



Analisis kelayakan usaha pembenihan ikan kerapu cantang (*Epinephelus fuscoguttatus x lanceolatus*) di Desa Klatakan, Kecamatan Kendit, Kabupaten Situbondo

[Feasibility of cantang grouper (*Epinephelus fuscoguttatus x lanceolatus*) hatchery in Klatakan Village, Kendit District, Situbondo Regency]

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ABSTRACT | Cantang grouper has a very promising market for aquaculture industry. Situbondo Regency is one of the grouper seed producers with quite a large number of cultivators. One of them is in the Klatakan Village, Kendit District. The cantang grouper hatchery business cannot be separated from the economic aspect of the financial feasibility of the business. The aim of the research is to analyze the financial feasibility of the cantang grouper hatchery business in Klatakan Village, Kendit District, Situbondo Regency. This research was carried out in July-August 2019 in Klatakan Village, Kendit District, Situbondo Regency. Data collection was carried out through direct observation and the sampling technique used in this research was purposive sampling, that is, the researcher had certain considerations in taking samples or determining samples for certain purposes. The research results obtained were a profit of Rp. 166,133,600/year with an R/C Ratio of 1.9. Break Even Point (BEP) value in rupiah Rp. 122,808,219 and Break Even Point (BEP) in units of 34,217. Payback Period analysis obtained a value of 1.7 years or 1 year 8 months. It can be concluded that the cantang grouper hatchery business is profitable and feasible by looking at several of these indicators.

Key words | Business feasibility, cantang grouper, hatchery

ABSTRAK | Kerapu cantang memiliki pangsa pasar yang sangat menjanjikan untuk industri budidaya ikan. Kabupaten Situbondo merupakan salah satu produsen benih kerapu dengan jumlah pembudidaya cukup banyak. Salah satunya di wilayah Desa Klatakan, Kecamatan Kendit. Usaha pembenihan ikan kerapu cantang tidak terlepas dari aspek ekonomi kelayakan finansial usaha. Tujuan penelitian untuk dapat menganalisis kelayakan finansial dari usaha pembenihan ikan kerapu cantang di Desa Klatakan, Kecamatan Kendit, Kabupaten Situbondo. Penelitian ini dilaksanakan pada bulan Juli-Agustus 2019 di Desa Klatakan, Kecamatan Kendit, Kabupaten Situbondo. Pengumpulan data dilakukan melalui observasi langsung dan teknik *sampling* yang digunakan dalam penelitian ini adalah purposive sampling yaitu peneliti mempunyai pertimbangan-pertimbangan tertentu di dalam pengambilan sampelnya atau penentuan sampel untuk tujuan tertentu. Hasil penelitian yang didapatkan yaitu keuntungan Rp. 166.133.600/tahun dengan *R/C Ratio* 1,9. Nilai *Break Even Point* (BEP) dalam rupiah Rp. 122.808.219 dan *Break Even Point* (BEP) dalam unit 34.217 ekor. Analisis *Payback Period* di dapatkan nilai 1,7 tahun atau 1 tahun 8 bulan. Dapat disimpulkan bahwa usaha pembenihan kerapu cantang ini menguntungkan dan layak untuk dilakukan dengan melihat beberapa indikator tersebut.

Kata kunci | Kelayakan usaha, kerapu cantang, pembenihan

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INTRODUCTION

One business activity that can be used as a driving force for the national economy is business in the

fisheries sector. This is because Indonesia is a country that has significant large fishery resources, both in quantity and diversity (Negara *et al.*, 2017). One of the fisheries activities is through aquaculture.

Aquaculture is a fisheries activity that produces aquatic biota (organisms) in a controlled environment with the aim of making a profit (Affandi & Diamahesa, 2023; Affandi & Setyono, 2023, 2024). One of the fish that can be cultivated and has high value on the market is grouper. Grouper aquaculture production in Indonesia in 2020 will reach 9,478 tons (Kementerian Kelautan dan Perikanan, 2022). However, it turns out that biological natural resources often need to be improved in the aquaculture business. This results in reduced production quality and business efficiency. In the aquaculture business, quality control is very important. Sometimes, aquaculture needs help to control product quality, due to many influencing factors such as water quality, temperature and feed. If this is not held, grouper production can be affected and do not meet the quality standards set in the local and international markets (Witoko *et al.*, 2018).

Increasingly intensive cultivation requires quality fry to produce the maximum survival rate of fish (Palupi *et al.*, 2020). The need for fry comes from nature and the hatchery/spawning process. The fry produced by the hatchery have superior properties (Yuhana *et al.*, 2019). While the supply of fry from nature through capture has several areas for improvement, which include the non-uniform size of the fry, and the very limited quantity. Besides that, excessive exploitation of fry catching can damage the balance of the ecosystem. This will ultimately reduce fish production from the area (Muliawan *et al.*, 2015).

Cantang grouper has a very good market share for the fish farming industry. Grouper fish is one of the luxury food commodities with a small amount of demand but a high selling value (Fabinyi *et al.*, 2012; Rimmer & Glamuzina, 2017). The grouper hatchery business is growing along with the development of the grouper cultivation business (Afero *et al.*, 2010). Currently grouper fish farming has developed, it is necessary to provide fry continuously, to meet the needs of fry it is necessary to have a grouper hatchery business whose technology can already be applied (Ismi *et al.*, 2014). Hybridization is one way to increase the genetic diversity of fish where the characters from the parents combine to produce offspring that grow fast, are resistant to disease and even to extreme environmental changes and sometimes even produce sterile fish (Ismi *et al.*, 2013).

Hybrid fry can add species diversification and also have cultivation prospects that have the opportunity

to increase fishery production in the future. Therefore, in grouper fish it is necessary to increase production and fry quality through hybridization so that it can help the need for fry in aquaculture and the hatchery can be implemented in the community as a profitable business. One of them is the cantang grouper resulting from a cross between a female tiger grouper and a male kertang grouper (Ismi *et al.*, 2013). The cantang grouper has faster growth, is more resistant to disease, and is more tolerant of unfavorable environments and limited space (Folnuari *et al.*, 2017). Knowledge of technical and financial analysis of cantang grouper hatchery absolutely must be mastered to produce maximum cantang grouper cultivation.

In Situbondo Regency, a grouper hatchery is being developed on the north coast of Java Island, namely Situbondo White Sand Beach, East Java. Precisely in the coastal area which is included in the area of Klatakan Village, Kendit District, Situbondo. Situbondo Regency is one of the districts that conducts grouper hatchery. Situbondo Regency is one of the producers of grouper fry and ready-to-consume grouper fish. Situbondo has many household-scale fish hatcheries that develop grouper hatchery production with a large number of cultivators (Andarwati, 2020). Cantang grouper hatchery business is inseparable from economic aspects which include investment costs, operational and maintenance costs, production and selling prices, as well as business financial feasibility. The aim of the study was to be able to analyze the financial feasibility of the cantang grouper hatchery in Klatakan Village, Kendit District, Situbondo Regency with indicators of investment costs, operational costs, total costs (TC), total revenue (TR), profit, R/C Ratio, Break Even Point (BEP), and Payback Period (PP).

MATERIALS AND METHODS

Place and Time

This research was conducted in July-August 2019. The research activities were carried out in Klatakan Village, Kendit District, Situbondo Regency, East Java Province.

Materials

The tools used in this study were a questionnaire used as a measuring tool for conducting interviews, stationery for recording research results and a laptop for processing the data that had been obtained. The

materials (objects) used in this study included the cantang grouper hatcheries that were sampled.

Data Collection

This type of research is descriptive, while the research variable is the economic potential and feasibility of the cantang grouper hatchery. In this study, 5 respondents from the cantang grouper cultivator group "X" were used. Their age range ranges from 33-46 years. All education levels are from Vocational High School. Group "X" has been cultivating cantang grouper for 6 years, including a hatchery unit only. Data collection was carried out through direct observation using the help of a questionnaire on cantang grouper hatcheries at the study site. The questionnaire contains a number of questions about the amount of capital, the amount of operational costs (data on components of costs incurred for labor, fry, feed, and so on), the amount of production, and the price. The sampling technique used in this study is purposive sampling, which is a sampling technique used by researchers if the researcher has certain considerations in taking the sample or determining the sample for a particular purpose (Santina *et al.*, 2021). The selected sample is people who have knowledge so they can provide the information needed by researchers, and have done cantang grouper hatchery for at least 5 years. The data obtained is in the form of primary data then analyzed descriptively.

Data Analysis

Data analysis techniques to determine business feasibility are calculated using the formula, namely investment costs, operational costs, Total Cost (TC), Total Revenue (TR), profits, R/C Ratio, Break Even Point (BEP), and Payback Period (PP). Investment costs are the initial costs incurred when setting up a business. The investment is used to finance the buildings and facilities needed in the hatchery business. Operational costs to support the cantang grouper hatchery consist of Fix Costs (FC) and Variable Costs (VC).

Total Cost (TC)

Total production costs or total costs can be calculated using the formula according to Kusuma & Mayasti (2014), namely:

$$TC = FC + VC$$

Note:

TC = Total Cost

FC = Fix Cost

VC = Variable Cost

Total Revenue (TR)

Revenue or total revenue can be calculated using the formula according to Asnidar & Asrida (2017), namely:

$$TR = P \times Q$$

Note:

TR = Total Revenue

P = Price of cantang grouper fry

Q = Total cantang grouper fry sold

Profit

Profits can be calculated using the formula according to Fanindi *et al.* (2018), namely:

$$I = TR - TC$$

Note:

I = Profit

TR = Total revenue

TC = Total cost of production

R/C Ratio

The Revenue/Cost Ratio (R/C Ratio) can be calculated using the formula according to Nugroho & Mas'ud (2021), namely:

$$R/C \text{ Ratio} = \frac{\text{Total Revenue}}{\text{Total Cost}}$$

Break Even Point (BEP)

Break Even Point Analysis (BEP) can be calculated using the formula according to Manuho *et al.* (2021), namely:

$$BEP_{unit} = \frac{\text{Fix Cost}}{\text{Selling price per unit} - \text{Variable cost per unit}}$$

$$BEP_{price} = \frac{\text{Fix Cost}}{1 - (\text{Variable cost per unit} / \text{Selling price per unit})}$$

Payback Period (PP)

The Payback Period (PP) can be calculated using the formula according to Ruminta (2020), namely:

$$PP = \frac{\text{Investment}}{\text{Profit}} \times 1 \text{ Year}$$

RESULTS

Situbondo is the northern coastal area of Java Island in East Java Province, with a coastline from west to east bordering Baluran National Park. Based on its geographical location, Situbondo is a horseshoe area that has the potential for fisheries, agriculture, plantations and the tourism sector. Situbondo Regency has the potential to develop grouper aquaculture because out of 17 sub-districts in Situbondo Regency, 13 sub-districts are coastal districts with a total length of coast reaching ±155 km which stretches from the eastern region of Situbondo Regency, namely Banyuputih District, to the western

region of Situbondo Regency, namely Banyuglugur District. Klatakan Village, which is located in Kendit District, is one of the locations that has the potential to develop a grouper fish farming business. One of the grouper fish farming activities carried out by the people of Klatakan Village is grouper hatchery of the cantang grouper species. Following are the details of the costs incurred while conducting the cantang grouper hatchery business in Klatakan Village,

Kendit District, Situbondo Regency:

Investment Cost

Investment costs are the initial costs incurred when setting up a business. The investment is used to finance the buildings and facilities needed in the hatchery business. Full details can be seen in Table 1 (primary data).

Table 1. Investment Cost of Cantang Grouper Hatchery

Cost Component	Unit	Total	Unit Price (Rp)	Total Price (Rp)	Technical Age (Year)	Depreciation (Fix Cost)
Land Lease	m ²	500	50,000	25,000,000	1	25,000,000
Hatchery Building	m ²	170	-	115,000,000	10	11,500,000
Larvae Tank	12 tons/unit	12	4,000,000	48,000,000	10	4,800,000
<i>Chlorella</i> sp. Tank	12 tons/unit	12	3,000,000	36,000,000	10	3,600,000
Rotifera Tank	12 tons/unit	4	3,000,000	12,000,000	10	1,200,000
Tandon	30 tons/unit	1	3,000,000	3,000,000	10	300,000
Generator set and Pump House	Unit	1	2,250,000	2,250,000	10	225,000
Sea Water Pump	Unit	1	2,000,000	2,000,000	10	200,000
Fresh Water Pump	Unit	1	350,000	350,000	10	35,000
Submersible Pump	Unit	3	1,000,000	3,000,000	2	1,500,000
Sea Water Installation	Unit	1	5,000,000	5,000,000	10	500,000
Fresh Water Installation	Unit	1	1,500,000	1,500,000	10	150,000
Blower	230 V	1	3,500,000	3,500,000	10	350,000
Oxygen Tube	50 kg	1	1,000,000	1,000,000	1	1,000,000
Aeration Installation	Package	1	1,100,000	1,100,000	10	110,000
Electrical Installation	127,000 volt	1	2,500,000	2,500,000	10	250,000
Production Facility	Package	1	1,500,000	1,500,000	5	300,000
Generator set	230,000 volt	1	5,000,000	5,000,000	10	500,000
Hatchery Equipment	Package	1	3,500,000	3,500,000	5	350,000
Refrigerator	Unit	1	2,000,000	2,000,000	5	400,000
Total				273,200,000		52,270,000

Operational Cost

Operational cost to support the cantang grouper hatchery consist of Fix Costs (FC) and Variable Costs (VC). Fix Costs (FC) are costs incurred every month but are not affected by production activities. For details of fix costs (FC) can be seen in Table 2. Variable Cost (VC) is a cost that changes due to changes in production. Details of variable costs (VC) can be seen in Table 3. In the hatchery business of cantang grouper, respondents carried out one production cycle within 2 months so that in 1 year there were 6 production cycles of cantang grouper fry. In this study, the investment costs that must be incurred by

respondents in the cantang grouper hatchery are Rp. 273,200,000 with a depreciation value of Rp. 52,270,000. The total fix cost (FC) of cantang grouper hatchery for 1 year in this study was Rp. 89,650,000. The total variable cost (VC) for cantang grouper hatchery for 1 cycle in this study was Rp. 15,945,000, so that the total variable costs for 1 year are Rp. 95,670,000. With the total production of cantang grouper fry produced during 1 cycle is 16,271 fish, it can be seen that the total variable cost for 1 cantang grouper fry is Rp. 980. The results of the feasibility analysis of cantang grouper hatchery business are briefly presented in Table 4

Table 2. Fix Cost (FC) of Cantang Grouper Hatchery

Cost Component	Unit	Total	Unit Price (Rp)	Total Price (Rp)
Depreciation			52,270,000	52,270,000
Equipment Maintenance Cost			9,860,000	9,860,000
Labor	Worker	4	5,000,000	20,000,000
Telephone	Month	12	60,000	720,000
Electricity Cost	Month	12	500,000	6,000,000
Property Tax	Year	1	300,000	300,000
License Fees	Year	1	500,000	500,000
Total Fix Cost 1 Year				89,650,000

Table 3. Variabel Cost (VC) of Cantang Grouper Hatchery

Cost Component	Unit	Total	Unit Price (Rp)	Total Price (Rp)
Eggs (150.000) x 1 Tank	Egg	150,000	10	1,500,000
Chlorella	Ton	10	25,000	250,000
Fertilizer	Package	2	200,000	400,000
Rotifera	2 kg/ Package	2	50,000	100,000
Artemia (5 Can/Tank) x 3 Tank	Can	10	800,000	8,000,000
Liquid Feed	Liter	1	400,000	400,000
Pellet Feed Ottohime A2	2 kg/ Package	1	430,000	430,000
Pellet Feed Ottohime C1	2 kg/ Package	1	324,000	324,000
Pellet Feed Ottohime S2	2 kg/ Package	1	324,000	324,000
Rebon Shrimp	Bag	70	5,000	350,000
Grading and Harvesting Costs	Package	1	500,000	500,000
Styrofoam	Unit	50	45,000	2,250,000
Fish Oil	Gram	100	200	20,000
Scott's Emulsion	200 ml/ bottle	2	36,000	72,000
Antibiotic	100 gr	1	240,000	240,000
Disinfectant	Kg	1	300,000	300,000
Chlorine	20 Liter/ jerrycan	2	80,000	160,000
Na-thiosulfate	Kg	5	20,000	100,000
Calcium Hypochlorite	15 Kg/Drum	1	225,000	225,000
Total Variable Cost 1 Cycle				15,945,000
Total Variable Cost 1 Year (6 Cycles)				95,670,000
Total Variable Cost 1 Unit (1 Fry)				980

Table 4. Results of Feasibility Analysis of Cantang Grouper Hatchery

Total Cost (TC)	Total Revenue (TR)	Profit	R/C Ratio	Break Even Point (BEP) Unit	Break Even Point (BEP) Price	Payback Period (PP)
Rp. 185,320,000	Rp. 351,453,600	Rp. 166,133,600	1,9	34,217 fish	Rp. 122,808,219	1.7 Year (1 Year 8 Month)

DISCUSSION

The profit which is the difference between revenue and the total cost of production in this study is known to be Rp. 166,133,600. This means that the cantang grouper hatchery business in Klatakan Village has economic potential. This is in accordance with Saragih (2021) which states that a business can be said to have economic potential when it can generate profits and can finance all needs for production.

The calculation results for the R/C ratio in this study resulted in an R/C ratio value of 1.9. This figure gives an interpretation that every Rp. 1,000 operational costs incurred by cultivators will generate revenue of

Rp. 1,900. A business is said to be feasible if the R/C ratio value is more than 1 ($R/C > 1$) (Malika & Adiwijaya, 2018). Based on the resulting R/C value, it shows a value of > 1 so that it can be said that the business has experienced efficiency, thus this business is feasible to run because it is profitable. This is in accordance with the results of research from Palupi *et al.* (2020) which resulted in an R/C ratio for cantang grouper hatcheries in Blitok Village, Bungatan District, Situbondo Regency, which was 1.3, this could mean that the cantang grouper hatchery business in Blitok Village was profitable.

In the cantang grouper hatchery business, it has experienced a breakeven point on sales of Rp.

122,808,219 or in other words produce a total of 34,217 fish.

Based on the production aspect, the cantang grouper hatchery business showed a BEP value of 34,217 fry. Based on the sales aspect, the cantang grouper hatchery business showed a BEP value of Rp. 122,808,219. So in this business experiencing a break even point on the sales of Rp. 122,808,219 or in other words produce a total of 34,217 fish. This is in accordance with research from Palupi *et al.* (2020) that the cantang grouper cultivation business in Blitok Village, Bungatan District, Situbondo Regency has a break-even point if the total revenue is 89,161 fish/year or 142,653,325/year. The break-even point is meant by the value of the break-even point, the business is said to have no profit or no loss. So if you want to get a profit, production must be above the break-even point.

Payback Period (PP) value is an analysis used to determine the payback period of the investment or costs that have been incurred. A business is said to be good so it is feasible to run if the time to pay back investment funds or expenses is faster (Antowijoyo *et al.*, 2017). In this study, the results of PP analysis obtained a value of 1.7. This means that the cantang grouper hatchery is feasible because the payback period is relatively fast, which is less than two years. This is in accordance with the opinion of Syamsuri & Alang (2023) which states that the smaller the PP value, the business is said to be feasible to run so that it can bring profits in a faster time.

The obstacles faced when conducting the cantang grouper hatchery business in the production process, both technical and economic constraints, namely the source of seawater originating from the waters of the Madura Strait, is getting worse day by day so it needs to be treated better in seawater reservoirs to produce water quality. which is good too. Another obstacle is the existence of disease attacks, one that often attacks grouper fish is Viral Nervous Necrosis (VNN). This type of viral disease is very dangerous in grouper hatcheries in the larval and fry stages. The resulting mortality can reach 100%.

CONCLUSION

This cantang grouper hatchery is profitable and feasible to do by looking at several indicators, namely the profit, R/C Ratio, Break Even Point (BEP), and Payback Period. However, in the cantang grouper fish

hatchery business in group "X" there are still several ways to increase income. Examples of ways that can be done are rejuvenating superior broodstock fish to improve the quality and quality of the seeds produced; improve the quality of cultivators through training, internships and mentoring so that the knowledge, experience and skills of cultivators increase and improve the management capabilities of cultivators in cultivation; the government should play a greater role in facilitating the formation of marketing networks; and optimizing appropriate technology to obtain optimal results.

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