



Feasibility analysis of tiger grouper cultivation business in floating net cages (KJA) in Sikakap village, Mentawai Islands Regency, West Sumatra Province

Rio Rado Tampubolon, Zulkarnaini, Hazmi Arief

Department of Fisheries Socio-Economic, Faculty of Fisheries and Marine, Universitas Riau, Pekanbaru, Indonesia

Abstract

Tiger grouper aquaculture in the Mentawai Islands has potential for further development. This study aims to analyze the investment, profit, income, and feasibility of the tiger grouper aquaculture business in Sikakap Village, Mentawai Islands Regency. A descriptive approach with quantitative analysis was used to assess the factors affecting business feasibility. The study involved 10 respondents, considered sufficient to obtain the necessary data. Data collected includes primary and secondary data through interviews, questionnaires, and literature reviews. The analysis shows that the total investment cost for a 3x3 cage is IDR 117,072,000 (average IDR 14,634,000), and for a 4x4 cage is IDR 38,162,000 (average (average IDR 19,081,000)), calculated per single cage unit. The monthly income for 3x3 cages is IDR 1,674,659 or IDR 20,110,914 annually, while the 4x4 cages generate IDR 2,172,465 monthly or IDR 26,069,584 annually. Based on RCR values, the 3x3 cage shows an RCR of 2.15, FRR of 137.42%, and PPC of 0.72 years (approximately 8.64 months). The 4x4 cage yields an RCR of 2.14, FRR of 136.62%, and PPC of 0.73 years (around 8.76 months). These indicators suggest that the floating net cage-based tiger grouper aquaculture business in Sikakap is feasible, offering relatively high income to farmers.

Keywords: Makerel fish, sustainability, MDS-Rap

Introduction

Based on FAO 2021 [1], it is explained that Indonesia has an area with the potential as a fishery resource, which is 26,606,000 ha. The Food and Agriculture Organization (FAO) said fish farming in the world is expected to increase by around 172 million tons in 2021, an increase of 15 percent from the average world demand in 2009-2011. This shows the high interest of business actors, especially in aquaculture [2]. Fishery resources are an important asset of the state which, if managed properly, will provide maximum benefits to the community [3]. Sikakap Village is a village that has considerable fishery potential, especially considering its strategic position on the coast and close to the waters of the Indian Ocean. The waters around Sikakap Village are rich in various types of marine fish, including tuna, skipjack, cob, grouper, and other reef fish [4]. Fish farming in public waters is very much needed as a counterbalance and assistant to fulfill fish production that has been obtained from catches that tend to decrease. Sikakap Village has great potential for marine fish cultivation such as grouper and white snapper. Floating net cage cultivation (KJA) is one of the methods that can be applied in the waters around Sikakap. The practice of tiger grouper cultivation in KJA has had a significant positive impact on increasing the income of cultivators. The advantages of tiger grouper cultivation are very significant with their rapid growth and can be mass-produced so that they can meet the market demand for live grouper. The use of marine areas with the Floating Net Cage (KJA) system for tiger grouper fish cultivation provides benefits for the surrounding community. These benefits are felt directly by the community through the results of the grouper business and indirectly through the sale of grouper fish by local collectors and the sale of feed in the form of rucah. Despite having good prospects and supported by the potential of natural resources, tiger grouper cultivation business with the KJA system is still rarely carried out by the community.

The main obstacles faced by the community are the high cost of capital required for long-term investment as well as business risks in the tiger grouper business. Thus, the business process of grouper cultivation at KJA in Sikakap Village still looks not optimal. With these problems, the researcher aims to conduct research and identify obstacles and evaluate the sustainability of KJA's business in Sikakap Village, Mentawai Islands, West Sumatra Province.

Research methods Time and place

The time of this research was from March 27 to April 20, 2024 in Sikakap village, Island Regency Mentawai, West Sumatra Province.

Research methods

The method used in this research is the survey method and interview to respondents. Data is collected through the use of structured interviews and questionnaires. These instruments are designed to obtain information from a representative sample of a defined population. The collected data is then subjected to statistical analysis to evaluate the research hypotheses. Although the data is gathered in a natural setting, the researcher plays an active role in the collection process, such as by distributing questionnaires and conducting structured interviews [5].

Determination of respondents

This study used purposive sampling method with certain criteria. Use of this is considered because the sampling is carried out by selecting specific respondents, based on the needs of the data to be obtained [6]. The number of samples to be taken is 10 people. Sample in this research was taken based on the number of cage plots that cultivate tiger grouper. Data collection techniques include interviews, questionnaires and documentation. Primary data consists of existing conditions and cage area, the number of feeds, stocking density, length of maintenance, maintenance

equipment, medicines, and fish prices. Secondary data obtained through literature, articles, previous research, geographical state of the research site, number of cultivators, the main occupation of the cultivator and the level of education. Then the relevant data that published by institutions in Sikakap Village and related agencies such as the Central Statistics Agency and Mentawai Regency Fisheries Office.

Data collection

This research employs several data collection methods, including direct observation, interviews using guided questionnaires, and a review of relevant literature. The study gathers both primary and secondary data. Primary data is sourced from structured interviews and questionnaires administered to fishers, while secondary data is acquired through analysis of existing literature and related documents.

Floating Net Cage Cultivation

Cultivation is a form of human intervention to increase aquatic productivity. Cultivation activities are carried out to produce fish in a controlled container or medium with profit orientation [7]. Floating net cages are containers for fish maintenance made of nets shaped like quadrilaterals or cylinders, floated on the water surface using buoys and frames made of wood, bamboo, or metal, as well as anchoring systems. The location chosen for fish farming in floating net cages is relatively calm, protected from storms, and easily accessible. The fish being farmed vary from different types of Snapper to Bream and even Barramundi. This floating net cage system is also a flexible process to transform traditional small-scale fishermen into aquaculture agribusiness entrepreneurs [8].

Venture capital

The business capital owned by 10 Tiger Grouper fish farmers using the systemcagefloating nets in Sikakap Village are their own capital. The initial capital for this Grouper Fish cultivation business varies for each farmer because not all farmers spend the same amount on making floating net cages, from how much equipment they make and how much they spend on floating net cages. The Grouper Fish cultivation business in Sikakap Village is a business carried out by farmers as a side business, but there are also farmers who make the Grouper Fish cultivation business in Sikakap Village their main business or livelihood.

Seed Distribution

The tiger grouper seeds used in tiger grouper farming in Sikakap Village come from Bali, Situbondo and Lampung. The seeds that are spread are on average 1-3 cm in size. Spreading is done when the water temperature is not too high. The spreading of seeds carried out by tiger grouper farmers in Sikakap Village is in accordance with the recommended rules for tiger grouper farming. The number of seeds spread is an average of 300-500 box⁻¹ so that the fish stocking density is in accordance with the recommended standards. The number of 300-500⁻¹ cage is considered optimal to make maximum use of space without causing excessive density.

Feeding

Grouper fish farmers in Sikakap village provide pellet

feed and trash fish twice a day in the morning at around 09.00 WIB and in the afternoon at 17.00 WIB. The feed given is pellets and fresh trash fish obtained from their own catch. Fish farmers provide feed based on their observations in the cages. If the fish are not enthusiastic about eating the feed given, then the farmer will stop providing trash. Farmers do not compare the biomass of fish and the number of fishes given so that the amount of feed given does not comply with the provisions that should be.

Production

The results of tiger grouper cultivation in the fishermen's group range from 8-9 grams per fish after undergoing a maintenance period of around 7-9 months. Each group member has a different amount of production due to variations in the number of seeds sown. However, the time of seed sowing and harvesting is carried out simultaneously by all farmers. In one harvest, tiger grouper production can reach more than 1 ton/cage, depending on the harvest time, fish weight, cage size, and stocking density. Fish farmers usually sell the harvest to collectors or agents who come directly to the cultivation location, at a price of IDR 120,000/kg.

Analysis of Grouper Fish Cultivation Business in Floating Net Cages Fixed Capital

Fixed capital is a sum of money invested in purchasing (procurement of assets) or goods (equipment) that are not used up in one production process but can be used repeatedly for a long period of time long [9]. Fixed capital in this study was obtained from the costs incurred for the purchase of wood, nets, drums, ropes, bolts and net weights. The amount of fixed capital spent by each respondent who had a 3x3 bag was IDR 2,730,000 and for respondents who had a 4x4 bag the fixed capital spent was IDR 3,891,000.

Working capital.

Working capital is the amount of cost spent for the purchase of capital goods spent in one production cycle and its shortterm rotation process such as tiger grouper seeds, pellets and ruca or flying fish. The working capital spent by respondents who have 3x3 bags is IDR 11,904,000 and respondents who have 4x4 bags is IDR 15,140,000

Total Investment

Investment is the investment of capital for one or more assets owned and usually long-term with the hope of getting profit in the future. Total investment in tiger grouper fish farming business consists of purchase of wood, nets, drums, ropes, bolts and net weights as well as costs incurred for purchasing seeds, fish and harvest wages. The total investment cost is IDR 14,634,000 for each respondent who has a 3x3 bag and for respondents who have a 4x4 bag, the investment cost incurred is IDR 19,081,000.

Total Production Cost

Total production costs are all fixed costs and variable costs that must be incurred to produce a business, within a certain period of time. Fixed costs include depreciation costs and maintenance costs. Variable costs include the purchase of fish seeds and pellets, as well as harvest wages. The total production costs in the grouper fish farming business in Sikakap Village incurred by each respondent who has a 3x3

bag size is IDR 13,076,250 while for respondents who have a 4x4 bag size is 16,733,416.

Net Income

Net income is the total income received by farmers for one year after subtracting by costs for labor as well as costs incurred for production facilities [10]. From the results research conducted in Sikakap Village, the total net revenue obtained in a year is amounting to IDR 20,110,914 while in a month it is IDR 13,397,276 in a 3x3 cage. To the net revenue obtained by respondents who have 4x4 cage bags is as large as 26,069,584 in a period of one year while in a month the revenue obtained is IDR 4,344,930.

Gross Income

Gross income is the amount of money or value obtained from the result of multiplying the price of fish produced at the selling price of fish produces at the selling price of fish [11]. From the results of research conducted in Sikakap Village, the total gross income which is obtained in a year of IDR 28,160,000 while in a month it is IDR 13,397,276 in a 3x3 cage. For the net income obtained by respondents who have cage bags the size of 4x4 is IDR 26,069,584 in a period of the one year while in a month the income of the obtained is IDR 4,344,930.

Revenue Cost of Ratio (RCR)

RCR (Revenue Cost Ratio) is a ratio that compares the annual income of a business with the total costs incurred. RCR will determine three main criteria [12]. First, if RCR > 1, the business is profitable and worth continuing. Second, if RCR < 1, the business is experiencing losses and should not be continued. Third, if RCR = 1, the business is at the breakeven point. From the research, it was found that the RCR results can be calculated as follows:

$$RCR = \frac{\text{Gross Income (TR)}}{\text{Total Production Cost (TC)}}$$

$$RCR = \frac{IDR 225.280.000}{IDR 104.610.000}$$

RCR = 2.15 (cage size 3x3)

$$RCR = \frac{\text{Gross Income (TR)}}{\text{Total Production Cost (TC)}}$$

$$RCR = \frac{IDR 71.830.000}{IDR 33.466.833}$$

RCR = 2.14 (4x4 cage bag size)

From the results of the grouper fish farming research, the average Revenue Cost Ratio (RCR) in a year in the Tiger Grouper respondent group in Sikakap Village, size 3x3 is 2.15. While for the 4x4 cage size, the RCR is 2.14. This shows that RCR > 1 so it is concluded that this business is profitable and feasible to continue.

Financial Rate of Return (FRR)

FRR (Financial Rate of Return) is a ratio that compares the annual profit of a business with the total investment issued [12]. FRR will provide an overview of how much profit can be obtained from a certain capital invested in a business, compared to the profit that can be obtained if the capital is

deposited in a bank. From the research, it was found that the FRR results can be calculated as follows:

$$FRR = \frac{\text{Net Income per year} \times 100}{\text{Total Investment}}$$

$$FRR = \frac{IDR 160.887.312}{IDR 117.072.000} \times 100$$

FRR = 137.42% (cage size 3 x 3)

$$FRR = \frac{\text{Net Income per year} \times 100}{\text{Total Investment}}$$

$$FRR = \frac{IDR 52.139.177}{IDR 36.162.000} \times 100$$

FRR = 136.62% (cage size 4 x 4)

From the results of the research on grouper fish farming business, the average Revenue Cost Ratio (FRR) in a year in the Tiger Grouper respondent group in Sikakap Village, size 3x3 is 137.42%. While for the 4x4 cage size, the FRR is 136.62%. This shows that the FRR value of the Tiger Grouper fish farming business scale is greater than the interest rate applicable in the Bank where if the capital is deposited, the interest rate in the bank is 8%.per year which means that the capital invested in this business is more profitable when compared to capital saved in a bank.

Payback Period of Capital (PPC)

PPC (Payback Period of Capital) is a ratio that measures the total annual investment made compared to the annual profit generated from a business [12]. The purpose of calculating PPC is to determine how long it will take to return the capital invested in the business. The PPC category is the higher the PPC value, the longer it will take to return the investment but conversely, the lower the PPC value, the faster the investment will return. From the research, it was found that the PPC results can be calculated as follows:

$$PPC = \frac{\text{Total Investment}}{\text{Net Income per year}}$$

$$PPC = \frac{IDR 117.072.000}{IDR 160.887.312}$$

PPC = 0.72 years or about 8.64 months
(3x3 cage bag size)

$$PPC = \frac{\text{Total Investment}}{\text{Net Income per year}}$$

$$PPC = \frac{IDR 38.162.000}{IDR 52.139.177}$$

PPC = 0.73 or around 8.76 months (cage size 4 x 4)

From the results of the study of grouper fish farming business, the average Payback Period of Capital (PPC) is 0.72 for 3x3 size and 0.73 for 4x4 size. If the payback period is longer than the economic life of the asset, the investment is considered unfeasible. Conversely, if the payback period is shorter than the economic life, the investment is considered feasible. This shows that the group of respondents of the Tiger Grouper Fish business requires an average of 8.64 months for 3x3 size and 8.76 months for 4x4 size to return the initial investment based on the net cash flow generated, so it is concluded that the investment in this grouper fish farming business is considered feasible and acceptable.

Conclusion

1. The total investment cost that must be spent for the size of to increase and improve household economic income, the author provides advice to Tiger Grouper fish farmers in Mentawai Village to increase the number of floating net cages they cultivate so that Tiger Grouper fish production can increase or improve and increase the profits generated from Tiger Grouper fish cultivation.
the 3 x 3 cage bag is IDR 117,072,000 with an average of IDR 14,634,000 and 4 x 4 is IDR 38,162,000 with an average of IDR 19,081,000. This result is the total investment cost based only on the calculation per box.
2. Based on the analysis of the income of the Tiger Grouper fish business by the respondent members, the tiger grouper fish as a whole is able to generate income of IDR 1,674,659/month or IDR 26,069,584/year.
3. The feasibility of the business is seen from the RCR value which is obtained from the respondent members of the 3 x 3 cage size of 2.15, the FRR value of 137.42% and the PPC value of 0.72 years or around 8.64 months. For the 4 x 4 cage size, the RCR was 2.14, the FRR value was 136.62% and the PPC value was 0.73 or around 8.76 months. Based on the results of the RCR, FRR, and PPC analysis, the Tiger Grouper cultivation business using the floating net cage system in Mentawai Village can be said to be feasible and the income level of the Tiger Grouper floating net cage farmers is included in the high category.

Suggestion

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