

ANALYSIS OF STRIPED CATFISH (*Pangasianodon hypophthalmus*) HATCHERY BUSINESS AT THE TUNAS MUDA FISH FARM PEOPLE'S HATCHERY UNIT IN KUOK DISTRICT KAMPAR REGENCY RIAU PROVINCE

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ABSTRACT

Kampar Regency is one of the largest producers of catfish cultivation in Riau Province, where in 2020 the total production can reach 32,401 tons. The catfish cultivation business has the largest increase every year compared to other fish farming businesses, thereby increasing the demand for catfish seeds from the people's hatchery business (UPR). UPR Tunas Muda Fish Farm is a striped catfish hatchery located in Kuok District, Kampar Regency, Riau Province. This hatchery business needs to be developed for its business in order to increase production yields even more. To develop this business, it is necessary to first know the feasibility level of the business. This research can be used as a study to determine the feasibility level of this hatchery business by analyzing an investment, profits, and Calculation of Revenue Cost of Ratio (RCR), Financial Rate of Return (FRR), and Payback Period of Capital (PPC). This research was conducted on 23 May – 05 June 2021 at UPR Tunas Muda Fish Farm. The method used in this research is the case study method. Respondents taken in this study were owners and all workers. The results showed that the total investment invested in this hatchery business was Rp.291.170.000. The annual profit earned is Rp.142.654.000. The RCR value obtained is 1.4, the FRR value obtained is 49%, and the PPC value obtained is 17 production periods or 2.1 years.

Keywords: Striped Catfish hatchery Business, Investment, Profit, Business Feasibility.

I. INTRODUCTION

Kampar Regency is one of the areas whose entire territory only has public waters, so this area is a center for freshwater fish farming in Riau Province. The production of freshwater aquaculture in this area in 2020 is 53.372 tons consisting of pond, cage and floating net cage cultivation businesses. The types of fish kept are carp, striped catfish, catfish, Asian redtail catfish, tilapia, and others. The various cultivated fish, catfish is the largest cultivated fish with 60.7%. The catfish farming business has experienced

the largest increase every year compared to other fish farming businesses [1].

The increase in catfish cultivation has resulted in a high demand for catfish seeds in the community, this has resulted in the development of catfish hatchery businesses in this area. According to [1], the number of catfish hatcheries continues to increase. According to [2], the success of the catfish farming business is largely determined by adequate production inputs, one of these production inputs is the availability of sufficient seeds from the hatchery business unit. Next [3] stated that the pond

cultivation business in District XIII Koto Kampar would be successful if the cultivators pay attention to ponds, feed, seeds, and labor. Maximum profit will be obtained if all these factors are in optimal condition. One of the production factors that play an important role is seed, where quality seed will produce good fish growth. According to [4] The characteristics of quality striped catfish seeds are fast, uniform growth, high survival rate, adaptive to rearing environments, free of parasites, and disease resistance. To meet these quality seeds, the Kampar District Fisheries Office has provided guidance on the UPR in this area.

The number of smallholder hatcheries (UPR) in Kampar Regency is 7 units with details of 5 units located in Koto Mesjid Village, XIII Koto Kampar District, 1 unit in Lereng Village Kuok District, and 1 unit in Sawah Baru Village, Kampar Timur District. The large number of UPR in Koto Mesjid Village is because this area is the largest catfish farming center in Kampar district. The area of fish farming land in Koto Mesjid Village, XIII Koto Kampar District is the largest fishery cultivation area compared to other sub-districts in Kampar district. However, at this time according to information from the fish cultivating community, the largest production of catfish fingerling in Kampar Regency comes from UPR Tunas Muda Fish Farm. According to [5], calculation of production results obtained by a business is known at the amount of production that gets the maximum profit. The greater the profit received, the more feasible the business is to be developed.

UPR Tunas Muda Fish Farm is a striped catfish hatchery located in Kuok District, Kampar Regency, Riau Province. This hatchery business needs to be developed for its business so that it can increase production even more. To develop this business, it is necessary to know in advance the level of business feasibility.

According to [6] business feasibility is a study that can find out whether the production of a business being carried out is profitable and feasible to develop. This study can be a reference to find out how the feasibility level of this hatchery business is by analyzing several aspects needed in the preparation of this research, such as: (1) investment, (2) profit, (3) Calculation of Revenue Cost of Ratio (RCR), Financial Rate of Return (FRR), and Payback Period of Capital (PPC) [7].

2. RESEARCH METHOD

Time and Place

This research was carried out on May 23 – June 5 2021 at the Tunas Muda Fish Farm Business (UPR) in Kuok District, Kampar Regency, Riau. The selection of research sites was done deliberately with the consideration that this hatchery business is capable of producing large amounts of seed production. Based on the results of the research survey, it is known that this hatchery business has more seed production than the others do.

Method

The method used in this study is the case method. Case research is research that aims to study intensively about a particular unit which includes individuals [8], whereas [9] states that case studies are concerned with everything that is meaningful in the development of cases that aim to understand the life cycle of an individual unit. Determination of respondents is determined as a whole, where the respondents taken in this study are the owner and all workers with details of one owner and three workers at the UPR Tunas Muda Fish Farm

Data Collection

Collecting data in this study is in the form of primary data and secondary data. Primary data collection used is direct interviews and field documentation.

Interviews were conducted by submitting questionnaires in the form of direct questions to respondents. Secondary data collection was carried out by searching for literature studies and browsing the internet. Secondary data was obtained from related agencies in the form of catfish production data from the Kampar District Fisheries Service, data from the Kampar District Central Statistics Agency (BPS) and other data sources such as literature related to this study.

Data Analysis

Data analysis was carried out to obtain an overview of the financial aspects of this hatchery business in the form of investment issued, profits earned, and business feasibility analysis using Revenue Cost of Ratio (RCR), Financial Average of return (FRR), and Payback Period of Capital calculations (PPC). Data processing is carried out analytically, where the data obtained will be processed using Microsoft Excel 2010 and displayed in the form of tabular numbers for easy reading and accompanied by explanations. This data analysis is useful for answering research objectives that will be explained as follows:

Investation

to find out the amount of investment invested in this hatchery business by adding up the fixed capital with the working capital issued [7]. The formula used is as follows:

$$I = MT + MK$$

Information:

- I : Investation
MT : Fixed capital
MK : Working capital

Profit

To find out the profit, namely by means of the total income of the hatchery business minus the total costs such as fixed costs and variable costs [10]. The formula used is as follows:

$$JI = TR - TC$$

Information:

- JI : profit (net income)
TR : total revenue
TC : total cost

Appropriateness Effort

Revenue Cost of Ratio (RCR)

RCR is a comparison between gross income and total costs incurred. RCR is used to see the feasibility of a business, with the greater the RCR value, the more feasible the business is. The formula used is as follows:

$$RCR = TR / TC$$

Information:

- TR : Total Revenue
TC : Total cost

Financial Rate of Return (FRR)

FRR is the ratio of profit per year to the investment issued multiplied by 100%. FRR is used for investment feasibility criteria compared to bank deposit rates. If the FRR value is greater than the interest rate at the bank, no investment will be made in the business and vice versa. The formula used is as follows:

$$FRR = JI / I \times 100\%$$

Information:

- JI : Profit
I : Investation

Payback Period of Capital (PPC)

PPC is used to measure how quickly an investment can return. The faster a business can return investment costs, the better the turnover of capital for the business [11], The formula used is as follows:

$$PPC = I / JI \times \text{period}$$

Information:

- I : Investation
JI : Profit
Period : length of time spawning.

3. RESULT AND DISCUSSION

General Condition of Research Area

Fishery business in Kampar Regency has a wide development potential and has great opportunities to be developed. For fish pond cultivation, an area of 6.111,3 hectares is available, of which 700.03 ha or 11.46% has been cultivated with a production of 14.135,15 tons or with a new productivity level of 20.91 tons/year, while the optimum productivity level pond cultivation can reach 50 – 75 tons in 2018 [12]. This area's aquaculture production in 2020 is 53,372 tons. Types of fish that are cultivated include carp, striped catfish, Asian red tail catfish, catfish, tilapia, and others. One of the dominant fish cultivated in this district is catfish, with a total production of 32,401 tons or 60.7% of the 2020 production. The catfish farming business has experienced the largest increase every year compared to other fish farming businesses, thereby increasing the demand for catfish fingerlings from smallholder hatcheries (UPR). In 2020 the UPR of this area is capable of producing 114,229,853 fingerlings [1]. One of the UPRs in Kampar Regency is the Tunas Muda Fish Farm UPR.

UPR Tunas Muda Fish Farm is a striped catfish hatchery unit, which was established in 2018 and only, started operating in 2019, this UPR is located in Kuok District, Kampar Regency, Riau. This UPR has a land area of 3,500 m². The business management system run by UPR is the owner as well as the manager. Employees employed consist of permanent employees. Permanent employees are workers who are employed to assist managers in hatchery activities, namely spawning activities, rearing and caring for larvae, and raising post-larval seeds. The workforce working at the UPR comes from locations around the hatchery with the aim of creating new jobs to reduce unemployment.

Striped catfish Hatchery Business Investment

Investment is the initial cost incurred when running a business, namely in the zero business year, where the amount is relatively large and does not run out in one production period. Investment costs are invested or incurred in a business with the aim of obtaining profits in the future, namely during the life of the business, or as long as the business is in operation [13]. The size of the business scale is classified based on the amount of investment invested in the business. Investment is the result of the sum of fixed capital and working capital. Capital in a business is useful as goods with economic value to increase production so that it will increase the profits earned. To make it clearer the investment invested in this hatchery can be seen in Table 1. The components of investment costs in this hatchery are divided into two, namely fixed capital and working capital.

Fixed capital

Fixed capital is a number of costs invested for the purchase (procurement of assets) or equipment that are not used up in one production process but can be used repeatedly for a long period of time [14]. Fixed capital issued in this hatchery business is the initial capital of the business; this capital is intended for initial preparation so that this business is able to produce seeds.

Working Capital

Working capital is the entire cost associated with business production activities, these costs are incurred once at the start of the hatchery business. The striped catfish hatchery process requires raw materials that are easily available. In procuring production facilities, this UPR was obtained from around Pekanbaru City and Kampar Regency. Procurement of production facilities in the form of mother

feed, artemia, silk worms, and spawning tools [15].

Table 1. Striped Catfish Hatchery Business Investment

No.	Component Cost	Amount Physique	Unit Physique	Total Cost (Rp)
A. Fixed Capital				
1.	Land lease			15,000,000
2.	Hatchery building			150,000,000
3.	Mother pond	5	Plot	10,960,000
4.	Like larvae	16	Bak	16,000,000
5.	Hatching tub	1	Bak	1,400,000
6.	Hatching funnel	8	units	1,440,000
7.	Like a Silk Worm	1	Bak	500,000
8.	Artemia vessel	13	Gallon	325,000
9.	Water pump	2	units	4,000,000
10.	Water Installation			3,000,000
11.	Aeration System	1	units	4,800,000
12.	Boreholes	2	units	8,000,000
13.	Water tank	1	units	1,500,000
14.	Parent	180	kg	13,500,000
15.	Oxygen tube	1	units	1,000,000
16.	Generator	2	units	20,000,000
17.	Other Equipment			1,500,000
Total Fixed Capital				252,925,000
B. Working Capital				
No.	Component Cost	Amount Physique	Unit Physique	Total Cost (Rp)
1.	Brood feed	27	Bag	8,775,000
2.	Ovaspect	2	Bottle	560,000
3.	Salt	150	Sak	1,500,000
4.	Artemia	4	Can	3,120,000
5.	Silk worms	500	Can	10,000,000
6.	Electricity			1,500,000
7.	Labor	3	Person	12,240,000
8.	Generator Oil			550,000
Total Working Capital				38,245,000
Total Investment in Striped Catfish Hatchery Business				291,170,000

Based on Table 1, it is known that the fixed capital issued by this UPR at the start of the business amounted to IDR 252.925.000, with the largest cost being the construction of the hatchery building. Other costs include making brood ponds, larva tanks, hatching tanks and silkworm tanks. While costs for supporting facilities such as water pumps, aeration systems, generators, oxygen cylinders, and others. Working capital costs of IDR 38.245.000. This working capital cost consists of raw material costs such as feed costs, and others. The cost of brood feed per sack in

this hatchery business is IDR 8.775.000, this type of feed is a feed product with the Pokphan 783-4 brand. Larval feed used in this hatchery is artemia and silkworms. The artemia costs Rp. 3,120,000 with the brand Supreme plus 425 g. This Artemia is the feed for the larvae when they first hatch until the larvae are 7 days old, then the larvae will be fed silk worms until the larvae are $\frac{3}{4}$ inch and 2 inches in size. The cost of the silk worms issued was IDR 10.000.000 with the Tubifex worms brand 110 g. Labor costs are calculated based on a profit-sharing system for one period, with

provisions of 20% for labor, and 80% for hatcheries.

The total investment spent on this hatchery business is IDR 291.170.000 per year. This total investment is issued at the beginning of the business so that it can run in the future until you get a profit, the greater the investment invested, the profit will also increase.

Advantages of Striped Catfish Hatchery Business

The profit of the striped catfish hatchery business is the difference between the income earned and the total costs incurred. Revenue and total costs are calculated for one year or eight production periods. Revenue is obtained from the sale of seeds, while the total costs incurred consist of fixed and variable costs.

Income

Revenue is the result of selling production from the business being carried out multiplied by the selling price of the business results being produced. In this striped catfish hatchery business, income is obtained from the sale of 1-day-old larvae, ¾-inch fingerlings 20 days old, and 2-inch fingerlings 40 days old. Operating income is calculated based on income for 1 year or 8 times the production period. For one production period, 2 spawning times are carried out, where 1 spawning time produces an average of 800.000 fingerlings.

At the first spawning, the larvae that are 1 day old are immediately sold for additional production costs, such as Artemia feed and others. The second spawning of new fingerlings is sold after 20 days old with a size of ¾ inches and 40 days old with a size of 2 inches.

The number of sales of seeds that are 20 days old at each spawning is 360,000 and 40.000 fingerlings that are 40 days old. The number of fingerlings that were 20 days old came from 600.000 larvae and 40 days old fingerlings from 200.000 fish. Based on these conditions, the survival rate for fingerlings ¾ inch in size was 60%. According to [16] in the Pasirgaok Fish Farm hatchery, Rancabungur District, Bogor Regency, the survival rate for ¾ inch fingerlings aged 20 days was 50%. This situation shows that the hatchery business at Tunas Muda Fish Farm has a better survival rate. According to Fish Farm's Young Tunas hatcheries, in their hatchery business, they have implemented good fish hatchery methods (CPIB). According to [4] CPIB is carried out by brood management, artificial spawning, hatching through aquariums, rearing larvae in a controlled environment, and harvesting seeds. The application of CPIB in this hatchery business can increase the yield of fingerlings production, so that it will also increase business income. For clearer annual income can be seen in Table 2.

Table 2. Revenue Period and Annual Striped Catfish Hatchery Business

No.	Description	Price (IDR)	Perperiod (fish)	Amount (IDR)	Per year (Fish)	Amount (IDR)
1.	Larvae	8	800,000	6,400,000	6,400,000	51,200,000
2.	Fingerling ¾ inch	130	360,000	46,800,000	2,880,000	374,400,000
3.	Fingerling 2 inches	220	40,000	8,800,000	320,000	70,400,000
Total Income Per Period & Annual			1,200,000	62,000,000	9,600,000	496,000,000

Based on Table 2 above, it can be seen that the annual income from the striped catfish hatchery is IDR 496,000,000. This income is obtained from income for 8 times the production period.

The per-period income earned by this hatchery is IDR 62,000,000, which comes from the first spawning for the sale of 1-day-old larvae at a price of IDR 8 per head multiplied by the number of larvae of

800,000, which is IDR 6,400,000. The spawning of the two fingerlings was raised until they were 20 days and 40 days old, 75% of the fingerlings were sold at 20 days old and 25% were sold after 40 days old. The 75% of the fingerlings amounted to 600.000, after 20 days, 360.000 could be sold. The larvae are 25% as many as 200.000 fish, after 40 days old they can be sold as many as 40,000 fish.

Total cost

Cost is the amount of money spent to be able to carry out the production of a business with the aim of making a profit. The costs in the striped catfish hatchery consist of 2 types of costs, namely fixed costs and variable costs. To make it clearer, the total costs incurred can be seen in Table 3.

Table 3. Total Cost of Striped Catfish Hatchery Business

No.	Cost component	Physical Amount	Union Fee	Perperiod Cost	Annual Fee (Rp)
A. Variable Costs					
1.	Brood feed	216 Sacks	325,000	8,775,000	70,200,000
2.	Ovaspect	16 Bottles	280,000	560,000	4,480,000
3.	Salt	1200 Sac	10,000	1,500,000	12,000,000
4.	Artemia	32 Cans	780,000	3,120,000	24,960,000
5.	Silk worms	4000 Cans	20,000	10,000,000	80,000,000
6.	Electricity			1,500,000	12,000,000
7.	Labor	3 people	4,080,000	12,240,000	97,920,000
8.	Generator Oil			550,000	4,400,000
Total Variable Costs					305,960,000
B. Fixed Costs					
1.	Maintenance costs				4,000,000
2.	Cost of depreciation				43,386,000
Total Fixed Costs					47,386,000
Total Cost of Striped Catfish Hatchery Business					353,346,000

Fixed cost

Fixed costs are costs that are incurred in a business without being affected by the level of production. Fixed costs in the striped catfish hatchery consist of maintenance costs and depreciation costs. Maintenance costs are costs incurred to repair tools for seed production so that the tools can last longer. Meanwhile, depreciation costs are replacement costs for the use of fixed capital that has decreased in function and can no longer be used. Maintenance costs and depreciation costs in this hatchery business are calculated annually.

Variable Cost

Variable costs are costs incurred during production activities that can vary depending on the price of the materials

used. Variable costs in the striped catfish hatchery business are the cost of fingerlings production for one period. This cost is calculated per year, which consists of eight production times.

Based on Table 3, it is known that the annual variable costs incurred in the striped catfish hatchery business are IDR 305.960.000. This annual variable cost is obtained from the cost of materials for seed production and the wages of labour incurred for eight times of production. The annual fixed costs incurred in the striped catfish hatchery business amount to IDR 47.386.000. This fee is obtained from the sum of maintenance costs and depreciation costs. Maintenance costs incurred amounted to 4.000.000 consisting of mains vitamin costs and maintenance costs for main ponds, while depreciation costs

incurred amounted to IDR 43.386.000 consisting of depreciation costs for main ponds, water pumps, hatchery buildings, land rent, cement tanks, drilled wells, generators, oxygen cylinders, water tanks, and mains. The total cost per year in this striped catfish hatchery business is IDR 378.146.000. The total annual cost is obtained from the sum of the annual fixed costs and annual variable costs.

Based on Tables 2 and 3, it is known that the annual profit obtained in this hatchery business is IDR 142.654.000. This profit is obtained from the annual income earned minus the total annual costs incurred. Annual income is obtained from the sale of larvae of IDR 51.200.000, sales of $\frac{3}{4}$ -inch fingerlings of IDR 374.400.000,

and sales of 2-inch fingerlings of IDR 70.400.000.

Feasibility of Striped Catfish Hatchery Business

Business Feasibility is an activity to assess the extent to which benefits can be obtained in carrying out a business activity, the results of this analysis are used as consideration in making decisions on a business that will be feasible to run and develop [17]. In this Siamese catfish hatchery, a business feasibility analysis is carried out to determine the Revenue Cost of Ratio (RCR) value, the Financial Rate of Return (FRR) value, and the Payback Period of Capital (PPC) value [15]. For more clarity, the results of the calculation of the feasibility analysis can be seen in Table 4.

Table 4. Calculation results of striped catfish hatchery business feasibility analysis

No.	Analysis Criteria	Score
1.	RCR	1,4
2.	FRR	49%
3.	PPC	17 Periods/2.1 Years

RCR is a comparison between the annual income earned and the total annual costs incurred in the striped catfish hatchery. This RCR has three criteria for whether or not a business is feasible. First, if the RCR results are > 1 , then this hatchery business is categorized as profitable and feasible to develop. Second, if the RCR result is < 1 , then this hatchery business is categorized as a loss and is not feasible to continue. Third, if the RCR result = 1, then this hatchery business is categorized as break even or no profit and no loss. FRR is the ratio between the annual profit earned and the total investment spent in this striped catfish hatchery business. The results of this FRR are useful for knowing the amount of profit obtained with a certain capital in this hatchery business compared to the capital deposited in the bank. PPC is the ratio between the total annual investment issued and the annual profit obtained from the

striped catfish hatchery. The results of this PPC calculation aim to determine the length of time needed to return the invested capital. The PPC assessment category is that the greater the PPC value, the longer the return on investment, conversely the smaller the PPC value, the faster the return on investment or this business is categorized as feasible to develop. PPC is the ratio between the total annual investment issued and the annual profit obtained from the striped catfish hatchery. The results of this PPC calculation aim to determine the length of time needed to return the invested capital. The PPC assessment category is that the greater the PPC value, the longer the return on investment, conversely the smaller the PPC value, the faster the return on investment or this business is categorized as feasible to develop. PPC is the ratio between the total annual investment issued and the annual profit obtained from the striped catfish

hatchery. The results of this PPC calculation aim to determine the length of time needed to return the invested capital. The PPC assessment category is that the greater the PPC value, the longer the return on investment, conversely the smaller the PPC value, the faster the return on investment or this business is categorized as feasible to develop.

Based on Table 4, it is known that the RCR calculation results in the striped catfish hatchery are 1.4. The results of this RCR indicate that the hatchery business is profitable, this is in line with the theory above that says if the RCR value is > 1 then this business is categorized as profitable and can be developed. The results of this RCR also show that the annual income earned is still higher than the total annual costs incurred in this hatchery business, where every 1 rupiah of costs incurred will generate a profit of 1.4 rupiah so that this business is classified as feasible.

According to [14] a business is said to be feasible to run if the Revenue Cost of Ratio (RCR) value is > 1 . Furthermore, the results of the FRR calculation in this hatchery business are 49%, this shows that the total profit per year is still 49% greater than the total investment spent on the business. Furthermore, the PPC value obtained was 2.1 years, which means that

the striped catfish hatchery business is able to return the investment capital when the business has been running for about 2.1 years. The greater the PPC value, the longer the return on business investment, conversely, the smaller the PPC value, the faster the return on business investment. This PPC value indicates that this hatchery business can be said to be feasible. According to [17], hatchery business is said to be feasible if the rate of return on investment capital is still in the age of the business, namely under 10 years.

4. CONCLUSION

Based on the known research results, it can be concluded as follows: The total investment spent in this hatchery business is IDR 291.170.000. The annual income earned is IDR 496.000.000, while the total annual expenses incurred are IDR 353,346,000. Then the annual profit obtained in this hatchery business is IDR 142.654.000.

The RCR value obtained is 1.4. The FRR value obtained is 49%. The PPC value obtained was 17 production periods or 2.1 years. Based on the analysis of the RCR, FRR, and PPC, the striped catfish hatchery business at UPR Tunas Muda Fish Farm can be said to be feasible and can be developed.

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