

A Financial Analysis on Gillnet Fishery Business in Sangatta District, East Kutai Regency, East Kalimantan, Indonesia

Helminuddin^a, Said Abdusysyahid^b, Qoriah Saleha^c, ^{a,b,c}Lecturer on Department of Fisheries Socio Economics FPIK Unmul, Email: h.helminuddin@gmail.com, syahids59@yahoo.co.id, qoriasa@yahoo.com

The objectives of this study were to (1) financially analyse the gillnet fishery business in the Sangatta Utara Village; (2) scrutinise the sensitivity of the gillnet fishery business to the percentage of the decrease in selling prices and fish catches as well as the percentage of the increase in fixed costs and variable costs. The study was conducted in the Sangatta Utara Village, Sangatta District, Kutai Timur Regency on October 2018. The number of gillnet fishermen was 30 people and they were all included as respondents (census). Data was analysed using discounted and non-discounted investment criteria (NPV, Net B/C Ratio, IRR, and Payback Period) and sensitivity analysis. The results of the study showed the following: (1) 15% Net Present Value (NPV) was IDR 125,152,293 (NPV > 0). (2) The value of the 15% Net Benefit-Cost Ratio (Net B/C Ratio) was 2.28 (Net B/C Ratio > 1). (3) Internal Rate of Return (IRR) value was 223% (IRR > 15%). (4) Payback Period (PBP) was 5.13 months or (0.43 years). Therefore, it could be said that the gillnet fishery business in the Sangatta Village, Sangatta District was feasible (profitable). The gillnet fishery business in the Sangatta Utara Village of Sangatta District was sensitive to the decrease in selling prices, decrease in catches, increase in fixed costs, and increase in variable costs. The reduction limit was 4.4% at the lowest selling price and catches, 9% at the highest increase in fixed costs, and 10% at the maximum variable costs.

Key words: *Gillnet, financial, sensitivity, Sanggata village.*

Introduction

Fishermen are people whose main livelihood is fishing (Law Number 45 of 2009). Based on ownership of fishing gear, fishermen are divided into three groups, namely, labour fishermen, (boat) owner fishermen, and individuals. In carrying out fishing activities, fishermen use various types of fishing gear, according to the FAO international standard classification, including surrounding nets, seine nets, bottom trawls, dredges, lift nets, falling gears, traps, hand lines, hooks and lines, gripping and wounding gears, and gillnets.

Gillnets are widely used by fishermen in Indonesia; some fishing areas even consider the tool as the best fishing gear to catch fish. An interview conducted by Bintang Prayogo (2017 from www.WWF.Indonesia/IlmuKelautanUndip) with 73 fishermen on their reason favouring gillnets revealed that gillnets helped them to reduce production cost, as the materials for making the nets could be easily obtained and modified. They could simply use sandals as a float when no float was available, not to mention the easy operation the nets provided. In gillnets, fish are enmeshed or entangled in the mesh (Dermawati *et al.*, 2019; Sweking *et al.*, 2018). The fish caught by gillnets are generally horizontal and vertical migratory species that are not very active, for example *Rasbora jacobsoni*, *Hampala macrolepidota*, *Cyptopterus micronema*, *Helostoma teminckii*, and *Anabas testudineus* (Sweking *et al.*, 2018).

Figure 1. Gillnets (KKP, 2017)





The economic activities carried out by the community in the Sangatta Utara Village are not based on a business feasibility analysis, including fishing activities. Many gillnet fishing activities do not involve any bookkeeping; the profit they claim from each fishing activity is limited to the difference of their revenue and costs. Various methods can be implemented to determine the profit of a business, from the simple one to mathematical analysis. According to Wiyono (2006), the catch of gillnet fishing is influenced by the catch time, the number of hauling, and the size of boat; this is the basis in economic business because it is closely related to the costs incurred by fishermen. Financial analysis and sensitivity analysis is quite important in business with the aim to identify the feasibility and sustainability of the business to avoid losses. Financial analysis has been widely applied in various fields of industry (Kusuma, 2010; Sutojo, 2000), manufacture (Firmansyah, 2006; Wolf, 2005), agriculture (Erlina, 2006; Rantala, 2010; Yuniati *et al.*, 2015), and forestry (Tomaselli *et al.*, 2012).

Financial and sensitivity analysis of gillnet fishery business is expected to provide a real financial description related to profits—whether the profits obtained are sufficient to support the business sustainability. Information on the business sensitivity against the percentage of decline in revenue and of increase in costs will also be obtained.

The objectives of this study were to (1) financially analyse the gillnet fishery business in the Sangatta Utara Village; (2) scrutinise the sensitivity of the gillnet fishery business to the percentage of the decrease in selling prices and fish catches as well as the percentage of the increase in fixed costs and variable costs.

Research Method

Research Period and Location

The gillnet fishermen interviews were conducted in the Sangatta Utara Village, Sangatta District, Kutai Timur Regency on October 2018. The sampling was performed using the census method by 30 active respondents.

Data Collection

The data collection was made up of both primary and secondary data. Primary data was data obtained from primary sources, both through direct observation and interviews with the respondents based on a questionnaire prepared in accordance with the objectives of the study. The secondary data was needed as a support and was obtained from relevant agencies and related research reports. The secondary data collection was conducted through literature study and the previous studies relevant to this research. Secondary data included the profile of the region, the business performance of fisherman communities, and demographic data.

Data Analysis

Data collected from observation and interviews were tabulated and analysed using the financial analysis. The analysis included discounted and non-discounted investment criteria and sensitivity analysis to find a comprehensive measure of business feasibility. The criteria used in financial analysis were as follows (Kadariah, 2001):

1. Net Present Value (NPV)

NPV is the difference between benefits and costs used as present value.

$$NPV = \sum_{t=1}^n \frac{Bt - Ct}{(1+i)^t}$$

Where:

Bt = Gross benefit in year t (IDR)

Ct = Gross cost in year t (IDR)

n = Economic life of seaweed cultivation (year)

i = applicable interest rate (%)

t = year

These investment criteria mean that:

- a. if $NPV > 0$, then the business is feasible to continue
- b. if $NPV \leq 0$, then the business reaches Break-Even Point, so it is not feasible to continue

2. Internal Rate of Return (IRR)

IRR is the interest rate that makes the NPV value equal to zero.

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

Where:

NPV' = Net Present Value positive (IDR)

NPV'' = Net Present Value negative (IDR)

i' = Discount rate giving a positive NPV value (%)

i'' = Discount rate giving a negative NPV value (%)

These investment criteria mean that:

- a. If $IRR > OCC$, the business is feasible to continue (profitable)
- b. If $IRR \leq OCC$, the business is not feasible to continue (non-profitable)

3. Net Benefit-Cost Ratio (Net B/C Ratio)

Net B/C Ratio is the comparison between net benefits and net costs used as present value.

$$Net\ B/C = \frac{\sum_{t=1}^n \frac{B_t - C_t}{(1+i)^t}}{\sum_{t=1}^n \frac{C_t - B_t}{(1+i)^t}}$$

Where:

B_t = gross benefit in year t (IDR)

C_t = gross cost in year t (IDR)

n = economic life (years)

i = applicable interest rate (%)

t = year

These investment criteria mean that:

- a. if $Net\ B/C > 1$, the business is feasible to continue
- b. if $Net\ B/C \leq 1$, the business is not feasible to continue

4. Payback Period (PbP)

Payback Period is a certain period of time that shows the cash inflow that cumulatively equals the amount of investment in the form of present value.

$$PbP = T_{p-1} + \frac{\sum_{i=1}^n \bar{I}_i - \sum_{i=1}^n \bar{B}_{iep-1}}{\bar{B}_p}$$

In which:

PBP = Payback Period

T_{p-1} = year before Payback Period

\bar{I}_i = amount of discounted investment

\bar{B}_{iep-1} = amount of discounted benefit before Payback Period

\bar{B}_p = amount of benefit at Payback Period

Sensitivity analysis was performed to find out the effects of changes. According to Gittinger (1986), changes in conditions of society that affect the income of business or community can

be identified using sensitivity analysis. In gillnet fishing, sensitivity may occur due to four main factors influencing the business activities, namely: (1) changes in product selling prices, (2) delays in business operation, (3) cost increases, and (4) changes in production volume (Susilowati and Kurniati, 2018).

Findings and Discussion

Description of Research Location

The Sangatta Utara Village is located in the Sangatta District of Kutai Timur Regency. The borders are as follow:

- North : Teluk Lingga Urban Village
- East : Makasar Strait
- South : Sangatta River / Singa Geweh
- West : Sangatta River / Kutai National Park / South Sangatta

Figure 1. Research Location



It is situated at a low topography area of 1-30 m above sea level. The characteristics of the regional climate are tropical, with an average rainfall of 1725 mm/year, which is influenced by the rainy and dry seasons, and the average temperatures of 29⁰C (Monograph of Sangatta Utara Village, 2016).

The total population was 38,699 people in 2016, consisting of 20,278 males and 18,421 females with 9,616 households. Sangatta Utara villagers were mainly working in the

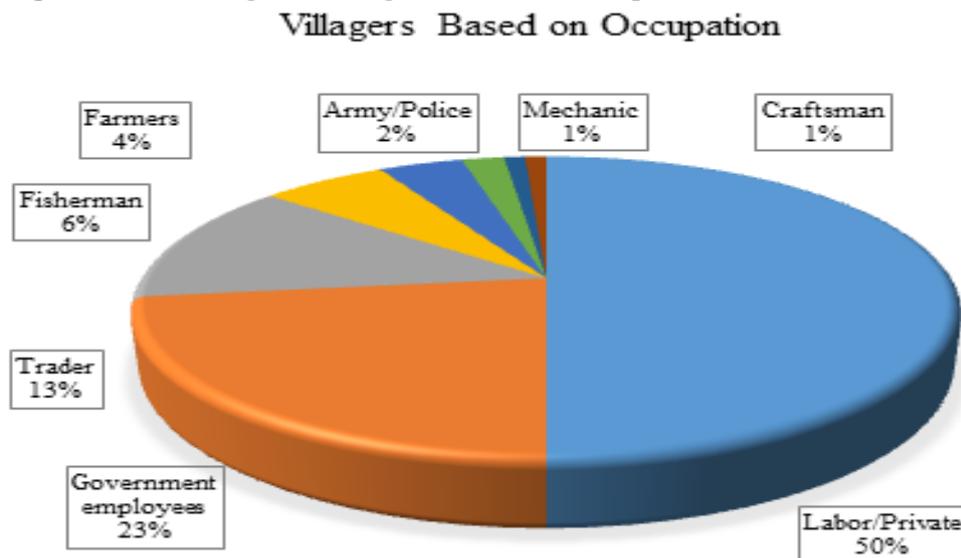
government sector (22.52%) and as employees in the private sector (49.65%). Only 5.52% of the population were fishermen. The information is summarised in Table 1.

Table 1: Occupations of Sangatta Utara villagers

No	Types of Occupation	Number (people)
1	Farmer	405
2	Labourer/worker	4,689
3	Civil servant	2,127
4	Craftsman	114
5	Merchant	1,274
6	Fisherman	521
7	Mechanic	91
8	Armed force/police	224
Total		9,445

Source: Data Profile of Sanggata Utara Village, 2016

Figure 2. Percentage of Villagers based on Occupation



Description of Gillnet Fishery Business in the Sanggata Utara Village

There were two groups of gillnet fishermen, namely the “Betutue Kenyamukan” and the “Taka Cumi-Cumi.” On average, they have been in the business for 7-8 years. Their catches were on a small scale. They operated outboard motors made of wood, with *ketinting* and *dompeng* as the machine, with an engine power of 3 hp, 5 hp, 6 hp, 9 pk hp 24 hp. They used gas oil and gasoline as the fuel. Their catches were snapper (*Lutjanus spp*), *gulamah* (*Pseudocienna amovensis*), mackerel (*Restrelliger canagurta* and *Scomber neglectus*),

skipjack (*Katsuwonus pelamis*), and Indian scad (*Decapterus ruselli*). They brought their catches every day to Tempat Pelelangan Ikan (TPI) or fish auctions, which were then sold to collectors and consumers in and out of the Sanggata Utara Village.

Figure 3. Gillnets



Figure 4. Fishing Boats in Sanggata Utara



Feasibility Analysis

The gillnet fishery business has been carried out for a long time by the community in Sanggata Utara. The fish captured by the fishermen include snapper, *gulamah*, mackerel, skipjack, and Indian scad.

a. Production Cost

The total cost is the sum of fixed and variable costs. Soekartawi (1990) explains that fixed costs are not related to the number of goods produced, while variable costs are costs that can increase production at the same time for each commodity produced.

From the calculation results, the investment cost was IDR 16,024,435. The total cost consists of total fixed cost and total variable cost. The fixed cost consisted of accumulated depreciation of the total investment of IDR 98,248,209. The variable cost consisted of the costs incurred during fishing activities, such as for fuel, consumption, ice cubes, and others of IDR 73,630,744.

b. Revenue

Gilarso (1989) argues that production includes every activity that directly or indirectly produces goods and services to meet human needs. Soekartawi (2003) states that the result of production process is product (output). The term production means usage—with this understanding it can be ascertained that production activities are combining various inputs to produce outputs.

The production in this study referred to the types of fish caught including snapper, *gulamah*, mackerel, skipjack, and Indian scad.

Revenue is the multiplication of total production with the selling price at that time, so the total revenue of respondents was IDR 214,807,787. Profit refers to the difference between the total revenue and the total costs incurred by fishermen in one fishing period. The average profit gained by gillnet fishermen in one year was IDR 40,113,019.

Financial analysis is the cash flow to find out whether a business can provide optimal benefits for the fishermen. The financial analysis used in this study was the investment criteria consisting of NPV, IRR, and Net B/CR (discounted), and Payback Period/PbP (not discounted).

a. Net Present Value (NPV)

Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. This study produced an NPV value of IDR 125,152,293. It means that the profit from the fishing business for a period of five years was IDR 125,152,293 at present value. Therefore, the gillnet fishery business in the Sanggata Utara Village is feasible to be continued based on the criteria of NPV value > 0 .

b. Internal Rate of Return (IRR)

Internal rate of return is a discount rate that makes the net present value (NPV) of all cash flows from a particular project equal to zero. IRR shows the ability of capital to provide benefits in the form of a discount rate, with $IRR > OCC$. The financial analysis produced an IRR value of 223% with an OCC of 15%. These results indicate that the capital invested in the gillnet fishery business in the Sanggata Utara Village was to provide benefits equal to 223% ($IRR > 15\%$), so this business is feasible to be continued.

c. Net Benefit-Cost Ratio (Net BCR)

Net BCR is a comparison between positive net benefit at present value and is a profit after the business is running, with negative net cost at present value which is the cost invested. The fishing business in the Sanggata Utara Village resulted in a Net BCR value of 2.28, meaning that the fishing business was able to provide net benefit of 2.28 times the investment costs incurred. In other words, IDR 1 of investment capital can generate net benefit of IDR 2.28 during the business process. Therefore, the business is feasible to be continued based on the Net BCR value > 1 .

d. Payback Period (PbP)

Payback Period is the period required to recover the initial outlay of the investment. The fishing business in the Sanggata Utara Village could recoup the investment costs within 6.13 months (0.43 years), as before the five-year life span of the project runs out, the investment capital could already be paid back. After the investment capital was returned, gillnet fishing gained the profit (net benefit). Thus, the business is worth continuing.

Table 2: Summary of Financial Analysis Results of the Gillnet Fishery Business in the Sanggata Utara Village

No	Investment Criteria	Value	Result	Feasibility Analysis
1	NPV (IDR)	125,152,293	$NPV > 0$	Feasible
2	IRR (%)	223	$IRR > 10\% \text{ (OCC)}$	Feasible
3	NBCR	2.28	$NBCR > 1$	Feasible
4	PbP (months)	6	$PP < \text{project life span}$ (5 years)	Feasible

Source: Primary Data (2019)

Sensitivity Analysis

The results of the sensitivity analysis show four scenarios carried out in the feasibility analysis of the fishing business. The four scenarios are: 1) decrease in selling price by 4.4% and fixed production; (2) decrease in production value by 4.4% and fixed costs; (3) increase in fixed costs by 9%; and (4) increase in variable costs by 10%.

Based on the sensitivity analysis of the four scenarios (NPV, IRR, NBCR, and PBP), the gillnets fishery business is feasible. The results of the sensitivity analysis are presented in Table 3.

Table 3: Results of the Sensitivity Analysis of the Gillnets Fishery Business

No	Scenario	NPV (IDR)	Net BCR (times)	IRR (%)	PbP (months)	Note
1	Decrease in selling price by 4.4% and fixed production	39,913,887	1.008	88	13	Feasible
2	Decrease in production value by 4.4% and fixed costs	39,913,887	1.006	88	13	Feasible
3	Increase in fixed costs by 9%	39,155,577	1.006	87	13	Feasible
4	Increase in variable costs	45,552,147	1.091	97	12	Feasible

Source: Primary Data (2019)

Conclusions

1. Net Present Value (NPV) of 15% is IDR 125,152,293 (NPV > 0). The 15% Net Benefit-Cost Ratio (Net BCR) is 2.28 (Net BCR > 1). The Internal Rate of Return (IRR) value is 223% (IRR > 15%). The Payback Period (PbP) is 5.13 months or 0.43 years. These results confirm that the gillnet fishery business in the Sanggata Utara Village of Sanggata District is feasible (profitable).
2. The gillnet fishery business in the Sanggata Utara Village of Sanggata District is sensitive to decrease in selling prices, decrease in catches, increase in fixed costs, and increase in variable costs. The reduction limit is 4.4% at the lowest selling price and catches, 9% at the highest increase in fixed costs, and 10% at the maximum variable costs.

REFERENCES

- Dermawati, Palo M., Najamuddin. 2019. Analisis Kontruksi dan Hasil Tangkapan Jaring Insang Permukaan di Perairan Kabupaten Maros Provinsi Sulawesi Selatan. *Jurnal IPTEKS*. Vol 6 (11): 44 – 69.
- Erlina, 2006. Analisis Perancangan Agroindustri Berbasis Karet. *Jurnal Bisnis dan Manajemen*, 3(1):73-92.
- Firmansyah, B.A., Veronika, A, Trigunaryah, B. 2006. Risk Analysis In Feasibility Study Of Building Construction Project: Case Study-PT. Perusahaan Gas Negara Indonesia. The Tenth East Asia-Pacific Conference on Structural Engineering and Construction, Bangkok, Thailand Tahun 2006. Bangkok 3-5 Agustus, Thailand.
- Gittinger, J. P. 1986. Analisis Ekonomi Proyek-Proyek Pertanian. Edisi Kedua. UI Press. Jakarta.
- Kadariah L. 2001. Evaluasi Proyek Analisis Ekonomi. Fakultas Ekonomi Universitas Indonesia. Jakarta.
- Kementerian Kelautan Perikanan (KKP). 2017. Buku Saku Pengolah Data Alat Tangkap. Kementerian Kelautan Perikanan (KKP), Jakarta.
- Kusuma, P.T.W.W, et al. 2010. Financial Analysis Pengembangan Usaha Kecil Menengah (UKM) Produsen Flakes Ubi Jalar (Emergency Food) (Studi Kasus UKM Mandiri Pangan Mapan Makmur, Gunung Kidul). *Proceeding Seminar on Application and Research in Industrial Technology 2010 (SMART) Tahun 2010: C1- C6*. Yogyakarta, 29 Juli 2010: Universitas Gadjah Mada Yogyakarta.
- Rantala, J., P. Harstela, V.M Saارينان and L. Tervo. 2010. A Techno-Economic Evaluation of Bracke and M-Planter Tree Planting Devices. Research Article The Finnish Society of Forest Science ISSN0037-5330. *The Finnish Forest Research Institute Silva Fennica*: p 43 (4)
- Sutojo S, 2000. Studi Kelayakan Proyek, Teori dan Praktek. Jakarta: Gramedia.
- Susilowati, E., Kurniati, H. 2018. Analisis Kelayakan dan Kepekaan: Studi Kasus Industri Kecil Tempe Kopti Semanan, Kecamatan Kalideres, Jakarta Barat. *Bisma*. 10 (2): 102-117.



- Sweking, Najamuddin, A., Firlianty. 2018. Jenis-jenis Ikan yang Tertangkap dengan Jaring Insang tetap (*Set Gillnet*), CPUE dan Panjang Baku Ikan di Danau Burung, dan Danau Hanjalutung di Kelurahan Petuk Ketimpun, Provinsi Kalimantan Tengah. *Jurnal Agribisnis Perikanan*, Vol 11 (2): 51 – 58.
- Tomaselli MF, Timko J, Kozak R. 2012. The Role of Government in the Development of Small and Medium Forest Enterprises: Case Studies from the Gambia. *Small-scale Forestry*. 11: 237–253.
- Wolf OM, et.al. 2005. Techno-economic Feasibility of Large Scale Production of Bio- based Polymers in Europe. Technical Report Series European Commission. Institute for Prospective Technological studies, Joint research, ISBN 92-79-01230-4, Technical Report EUR22103EN.
- Wiyono, E.S., Yamada, S., Tanaka, E., Arimoto, T., Kitakido, T. 2006. Dynamics of Fishing Gear Allocation by Fisheries in Small Scale Coastal Fisheries of Pelabuhan Ratu Bay Indonesia. *Fisheries Management and Ecology* 13(3):185 – 195.
- Yuniati D, Khotimah H, Yeny I. 2015. Studi Kelayakan Pengembangan Bambu Tabah (*Gigantochloa nigrociliata* Buse-kurz) sebagai Sumber Pangan. Di dalam: Hermiati E, Dwianto W, Fatriasari W, Yanto DHY, Anita SH, Kurniawan YD, Zulfiri A, Astari L, Zulfiana D, Pramasari DA *et al.*, editor. *Akselerasi Peran dan Sinergi Masyarakat Peneliti Kayu Indonesia dalam Upaya Mendukung Industri Kehutanan Berbasis Iptek dan Berwawasan Lingkungan. Seminar Nasional XVIII Masyarakat Peneliti Kayu Indonesia (MAPEKI)*; 2015 November 4-5; Bandung, Indonesia. Bandung (ID): Masyarakat Peneliti Kayu Indonesia (MAPEKI). hlm 431-439.