

Financial Analysis of Fish Cage Cultivation of Nile Tilapia in Keranggan Village, Muaro Jambi Regency

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ABSTRACT

This study aims to figure out financial analysis of fish cage cultivation of Nile tilapia in Keranggan Village, Muaro Jambi Regency. Data collection in this study is primary data by means of observation, namely filling out questionnaires and direct interviews with fish cage cultivation of Nile tilapia in Keranggan Village, Muaro Jambi Regency. The location selection is deliberately carried out with the consideration that the object of this study was widely spread in Muaro Jambi Regency, especially in Keranggan Village, Sekernan District. The population in this study is Nile tilapia farmers who are the owners for 25 business units of tilapia cage. The data studied in this study are taken from primary data. A cluster system is used to determine the sample in this study which is carried out in Keranggan Village, Sekernan District for fish farmers who have a total of 6 cages, with a sample of 25 respondents who were taken directly from all cage farmers who have cage with 6 ponds in the Keranggan Village. The data are analyzed using the financial feasibility analysis of fish cage cultivation of Nile tilapia using the calculation formula for net present value, internal rate of return, net benefit cost ratio, and payback period analysis. The results of the feasibility of fish cage cultivation of Nile tilapia in Keranggan Village are currently financially feasible with a net present value of Rp2,097,227, internal rate of return 12.80%, net benefit/cost ratio Rp1,235, and payback period analysis obtained for 0.6695 years (6 months 24 days).

Keywords: Financial, Fish, Cage, Cultivation, Nile Tilapia

INTRODUCTION

Fisheries in Indonesia can be divided into three types of fisheries: seawater fisheries, brackish water fisheries, and inland water fisheries (Mubyarto, 2007). Seawater fisheries are fisheries that are cultivated in open seas, brackish water fisheries are fisheries that are cultivated in the form of ponds at river mouths or areas close to seawater, while inland water fisheries are fisheries that are cultivated in ponds and public waters or rice fields. Inland water fisheries can be divided into 3 types: freshwater pond fisheries, fisheries in swamps, reservoirs, lakes and rivers, and rice field fisheries (Kamal, 1990; Lubis, 1992).

Fisheries are all organized activities related to the management and utilization of fish resources and their environment started from pre-production, production, processing and up to marketing, which are carried out in a fishery business system. Generally, fishing business is aimed at providing food for humans, though there may be other purposes (such as sports or recreational fishing), or it may also be for the purpose of making jewellery or fish products such as fish oil. Fisheries have a fairly important role, especially for producing animal protein in order to meet food and nutritional needs, increasing exports, providing industrial raw

materials, expanding employment and business opportunities, and supporting regional development while still paying attention to environmental sustainability and functions (Liasari, 2006; Tegar, 2015).

Fishery is one of the sectors that drive economy in Indonesia. There are various forms of fishery activities in Indonesia, one of which is aquaculture using floating net cage. Floating net cage are cultivation that uses nets as a means of breeding. Breeding is usually conducted in the sea or fresh water such as lakes or reservoirs. The location for breeding activities using floating net cage is relatively calm, protected from storms and accessible. Fish farmers sow fish seeds at the beginning of the breeding season, hoping that at harvest time they will harvest the results.

Fisheries are all activities related to the management and utilization of fish resources and their environment from pre-production, production, processing and up to marketing, which are carried out in a fishery business system. Capturing fisheries is an economic activity that includes the capture or collection of aquatic animals and plants that live in sea water or public waters freely. According to Law Number 45 of 2009, capture fisheries business is a fishery business based on fishing activities. The definition of fishing itself is an activity to obtain fish by any devices in waters that are not in a state of being cultivated, including activities that use ships to load, to transport, to store, to cool, to handle, to process, and to preserve them. The capture fisheries system in Indonesia is partly carried out by small fishermen in the traditional way by using relatively simple fishing gear and simple boats (Tajerin, 2004; Usni and Dani, 2013).

The production of cage fish in Sekernan district in 2019 reached 6.01 tons, and the average price per year in 2019 was Rp28,000. Then in 2020 it increased to 6.03 tons, and the average price per year in 2020 was Rp25.000.

The production of cage is different every year due to the unoptimal weather or water quality. In addition, it can also be caused by some fish farming that reduce their fish populations due to losses in the previous few months, for example in the last year the selling price of fish has fallen to a lower price than the normal price for buyers in cage. The income of cage in each region is certainly different.

This study aims to figure out financial analysis of fish cage cultivation of nile tilapia in Keranggan Village, Muaro Jambi Regency.

RESEARCH METHODS

In this study, the researchers used field research type, which is a study in which the researcher goes directly to the field to obtain data or information directly by visiting the respondent (Kadir, 2010; Notoadmodjo, 2010; Sugiyono, 2017).

Data collection in this study is primary data by means of observation, namely filling out questionnaires and direct interviews with fish cage cultivation of nile tilapia in Keranggan Village, Muaro Jambi Regency.

The location selection is deliberately carried out with the consideration that the object of this study was widely spread in Muaro Jambi Regency, especially in Keranggan Village, Sekernan District.

The population in this study is nile tilapia farmers who are the owners for 25 business units of tilapia cage. The data studied in this study are taken from primary data. A cluster system is used to determine the sample in this study which is carried out in Keranggan Village, Sekernan District for fish farmers who have a total of 6 cages, with a sample of 25 respondents who were taken directly from all cage farmers who have cage with 6 ponds in the Karang Village.

The data are analyzed using the financial feasibility analysis of fish cage cultivation of nile tilapia using the calculation formula for net present value, internal rate of return, net benefit cost ratio, and payback period analysis.

RESULTS AND DISCUSSION

Financial Feasibility

Details of investment costs for fish cage cultivation of Nile tilapia are shown in Table 1:

Table 1. Investment Cost in Year 0 for 6 Units of Fish Cage Cultivation of Nile Tilapia

Type of Production Factor	Unit	Cost of Unit (Rp)	Cost (Rp)	Total Cost (Rp)
Investment Cost				
a.Making of Cage	6	Rp3,300,640	Rp20,283,840	
b.making of Boat	1	Rp2,180,000	Rp2,180,000	
Sum			Rp20,283,000	
Total of Sum Year 0 (Investment)				Rp 20,283,000

Operational costs are costs incurred every period (6 months) and in one year there are 2 harvesting periods during fish cultivation in cage as shown in Table 2:

Table 2. Operational Cost for Fish Cage Cultivation of Nile Tilapia

Number	Type of Production Factor	Total Cost (Rp)	
		Year 1	Year 2
1	Seed of Nile Tilapia	Rp6,328,000	Rp6,189,600
2	Fish Feed Jatra	Rp45,260,000	Rp49,780,000
3	Maintanance	Rp936,000	Rp976,000
Sum of Operational Cost		Rp52,524,000	Rp56,945,600

Based on the calculation of operational costs, it can be seen that the feed component is the largest component of operational cost needs. This is understandable because in a fish farming business, the fish feed component is the largest component because it involves the survival of fish. Revenue

(inflow) is everything that is produced by an activity that uses a number of costs, Table 3 shows the projected revenue from fish farming business in cage. The benefits of fish business in cage consist of total sales value of tilapia for consumption as the main product in the business.

Table 3. Projected Revenue of Fish Cage Cultivation of Nile Tilapia in 6 Units of Cage Every Year

Number	Product	Sales Value (Rp)	
		Year 1	Year 2
1	First and Second Period of Tilapia	Rp64,440,000	Rp68,132,000
Total Sales Income		Rp64,440,000	Rp68,132,000

The assumption of tilapia yields is that yields are not constant due to seasonal changes in each maintenance period, so that fish yields tend to be non-uniform in volume while the selling price of tilapia is based on the market price or the actual price prevailing in the local (traditional) market.

Net Present Value Analysis

Net present value is the difference between the present value of cash inflows and the present value of cash outflows over a period of time net present value. It is usually used for capital allocation to analyze profits in a project that will be implemented. The results of the financial analysis of fish cage cultivation of Nile tilapia in Keranggan Village, Muaro Jambi Regency can be seen in Table 4:

Table 4. Net Present Value

Year	Investment	Operational Cost	Total Cost	Benefit	Net Benefit	DF 5 %	Present Value
	a	b	c = a+b	d	e = d-c	f	g = e x f
0	Rp20,283,000		Rp20,283,000		-Rp20,283,000	1.0000	-Rp20,283,000
1		Rp52,524,000	Rp52,524,000	Rp4,440,000	Rp11,916,000	0.9524	Rp11,348,571
2		Rp55,969,600	Rp55,969,600	Rp68,132,000	Rp12,162,400	0.9070	Rp11,031,655
Net Present Value							Rp2,097,227

Net present value is the present value of money with a certain discount rate, which will be received by business actors if they carry out business activities. In year 0 the net present value is negative because the businessmen have to spend money on investment activities without earning income. This is because production activities have not been running. In the 1st year to the 2nd year, net present value is positive because aquaculture activities have been running so that farmers receive income from the sale of harvested fish. Based on the Table 4, net present value obtained is Rp2,097,227. This means that the present value of income for 2 years will gain a

profit of Rp2,097,227 at an interest rate of 5%. A positive value means that fish cage cultivation of nile tilapia in Keranggan Village, Muaro Jambi Regency is feasible to do.

Internal Rate of Return Analysis

Internal rate of return is the discount rate that results net present value of fish farming projects in cage which is equal to 0. Internal rate of return is obtained by trial and error method until a negative net present value is obtained. The next step is to interpolate to get the desired value. The table below describes the process of getting the internal rate of return value.

Table 5. Net Present Value

Year	Net Benefit a	DF 5% b	Present Value (DF 5%) c = a x b	DF 20% d	Present Value (DF 20%) e = a x d
0	-Rp20,283,000	1.000	-Rp20,283,000	1.000	-Rp20,283,000
1	Rp11,916,000	0.952	Rp11,348,571	0.833	Rp9,930,000
2	Rp12,162,400	0.907	Rp11,031,655	0.694	Rp8,446,111
			Rp2,097,227		-Rp1,906,889
			NPV 1		NPV 2

By using formula, the result of internal rate of return (IRR) (20% of loan capital) is:

$$IRR = 5 + \frac{2,097,227}{2,097,227 - (-1,906,889)} \times (20-5) 15$$

$$IRR = 5 + 0.52 \times 15$$

$$IRR = 5 + 7.80$$

$$IRR = 12.80\%$$

Based on the results of the IRR of 12.80%, means that a business with 20% loan capital will provide a profit rate of 12.80% per year. The value is also greater than the required interest rate of 6%. So, it can be said that fish cage cultivation of nile tilapia in Keranggan Village, Muaro Jambi Regency is feasible.

Net Benefit/Cost Ratio Analysis

Net benefit/cost ratio is obtained from the comparison of the total flow of benefits with the total flow of costs during the life of the cage business, all the total flow of benefits and costs are discounted with a discount factor value of 5%. Thus, the values obtained are:

Table 6. Net Benefit/Cost Ratio

Year	Net Benefit a	DF 5% b	Present Value (DF 5%) c = a x b
0	-Rp20,283,000	1.000	-Rp20,283,000
1	Rp11,916,000	0.952	Rp11,348,571
2	Rp12,162,400	0.907	Rp11,031,655
			Rp2,097,227

$$Net\ B/C = \frac{11,031,655(+)}{-8,934,429(-)}$$

$$Net\ B/C = \frac{11,031,655}{8,934,429} = 1,235$$

From Table 6, it can be seen that the net benefit/cost ratio is Rp1,235. This shows that every Rp1.00 costs incurred will generate a benefit of Rp1,235. So, according

to the net benefit/cost eligibility criteria, that fish cage cultivation of Nile tilapia in Keranggan Village, Muaro Jambi Regency with its own capital is feasible to run.

Payback Period Analysis

Payback period is used to measure the period of time required to return the initial investment costs incurred by the cage business owner. The payback period (PBP) for investments are as follow:

Table 7. Payback Period

Year	Investment a	Operasional Cost b	Benefit c	DF 5% d	Ii a x d	OM b x d	B c x d
0	Rp20,283,000			1.000	Rp20,283,000	Rp -	Rp -
1		Rp52,524,000	Rp 64,440,000	0.952		Rp 50,022,857	Rp61,371,429
2		Rp55,969,600	Rp 68,132,000	0.907		Rp 50,766,077	Rp61,797,732
			Rp 132,572,000		Rp20,283,000	Rp100,788,934	Rp123,169,161

$$PBP = \frac{20,283,000 - 61,371,429}{61,371,429}$$

$$PBP = 0.6 + 0.6695$$

$$PBP = 6 \text{ Months } 24 \text{ Days}$$

$$0.6695 \text{ -----} 6 \text{ Months}$$

$$0.8034 \times 30 = 24.1020 \text{ -----} 24 \text{ Days}$$

Based on the investment with own capital in fish cage cultivation of Nile tilapia in Keranggan Village, Muaro Jambi Regency, the period of time is needed to recover the initial investment costs. Meanwhile, for investments with 5% capital coming from loans, the period of time needed to return the initial investment costs is 6 months and 24 days.

CONCLUSIONS AND RECOMMENDATIONS

The results of the feasibility of fish cage cultivation of Nile tilapia in Keranggan Village are currently financially feasible with a net present value of Rp2,097,227, internal rate of return 12.80%, net benefit/cost ratio Rp1,235, and payback period analysis obtained for 0.6695 years (6 months 24 days).

Based on the results of the analysis that has been carried out by researchers for fish cage cultivation of Nile tilapia in Keranggan Village, researchers can provide the following suggestions:

1. It is necessary to increase the production of tilapia through the expansion of tilapia cultivation area to the maximum

limit of land area which is set at 10 percent to achieve maximum production.

2. Local governments can assist in providing capital for small farmers who want to develop a fishery business.
3. Also, anticipating changes in production costs and selling prices.

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