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Feasibility Analysis of Koi Fish (*Cyprinus carpio*) Hatchery Business at Batu Kumbung Fish Seed Center (BBI), Lingsar Subdistrict

Analisis Kelayakan Usaha Pembenihan Ikan Koi (*Cyprinus Carpio*) Di Balai Benih Ikan (BBI) Batu Kumbung, Kecamatan Lingsar

Sahrul Alim*, Nuri Muahiddah

Aquaculture Departement, Mataram University

Pendidikan Street Number 37 Mataram, West Nusa Tenggara

*Coresponding author: sahrulalim@unram.ac.id

ABSTRACT

Koi fish (*Cyprinus carpio*) is one of the potential freshwater ornamental fish commodities that can be cultivated. This freshwater ornamental fish has several advantages, including easy maintenance, ability to survive in low oxygen water, and ability to produce high-quality eggs. The purpose of this research is to assess the feasibility of the breeding activities conducted at BBI Batu Kumbung through economic analysis. The research method used in this study is "Descriptive Comparative Method". Based on the research findings the economic analysis conducted includes assumptions, Total Costs Rp. 39.304.000, Sales Revenue Per Cycle Rp. 64.200.000, Income Per Cycle Rp. 24.896.000, R/C Ratio 1.63, Break-Even Point Price Rp. 1.224 per fish, Break-Even Point Production 19.652 and Payback Period 6.3 months. Based on the business analysis, the production of koi fish seeds at BBI Batu Kumbung can be considered feasible and has the potential for development, as it can provide good profits with a good Return on Investment (ROI).

ABSTRAK

Ikan koi (*Cyprinus carpio*) merupakan salah satu komoditi ikan hias air tawar yang memiliki potensi untuk dibudidayakan karena ikan hias air tawar ini memiliki beberapa keunggulan yaitu mudah di pelihara, dapat hidup di perairan dengan kandungan oksigen rendah dan mampu menghasilkan telur yang baik. Tujuan dari penelitian ini adalah untuk mengetahui kelayakan usaha dari kegiatan pembenihan yang dilakukan di BBI Batu Kumbung melalui analisis ekonomi. Metode yang digunakan dalam penelitian ini adalah metode “Deskriptif komparatif”. Berdasarkan hasil analisis ekonomi yang dilakukan mulai dari Asumsi, Total Biaya sebesar Rp. 39.304.000, Hasil Penjualan Per Siklus sebesar Rp. 64.200.000, Pendapatan per siklus sebesar Rp. 24.896.000, R/C Ratio sebesar 1,63, BEP (*Break Event Point*) Harga yaitu Rp. 1.224 per ekor, BEP *(Break Event Point)* Produksi yaitu Rp. 19.652 ekor, dan JWPM (Jangka Waktu

pengembalian Modal) yaitu 6,3 bulan. Berdasarkan analisis usahanya, maka produksi benih ikan koi di BBI Batu Kumbung dapat dikatakan layak dilakukan dan berpotensi untuk di kembangkan, karena dapat memberikan keuntungan yang baik dengan JWPM yang baik.

Kata Kunci	*Cyprinus carpio, Pembenihan ikan, Kelayakan Usaha*
Keywords	*Cyprinus carpio, fish breeding, business feasibility*
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INTRODUCTION

Koi fish hatchery (*Cyprinus carpio*) is a cultivation activity that has good potential so it plays an important role in the fishing industry, especially to obtain quality seeds. Koi is a type of freshwater ornamental fish that has a high selling value and is in demand by domestic and foreign markets. In Lingsar District, there is the Batu Kumbung Fish Seed Center (BBI) which has the potential to develop a koi fish hatchery business (Triyanti and Yulisti, 2012).

Fish cultivation is an appropriate alternative in an effort to increase fisheries production, both quantity and quality. Since the 1980s, fish cultivation businesses have developed rapidly until today, especially in freshwater and brackish water cultivation. However, until now cultivation business activities have experienced technical, biological obstacles and high environmental burdens (Nikijuluw, 2001).

Ornamental fish are a fishery commodity that has great potential in generating foreign exchange and improving the prosperity of the fishing community (cultivators). Ornamental fish consist of two types, namely saltwater ornamental fish and freshwater ornamental fish. However, the freshwater ornamental fish business is more popular or popular with the public or cultivators compared to seawater ornamental fish. This happens because maintaining freshwater ornamental fish is easier than seawater ornamental fish. However, at the freshwater fish cultivator level, they often encounter difficulties or complaints, namely the widespread game of certain people to import freshwater ornamental fish from abroad which causes the price of freshwater ornamental fish to fall, because of the market share of ornamental fish in Indonesia in the world. Currently it is 7.5% smaller than the Singapore market which reaches 22.8%, while the potential for ornamental fish in Indonesia far exceeds that of neighboring countries. Basically, the potential for ornamental fish in Indonesia is spread across Java, Sumatra, Bali, Kalimantan, Sulawesi, Maluku and Papua (Bachtiar, 2004).

One of the freshwater ornamental fish that people really like is the koi fish (Cyprinus carpio), because koi fish are ornamental fish that originate from China and then spread to Japan and various other countries in the world, including Indonesia. Even though the price of this ornamental fish is very expensive, many people or cultivators want to cultivate koi fish. This is because koi fish have a beautiful body shape, attractive color, and very agile movements so that people have a high interest in cultivating koi fish

(Gunadi and Sudenda, 2008).

According to Nasing (2020), the ornamental koi fish business is a mainstay of exports which is growing rapidly in line with increasingly high international market demand, so that koi fish have become a mainstay of exports. In 2012, the trade value of this exotic ornamental fish was estimated at IDR 600 billion – IDR 700 billion. Seeing that the market prospects are quite high and promising, the koi fish business seems to be getting quite high profits, however, to produce quite high profits, very superior seeds are needed. Apart from that, knowledge is also needed about good koi fish hatchery production management, so that it not only produces superior koi fish seeds, but also provides maximum profits from the hatchery business carried out.

One of the agencies in West Nusa Tenggara Province that carries out koi fish hatchery business activities is the Batu Kumbung Fish Seed Center (BBI), where this agency not only acts as a place for research and development in freshwater fish hatchery activities but also carries out regular production activities. so that it can guarantee the availability of koi fish seeds in the Lombok area and its surroundings (Nugroho and Haryadi, 2017). For this reason, the author is interested in further research regarding business feasibility analysis of koi fish hatcheries at the Batu Kumbung Fish Seed Center (BBI) in order to find out directly about koi fish hatchery techniques and appropriate seed production management in order to obtain maximum profits. Based on the background above, the problem can be formulated as follows, namely regarding how to hatch koi fish (Cyprinus carpio) at the Batu Kumbung Fish Seed Center (BBI) and the feasibility of the koi fish hatchery business being carried out.

In this case, an analysis of the feasibility of the koi fish hatchery business at BBI Batu Kumbung was carried out. The purpose of this analysis is to evaluate the potential and success of the koi fish hatchery business in this location, as well as assess the factors that influence the success of the business. Business feasibility analysis will involve several important aspects, including hatchery techniques, resource availability, environmental management, economic aspects, and other factors that can influence the success of a koi fish hatchery business. The results of this analysis will provide valuable information for stakeholders, such as local governments, fishermen, fish farmers, and prospective entrepreneurs, in developing koi fish hatchery businesses. The aim of carrying out this research is to find out and learn directly about the business feasibility analysis of koi fish hatchery production in order to obtain maximum profits. The benefit of this research activity is to find out how to carry out a feasibility analysis of a business or production that is run well in order to get maximum profits. By considering these various factors, the feasibility analysis of the koi fish hatchery business in BBI Batu Kumbung is expected to provide a better understanding of the potential and success of the koi fish hatchery business, as well as encourage the development of the fisheries sector in the area.

METHODS

This research on the feasibility analysis of the koi (Cyprinus carpio) fish hatchery business was carried out for 3 months, namely from 15 January – 15 April 2020, at the Batu Kumbung Fish Seed Center (BBI) located in Batu Kumbung Village, Lingsar District, West Lombok Regency , NTB Province.

This study uses a comparative descriptive method to conduct a feasibility analysis of the koi fish hatchery business at the Batu Kumbung Fish Seed Center (BBI), Lingsar District. The following are the steps taken in this research:

1. Data collection: The data required in this research was collected through direct observation at BBI Batu Kumbung, interviews with BBI officers, as well as literature studies related to koi fish hatcheries. The Observation Method is a method of collecting data by making direct observations on all matters related to koi fish (Cyprinus carpio) hatchery techniques and business analysis at the Batu Kumbung Fish Seed Center (BBI), Lingsar District. The interview method is a method carried out by asking parties or technicians at the agency where research activities are carried out. Interviews were conducted with the aim of collecting data or obtaining information regarding koi fish (*Cyprinus carpio*) hatchery techniques and business analysis at the Batu Kumbung Fish Seed Center (BBI), Lingsar District.
2. Identification of feasibility factors: Factors that will be evaluated in the business feasibility analysis include seeding techniques, availability of resources (such as land, water and feed), environmental management (water quality and environmental sustainability), economic aspects (production costs, income, and profitability), as well as other factors that can influence the success of a koi fish hatchery business.
3. Economic data collection: Data on production costs, income, and profitability of koi fish hatchery businesses at BBI Batu Kumbung were collected through interviews with BBI officers, review of financial documents, and literature studies related to economic analysis of fisheries businesses.
4. Economic data collection: Data on production costs, income, and profitability of koi fish hatchery businesses at BBI Batu Kumbung were collected through interviews with BBI officers, review of financial documents, and literature studies related to economic analysis of fisheries businesses.

By using comparative descriptive methods and referring to various relevant references, it is hoped that this study can provide a comprehensive picture of the feasibility of koi fish hatchery businesses in BBI Batu Kumbung, Lingsar District, as well as provide valuable insight for stakeholders in the fisheries sector.

RESULT AND DISCUSSION

Market demand for koi fish is very high in Indonesia. Koi fish have become one of the ornamental fish that are popular among ornamental fish fans in Indonesia. Demand for koi fish continues to increase along with increasing public interest in the ornamental fish hobby. Koi fish have a unique charm with their bright color combination and beautiful patterns on their bodies. The beauty of koi fish makes it a favorite choice for placement in garden ponds, ornamental ponds and aquariums, hotels or tourist attractions (Bachtiar, 2004).

Apart from that, koi fish also have symbolic meaning in Indonesian culture. It is considered a fish that brings good luck. Koi fish are often chosen as decoration in

traditional celebrations and ceremonies. In the ornamental fish industry, the koi fish market covers a wide consumer segment, from novice ornamental fish enthusiasts to experienced collectors. The demand for high quality and unique koi fish continues to increase, so there are good business opportunities in koi fish hatcheries.

Thus, the koi fish hatchery business has bright prospects in the Indonesian market. By producing high quality koi fish, following market trends, and providing a variety of attractive colors and patterns, the opportunity to meet market demand and achieve business success in the koi fish hatchery industry is enormous.

Analysis of Economic Assumptions

Rent 30 acres of land with pool facilities measuring 4 m x 20 m in 3 plots. The workforce used is 4 people. Length of maintenance (nursing 1 for 30 days). Selling price Rp. 2000, Number of parents, 2 males and 1 female. The number of parents laying eggs is 1. Fecundity of parent eggs is 110,400 eggs/female. Egg hatchability (HR) 45.10%. The number of larvae was 49,800. Survival rate/survival rate 64.45%. The number of seeds is 32,100.

Fixed cost

Component	Unit	Number of tools	Price (RP)	Total cost (Rp)	Lifetime (bulan)	Waning Moon (Rp)
Land lease	Unit	1	20.000.000	20.000.000	12	1.666.667
Hoe	Unit	1	150.000	150.000	3	50.000
Tub	Unit	3	75.000	225.000	3	75.000
Seser	Unit	3	50.000	150.000	3	50.000
Bucket	Unit	1	35.000	35.000	3	11.666
Secopnet	Unit	1	25.000	25.000	3	8.333
Tea strainer	Unit	2	10.000	20.000	3	6.666
Amount	**-**	**12**		**20.605.000**	**-**	**1.868.332**

Variable Costs (Per Cycle)

Component	Unit	Amount	Price (Rp)	Total cost (Rp)
Feed	Kg	180	187.000	374.000
Bran	Kg	300	2000	200.000
Organic fertilizer	Kg	150	2000	100.000
Labor	Orang	4	18.000.000	18.000.000
Chalk	Kg	15	5000	25.000
Amount	**-**	**-**	**-**	**18.699.000**

Total cost

To get the total costs, you can find out the formula for the total costs incurred according to Saparinto and Susiana (2013), namely:

Total cost = Fixed Costs + Variable Costs
= Rp 20.605.000 + Rp. 18.699.000
= Rp 39.304.000

Sales Results per cycle

The formula for getting sales results per cycle can be done using the formula from Saparinto and Susiana (2013), namely:

Sales results = Number of seeds (heads) x Price of seeds per head
= 32.100 ekor x Rp. 2000/ekor
= Rp. 64.200.000

The sales proceeds per cycle of the koi fish seed production process are IDR 64,200,000, meaning that in one hatching activity the revenue value is as much as Rp. 64.200.000.

Cost

Saparinto and Susiana's (2013) income formula, namely:

Cost = Rp. 64.200.000 – Rp. 39.304.000
= Rp. 24.896.000

The income value from koi fish seed production activities is Rp. 24,896,000, meaning that in one seed production cycle you get a profit of as much as Rp. 24.896.000.

R/C Ratio

According to Handayani (2017) R/C Ratio is a comparison between revenue and costs. Mathematically it can be calculated using the following formula:

$$\text{R/C Ratio} = \frac{\text{Sales results}}{\text{Total cost}}$$

$$\text{R/C Ratio} = \frac{\text{Rp 64.200.000}}{\text{Rp.39.304.000}}$$

$$= 1{,}63$$

So the R/C Ratio value obtained is 1.63, meaning that for every 1 expenditure you will get 1.63 in revenue. The production of koi fish seeds is said to be feasible to continue because the R/C Ratio value is > 1. In accordance with the statement of Saparinto and Susiana (2013), a business is said to be feasible if the R/C Ratio value is > 1. The R/C Ratio value is obtained from sales proceeds. more seeds than the total cost used.

BEP (*Break Even Point*)

Break Event Point is a situation where a business experiences a break-even point, namely a situation where there is no loss but no profit. BEP can be calculated using the formula (Arie and Dejee, 2013) as follows:

- **BEP Price :**

BEP Price = Total production costs: Total seed production

$$= \frac{\text{Rp. } 39.304.000}{\text{Rp. } 32.100} = \text{Rp. } 1.224 \text{ per ekor}$$

So from the BEP price calculation the result is IDR. 1,224 per head, meaning that the break-even value occurs if the selling price of the seeds is Rp. 1,224 per head, while the selling value of the seeds is Rp. 2000 per head. This means that the sales value is higher than the break-even value and produces a profit and is said to be worth continuing.

- **BEP Production**:

$$\text{BEP Production} = \frac{\text{Total production costs}}{Price\ of\ seeds\ per\ head}$$

$$= \frac{\text{Rp. } 39.304.000}{Rp\ 2000} = \text{Rp. } 19.652 \text{ ekor}$$

The results of the BEP production calculation, which is 19,652 fish, show that the break-even value for koi fish seed production if the seed production is 19,652 fish, while the total production of seeds produced is 32,100 fish, so it can be seen that seed production activities make a profit.

Capital withdrawal period (JWPM)

The capital withdrawal period formula (JWPM) according to Saparinto and Susiana (2013), namely:

$$\text{JWPM} = \frac{\text{Fixed costs + Variable costs x 1 year}}{\text{One year profit}}$$

$$= \frac{20.605.000+18.699.000 \text{ x 1 tahun}}{74.688.000}$$

$$= \frac{39.304.000 \text{ x 1 tahun}}{74.688.000}$$

$$= 6,3$$

The JWPM value calculated in 3 cycles for 1 year is 6.3, meaning it takes 6 months and 3 days for the capital to be returned.

The potential for the koi fish hatchery business at BBI Batu Kumbung is very large. Koi fish, with their bright colors and unique patterns, are highly sought after in the ornamental fish market. BBI Batu Kumbung, with its expertise and facilities, is well positioned to capitalize on this demand. This business can provide several benefits. First, koi fish hatcheries are a niche market or what is also called a market that offers special needs and appreciates high quality and unique specimens. BBI Batu Kumbung can utilize its expertise to produce superior quality koi fish with desired properties (Setyono et al., 2020).

Second, the location of BBI Batu Kumbung can be an advantage. If it is located in an area with good infrastructure and accessibility, it can attract customers and distributors more easily. Additionally, the availability of suitable water sources and environmental conditions in the area can contribute to the success of koi fish hatchery operations. Furthermore, the potential for business expansion and growth is very

promising. As demand for koi fish continues to increase, BBI Batu Kumbung may explore opportunities to expand production capacity, diversify product offerings, and possibly enter new markets (Setyono et al., 2020).

However, it is important to conduct comprehensive market research, assess competition, and develop a strong marketing strategy to position koi fish seeds from BBI Batu Kumbung well in the market. In addition, maintaining high standards of fish health and welfare, as well as implementing appropriate biosecurity measures, will be key to business success and sustainability. Overall, with good planning, good management, and attention to market dynamics, the koi fish hatchery business at BBI Batu Kumbung has great potential to gain significant profits and growth. Based on the business analysis, koi fish seed production at BBI Batu Kumbung can be said to be feasible and has the potential to be developed, because it can provide good profits with good JWPM.

CONCLUSION

Based on the business analysis carried out, the production of koi fish seeds at BBI Batu Kumbung can be said to be feasible and has the potential to be developed, because it can provide good profits with a good JWPM. Apart from that, the quality of the parents plays a very important role in koi fish hatchery, so that the results obtained will be maximum. The things that need to be considered are good fecundity and egg hatchability. This will greatly influence the number of seeds produced from spawning activities as well as the profits that will be obtained when selling or marketing the seeds.

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