

Business Analysis of Lift Net Operation in Bone Bay, Bone Regency, South Sulawesi

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Abstract: The bagan boat is a type of fishing gear that utilizes light to attract schools of fish, either through positive phototaxis or by luring fish searching for food around the light. This method is particularly effective for catching pelagic species such as anchovies, tuna, and squid. This study evaluates the financial feasibility of operating bagan boat fishing gear in Bone Bay, South Sulawesi, through several key financial indicators, including Profit/Loss Analysis, Payback Period (PP), Net Present Value (NPV), and Revenue Cost Ratio (R/C Ratio). The analysis of the operational costs revealed total costs amounting to Rp 487,826,666, which include depreciation, maintenance, and operational expenses. The total revenue generated from the operation was Rp 951,243,999, resulting in a Revenue Cost Ratio (R/C ratio) of 1.95, indicating profitability. The Payback Period (PP) was calculated at 1.56 years, demonstrating a relatively quick return on investment. Additionally, the Net Present Value (NPV) was found to be Rp 1,078,386,238, confirming that the investment generates positive returns. Based on these findings, the operation of bagan boat fishing gear is deemed financially viable, profitable, and sustainable, with strong potential for future growth and development.

Keywords: Bagan boat; Feasibility; Fishing gear; NPV; Phototaxis

Introduction

One of the fishing gears used in Bone Bay, Bone Regency, South Sulawesi for fish-catching efforts is the bagan boat fishing gear. The Bagan Boat Fishing Gear (API), operates by utilizing light to gather schools of fish, either fish with positive phototaxis or those seeking food around the light. Generally, it is more effective for catching small pelagic fish such as anchovies, scads, mackerels, and squids. Light aids are generally used during the operation of the bagan boat, aiming at attracting target fish that have positive phototaxis (Atmaja, 2013). Small pelagic fish resources have been recognized as playing a role in the region's economic development, especially in areas with small pelagic fish potential. In addition, economically, the income of

communities, particularly those of coastal fishermen, can be increased (Nelwan et al., 2016; Purnama et al., 2023).

Fishing activities with bagan boat gear in Bone Bay have been conducted not only as a means of livelihood for fishermen in their daily lives but also as a business endeavor in fish-catching (Sahar et al., 2020). Feasibility analysis of operating the bagan boat fishing gear is necessary for the sustainability of the fishing business and the welfare improvement of the fishermen themselves. Published research stated that it is essential to determine how capital preparedness is utilized to run the business and whether the business can provide profitable returns (Purnama et al., 2023). Therefore, a feasibility analysis needs to be conducted for the operation of the bagan boat fishing gear.

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In conducting a fisheries business feasibility analysis, it is crucial to consider various aspects such as economic viability, sustainability, and social impact. Several studies have provided valuable insights into assessing fisheries business feasibility from different perspectives. The importance of examining the socio-economic feasibility of transitioning fisheries management, particularly in regions like the Mediterranean, where small-scale fisheries play a significant role (Juan et al., 2024). Understanding cost-benefit analysis and coastal communities' reliance on fishing activities is critical in assessing fisheries business feasibility.

Focused on analyzing the carrying capacity of fisheries investment will ensure sustainability (Putri et al., 2022). Their research highlighted the importance of using a business feasibility approach to assess investment feasibility in fisheries, particularly in areas such as the Seribu Islands. Feasibility modeling can be applied to ecosystem-based fisheries management, presenting case studies from various regions (Doyen et al., 2017; Péreau et al., 2012). This approach provides a framework for evaluating the feasibility of fisheries management strategies that integrate ecological considerations.

The joint feasibility of Mediterranean demersal fisheries under various management scenarios. Their study underscored the importance of considering social and economic perspectives in determining fisheries feasibility, especially concerning income sources and sustainability goals (Rossetto et al., 2014). In short, a comprehensive feasibility analysis for fisheries businesses should consider economic viability, sustainability goals, social impact, and ecosystem-based management strategies. By integrating insights from studies like those mentioned above, stakeholders can make informed decisions regarding fisheries business feasibility and management.

Furthermore, The importance of evaluating the sustainability of the fisheries industry holistically, particularly the fish fillet processing industry, beyond merely economic feasibility (Dewinta & Ma'ruf, 2020). They argued that while a business might be economically feasible, it does not guarantee overall sustainability from other perspectives. This highlights the importance of conducting thorough feasibility studies that consider various dimensions of sustainability in fisheries.

Fisheries business feasibility is an essential aspect that covers various dimensions such as ecological sustainability, economic viability, and social welfare. The need to consider ecological, economic, and social goals in fisheries management to achieve sustainability (Péreau et al., 2012). They highlighted the necessity of feasibility conditions that address stock conservation,

economic efficiency, and the maintenance of fishing activities over time.

Business analysis in the fisheries sector is essential to ensure the sustainability and profitability of fisheries-related ventures. Business analysis involves examining various aspects of the fisheries industry, such as production costs, revenues, supply chain efficiency, and market demand, to make informed decisions that enhance competitiveness and sustainability (Firdaus et al., 2020; Nurhayati et al., 2023; Putri et al., 2022; Ramli et al., 2024).

A business feasibility analysis is required to determine whether a business to be undertaken or currently being run is feasible or not to continue. Several methods can be used to assess investment feasibility, namely Payback Period (PP), Net Present Value (NPV), Profitability Index (PI), Internal Rate of Return (IRR), and Average Rate of Return (ARR) (Suliyanto, 2010). Furthermore, there are four methods commonly considered for assessing cash flow from an investment, namely the Payback Period, Net Present Value, Internal Rate of Return, and Profitability Index.

Method

Research Design

This research was conducted from April to July 2024 in Bone Bay, Bone Regency, South Sulawesi. All process shows in figure 1. The research related to the Business Analysis of Operating Bagan Boat Fishing Gear in Bone Bay, Bone Regency, South Sulawesi was a descriptive quantitative study using a survey approach, which aimed to systematically and accurately describe a condition or specific population area in a factual manner (Fadjar et al., 2019; Hasan & Tamam, 2019; Islamy & Senas, 2023). The research was conducted through direct observation and monitoring of the object using research instruments in the form of questionnaires with numerical data, although qualitative data also served as support, such as the results of interviews between the researcher and respondents (Insani et al., 2020; Islamy et al., 2024a; Islamy & Hasan, 2020; Jatayu et al., 2023). Quantitative research instruments were formal, standardized, and measured. In addition to structured interviews using questionnaires, semi-structured interviews, which are more flexible, were also employed to gather more in-depth information after receiving answers from previously mentioned questions.

The case study in this research involved sampling from fishermen engaged in fishing activities (Hasan et al., 2020; Insani et al., 2020) using bagan boat fishing gear, who met the following criteria: the capital used was self-owned, with no loans from banks or others; income was solely derived from the sale of catches; depreciation costs were assumed to be 15 years for the

economic life of boats, 20 years for the economic life of engines, and 3 years for the economic life of fishing gear.

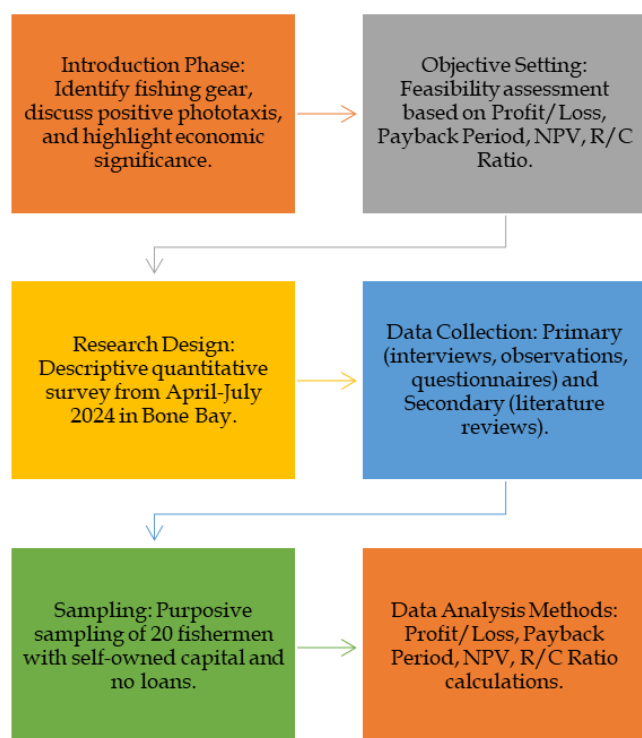


Figure 1. Research flowchart

Sample and Data Collection

Data used in this research consisted of primary and secondary data. Primary data observed included interview forms, direct field observations, and the completion of questionnaires. This was supported by secondary data, such as literature reviews and other relevant information sources, for instance, data from the community or local fisheries department. The sampling technique used was purposive sampling, also known as judgment sampling. Purposive sampling involved selecting samples from the population based on specific criteria or objectives of the researcher, aiming to describe the population characteristics (Nursalam, 2011). The research population consisted of fishermen using bagan boat fishing gear in Bone Bay, Bone Regency, South Sulawesi. Respondents selected for this study were 20 fishermen who operated bagan fishing gear.

Data Collection Methods

Interview Technique: According to Esterberg in published book (Sugiyono, 2016), an interview is a meeting between two people to exchange information and ideas through question and answer, so that meaning can be constructed on a particular topic. **Observation Technique:** Observation is a complex process, consisting of various biological and psychological processes (Sugiyono, 2016). Two of the most important are observation and memory processes. **Documentation**

Technique: Documents are records of past events (Sugiyono, 2016). Documents can take the form of writing, images, or monumental works of a person. Documents in the form of writing include diaries, life histories, stories, biographies, regulations, and policies. Documents in the form of images include photos, motion pictures, sketches, etc. Documents in the form of works include art such as paintings, sculptures, films, and so on. Document studies complement the use of observation and interview methods in qualitative research.

Data Analysis

The data obtained from the fishing activities using bagan boat fishing gear operated by the fishermen were then analyzed using profit/loss analysis, payback period (PP), net present value (NPV), and revenue cost ratio (R/C ratio). Profit/loss analysis was aimed at determining the amount of profit or loss from the managed business. A profitable business will have revenue greater than total expenses, where the formula to calculate profit/loss is total sales minus total costs. Meanwhile, the formula to calculate the payback period is net cash investment divided by annual net cash inflows. The payback period is a method used to calculate the period required to recover the money invested from the annual cash inflows (proceeds) generated by the investment project (Purnama et al., 2023).

The net present value method is conducted by comparing the present value of net cash inflows (proceeds) with the present value of the investment costs (outlays) (Purnama et al., 2023). Meanwhile, the revenue cost ratio is the ratio between total revenue and total costs (Purnama et al., 2023; Soekartawi, 1993). If the R/C ratio is greater than 1, the business is profitable or feasible for further development.

Result and Discussion

Profit and Loss Analysis

The profit and loss analysis were obtained by subtracting the total costs incurred from the total revenue generated in one accounting period, which is one year. The profit generated from the operation of the bagan boat fishing gear was Rp. 487,826,666/year, resulting in a net profit for the bagan boat owner (business owner) of $\text{Rp. } 487,826,666 \times 50\% = \text{Rp. } 243,913,333$ /year, and when divided by 12 months, the monthly profit was Rp. 20,326,111.08. The 50% value represents labor costs, which is an agreed profit-sharing arrangement (50% for fishermen/crew and 50% for the boat owner) from the revenue obtained in the operation of the bagan boat fishing gear in Bone Bay, Bone Regency.

Table 1. Operational Costs of Bagan Boat Fishing Gear Operations

| Economic Aspect | Amount (Rp) |
|-------------------|-------------|
| Depreciation Cost | 83,666,666 |
| Maintenance Cost | 47,760,000 |
| Operational Cost | 356,400,000 |
| Total Costs | 487,826,666 |

Table 2. Revenue from Bagan Boat Fishing Gear Operations

| Fish Type | Price/Kg (Rp) | Catch Amount (Kg) | Amount (Rp) |
|-----------|---------------|-------------------|---------------|
| Tuna | 25,000 | 25,740 | 643,500,000 |
| Anchovies | 15,000 | 79,200 | 1,188,000,000 |
| Squid | 22,000 | 3,300 | 72,600,000 |
| Total | | | 1,904,100,000 |

Payback Period (PP)

The payback period was used to determine the time frame for recovering the investment. The payback period is a method used to calculate the period required to recover the money invested from the annual cash inflows (proceeds) generated by the investment project (Suliyanto, 2010). The results of the analysis, by dividing the net investment by the annual net cash inflows, showed that the payback period for the operation of the bagan boat fishing gear was 1.56. This indicates that the fishing operation using the bagan boat can recover the investment within 1 year and 5 months, which means the return on investment for this business is relatively fast as it is less than 3 years.

Net Present Value (NPV)

The analysis of the operational costs for bagan boat fishing gear operations revealed a total cost of Rp 487,826,666, derived from depreciation costs (Rp 83,666,666), maintenance costs (Rp 47,760,000), and operational costs (Rp 356,400,000). These values represent the essential expenditures required for the operation of the fishing gear. Using the Net Present Value (NPV) method, the present value of the net cash inflows was compared to the present value of the investment costs at an annual interest rate of 6%. Assuming the annual profit remains at Rp 1,660,186,667, the net cash inflows over the first year, discounted at 6%, $NPV = Rp\ 1,566,212,904 - Rp\ 487,826,666 = Rp\ 1,078,386,238$.

The positive NPV of Rp 1,078,386,238 indicates that the investment in bagan boat fishing gear remains financially feasible. This result confirms that the expected returns exceed the initial costs when discounted at the specified interest rate. The findings underscore the economic viability of the bagan boat fishing gear operation, suggesting that it is a profitable venture for stakeholders. Moreover, the rapid payback period and substantial profit margin further enhance its

attractiveness as an investment opportunity. Future studies could explore sensitivity analyses under varying economic conditions to ensure robustness and adaptability in financial planning.

Revenue Cost Ratio (R/C ratio)

The Revenue Cost Ratio (R/C ratio) is a critical financial metric used to assess the profitability of a business by comparing total revenue to total costs. It is calculated by dividing the total revenue by the total costs, and it provides insight into whether the business is operating at a loss, at break-even, or at a profit. In the case of the bagan boat fishing gear operation, the analysis revealed an R/C ratio of 1.95, indicating that the total revenue generated from the operations exceeds the total costs by 95%. This result confirms that the operation is profitable, as the revenue is significantly higher than the costs incurred.

For example, with total costs amounting to Rp 487,826,666, the total revenue was calculated as follows: $\text{Total Revenue} = \text{R/C Ratio} \times \text{Total Costs} = 1.95 \times 487,826,666 = Rp\ 951,243,999$. This confirms a substantial profit margin, further supporting the financial feasibility of the bagan boat fishing gear business. The positive R/C ratio highlights the efficiency and profitability of the operation, suggesting that it is not only covering its costs but also generating significant returns. This reinforces the attractiveness of the business for future development and suggests that optimizing operations can further increase revenue generation, ensuring long-term economic sustainability.

Future research should include an exploration of other fisheries commodities, encompassing both finfish and non-fish resources such as marine plants and algae (Islamy, 2019; Islamy et al., 2024b; Islamy & Hasan, 2020; Isroni et al., 2023). These resources hold significant potential as sources of nutrients and bioactive compounds (Armando et al., 2021; Islamy et al., 2024c; Islamy & Senas, 2023; Serdiati et al., 2024). For example, marine algae have been identified as rich in essential fatty acids, proteins, vitamins, and minerals, which can be utilized to enhance the nutritional quality of aquaculture feeds and human diets (Islamy et al., 2024d). Similarly, non-fish species like shellfish and crustaceans may harbor bioactive compounds with applications in treating human diseases, aligning with the goal of sustainable resource utilization (Islamy et al., 2024d).

The profitability analysis of the bagan boat fishing gear operation underscores the importance of diversifying resource exploitation to ensure economic sustainability. By integrating finfish and non-fish commodities into aquaculture systems, revenue streams can be diversified, potentially improving the revenue-cost ratio for fisheries operations. Additionally, the

incorporation of marine plants and algae into aquaculture practices offers a dual benefit: reducing environmental impacts and adding value through the production of high-value bioproducts. These factors highlight the feasibility and urgency of expanding research in this area to enhance economic and ecological returns.

Moreover, the rapid payback period and positive net present value of the bagan boat operation suggest that investments in diversified aquaculture systems are likely to yield favorable outcomes. Investigating the bioactive properties of marine resources can lead to innovations in functional food production and pharmaceuticals, further broadening the scope of potential economic benefits. By focusing on underutilized resources such as marine algae and non-fish species, future research can contribute to the development of a more sustainable and resilient aquaculture industry while addressing global challenges related to nutrition and human health (Islamy et al., 2024c; Kilawati et al., 2024a; 2024b; Kilawati & Islamy, 2019).

Conclusion

The operation of bagan boat fishing gear in Bone Bay has been shown to be financially feasible and profitable. With total costs of Rp 487,826,666 and a total revenue of Rp 951,243,999, the business demonstrates a strong profit margin, reflected in the Revenue Cost Ratio (R/C ratio) of 1.95. The analysis further reveals that the operation is capable of recovering its initial investment within 1.56 years, as indicated by the Payback Period (PP). Additionally, the Net Present Value (NPV) of Rp 1,078,386,238 confirms that the investment is financially viable and will generate positive returns when discounted at an interest rate of 6%. These findings suggest that the bagan boat fishing gear business is not only profitable but also has the potential for continued growth and development. The results support the feasibility of expanding the business and optimizing its operations to maximize revenue generation. Further diversification of the resources and efficient management can ensure long-term sustainability and enhance the economic benefits for stakeholders involved in the business.

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Author Contributions

K.S.H., contributed to the conceptualization, methodology design, and drafting of the manuscript. M.M., was responsible

for data collection, analysis, and interpretation. M.S., provided technical support in the design and execution of the fieldwork. M.R.N., contributed to the review and validation of the data analysis results. B.K., provided supervision, critical revisions, and ensured the accuracy of the final manuscript. All authors have read and approved the final version of the manuscript.

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Conflicts of Interests

The authors declare no conflict of interest.

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