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ANALYSIS OF NILE TILAPIA CAGE FISH FARMING BUSINESS INCOME OWNED BY MR. MOEHAJI

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ABSTRACT
Micro, Small, and Medium Enterprises (MSMEs) play a vital role in promoting economic growth, including in the aquaculture sector. This study aims to analyze income, Break Even Point (BEP), and Return on Investment (ROI) of the Nile tilapia cage fish farming business owned by Mr. Moehaji, located in the Mahakam River, Tenggarong. A descriptive quantitative approach was used, with both primary and secondary data collected from production and financial records spanning from 2013 to 2025.The results indicate that the cage farming business consistently generated significant profits in each harvest period, with a positive trend in both revenue and profit as the number of cages and production volume increased. The BEP was exceeded in all periods, demonstrating that the business operated under profitable conditions. Furthermore, the ROI showed high investment efficiency, with a steady increase each year, reflecting the feasibility and promising prospects of the business.
The study also found that the traditional financial management approach posed challenges in monitoring cash flow and planning. Therefore, improvements in financial management systems and business training are necessary to enhance the sustainability and professionalism of the Nile tilapia cage farming operation..

I. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) play an important role in driving national economic growth, especially in creating employment, increasing community income, and supporting food and nutrition security. One potential MSME sector is the aquaculture sector, particularly the Nile tilapia cage fish farming business. Nile tilapia (*Oreochromis niloticus*) is a highly popular freshwater fish commodity due to its good taste, high nutritional value, and relatively short and easy maintenance period.

Nile tilapia cage fish farming is growing rapidly in various regions, including areas with abundant water resources like rivers, lakes, and reservoirs. The Mahakam River which passes through Tenggarong Sub-district is a large water potential. The extensive and relatively calm water in some parts of the river makes the Mahakam River very suitable for the development of cage fish farming. One such business is the Nile Tilapia Cage Fish Farming owned by Mr. Moehaji in the Mahakam River, Mangkurawang Village, Tenggarong Sub-district.

Initial interviews revealed that financial management is still handled traditionally by Mr. Moehaji himself without separating business finances from his personal finances. This often leads to difficulties in monitoring cash flow, accurately calculating production costs, and determining the actual income and profit earned. This can result in inaccurate decision-making regarding business management, such as feed purchasing, cage maintenance, and marketing strategies.

In this context, income analysis is an important aspect to study. The net income from the Nile tilapia cage fish farming business can be an indicator of business sustainability and a reference for designing future development strategies. Unfortunately, without a systematic financial management system, income information tends to be inaccurate, making business evaluation difficult.

This research is important to analyze the extent to which the Nile tilapia cage fish farming business can provide a decent income for the entrepreneur, while also identifying weaknesses in the traditional recording and financial management system. Thus, the results of this research are expected to serve as a basis for providing recommendations to enhance the capacity of the entrepreneur in implementing a more modern, effective, and sustainable financial management

II. LITERATURE REVIEW

2.1. Cages (*Keramba*)

A *keramba* is a basket or box made of bamboo slats for fish farming. Another definition of *keramba* is a fish cultivation container in the form of a cage made of bamboo or wooden planks placed in the river body. According to the Great Indonesian Dictionary (KBBI), *keramba* is a long, woven bamboo basket with a wooden frame, usually layered to be waterproof, used for transporting or storing fish; *keramba* can also be defined as a basket or box made of bamboo slats for culturing fish in a river (lake, reservoir)

2.2. Production Cost

Cost is an inseparable element of a company's activities. Cost is defined as a resource that is sacrificed or foregone to achieve a specific goal (Emanauli, 2021). According to Hapsari (2018), cost is the sacrifice of economic resources measured in monetary units that has occurred or is likely to occur to achieve certain goals. Meanwhile, according to Harman (2013), production cost is the cost used to value inventory listed in the financial statements and its amount is relatively larger than other types of costs that constantly recur in the same pattern routinely. Production cost is the largest expense for manufacturing companies, therefore management must control production costs and optimize their utilization rationally and systematically so that production costs become rational and effective.

2.3. Business Income

Income can be interpreted as all forms of gain (increasing wealth). In other words, income is not an increase in wealth. In the world of accounting and business, there is a separation between income and profit, as well as between expenses and losses, all of which are separated because the logic and process flow are quite different. According to Hidayat (2014), income is an important aspect in the preparation of financial statements, and its influence is significant.

2.4. Profit/Gain

According to Khanifah (2019), gains (profit) is the increase in equity value from incidental transactions that are not the entity's main activity and from other transactions or activities that affect the entity during a certain period, except those originating from the results or investments from owners. Meanwhile, Manda (2018) states that profit or remaining business results is the difference between output value and input value. Profit can also be defined as an increase in capital (net assets) resulting from secondary or infrequent transactions of a business entity, and from all other transactions or events that affect the business entity over a period, except those arising from revenue or owner investment, according to Maruta (2018). According to Nata (2021), profit/gain is the difference between total revenue and total costs incurred, which is an incentive for producers to undertake production.

2.5. Break Even Point (BEP)

Break-even analysis or is known as Break Even Point (BEP) analysis is one of the most important financial analyses in corporate financial planning. Break-even analysis is often referred to as profit planning analysis. The Break Even Point (BEP) is a condition where the company's operations neither gain a profit nor suffer a loss. In other words, revenue and costs are equal, so the profit is zero. BEP is the break-even point where the amount of revenue is equal to the total cost (Anderson et al., 2019). The occurrence of the break-even point depends on how long the project's revenue flow can cover all operating and maintenance costs along with other capital costs. BEP analysis is an analytical technique to study the relationship between cost, profit, and sales volume or Cost, Profit, and Volume (CPV) analysis, especially in profit planning (Piramida, 2018)

III. METHODS

The type of research used in this study is a Descriptive Quantitative Approach with the aim of describing the research object or research results. According to Manuho (2021), descriptive method functions to describe or give an overview of the object under study through collected data or samples as they are, without performing analysis and drawing conclusions that are not generally applicable. The types of data used in this study are Qualitative data, which are data in the form of information, and Quantitative data, which are data in the form of numbers, obtained directly from the object under study (Siswanto, 2018).

3.1. Analysis Tools

Total cost can be calculated using the formula: TC = TFC + TVC. Where:

- TC (Total Cost) = Total Production Cost (IDR)
- TFC (Total Fixed Cost) = Fixed Cost (IDR)
- TVC (Total Variable Cost) = Variable Cost (IDR)

To get an idea of the average cost per kilogram for Nile tilapia, the following formula can be used (Suswadi, 2018): AC=TC/Q. Where:

- AC = Average Cost
- TC = Total Cost
- Q = Total Production (nile tilapia)

3.2. Business Revenue

To calculate Total Revenue for this cage farming business, the following formula can be used (Tiswiyanti, 2018): TR=P×Q. Where:

- TR (Total Revenue) = Total revenue (IDR)
- P (Price) = Price (IDR)
- Q (Quantity) = Total cage production (Kg)

3.3. Business Income

Business income is defined as Profit, calculated by subtracting total costs from total revenue, to see the magnitude of the income using the formula: PUT/Profit=TR−TC. Where:

- PUT = Farm Business Income
- TR = Total Revenue
- TC = Total Cost

If:

- TR > TC, the company is in a state of profit
- TR = TC, the company is at BEP
- R < TC the company is in a state of loss (Yusuf, 2014)

3.4. Break Even Point (BEP)

Break Even Point (BEP) describes the condition where the business is at the break-even level. In this study, the production level that results in total revenue being equal to the total costs incurred will be determined. BEP will be reached when TC = TR. To find

out the production quantity that must be achieved, the formula TC / P (Total Cost divided by price/kg) is used.

3.5. Return on Investment (ROI)

Return on Investment (ROI) is a ratio used to determine the profit obtained compared to the amount of investment planted to assess its efficiency. Through the resulting percentage, the company can compare the effectiveness of various investment options (Birken, 2021).

The ROI formula is: ROI=(Cost of Investment/Net Profit)×100%

IV. RESULTS

4.1 Investment Analysis

The cage farming business owned by Mr. Moehaji shows a gradual investment pattern from 2013 to 2023. In each investment period, he built 20 cage boxes made from ironwood (*kayu ulin*) as the main material, plastic drums as floats, nylon nets, and other supporting equipment such as rope, nails, bolts, and additional floats.

In 2013, Mr. Moehaji started the initial investment with a total cost of Rp52,380,000. The largest components came from labor costs of Rp17,000,000 and ironwood material valued at Rp21,000,000. This period was the initial foundation of the cage business, where the first cage structure was fully built. This investment reflects a relatively efficient initial capital due to raw material and labor prices that were not yet too high.

Two years later, in 2015, Mr. Moehaji invested again with a total of Rp54,850,000. There was an increase of about 4.7% from the previous period. This increase was due to rising prices for wood materials, plastic drums, and labor wages, which increased to Rp18,000,000. The investment in this period reflects an expansion or partial refurbishment of the cages to maintain productivity and structural safety.

In 2018, the total investment increased to Rp57,580,000. This increase reached about 5% compared to 2015, mainly triggered by the rising cost of ironwood (Rp22,500,000) and plastic drums (Rp8,400,000). In addition, net costs also increased, reflecting the purchase of better quality materials to increase durability and fish yield. Labor wages rose to Rp19,000,000, indicating an increase in wage standards and the need for more skilled labor.

In 2021, the total investment rose again to Rp60,350,000, an increase of about 4.8% from the previous period. The main factors were the increase in raw material costs and labor wages, which reached Rp20,000,000. The emergence of additional floats with a cost of Rp900,000 per period indicates that Mr. Moehaji began to pay attention to the safety aspect and operational efficiency of the cages to better withstand the load.

The last investment period in 2023 shows a total investment of Rp63,380,000, an increase of about 5% from 2021. A significant increase occurred in labor costs, reaching Rp22,000,000. This increase is in line with the rising trend of material prices and wages in the fisheries sector. This value also indicates a strengthening of investment capacity and an increase in the quality of the cage infrastructure to remain productive amidst raw material inflation.

Overall, from 2013 to 2023, Mr. Moehaji's cumulative total investment reached Rp288,540,000. There is an average upward trend of 4–6% in investment each period, caused by inflation in building material prices, improved material quality, and rising labor costs. Consistency in investment every few years shows that this cage business is managed sustainably and planned. The reinvestment pattern carried out every 2–3 years reflects a strategy for asset rejuvenation and increased production capacity. Furthermore, the gradual increase in costs also shows that Mr. Moehaji adapts to changing market prices without sacrificing the quality of the cage construction. Thus, this investment not only maintains

the business continuity but also enhances long-term efficiency and the overall asset value of his cage fish farming business.

The following table shows the total investment costs incurred by Mr. Moehaji from 2013 to 2023:

Table 1. Total Cage Manufacturing Investment Cost per Period (in thousands of Rupiah)

Investment Period (Year)	Ironwood/ Eusideroxylon zwageri (Beams & Planks))	Plastic Drums 200L (Floats)	Nylon/ HDPE Nets (3x3x1.5 m)	Ropes/ Cables (Nylon/Net Ties)	Nails, Bolts, Nuts, and Fasteners	Additional Floats	Labor Wages (Contract / Lump Sum)	Total Investment Cost
2013	21,000	7,600	5,000	430	650	700	17,000	52,380
2015	21,600	8,000	5,400	450	700	700	18,000	54,850
2018	22,500	8,400	5,800	480	700	700	19,000	57,580
2021	23,400	8,800	6,000	500	750	900	20,000	60,350
2023	24,000	9,200	6,000	500	780	900	22,000	63,380
Total Investment Cost								288,540

Source: Processed Data

4.2. Production Cost Analysis

Based on the production cost data for Mr. Moehaji's Nile tilapia cage farming business, it is known that production activities were carried out in stages over several investment periods. Each period shows an increase in the number of operational cages, starting from 20 boxes at the beginning of the business up to 100 boxes in the 25th period. This increase in production capacity was followed by an increase in the total production cost incurred each period.

In the first to fourth periods, the number of operational cages was 20 boxes, with a total production cost of Rp41,000,000 – Rp42,200,000 per period. The largest cost was allocated to fish feed, which was around Rp27,500,000 – Rp28,600,000, or almost 70% of the total production cost. Other cost components such as fish seeds, medicines, maintenance, labor, and electricity were still relatively low because the scale of the business was small and the labor mostly came from family.

Entering the fifth to eleventh periods, the capacity increased significantly to 40 cage boxes. Correspondingly, the total production cost increased significantly to around Rp75,000,000 – Rp79,400,000 per period. The feed cost component remained dominant, with average expenditure reaching more than Rp60,000,000 per period. This increase in feed cost shows that feed is the most influential factor in total production cost, thus feed efficiency needs to be a focus of management.

Next, in the 12th to 17th periods, the cage capacity increased again to 60 boxes, with a total production cost reaching Rp129,300,000 – Rp132,600,000 per period. The cost increase at this stage was influenced not only by the addition of cages but also by the increase in feed costs and more intensive labor. Labor costs increased to Rp15,000,000 per period, reflecting the need for additional workers for maintenance and supervision of a larger number of cages.

In the 18th to 21st periods, the number of cages reached 80 boxes, with the total production cost increasing to Rp172,900,000 – Rp175,800,000. Besides the feed factor, fish seed costs also increased quite significantly from Rp7,800,000 to Rp10,800,000, in line with the need for more seed stocking. The increase in cleaning and maintenance costs also shows that the complexity of management is higher at the medium-to-large scale.

The final stage, the 22nd to 25th periods, shows a well-established production scale with 100 cage boxes and the highest total production cost reaching Rp238,750,000 per

period. The feed cost component at this stage reached Rp192,500,000, or about 80% of the total production cost. Significant increases are also seen in labor costs (Rp20,000,000) and maintenance costs (Rp12,500,000), indicating the professionalization of operational activities and increased maintenance intensity.

In general, the pattern of production cost development shows a positive correlation between the increase in the number of cages and the total production cost. However, the proportion between cost components is relatively constant, where fish feed is always the dominant factor in the cost structure. This illustrates a typical characteristic of the Nile tilapia farming business, where the efficiency of feed usage highly determines the level of business profit.

The following table shows the production costs of Mr. Moehaji's cage business from the first period to the twenty-fifth production period:

Table 2. Production Costs of Cage Business per Period (in thousands of Rupiah)

Period	Nile Tilapia Seeds	Fish Feed	Medication and Vitamins	Cage Cleaning and Maintenance	Daily Labor for Maintenance	Electricity Cost (Pumps/Support Equipment)	Total Production Cost	Remarks/ (Number of Cages)
1	2,400	27,500	600	2,500	7,500	500	41,000	20
2	2,400	27,500	600	2,500	7,500	500	41,000	20
3	2,500	28,600	600	2,500	7,500	500	42,200	20
4	2,500	28,600	600	2,500	7,500	500	42,200	20
5	5,200	57,200	600	4,000	7,500	500	75,000	40
6	5,200	57,200	600	4,000	7,500	500	75,000	40
7	5,200	61,600	600	4,000	7,500	500	79,400	40
8	5,200	61,600	600	4,000	7,500	500	79,400	40
9	5,200	61,600	600	4,000	7,500	500	79,400	40
10	5,200	61,600	600	4,000	7,500	500	79,400	40
11	5,200	61,600	600	4,000	7,500	500	79,400	40
12	7,800	99,000	1,000	6,000	15,000	500	129,300	60
13	7,800	99,000	1,000	6,000	15,000	500	129,300	60
14	7,800	102,300	1,000	60,000	15,000	500	132,600	60
15	7,800	102,300	1,000	6,000	15,000	500	132,600	60
16	7,800	102,300	1,000	6,000	15,000	500	132,600	60
17	7,800	102,300	1,000	6,000	15,000	500	132,600	60
18	10,800	136,400	1,200	9,000	15,000	500	172,900	80
19	10,800	140,800	1,200	7,500	15,000	500	175,800	80
20	10,800	140,800	1,200	7,500	15,000	500	175,800	80
21	10,800	140,800	1,200	7,500	15,000	500	175,800	80
22	11,200	192,500	1,800	12,500	20,000	750	238,750	100
23	11,200	192,500	1,800	12,500	20,000	750	238,750	100
24	11,200	192,500	1,800	12,500	20,000	750	238,750	100
25	11,200	192,500	1,800	12,500	20,000	750	238,750	100

Source: Processed Data

4.3 Business Income Analysis

Mr. Moehaji's Nile tilapia farming business shows consistent development from year to year, in terms of both production volume and income value. Based on data from the 2013 to 2025 periods, there is a significant increase in total production and income, reflecting successful management and a gradual expansion strategy.

In the early years, the first to fourth periods (2013–2014), Nile tilapia production was still relatively small, ranging from 1,960 to 2,100 kilograms per harvest. With an average selling price of Rp26,000 per kilogram, the total revenue obtained during this period was in the range of Rp50,960,000 to Rp54,600,000. The scale of the business at this stage was still limited, in line with the 20 cage boxes used. The business was still in the pioneering phase, and sales revenue was mainly directed at covering operational costs and working capital.

As experience and production capability increased, in the fifth to eighth periods (2015–2016), production capacity rose quite sharply to about 3,850–4,100 kilograms per harvest. The selling price of fish also increased to Rp27,000 per kilogram, so revenue increased significantly, reaching the range of Rp103,950,000 to Rp110,700,000 per period. This revenue increase reflects the result of increasing the number of cages to 40 units and implementing more optimal feed and maintenance management.

Entering the ninth to twelfth periods (2017–2018), Mr. Moehaji's business experienced a more stable growth phase. Fish production increased to 4,030–6,050 kilograms per harvest, with the selling price increasing from Rp28,000 to Rp29,000 per kilogram. This increase in production capacity had a direct impact on revenue, which jumped from Rp116,870,000 to Rp175,450,000. The surge indicates that the business has entered the medium scale with increasingly better production efficiency.

Furthermore, in the 13th to 18th periods (2019–2021), the total production continued to grow, reaching 8,040 kilograms with a selling price of Rp30,000 per kilogram. The revenue generated at this stage reached Rp241,200,000 per period. This revenue increase was caused not only by the increase in production volume but also by the rising selling price of Nile tilapia in the market due to continuously growing demand. This shows that Mr. Moehaji's cage fish farming business is able to adapt to market dynamics and maintain production quality to sustain a competitive selling price.

In the 2019–2023 period, the increase in production and revenue was even more significant. Fish production reached 8,100–10,100 kilograms per harvest, with selling prices between Rp31,000 and Rp32,000 per kilogram. The revenue obtained ranged from Rp246,450,000 to Rp323,200,000 per period. This increase is consistent with the addition of cages up to 100 units. This stage shows that Mr. Moehaji's business has entered the large scale with professional management and high productivity.

In the last periods, 2024–2025, Nile tilapia production reached 9,920–10,050 kilograms with a selling price of Rp33,000 per kilogram. The revenue obtained reached Rp327,360,000 to Rp331,650,000 per period. This achievement is the result of mature and efficient business management, where the production system has run stably and is able to generate maximum output with maintained quality.

In general, the analysis results show that Mr. Moehaji's Nile tilapia cage farming business income has increased significantly from year to year. This increase in income is influenced by two main factors:

1. Addition of production cages, which directly impacts the increase in the volume of fish harvested.
2. Increase in the selling price of Nile tilapia in the market, which rose from Rp26,000/kg in 2013 to Rp33,000/kg in 2025.

The following table shows the income of Mr. Moehaji's cage business from the first period to the twenty-fifth production period:

Table 3. Cage Business Income per Period

No.	Year	Harvest Period	Production Output (Kg)	Unit Price (IDR)	Total Revenue (IDR)
1	2013	First	2,000	26,000	52,000,000
2	2013	Second	1,960	26,000	50,960,000
3	2014	Third	1,980	26,000	51,480,000
4	2014	Fourth	2,100	26,000	54,600,000
5	2015	Fifth	3,950	27,000	106,650,000
6	2015	Sixth	4,100	27,000	110,700,000
7	2016	Seventh	3,850	27,000	103,950,000
8	2016	Eighth	3,970	27,000	107,190,000
9	2017	Ninth	4,020	28,000	112,560,000
10	2017	Tenth	4,050	28,000	113,400,000
11	2018	Eleventh	4,030	29,000	116,870,000
12	2018	Twelfth	6,050	29,000	175,450,000
13	2019	Thirteenth	6,100	29,000	176,900,000
14	2019	Fourteenth	6,050	29,000	175,450,000
15	2020	Fifteenth	6,150	29,000	178,350,000
16	2020	Sixteenth	6,200	29,000	179,800,000
17	2021	Seventeenth	6,070	29,000	176,030,000
18	2021	Eighteenth	8,040	30,000	241,200,000
19	2022	Nineteenth	8,100	31,000	251,100,000
20	2022	Twentieth	7,950	31,000	246,450,000
21	2023	Twenty-first	8,060	31,000	249,860,000
22	2023	Twenty-second	10,100	32,000	323,200,000
23	2024	Twenty-third	10,050	33,000	331,650,000
24	2024	Twenty-fourth	9,980	33,000	329,340,000
25	2025	Twenty-fifth	9,920	33,000	327,360,000

Source: Processed Data

4.4. Profit/Loss Analysis

Based on the profit and loss calculation data for Mr. Moehaji's Nile tilapia cage farming business during the 2013 to 2025 period, there is a significant development in both revenue and net profit generated.

In the early period of the business in 2013, total revenue was recorded at Rp52,000,000 with total production costs of Rp41,000,000, resulting in a profit of Rp11,000,000 in the first harvest. This value is still relatively small, considering the business was in the initial stage with a limited production scale and not yet optimal cost efficiency.

In the following years, the business showed a positive growth trend. In 2015, for example, profit increased to Rp35,700,000 per harvest period, along with increased productivity and efficiency in feed usage and fish care. This consistent increase in revenue indicates that the cage business has begun to reach a more stable economy of scale.

The 2018 to 2020 period marked a phase of business maturity, with profit ranging from Rp37,470,000 to Rp47,200,000 per harvest. During this period, cost efficiency appeared to be better maintained even though production costs increased due to rising feed

and maintenance prices. However, the increase in the selling price of Nile tilapia in the market also covered these rising costs.

Subsequently, in 2021–2023, there was a significant surge in net profit. Profit increased from Rp69,800,000 in 2021 to Rp84,450,000 in 2023. This shows that the management strategy and increase in production capacity implemented by Mr. Moehaji successfully yielded optimal results. Furthermore, increasing market demand for Nile tilapia also boosted the selling price and sales volume.

The peak of the highest profit was reached in 2024 with a profit of Rp92,900,000, followed by Rp90,590,000 in the subsequent period. Although profit slightly decreased to Rp88,610,000 in 2025, this decrease is relatively small and still reflects a very healthy business condition.

In general, the average annual net profit shows a consistently increasing trend for over a decade. From these analysis results, it can be concluded that Mr. Moehaji's Nile tilapia cage farming business is a sustainably developing business, with a continuously increasing level of profitability over time. The main supporting factors for this business success include increased production capacity, operational cost efficiency, and the ability to adapt to market price dynamics. With good management and the right maintenance strategy, this cage business has great potential to continue growing and become a model for profitable and highly competitive community-based fisheries development.

The following table shows the profit/loss calculation for Mr. Moehaji's cage business from the first period to the twenty-fifth production period:

Table 4. Profit/Loss Calculation of Nile Tilapia Cage Business per Period

No.	Year	Harvest Period	Total Revenue (IDR)	Total Production Cost (IDR)	Profit/Loss (IDR)
1	2013	First	52,000,000	41,000,000	11,000,000
2	2013	Second	50,960,000	41,000,000	9,960,000
3	2014	Third	51,480,000	42,200,000	9,280,000
4	2014	Fourth	54,600,000	42,200,000	12,400,000
5	2015	Fifth	106,650,000	75,000,000	31,650,000
6	2015	Sixth	110,700,000	75,000,000	35,700,000
7	2016	Seventh	103,950,000	79,400,000	24,550,000
8	2016	Eighth	107,190,000	79,400,000	27,790,000
9	2017	Ninth	112,560,000	79,400,000	33,160,000
10	2017	Tenth	113,400,000	79,400,000	34,000,000
11	2018	Eleventh	116,870,000	79,400,000	37,470,000
12	2018	Twelfth	175,450,000	129,300,000	46,150,000
13	2019	Thirteenth	176,900,000	129,300,000	47,600,000
14	2019	Fourteenth	175,450,000	132,600,000	42,850,000
15	2020	Fifteenth	178,350,000	132,600,000	45,750,000
16	2020	Sixteenth	179,800,000	132,600,000	47,200,000
17	2021	Seventeenth	176,030,000	132,600,000	43,430,000
18	2021	Eighteenth	241,200,000	171,400,000	69,800,000
19	2022	Nineteenth	251,100,000	176,000,000	75,100,000
20	2022	Twentieth	246,450,000	176,000,000	70,450,000
21	2023	Twenty-first	249,860,000	176,000,000	73,860,000
22	2023	Twenty-second	323,200,000	238,750,000	84,450,000

No.	Year	Harvest Period	Total Revenue (IDR)	Total Production Cost (IDR)	Profit/Loss (IDR)
23	2024	Twenty-third	331,650,000	238,750,000	92,900,000
24	2024	Twenty-fourth	329,340,000	238,750,000	90,590,000
25	2025	Twenty-fifth	327,360,000	238,750,000	88,610,000

Source: Processed Data

4.5. Break Even Point (BEP) Analysis

The Break Even Point (BEP) represents the minimal production point for the business not to suffer a loss. The calculation results show that all harvest periods have production results that exceed the BEP value, meaning the Nile tilapia cage farming business has never been in a loss position during the analysis period.

For example, in the first period of 2013, the BEP was at 1,577 kg, while the actual production reached 2,000 kg. In 2024, the BEP reached 7,235 kg, while production in that period reached 10,050 kg. This success in exceeding the BEP indicates that the business is run efficiently, and the risk of loss can be optimally minimized.

The following table shows the Break Even Point calculation for Mr. Moehaji's cage business from the first period to the twenty-fifth production period:

Table 4. BEP Calculation of Nile Tilapia Cage Business per Period

No.	Year	Harvest Period	BEP (kg)
1	2013	First	1.577
2	2013	Second	1.577
3	2014	Third	1.623
4	2014	Fourth	1.623
5	2015	Fifth	2.778
6	2015	Sixth	2.778
7	2016	Seventh	2.941
8	2016	Eighth	2.941
9	2017	Ninth	2.836
10	2017	Tenth	2.836
11	2018	Eleventh	2.738
12	2018	Twelfth	4.459
13	2019	Thirteenth	4.459
14	2019	Fourteenth	4.572
15	2020	Fifteenth	4.572
16	2020	Sixteenth	4.572
17	2021	Seventeenth	4.572
18	2021	Eighteenth	5.713
19	2022	Nineteenth	5.677
20	2022	Twentieth	5.677
21	2023	Twenty-first	5.677
22	2023	Twenty-second	7.461
23	2024	Twenty-third	7.235
24	2024	Twenty-fourth	7.235
25	2025	Twenty-fifth	7.235

Source: Processed Data

4.6. Return on Investment (ROI) Analysis

ROI is used to measure how much profit is obtained compared to the amount of investment planted. The cumulative total investment in cage construction up to 2023 reached Rp288,560,000. Based on the ROI calculation for the last few years, the Nile tilapia cage farming business shows a high level of investment efficiency.

For example, in 2024, the ROI reached about 32.2%, which indicates that for every Rp100 of capital invested, the business generates a profit of more than Rp32. The continuously increasing ROI over time reflects increasingly professional and systematic management. This is supported by increased production capacity, control over production costs, and the right sales strategy. A high ROI also indicates that the business is not only financially viable but also has the potential to be developed further to a larger business scale.

V. CONCLUSIONS

5.1. Conclusion

Overall, the analysis of income, BEP, and ROI indicates that Mr. Moehaji's Nile tilapia cage farming business is highly financially viable, has long-term development potential, and is capable of generating stable and continuously growing profits. Moving forward, efforts to modernize financial record-keeping and production management will be important steps to support the optimal sustainability and growth of this business.

5.2. Limitations and Recommendations for Future Research

This research has several limitations that need to be considered, both in terms of technical data collection and the methodological aspects of the analysis used.

First, the business's financial record-keeping by the entrepreneur is still traditional and non-standardized, so some financial data had to be obtained through direct interviews and manual tracing. This presents the potential for errors in recording hidden or unexpected costs, as well as the possibility of undocumented expenses.

Second, the production and financial data used in the analysis were obtained from a quite long time span (2013–2025), but not all supporting variables were analyzed comprehensively, such as market price fluctuations, weather conditions, the risk of fish disease outbreaks, and changes in government policies that could directly or indirectly affect fish farming.

Third, the analytical approach used is descriptive quantitative and does not deeply explore managerial and socio-economic factors that could contribute to the success or failure of the business. For example, aspects of marketing, distribution, and local labor involvement were not thoroughly analyzed in this study.

Fourth, because this research is a case study on a single entrepreneur, the results and conclusions obtained cannot be broadly generalized to all Nile tilapia cage farmers in other regions who may have different characteristics in terms of resources, market access, and production scale.

By understanding these limitations, it is hoped that future research can be conducted with a more comprehensive approach and involve more variables and entrepreneurs as comparative respondents.

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