



Financial Analysis of Carp (*Cyprinus carpio*) Hatchery Business (Case Study in Ciparay Sub-District, Bandung District, West Java, Indonesia)

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Authors' contributions

This work was carried out in collaboration among all authors. Author IG designed research, managed wrote manuscript, managed data analysis. Author AEA designed research, wrote the manuscript drats, managed data analysis and managed the literature searches. Author YD managed the manuscript. Author AAHS managed manuscript, managed data analysis and managed the literature searches. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Carp (*Cyprinus carpio*) hatchery cultivation is one of the business activities carried out by the community in Ciparay District, Bandung Regency. This research aims to analyze the financial feasibility of carp hatchery cultivation in Ciparay District, Bandung Regency. This research was conducted using a case study method consisting of primary data and secondary data. Primary data obtained from interviews with respondents and secondary data obtained from related agencies. This research uses 38 respondents as samples based on the sampling method (purposive sampling). The analysis used in this research is descriptive quantitative. The results obtained from this research are carp hatchery cultivation in Ciparay District has a profit value of 164,225,000 IDR/year, Profitability of 217%, R/C of 3.2 and Payback Period of 33 days so it is feasible to run and develop. Carp hatchery cultivators in Ciparay District, Bandung Regency are indicated to be prosperous because they have a higher income than the Regional Minimum Wage of Bandung Regency.

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1. INTRODUCTION

Fish farming has an important role in supporting efforts to fulfill healthy food and can be accepted by the whole community. West Java is one of the provinces in Indonesia that has potential in the field of aquaculture. Aquaculture production which has continued to increase from 2003 to 2010 and continues to increase is a distinct advantage for West Java Province. One area in West Java Province that has the potential to produce aquaculture is Bandung Regency, where fish production in 2018 was 13,838 tons and the annual production rate increased by 10% [1].

In aquaculture there are areas for hatcheries, nurseries, enlargements and nowadays fish processing businesses are also developing which are spread in almost all areas of Bandung Regency. Aquaculture development efforts cannot be separated from the hatchery stage which is the starting point in aquaculture business concerning the availability of fish fry [2]. To support the success of fish farming, one of the determining factors is the availability of fish that meet the requirements for quality, quantity, and continuity [3]. The fish hatchery business area in Bandung Regency is concentrated in the southern part of Bandung Regency, including the Ciparay, Majalaya, Pacet and Ibun sub-districts. Ciparay sub-district has an area of 79.67 km² [4]. Fish hatchery production in Ciparay District in 2019 was 223,085,429 fish and the production rate increased by more than 100% from the previous year.

In general, hatchery cultivation activities in Ciparay District focus on three main commodities, namely catfish, carp and tilapia. Carp hatcheries have the highest productivity compared to catfish and tilapia, which is 82,524,910 in 2019 [5]. Carp is a characteristic fish of Bandung Regency so that the production process and hatchery activities continuity and improved as an effort to maintain production and economic value. According to [6] the demand for carp is quite high. The amount for the Jakarta, Bogor, Depok and Bekasi (Jabodetabek) areas can reach 50 tons per day, this number does not include requests from other cities. The demand for carp commodities is estimated to increase in the range of 100 tons per day. This amount must be balanced with a continuous supply of carp. To meet the demand for carp, it is necessary to

have superior fish fry in good quality and quantity. Fish fry produced from carp hatchery cultivation in Ciparay District, Bandung Regency directly contribute to meeting the demand for carp needs.

Carp hatchery activities in Ciparay District are carried out naturally in soil ponds with the majority of hatcheries doing special spawning on hapa specially installed in hatchery ponds. Hatcheries are carried out regularly, with good brood management in groups that are experienced in doing carp hatchery. Some farmers do fish hatchery using rented broodstock provided that the broodstock is gonadally mature. The main source of carp used for the spawning process comes from the Sukabumi Fish Fry Center and the Ciparay Fish Fry Center. The type of fish used is Majalaya carp. The female majalaya carp used in spawning is usually 2-3 kg per head while the male fish is 0.5-1 kg per fish from the same carp strain.

The facilities and infrastructure used in carp hatchery are ponds with a soil base whose bunds are made of soil. Other supporting equipment in the form of spawning hapa, kakaban, scoop, anco, bucket, hoe, harvesting equipment and warehouse in the form of huts around the cultivation area. The number of ponds owned by carp hatcheries ranges from 8-12 units. These containers are used for rearing broodstock, spawning and nursery eggs. In general, the carp spawning system in Bandung Regency uses a natural spawning system, namely spawning fish without human intervention, occurring naturally (without giving hormones).

The marketing of carp fry in Ciparay District, Bandung Regency goes through several chains to deliver products to consumers, namely from consumers taking directly to the hatchery, some can also be delivered to the buyer's place on demand and through middlemen. The fish fry produced by carp hatcheries in Ciparay District, Bandung Regency are used by carp breeders in the Minapadi system in the Pacet, Cikoneng, Babakan Tanjung, Cibodas, Cimalencer, Garut and Bogor areas.

Every business carried out by a person or group of people must aim to generate profits and the business is sustainable. Based on the search results, there is no research on the financial analysis of carp hatchery business in Ciparay

District, Bandung Regency. This business is very important for fish farmers in Ciparay District, Bandung Regency, so it is necessary to know its contribution to increasing people's income. Therefore, it is deemed necessary to conduct this research, it is hoped that it can be analyzed to what extent the carp hatchery business in Ciparay District, Bandung Regency is profitable and contributes to the welfare of carp hatchery cultivators.

2. MATERIALS AND METHODS

2.1 Time and Place

This research was conducted from July 2020 to August 2021 and the data were collected during May to June 2021 in the Ciparay Subdistrict, Bandung Regency, West Java, Indonesia.

2.2 Research Methods

The research method employed was the case study method. Data and information were collected from respondents by questionnaire distribution.

2.3 Type and Data Source

The data used in this research are primary data and secondary, both qualitative and quantitative. Primary data were based on direct observation and interviews with questionnaire guidelines. These data include fish hatchery business activities, obstacles faced and components of business feasibility. Secondary data were obtained from various related agencies, such as the Bandung Regency Livestock and Fisheries Service, the West Java Provincial Fisheries and Marine Service, the Bandung City Food and Agriculture Office, the Central Statistics Agency and literature related to research.

2.4 Sampling Techniques

The sampling technique used in this study was purposive which is a sampling technique with certain considerations [7]. A total of 38 carp hatchery cultivators in Ciparay District were used as respondents in this research. The sample criteria used in this research are: (i) cultivators who have a carp hatchery business in Ciparay District, Bandung Regency, (ii) owners or people who are trusted by the owners of carp hatchery businesses in Ciparay District, Bandung Regency (iii) cultivators from the carp hatchery

cultivation group alone or in association with other fish hatchery cultivation, (iv) group of fish cultivators with land area: narrow (<1,000m²), medium (1,000-2,000m²) and spacious (>2,000m²) [8], (v) group of fish farmers who are willing to be interviewed.

2.5 Data Analysis Methods

The data analysis method utilized in this research was descriptive analysis. Which is an analytical method that seeks to explain the condition of the object of study according to certain criteria so that it can provide an overview of what actually happened at the research site [9].

2.5.1 Benefit cost analysis

Cost benefit analysis is used to calculate the components of costs and revenues generated from fish hatchery cultivation in Ciparay District, Bandung Regency by previously conducting interviews. The cost components used are investment costs and operational costs. The revenue component is the selling value of the harvest.

2.5.2 Financial analysis

The financial parameters utilized in this business analysis were business profit analysis, the balanced revenue and cost (R/C ratio), payback period analysis and cost of goods manufactured analysis.

Profit Analysis: Mathematically the analysis of business profits can be formulated as follows [10]:

$$\pi = TR - TC$$

Description:

π : profit
 TR : *total revenue*
 TC : *total cost*

Business criteri:

TR > TC then the business is profitable (worthy)
 TR < TC then the business loses (not worth it)
 TR = TC then the business is in a state of break-even (feasible)

Profitability analysis: Mathematically can be formulated as follows:

$$\text{Profitability} = \frac{\pi}{TC} \times 100$$

Description:

π = Profit of carp hatchery business

TC = Total cost of carp hatchery business

According to [11] the criteria used in the profitability assessment are:

Profitability > 0 means that the carp hatchery is profitable. Profitability = 0 means the carp hatchery business is Break Event Point (BEP) and Profitability < 0 means the carp hatchery business is not profitable.

The Balanced Revenue and Cost (R/C): The balanced revenue and cost (R/C) analysis is a comparison in which total revenues are divided by total costs expressed by the equation [10]:

$$R/C = \frac{TR}{TC}$$

Description:

TR : total revenue

TC : total cost

Business criteria:

R/C > 1 then the business is profitable (worthy)

R/C < 1 then the business loses (not worth it)

R/C = 1 then the business is in a state of break-even (feasible)

Payback Period Analysis: Payback period (PP) is used to measure the length of return on investment from the profit received [12]:

$$PP = \frac{1}{\pi} \times 1 \text{ year}$$

Description:

1 : investment

π : profit

If the value of the payback period (PP) is getting smaller, it means that the return on investment is getting faster (feasible) and if the value of the payback period (PP) is getting bigger, it means that the return on investment is getting longer (not feasible).

Cost of Goods Manufactured Analysis: Cost of goods manufactured is used by the company to determine the characteristics of the company's management, but basically it aims as a basis for determining the selling price of the product [13].

The following is the calculation of the cost of production [14]:

$$HPP = \frac{\sum \text{cost}}{\text{production quantity}}$$

2.6 General Illustration of the Research Location

Ciparay District is geographically located at 7°00'-7°80' South Latitude and 107°32'-107°39' East Longitude with an area of 79.67 km² [4]. Administratively, the boundaries of the Ciparay sub-district are in the north: it is bordered by the Solokan Jeruk sub-district, in the south: the Pacet sub-district, in the east: the Majalaya sub-district, in the west: the Baleendah sub-district. Ciparay District is part of Bandung Regency which has 14 villages. There are several locations that are used as sampling sites in Ciparay District, including in Sagaracipta Village and Pakutandang Village. Geographically, Sagaracipta village is bordered by other villages. To the north it is bordered by Pakutandang Village Road, to the south by Cikoneng Village Road, to the west by Cirasea River and to the east by Blue Village/Tanjung Wangi Road. The potential of natural resources in Sagaracipta Village and Pakutandang Village is widely used as a livelihood by the residents for agricultural, fishery and animal husbandry activities. Most of the agricultural activities carried out by residents are rice fields or planting rice. As for fisheries, the activities are hatching freshwater fish (Ambo catfish, carp and tilapia). As an area where the community is engaged in fish farming business activities, either as a main source of livelihood or a side source of livelihood, with various sources of income and cultivation systems.

3. RESULTS AND DISCUSSION

3.1 General Characteristics of Respondents

Respondents in this research were carp hatchery cultivators of Ciparay Subdistrict. Questionnaires were distributed to 38 respondents explaining the characteristics of respondents such as age, education level and work experience.

Age level affects a person's ability to carry out cultivation activities. This can be seen from their strong physical condition and more experience compared to younger people [15]. Characteristics

of respondents by age consisted of below 15 years, 15-64 years and above 65 years of age (Fig. 1).

Fig. 1 shows that from 38 respondents, 37 persons (97%) belonged to the age group 15-64 years. This shows that the majority of carp hatchery cultivators in Ciparay District are of productive age [16]. Cultivators with productive age will be more enthusiastic to learn new things [17].

The condition of a person's level of education can affect a person's skills, behavior and attitudes and differences in educational background will affect a person's pattern or way of thinking and how to behave in dealing with various problems faced [18]. Characteristics of respondents based on education level consist of

elementary school, junior high school, senior high school and college (Fig. 2).

Based on the research results shown by Fig. 2, the majority of carp hatchery cultivators in Ciparay District have a high school education level, which is 15 persons or 39%. According to [19], the low level of education was due to past economic conditions that did not support getting a long education. Although the level of education possessed by carp hatchery cultivators is quite low, the technical ability of cultivators to carry out carp hatchery cultivation is good. In addition to formal education, farmers also attend seminars and trainings held by the local Fisheries Service. In addition, experience and guidance from other cultivators also increase knowledge for cultivators in conducting carp hatchery cultivation.

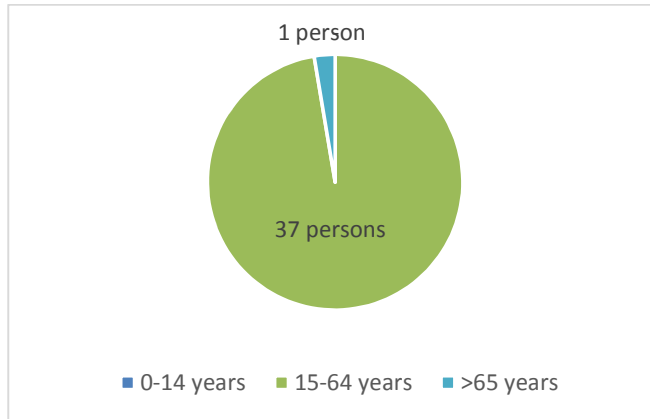


Fig. 1. Characteristics of respondents by age

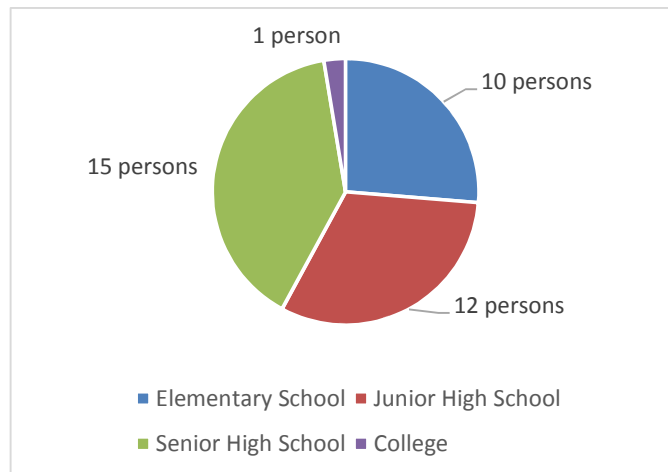


Fig. 2. Characteristics of respondents by education level

Business experience is one of the most important factors and affects the results or output of the carp hatchery business carried out. Experience will provide cultivators with knowledge about the state of managed cultivation so that cultivators are able to make the right decisions for the cultivation techniques to be taken [20]. Characteristics of respondents based on work experience can be seen in Fig. 3.

Based on Fig. 3 it can be seen that the majority of carp hatcheries cultivators in Ciparay District, Bandung Regency have aquaculture experience of 1-10 years are 31 persons (82%). Cultivators with 11-20 years of experience are 5 persons (13%) and cultivators with 21-30 years of experience are 2 persons (5%). The more the experience of cultivators increases, the technical skills of cultivators in carrying out carp hatchery cultivation will also increase [20].

3.2 Benefit Cost Analysis

3.2.1 Investment cost

The investment cost is the cost expense before conducting operational activities. The following is the cost required to conduct a fresh fish marketing business in Table 1.

Based on Table 1, the highest investment costs incurred by farmers are in case 2 of 19,600,000 IDR/year with the proportion of brood fish costs being 55% of the total investment costs. Meanwhile, the lowest investment cost is in case 1 of 9,800,000 IDR/year with the proportion of feed warehouse costs being 51% of the total investment cost. The difference in the amount of investment costs required is caused by differences in the area of cultivating land, the

number of ponds and production equipment and logistics used in cultivation [21].

3.2.2 Production cost

The production cost was classified into two, namely fixed and variable costs [10]. Fixed costs and variable costs in carp hatchery business can be seen in Table 2 and Table 3.

Based on Table 2, the total fixed costs incurred for carp hatchery business are different in each case. The carp hatchery business in Ciparay District which has the highest total fixed costs is case 2, which is 8,540,000 IDR/year with the highest proportion of costs, namely the depreciation cost of brood fish, which is 63% of the total fixed costs incurred by farmers. The lowest total fixed cost of carp hatchery business incurred by cultivators is in case 1, which is 3,400,000 IDR/year. The difference in the amount of fixed costs is caused by the large amount of capital used by fish farmers. The greater the amount of capital used, the greater the fixed costs incurred [22].

Based on Table 3, the total variable costs incurred for carp hatchery business are different in each case this is due to the use of production factors for each fish cultivator is also different [22]. The carp hatchery business in Ciparay District which has the highest total variable cost is case 3, which is 68,600,000 IDR/year with the highest proportion of costs, namely land rent costs of 66% of the total variable costs incurred by farmers. While the lowest total variable costs of carp hatchery business incurred by farmers are in case 1, which is 24,336,000 IDR/year with the highest proportion of costs being land rent costs of 21% of the total variable costs incurred by farmers.

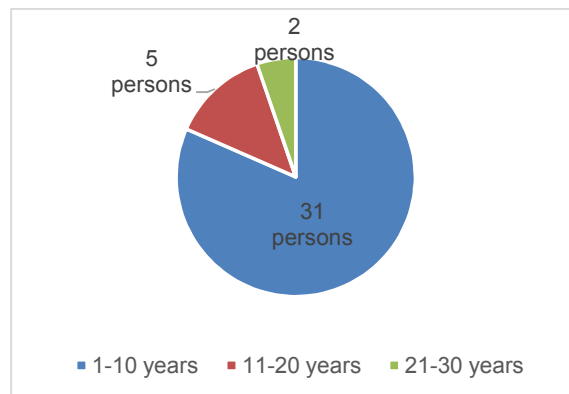


Fig. 3. Characteristics of respondents by work experience

Table 1. Investment cost of carp hatchery cultivator

No.	Type of Investment	Case 1 (land area <1,000m ²)		Case 2 (land area 1,000-2,000m ²)		Case 3 (land area >2,000m ²)	
		Total Cost (IDR/Year)	Depreciation (IDR/Year)	Total Cost (IDR/Year)	Depreciation (IDR/Year)	Total Cost (IDR/Year)	Depreciation (IDR/Year)
1	Broodstock	0	0	10,800,000	5,400,000	12,000,000	6,000,000
2	Feed warehouse	5,000,000	1,000,000	4,200,000	840,000	0	0
3	Production Equipment	3,800,000	1,900,000	3,800,000	1,900,000	2,050,000	1,025,000
4	Logistics Equipment	1,000,000	500,000	800,000	400,000	300,000	150,000
	Total	9,800,000	3,400,000	19,600,000	8,540,000	14,350,000	7,175,000

Table 2. Fixed cost of carp hatchery business

No.	Type of Cost	Case 1 (land area <1,000m ²)	Case 2 (land area 1,000-2,000m ²)	Case 3 (land area >2,000m ²)
		Total Cost (IDR/Year)	Total Cost (IDR/Year)	Total Cost (IDR/Year)
I	Fixed Cost			
1.1	Depreciation of broodstock	0	5,400,000	6,000,000
1.2	Depreciation of feed warehouse	1,000,000	840,000	0
1.3	Depreciation of production equipment	1,900,000	1,900,000	1,025,000
1.4	Depreciation of logistic equipment	500,000	400,000	150,000
	Total	3,400,000	8,540,000	7,175,000

Table 3. Variable cost of carp hatchery business

No.	Type of Cost	Case 1	Case 2	Case 3
		Total Cost (IDR/Year)	Total Cost (IDR/Year)	Total Cost (IDR/Year)
II	Variable Cost			
2.1	Employee	2,400,000	9,600,000	12,000,000
2.2	Land lease	5,130,000	22,500,000	45,000,000
2.3	Sinta/bintang pellets	3,600,000	9,000,000	0
2.4	Breeder rearing feed	3,060,000	9,180,000	4,800,000
2.5	Manure	2,700,000	2,700,000	3,200,000
2.6	Organic Fertilizer	486,000	486,000	720,000
2.7	Salt	1,440,000	1,440,000	0
2.8	Duck Egg	1,440,000	1,440,000	2,880,000
2.9	Broodstock rent	4,080,000	0	0
	Total	24,336,000	56,346,000	68,600,000

3.2.3 Revenue

Revenue is the result of multiplying the amount of harvest (glass) and the price per glass (IDR) from the sale of the harvest. The details of receiving harvests for 1 year can be seen in Table 4:

Based on Table 4, the carp hatchery business in Ciparay District produces carp fish fry with a size of 1-1.5cm, the highest yield is in case 3, as many as 1,500 cups, the annual production is 24,000 cups and with the selling price of carp fish fry 10,000 IDR/glass, the total the revenue obtained is 240,000,000 IDR. While the lowest total revenue is in case 1, which is 64,800,000 IDR/year with the production of 3,600 cups of carp fish fry. Total production in carp hatchery cultivation has a very significant effect on farmers' income.

3.3 Financial Analysis

3.3.1 Profit

Profit is the total revenue minus the total cost [23]. The advantages of carp hatchery cultivation can be seen in Table 5.

Based on Table 5, the data shows that the profit is positive, which means that the carp hatchery business in Ciparay District, Bandung Regency is profitable. The highest profit is in case 3, with a total revenue of 240,000,000 IDR/year and a total cost of 75,775,000 IDR/year, the profit obtained is 164,225,000 IDR/year or 13,685,416 IDR/month. While the lowest profit is in case 1, with a total revenue of 64,800,000 IDR/year and

a total cost of 27,736,000 IDR/year, the profit obtained is 37,064,000 IDR/year or 3,088,666 IDR/month.

3.3.2 Profitability

Profitability is the ability of business activities to earn profits concerning sales, total assets, and own capital [24]. The following is the profitability of the carp hatchery business, which can be seen from Table 6.

The highest percentage of profitability generated in carp hatchery cultivation in Ciparay District, Bandung Regency is in case 3, namely cultivators with a cultivation area of > 2,000 m² have a percentage of 217%, meaning that each use of production inputs of IDR1 will generate a profit of 217 IDR. In case 1, the percentage of profitability is 134%, meaning that every use of production input of 1 IDR will generate a profit of 134 IDR. Whereas in case 2, the percentage of profitability is 150%, meaning that every use of production input of 1 IDR will generate a profit of 150 IDR. Carp hatchery cultivation business in Ciparay District, Bandung Regency can be said to be profitable because of the three cases it has a profitability value > 0 [11].

3.4 Revenue and Cost Balance

The balance of revenue and costs (R/C) analysis is a comparison between revenues and costs. This analysis is used to determine whether the business is profitable or not and is feasible to develop. The following R/C of carp hatchery cultivation can be seen from Table 7.

Table 4. Revenue of carp hatchery business

No.	Description	Unit	Case 1	Case 2	Case 3
			Value		
1.	Carp fry size 1-1.5cm	glass	100	300	1,500
2.	Selling Price	IDR/glass	18,000	15,000	10,000
3.	Income	IDR/Year	64,800,000	162,000,000	240,000,000
4.	Production	glass	3,600	10,800	24,000

Table 5. Profit of carp hatchery business

No.	Type of Cost	Case 1	Case 2	Case 3
		Total (IDR/Year)		
1	Revenue	64,800,000	162,000,000	240,000,000
2	Fixed Cost	3,400,000	8,540,000	7,175,000
3	Variable Cost	24,336,000	56,346,000	68,600,000
	Profit (IDR/Year)	37,064,000	97,114,000	164,225,000
	Profit (IDR/Month)	3,088,666	8,092,833	13,685,416

Based on Table 7, the largest R/C value, namely in case 3 of 3.2, means that every IDR1.00 of the costs incurred in the cultivation of carp hatcheries provides an income of 3.2 times the costs incurred. Whereas in case 1, the R/C value is 2.3, which means that for every IDR1.00, the costs incurred in the cultivation of carp hatcheries provide an income of 2.3 times the costs incurred. In case 2 the R/C value is 2.5 for every 1.00 IDR the costs incurred in the cultivation of carp hatcheries provide an income of 2.5 times the costs incurred. The R/C value > 1 indicates that the carp hatchery business in Ciparay District, Bandung Regency is feasible because the business activities carried out can provide greater revenue than the expenditure.

3.4.1 Payback period

The payback period is used to measure the length of return on investment from the profits received by the owner [12]. The payback period value can be seen in Table 8.

Based on Table 8, the carp hatchery business in Ciparay District has the fastest return on investment costs in case 3. The total investment cost is 14,350,000 IDR and the total annual profit is 164,225,000 IDR, the PP value of the carp hatchery business is 0.09 means the investment cost payback period is 1.08 months or 33 days.

In case 2, the PP value for the carp hatchery business is 0.20, meaning that the investment cost return period is 2.4 months, while in case 1 the PP value for the business is 1.3, meaning the investment cost return period is 15.6 months. The greater the PP value, the longer the return on capital, and the smaller the PP, the faster the return on business capital [25]. The three cases had PP < 3 years, included in the category of fast return on business capital [26].

3.4.2 Cost of goods manufactured

Cost of goods manufactured used by companies to determine the characteristics of company management, but basically aims as a basis for controlling production costs and determining product selling prices [13]. The results of the analysis can be seen in Table 9.

Based on Table 9, the cost of production is obtained by dividing the total cost (IDR) by the total production. In case 1 the total cost incurred by the cultivator is 27,736,000 IDR with a total fish fry production of 3,600 cups, then the cost of production is 7,704 IDR meaning the minimum price of one glass of carp fry to be sold is 7,704 IDR, the price is set so that cultivators do not suffer losses. In case 2 the total cost incurred by the cultivator is 64,886,000 IDR with the total production of 10,800 glasses of carp fry, so the

Table 6. Profitability of carp hatchery business

No	Case	Description		Profitability (%)
		Profit (IDR)	Total Cost (IDR)	
1.	Case 1	37,064,000	27,736,000	134
2.	Case 2	97,114,000	64,886,000	150
3.	Case 3	164,225,000	75,775,000	217

Table 7. R/C of carp hatchery business

Description	Case 1	Case 2	Case 3
	Price (IDR)		
Revenue	64,800,000	162,000,000	240,000,000
Total Cost	27,736,000	64,886,000	75,775,000
R/C	2.3	2.5	3.2

Table 8. Payback period of carp hatchery business

No.	Case	Type of Cost		PP (Year)
		Investation (IDR)	Revenue (IDR)	
1.	Case 1	9,800,000	37,064,000	1.3
2.	Case 2	19,600,000	97,114,000	0.20
3.	Case 3	14,350,000	164,225,000	0.09

Table 9. CoGM of carp hatchery business

No.	Case	Description		CoGM (IDR)
		Total Cost (IDR)	Production	
1.	Case 1	27,736,000	3,600	7,704
2.	Case 2	64,886,000	10,800	6,008
3.	Case 3	75,775,000	24,000	3,157

CoGM is 6,008 IDR, meaning the minimum price of one glass of carp fry is 6,008 IDR. In case 3, the total cost incurred by the cultivator is 75,775,000 IDR with a total production of 24,000 glasses of carp fry, then the CoGM is 3,157 IDR, meaning that the minimum price of one glass of carp fry is 3,157 IDR. Cultivators can determine the selling price of fish fry according to the market price but not lower than the CoGM value.

4. CONCLUSION

Based on the research results, it can be concluded that the carp hatchery business in Ciparay District, Bandung Regency is feasible to run and develop, which is indicated by the fulfillment of business feasibility requirements from several parameters such as profit analysis, profitability analysis, the balance of revenues and costs or R/C, payback period and cost of production. Cultivation business in case 3 with a cultivated area of >2,000 m² is considered more feasible and profitable than in case 1, which is a cultivation area of <1,000 m² and case 2 with a land area of 1,000-2,000 m². The level of welfare by comparing the income of carp hatchery cultivators in Ciparay District, Bandung Regency with the Regional Minimum Wage of Bandung Regency, is indicated as prosperous in case 2, namely cultivators with a cultivation area of 1,000-2,000m² and in case 3, cultivators with a cultivation area of > 2,000m² because the cultivator's income is more than the Regional Minimum Wage of Bandung Regency in 2021. However, in case 1, cultivators with a land area of <1,000m², it is indicated that they are less prosperous because the cultivator's income under the Regional Minimum Wage of Bandung Regency.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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