



Feasibility Analysis of Freshwater Fish Farming Business at Karya Mulya Fish Farming Group, Banyumas Regency

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Abstract

This study aims to determine the feasibility of freshwater fish farming as an effort to support the *minapolitan* area of the Banyumas Regency. The research was carried out in Karang Lewas District. Data collection was carried out proportionally by interviewing the fish farmers of each fish farming group. Data analysis on the feasibility of fish farming was performed using the B/C ratio, PP, and BEP (Break-Even Point) criteria. The analysis method of the business feasibility was an analysis of business costs and income. Results of the analysis of B/C ratio value in fish farming was 1.13 to 1.69, BEP calculation used data according to the respondents, while the Payback Period (PP) of the fish farming ranged between 1.00-1.49 meaning that the capital return in less than 5 years. Those values state that the activities of freshwater fish farming have a capital return of more or less over 1 - 1.5 years. It shows that the business of freshwater fish farming in both hatcheries and fish rearing is feasible to maintain.

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INTRODUCTION

Banyumas Regency is one of the pilot areas of *minapolitan* development along with 24 centers of fish farming production in Indonesia in 2011. *Minapolitan* region is located in 10 districts, namely Kedungbanteng, Karanglewas, Baturraden, Sumbang, Kembaran, Sokaraja, Sumpiuh, Kemrajen, Cilongok, and Ajibarang. In Banyumas, several types of fish such as nilem fish (bony lip barb), carp, catfish, Java barb, goldfish, Nile tilapia, and tilapia fish have long been cultivated. Fish products in the market are not only consumption-sized fish but also fish seeds in various sizes and even spawning eggs. In addition to meeting domestic needs, these fish have

been targeted to export commodities, both in the form of whole fish and fillets.

The main factor of failure in fish production other than in aquaculture and fish feed management is aquaculture management (Fitriadi *et al.*, 2020). The problems faced by most freshwater fish farmers in Banyumas are limited capital and equipment, lack of knowledge about market and technology information, as well as lack of skills, policies, and institutional support. Those problems and weaknesses may lead to the failure of freshwater fish farming activities. The failure is likely caused by errors of planning, errors in estimating the market, and so on. Calculation of the financial

aspects including the capital, costs, and revenue in a specific period is necessary to improve financial profit. Several preceding studies on the financial aspects of fish farming in Banyumas had been carried out, for example, a study by Fathurrohman (2013) stating that fishery agribusiness activities in Sokaraja district of Banyumas Regency are the center of carp rearing business, it is a side activity to earn additional income. It was further explained by Junita and Utami (2019) in their research on the production factors of carp hatchery in Kedungbanteng District of Banyumas Regency; it stated that capital or financial aspect is a crucial production factor. There has been no research analyzing the activities of the fish farming business in various regions of Banyumas Regency.

The followings are variables will be observed in the fish rearing activity: seed, feed, force labor, electricity, maintenance of assets, license, transportation, fertilizers, and drugs, etc. Meanwhile, business prospects can be determined based on the calculation of BEP, Payback Period (PP), and Benefit-Cost Ratio (B/C Ratio) (Palupi *et al.*, 2020). Based on these variables, it can be concluded whether or not the freshwater fish farming activities in the District of Karang Lewas, Banyumas, are feasible to maintain. This analytical study aims to determine the business feasibility of freshwater fish farming (in terms of revenue analysis of costs and profits) in Karang Lewas District of Banyumas Regency.

METHODOLOGY

Place and Time

This research was conducted from February - June 2020. The study was conducted in Karang Lewas District which is one of the centers for fish farming of carp, pomfret, Nile tilapia, and catfish with a total production of 337,000 fish per production.

Research Materials

This study made use of primary data from interviews, Focus Group Discussion, as well as secondary data. The primary data were obtained from direct observation on-site and direct interviews with fish farmers, as well as assessment of market aspect, technical or operational aspect, the management or organizational aspects, and financial aspect. The secondary data was taken from various books explaining fish farming, preceding studies, supplementary books, internet access as well as information obtained from associated institutions, for example, fishery statistic data from the Department of Marine and Fisheries of Central Java was used as a relevant reference for this research.

Research Design

The method used in this study was the descriptive-analytical method that focused on problem-solving comprising facts or factual circumstances in the field.

Work Procedure

Business Feasibility Analysis

Primary data collection includes those from the associated institutions. The collected data was then tabulated and analyzed for business feasibility using the following:

Cost and revenue analysis was done by calculating components of the cost incurred by the fish farmers including the cost of breeding, seeds, land rent, maintenance of equipment, fertilizer, feed, electricity, dolomite, etc. As well as the income calculation which is the difference between revenues and costs incurred, so that profit from fish farming activities can be calculated.

A business feasibility analysis was carried out using BEP, B/C ratio, and PP. Costs in the fish farming business are classified as follows: initial cost which means the costs spent before the business starts to run, such as capital, etc.; and operational cost which is the costs incurred when the fish farming business

runs and yields products. After calculating the revenue of the fish farming business, the calculation of initial cost, production or operational costs, and revenues were used to calculate BEP, B/C ratio, and PP.

The Payback Period is a period of returning the total amount of investment, calculated using cash flow from the beginning of the project up to the net flow of additional production; hence, it reaches the total amount of capital investment. According to Nurmalina *et al.* (2018), the Payback Period can be mathematically formulated as follows:

$$PP = \frac{\text{investment}}{\text{profit}}$$

It uses the following criteria: PP < 5 years means that the business has a rapid PP so it is feasible to operate, while PP > 5 years means that the business has a slow PP so it is not feasible to operate.

According to Bakti *et al.* (2010), Net Benefit-Cost Ratio is the amount of additional benefit for each additional cost for one unit of time. B/C ratio is the comparison between the present value of the positive value net benefit and the

negative value net benefit. The formula used is as follows:

$$B/C \text{ Ratio} = \frac{\text{revenue}}{\text{total cost}}$$

B/C Ratio > 1 means that the business is feasible or profitable, while B/C Ratio < 1 means that the business is not feasible nor profitable.

Data Analysis

The data analysis used in this research is descriptive, and business feasibility analysis. Descriptive analysis is an analysis used to describe the results of observations following the reality in the field regarding something being studied (Neliyana *et al.*, 2014).

RESULTS AND DISCUSSION

Freshwater fish farming business run by Karya Mulya 2 group in Karanglewas District, Banyumas Regency, indicated that fish farming business such as the cultivation of pomfret, carp, and tilapia is concentrated in certain districts. The cost incurred for fish farming including explicit and implicit costs is used to calculate income and profits (Hidayati, 2019).

Table 1. Costs and income of freshwater fish farming.

Components	Carp Rearing	Carp Hatchery	Pomfret Hatchery	Tilapia Rearing
Land Area (m ²)	1,320	2,320	930	4,929
Explicit Costs (IDR)	4,440	31,235	19,447	40,000
Implicit Costs (IDR)	1,000	7,000	7,000	15,000
Total Costs (IDR)	5,440	38,235	26,447	55,000
Income (IDR)	33,700	49,000	31,000	70,000
Profit (IDR)	28,260	10,765	4,553	15,000

The results show that land area in the fish farming business, both rearing, and hatchery, analytically affected the fish farmers' income. The larger the land area, the more fish can be reared which resulted in a higher income. This is following the opinion of Sutiani *et al.* (2020) stating that the income of the fish farming business is strongly influenced by the scale of the business, moreover, the facility of the fish farming supported by capital will determine the results. It is further explained by Pujastuti (2012) that fish

farming is influenced by technology, one of which is the type of feed technology resulting in fish growth increase and increase income.

Income from the hatchery business is higher than that in the rearing business because the hatchery has a faster turnover since the fish seeds will be cultured only in 21 to 60 days depends on the farmers' decision to harvest the fish based on its size. To maximize the income of catfish cultivators, it is necessary to increase the number and area of ponds and develop

aquaculture businesses, apply good maintenance and cultivation methods (Jatnika *et al.*, 2014). It is following the opinion of Mahyudin (2011) stating that pomfret fish hatchery has a faster capital turnover with a smaller risk compared with that of rearing business. The fish size

affects the selling price; the bigger the fish, the higher the farmers' income. In addition, in the hatchery business, a productive tilapia broodstock can be used a maximum of 5 times a year, while carp broodstock can be used twice a year.

Table 2. BEP value.

Components	Carp Rearing (IDR/Kg)	Carp Hatchery (IDR/Fish)	Pomfret Hatchery (IDR/Fish)	Tilapia Rearing (IDR/Fish)
BEP of Product	376	8,878	28,175	12,25
Production	3,000	22,000	23,000	4,000
BEP of Price	2,998	1,513	121	13,750
Market Price	25,000	4,000	1,000	17,500

BEP is the value of the break-even point where there is a balance between the revenue and the total cost, which means that the revenue is equal to the total cost that has been incurred (Winarti, 2017). BEP analysis can be used as a business plan for it can be calculated by the amount of production (kg) and the revenue (IDR) to make a profit and hence the price of fish can be calculated (in IDR or kg). Therefore, the fish farmers earn profit from the total cost of production (Suratiyah, 2008). BEP or break-even point in fish farming occurs when the total cost incurred is equal to the total

production, while BEP of products in fish farming may occur when the total cost is equal to the average price of fish in the market.

From Table 2, it can be concluded that the freshwater fish farming business is above the BEP of product and the BEP of price. BEP was calculated following the respondent. Most of the fish farmers cultivate fish on a land of 1,000 – 5,000 m². Results of the B/C ratio and PP calculation for three types of freshwater fish, namely, carp, tilapia, and pomfret in Sleman Regency are presented in Table 3.

Table 3. Value of B/C ratio and Pay Period (PP).

Component	Carp Rearing	Carp Hatchery	Pomfret Hatchery	Tilapia Rearing
B/C Ratio	1.69	1.13	1.55	1.27
PP	1.15	1.43	1.49	1

B/C Ratio business analysis is one of the business feasibility analyses to determine whether or not a business or a product is feasible to carry out. B/C ratio value of the fish farming was 1.13 – 1.69, indicating that the fish farming business, both hatchery, and rearing, was feasible to carry out. When the value of B/C > 1, it means that the cash income can cover the cash costs/expense, therefore, it is feasible for sustainable investment (Haming and Basalamah, 2003).

PP value of the fish farming ranged from 1.00 to 1.49 which means a return of the capital is in less than 5 years. This value states that the fish farming activities have an annual return of capital for more or less 1 year to 1.5 years. The payback period is considered rapid as some hatchery farmers had harvested the fish after 2 – 3 months culture and some farmers reared the fish in a bigger size, around 5 – 7 cm, resulting in a shorter farming period. According to Wati (2016), the capital return is considered rapid if the

PP value is < 5 years and is considered slow if the PP value is > 5 years. The faster return of a project investment indicates a better project since it has a smooth capital turnover (Yacob, 2003; Palupi *et al.*, 2021). Husnan and Suwarsono (1993) stated that the faster return of a business capital indicates a better project because the returned capital can be expended to finance other projects.

CONCLUSION

Results of the study indicate that freshwater fish farming in Banyumas Regency is financially feasible. B/C Ratio value obtained in the study was 1.13 – 1.69 and the Payback Period value was 1.00 – 1.49.

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