capital (IDR)
Fleet	
- Ship	34.800.000
- Machine	5.300.000
Fishing Gear	
- Gill Net	650.000
Total	40.750.000

Table 2. Working capital of gill net fishermen in Pekan Tua Village

Description II	Working Capital (IDR)
BBM	50.000
Rations	
- Eat	20.000
- Cigarettes	20.000
Coffee	11.500
Labor Wages	80.000
Total	181.500

Table 3. Total investment of gill net fishermen in Pekan Tua Village

No	Capital Type	Amount (IDR)
1	Fixed Capital	40.750.000
2	Working capital	181.500
Total Investment		40.931.500

Working capital spent by fishermen of Pekan Tua Village for fuel amounting to IDR 50,000, this price is accumulated for the purchase of 8 L of diesel fuel, when fishing fishermen only spend as much as 2-3 L in one day fishing, while for rations which include the cost of food, cigarettes, and coffee where for food the average is IDR 20.000. In contrast, for cigarettes, the average is IDR 20,000, and for coffee, IDR 11,500. The average work wage is IDR 80.000/day. The total investment spent by fishermen for catching business with gill net fishing gear (Gill net) with a motorboat fishing fleet of IDR 40,931,500 (Table 3). This aligns with research by Saputra et al. (2016), which states that investment is a component of fixed capital plus working capital.

3.3. Production and Income

The catch in Pekan Tua Village is influenced by the fishing season. In the world of capture fisheries, there are generally three fishing seasons: peak, medium, and lean.

Table 4. Catch results of fishermen in Pekan Tua Village, Kempas Sub-district, Indragiri Hilir Regency

Season	Catch yield (kg)		
	Trip	Month	Year
Peak	15,71	471,23	1.413,7
Medium	11,81	283,4	1.416.9
Famine	5,92	118,45	473,80
Total catch per year		3.304,4	

Based on Table 4, it can be seen that the catch of fishermen in each season is different. In the peak season, fishermen get an average catch of 15.71 kg/trip, while in the medium season, fishermen only get an average of 11.81 kg/trip. Then, in the lean season, the average produced in one trip is only 5.92 kg /trip. It can also be seen in Table 4 that the average catch of fishermen per month based on the season, namely, in the peak season of 471.23 kg /month. This catch starts in June, and it can be seen that the catch of fishermen in each season is different. In the peak season, fishermen get an average catch of 15.71 kg /trip, while in the medium season, fishermen only get an average of 11.81 kg/trip. In the lean season, the average produced in one trip is only 5.92 kg/trip. It can also be seen in Table 7 the average catch of fishermen per month based on the season, namely, in the peak season of 471.23 kg/month, this catch starts in June.

Gross income is the result of selling the catch as an input at the prevailing price in the market and has not been reduced by costs. As producers, fishermen not only aim to produce fish as production, but the ultimate goal of the fishing business that fishermen will carry out is to obtain income in the form of money.

Table 5. Gross Income of Gill Net Fishermen in Pekan Tua Village, Kempas Sub-district, Indragiri Hilir Regency

Season	Gross Income (IDR)		
	Trip	Month	Year
Peak	549.763	16.492.875	49.478.625
Medium	472.300	11.335.200	56.676.000
Famine	266.513	5.330.250	21.321.000
Average gross revenue per year		127.475.625	

Based on Table 5, the gross income of motorboat fishermen during the peak season is IDR549,763/trip; during the medium season, IDR472.300/trip; and during the lean season, the gross income of fishermen is IDR 266.513/trip. Based on the calculations, the average income of Pekan Tua Village fishermen per month in the peak season is IDR 16.492.875/month. In the medium season, the monthly income is IDR 11.335.200/month; in the lean season, it is IDR 5.330.250/month. Based on Table 5, the gross income per year based on the peak season is IDR 49.5478.625/year. In the medium season, it is IDR 56.676.000/year; in the lean season, it is IDR 21.321.000/year. Then, the average gross income per year is IDR 127.475.625. This is in line with the research of Nita et al. (2023), which states that gross income results from total production multiplied by the selling price.

Fixed costs incurred by gill net fishermen include depreciation costs (boats, engines, and nets). Depreciation costs are a consequence of using fixed capital, where fixed capital will experience a decrease in function. Maintenance costs are given to ensure that the tools used to produce these products have a more durable economic value. Maintenance costs required by fishermen in Pekan Tua Village include boat, engine, and net maintenance costs.

Table 6. Fixed Costs of Gill Net Fishermen in Pekan Tua Village

No	Item Type	Depreciation (IDR)	Maintenance (IDR)	Average fixed costs (IDR/year)
1.	Ship	3.480.00	500.000	3.980.000
2.	Machine	530.000	650.000	1.180.000
3.	Net	130.000	100.000	230.000
Total		4.140.000	1.250.000	5.390.000

Based on Table 6, the total fixed costs of gill net fishermen in Pekan Tua Village include several aspects, including boats with an average depreciation cost of IDR 3.480.000 and an average maintenance cost of IDR 500.000, so the total cost is IDR 3.980.000. On the engine, the average depreciation cost is IDR 530.000 with an average maintenance cost of IDR 65.000, so the fixed costs incurred are IDR 1.180.000. For the nets used, the average depreciation cost is IDR 130.000; for an average maintenance of IDR 100.000, the fixed costs incurred are IDR 230.000. So, the annual fixed cost is IDR 5.390.000/year. This is in line with the research of Elinah et al. (2021), which states that the total cost is the sum of depreciation and maintenance costs.

Non-fixed costs are costs incurred on a variable basis and change in line with the production volume. The non-fixed costs of gill nets are related to the costs incurred. Based on interviews with gillnet fishermen in Pekan Tua Village, the amount of non-fixed costs differs for each fisherman. Non-fixed costs include fuel costs, consumption costs, and cigarette costs.

Table 7. Non-fixed Costs of Gill Net Fishermen in Pekan Tua Village

No	Needs	Per Trip (IDR)
1.	BBM	50.000
2.	Eat	20.000
3.	Cigarettes	20.000
4.	Coffee	11.500
5	Labor wages	80.000
Total		181.500

Based on Table 7 shows that the average non-fixed cost of gillnet fishermen in one trip is IDR 181.500/trip. The components of non-fixed costs include fuel of ID 50.000/trip, food costs of IDR 20.000/trip, average cigarette costs incurred by fishermen of IDR 20.000/trip, average coffee purchase costs of IDR 11,500/trip, and costs for fishermen labor wages of IDR 80.000/trip. This labor wage is an implicit cost or the cost of labor that works during fishing time.

Table 8. Non-fixed costs per month and year of gill net fishermen in Pekan Tua Village

No	Season	Non-fixed costs (IDR)	
		Month (IDR)	Year (IDR)
1	Peak	5.445.000	16.335.000
2	Medium	4.356.000	21.780.000
3	Famine	3.630.000	14.520.000

Total cost is the cost incurred by gillnet fishermen, consisting of fixed and non-fixed costs in one trip. It can be calculated into one month and one year of fishing trips. Total costs are obtained from the sum of fixed costs and non-fixed costs.

Table 9. Total cost of gill net fishermen in Pekan Tua Village

Season	Fixed Cost (IDR/year)	Non-fixed costs			Total cost (IDR/year)
		Trip (IDR)	Month (IDR)	Year (IDR)	
Peak	1.347.498	181.500	5.445.000	16.335.000	17.682.498
Medium	2.245.830	181.500	4.356.000	21.780.000	24.025.830
Famine	1.796.664	181.500	3.630.000	14.520.000	16.316.664
Jumlah	5.390.000	544.500	13.431.000	52.635.000	58.024.992

Based on Table 9, it can be seen that the fixed costs per year in the peak season amounted to IDR 1.347.498, in the medium season amounted to IDR 2.245.830, and in the lean season amounted to IDR 1.796.664. As for non-fixed costs in the peak season of IDR 17.682.498, in the medium season of IDR 24.025.830, and in the lean season of IDR 14.520.000, the total cost for the average total cost of gill net fishermen in Pekan Tua Village in the peak season was IDR 17.682.498, the medium season was IDR 24.025.830, and in the lean season was IDR 16.316.664, the results of this calculation are the sum of fixed costs with non-fixed costs. So, the average total cost is IDR58.024.992. Net income is the reduction between gross income and total costs incurred in one fishing trip (Siagian et al., 2020). In this case, the total costs incurred are fixed and variable.

Tabel 10. Average Net Income of Gill Net Fishermen in Pekan Tua Village

Season	Gross revenue (IDR/year)	Total cost (IDR/year)	Income net income (IDR/year)
Peak	49.478.625	17.682.498	31.796.127
Medium	56.676.000	24.025.830	32.650.170
Famine	21.321.000	16.316.664	5.004.336
Jumlah	127.475.625	58.024.992	69.450.633

Based on the data in Table 10, it can be seen that the average gross income per year by gillnet fishermen in Pekan Tua Village is IDR127.475.625. The total cost incurred by gillnet fishermen per year is IDR 58.024.992. The total net income per year is IDR 69.450.633. This is in line with the research of Siagian et al. (2020), which found that profit or net income comes from gross income minus total costs.

3.4. Business Feasibility

Table 11, gill net fishermen produce an R/C value of 2.20, meaning that for every IDR 1 of capital spent, the business owner will receive IDR 2.20 (Firmansyah et al., 2023). Based on the calculation table, the R/C value for gill net fishermen is more than one, so the business is feasible to continue. This is evidenced by the predetermined criteria where the R/C value generated by the gill net fishing gear business in Pekan Tua Village is R/C> 1, so the fishing business using gill net fishing gear is feasible to continue because it meets the predetermined criteria. This value is obtained by dividing the total revenue by the total cost, so the R / C value is 2.20.

Tabel 11. R/C Value of Gill Net Fishermen in Pekan Tua Village

No	Description	Total
1	total revenue (IDR)	127,475,625
2	total cost (IDR)	58,025,000
3	R/C	2.20

Table 12. FRR value of gillnet fishermen in Pekan Tua village

No	Description	Total
1	Net Income (IDR)	69,450,625
2	Total Investment (IDR)	40,931,500
3	FRR	169.68

Based on Table 12, the bank deposit interest rate used by researchers is 3%, with a 12-month deposit issued by BRI bank in July 2023. BRI Bank was chosen because the service office has reached the sub-district area compared to other banks. Table 14 shows that the FRR of gill net fishermen is 169.68%. The FRR value of the fishermen's business using gill nets is greater than the deposit interest rate prevailing in the bank. Where seen from the FRR criteria, namely, if the FRR value of a business is> from the bank deposit interest rate, the business provides a profit on the investment invested, and the investment should be invested in the business. Conversely, if the FRR value is < from the bank deposit interest rate, the business investment should not be funded because it will be detrimental. It can be seen from the results of the FRR calculation where net income is divided by total investment, resulting in an FRR value of 169.68%.

Tabel 13. PPC Value of Gill Net Fishermen in Pekan Tua Village

No	Description	Total
1	Total Investment (IDR)	40,931,500
2	Net Income (IDR)	69,450,625
3	PPC	0,59

Table 13 shows that the PPC value for fishermen in Pekan Tua Village is 0,59 years, which means that the length of return on capital invested in the gill net business is six months. The faster the return, the better it is to try. Based on calculations on the gill net fishing gear business, the return on invested capital is fairly fast, which is around six months; where this result is obtained from the results of the division between total investment divided by net income multiplied by 12 months or one year, then received a return of capital for six months.

4. Conclusions

The total investment of fishermen in the feasibility of fishing with gill net fishing gear in Pekan Tua Village is IDR 40.931.500. The average catch of gill net fishermen in Pekan Tua Village during the peak season is 1,413.7 kg /year. The medium season in a year is 1416.9 kg /year, and the lean season in a year is 473.80 kg /year. The total catch of fishermen per year is 3,116.36 kg/year. The average net income fishermen earn based on the peak season is IDR 31.796.127, in the medium season IDR 32.650.170, and the lean season IDR 5.004.336. From the analysis of business feasibility criteria, the R/C ratio value is 2.19, the FRR value is 169.68%, and the PPC value is 0,59 years or six months. Based on investment criteria, the fishing business with gillnet gear in Pekan Tua Village is feasible to continue.

5. Suggestions

To increase fishermen's catch in Pekan Tua Village, it is necessary to increase the number of pieces fishermen use. To preserve fish resources in the Batang Indragiri River, the government or related agencies such as the Fisheries Service need to supervise the activities of fishermen who use electric current and the use of potassium, which can harm other fishermen to reduce the yield of fish resources in the Batang Indragiri River.

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