

## **Development Opportunity Of Floating Net Cage (Fnc) System-Trevally (*Caranx* Spp.) Culture Business In Amurang District, South Minahasa Regency, North Sulawesi, Indonesia**

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**Abstract :** *Business opportunity and prospect of floating net cage system-trevally culture were studied in Amurang District based on its financial aspects. Trevally culture is one of alternative livelihoods of coastal communities in Amurang district in order to reduce the dependence upon fishing activities towards over-exploitation. Data collection used purposive sampling, intentionally selecting Ranoyapo and Bitung villages, trevally culture business centre in Amurang district, as study site. For this, 30 respondents of fish farmers were selected for their business feasibility analysis.*

*This study was aimed at knowing the feasibility level and the profit of the trevally culture business in Amurang district. The feasibility analysis used Net B/C Ratio, Internal Rate of Return (IRR), Rate of Return On Investment (ROI), Payback Period (PBP), and Break Even Point (BEP) calculations. Results showed that B/C ratio of 1.17, production BEP of 18.409 kg and production price BEP of Rp. 35,066/kg. Rate of Return on Investment (ROI) obtained was 10.56 months. The profitability (ROI) was 1.58 % and IRR was 85.27%. As conclusion, trevally culture in Amurang district, South Minahasa regency is feasible to develop as an alternative livelihood, but it needs to have strategic steps to be able to raise production and gain, such as seedling and food supply, so that trevally culture could become one of the alternative businesses to develop in the coastal area of Amurang district.*

**Keywords:** *Trevally culture business, business feasibility, financial analysis.*

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### **I. Introduction**

South Minahasa Regency has a coastal area with 168.22 km of coastline facing Sulawesi Sea with an area of 56.00 ha (4 miles). Fisheries communities in the area comprise 11,548 fishermen, 811 fish sellers, 1,540 fish farmers and 438 fish processor (Anonimous, 2011)

The sustainable potency of Indonesia marine fisheries resources is 6.4 million tons per year, including demersal fish 1.36 million tons and coral fish 145 thousand tons. Exploitation is allowed as much as 80% of the sustainable potency or about 5.12 million tons per year (Nikujuluw 2002).

Mariculture is highly potential to develop in the coastal waters of Amurang district since it is supported by extensive marine coastal waters and good water conditions for maricultural business. Nevertheless, the areal use for mariculture is very low, 22 Ha for seaweed culture, 218 Ha for floating net cage culture, and 0.1 Ha sea cucumber culture, respectively.

One of mariculture businesses that could be developed in the coastal waters of South Minahasa Regency is trevally culture in the floating net cage (FNC). Trevally (*Caranx* spp.) is one of highly potential fish species to develop due to their comparative superiority as follows (Anonimus, 2001), i.e. capable of living in high density (150 ind./m<sup>2</sup>), high growth rate, highly reactive to food addition, sufficiently efficient food conversion, and consumer's high preference.

Beside encouraging export development, FCN system-fish culture development also becomes an alternative solution in solving natural population reduction as a result of intensive fishing activities and coral reef destruction as trevally habitat (Sudirman, 2008).

Trevally culture with floating net cage system has not been developing in the coastal waters of South Minahasa Regency if compared to the present potency. Field conditions indicate that this fish culture is just developed in Amurang, 10 Ha, and West Amurang, 5 Ha, districts, respectively. Amurang district is one of the areas starting the development of the floating net cage system-trevally culture business. Low interest of the community to do this culture business could result from capital limitation, difficulty to get seedlings and insufficient knowledge and technological mastery.

Since the mariculture potency is relatively large, the limitation of mariculture potency utilization, low preference to do the trevally culture in FNC system despite high economic value, and many problems

encountered in the trevally culture business in the FNC, information on trevally culture business opportunity in the FNC is needed.

This study was aimed at knowing the magnitude of gains and business feasibility obtained from floating net cage system-trevally culture in Amurang district, South Minahasa Regency. Business analysis is absolutely done, if someone wants to start the business in order to measure or calculate whether the trevally culture is profitable or not. Business analysis gives the farmer some illustrations to plan the business. (Supriadi, 2009)

## **II. Research Method**

This study used survey method using interviews and direct observations in the trevally culture location. The former used questionnaires covering respondent identity, biotechnical, economic, and institutional variability in FNC-trevally culture business, environmental impacts, and problems encountered. The respondents targeted in this survey was those who ran the FNC system-trevally culture in the coastal waters of Amurang district, particularly Ranoyapo and Amurang villages. General approach used to achieve the study objective was through primary and secondary data collection. The former came from various previous studies through observational data collection. Data analysis was descriptively carried out and development feasibility analysis through Net B/C Ratio, Internal Rate of Return (IRR), Rate of Return On Investment (ROI), Payback Period (PBP), and Break Even Point (BEP) calculations.

According to Giatman (2006), to know the business feasibility, the business activity analytical method was used with several criteria as follows:

a. Business profit

Gross profit of one-period culture activity is the difference between total revenue and total operational cost (variable cost and fixed cost). Net profit is the profit after tax as much as 15%.

$$\text{Profit} = \text{Total revenue} - \text{Total Operational Cost}$$

b. Profit Rate/Capital Efficiency

Profit obtained in a business can reach certain percent of total cost spent, the ratio between net business profit and total operational cost (fixed cost + variable cost) multiplied by 100%

c. Business Feasibility (B/C Ratio)

Benefit Cost Ratio is the ratio between net gains and total operational cost (fixed cost and variable cost). If B/C ratio is bigger than 1, the business is not feasible to run.

d. Net Present Value (NPV)

Net Present Value is number of present cash flow minus the investment capital considered as investment cost in certain time period in which the NPV is highly affected the discount rate established. The NPV was calculated using Giatman (2006)

$$\text{NPV} = \sum_{\text{ot}}^n \text{CF}_t (\text{PIF})$$

where

CF<sub>t</sub> = Cash Flow Total (benefit + cost )

PIF = Present Interest Factor.

e. Break Even Point

This analysis is intended to know how many products must be sold or how much the selling price is that a company does not get loss.

Break Even Point (BEP) consists of 2 analyses, (1) break even point as a result of total cost and product unit price ratio of business break even point calculation achieved in number of certain fish production and (2) production price break even point as a result of total cost and total production ratio, the business break even point achieved at certain product price per kg fish.

Production BEP = total operational cost/unit product price

Production price BEP = total operational cost/total production

f. Capital Return

The capital spent as business cost capital will return in several harvest periods is the ratio between total operational cost (fixed cost and variable cost) and net profit.

Capital return = total operational cost/net profit

e. Capital Efficiency

Profit gained in a business can reach certain percent of total cost spent is the ration between net profit and total cost (fixed cost and variable cost) multiplied by 100%.

Capital efficiency = (net profit/total cost) 100

f. Internal Rate of Return (IRR)

IRR is the interest rate within a specified period that makes the NPV of the project equal to zero. This analysis aims to determine the level of internal gains derived from investment.

g. Profitability (ROI)

Investment return period is calculated based on profit.

Profitability = ( net profit/total investment) 100

### III. Results and Discussion

Business analysis is very important activity done before beginning a business in order to have a figure on business feasibility and benefit obtained. The trevally business analysis highly varies, and it results from that the operational cost estimation used is dependent upon the extent of the business unit, equipment and material used and site position.

#### 1. Investment Technical Analysis

The cost needed for floating net cage system-trevally culture in South Minahasa regency consists of investment cost and working capital.

The former covers 8m x 3m-raft construction with 3-2.5mx3mx2.5m bags and the availability of canoe and working tools.

The latter includes seedling supply cost, food cost and worker’s wages, and maintenance cost.

Financing those cost components is calculated based on prices in Amurang district or South Minahasa regency undr several following assumptions:

- 1) Economic period of 3 years
- 2) Funds come from Bank loan with an interest rate of 12 % per year for 3 year period.
- 3) Income tax as much as 15 %
- 4) Rearing period of 5 months or 2 cycles a year
- 5) Selling price of Rp. 40,000/Kg
- 6) Seedlings stocked are 10 cm x 3 cm size as many as 1000 individuals a rearing cycle with mortality rate of 15 % and body weight of 350 gr/ind.
- 7) Rearing period is 5 months.

Based on those assumptions, the investment cost and the operational cost are presented in Table 01.

**Table 01.** Investment and Production Cost Estimation (for 10 FNC)

Component	Total (Rp)	%
Investment Cost	65.550.000	31,33
Fixed Cost	49.381.000	23,61
Variable Cost	94.277.500	45,06
Total Cost	209.208.500	100

Total cost needed for 10 units of the floating net cage system-trevally culture in Amurang district is Rp. 209,208,500 in which the largest is the variable cost reaching 45.06 %. The contribution to the extent of the variable cost is fish food. The trevallies Amurang district were fed averagely 5 kg trash fish/day obtained from fishing around the waters of Amurang district.

Compared with FNC system-grouper culture in Tatapaan district, South Minahasa regency, in which the total cost needed for 10 units was 3,029,897,979 (Eva.M,2011), trevally culture business requires relatively lower cost. Detail investment cost, variable cost and fixed cost needed for the FNC system-trevally culture in Amurang district is given in appendix 1.

#### 2. Profitability Analysis

##### 1) Business Profit

The objective of any business is to obtain profits, and it could be gained if total gain is higher than total expenditures. The business profit of FNC system-trevally culture in Amurang district is given in Table 02.

**Table 02.** Benefit-Cost Analysis of Trevally Culture of Floating Net Cage in Amurang District.

No.	COMPONENT	TOTAL (Rp.)
1	Total Cost	620.040.810
2	Total Gain	840.000.000
3	Total Gain before tax	219.959.190
4	Income tax (15%)	22.943.879
5	Total Gain after tax	186.969.312

Table 02 shows that the net gain for a 3-year-trevally culture business of 10 FNC units in 6 production cycles reduced by the income tax is Rp. 186,969,312 or Rp. 63,323,104 per year or Rp. 31,161,552 per cycle. It means that the trevally culture could give the farmer profit since the net gain obtained is higher than the expenditure.

## 2) Profit Rate

Profit Rate is a calculation to know the capital efficiency through consideration of the business profit volume relative to the total operational cost. The profit rate of the trevally business in Amurang district is as follows:

$$\begin{aligned} \text{PR} &= \frac{\text{Business Profit} \times 100}{\text{Total Operational Cost}} \\ &= \frac{\text{Rp.123,197,000} \times 100}{\text{Rp. 716,803,000}} \\ &= 17.19 \% \end{aligned}$$

It means that in 3 years the trevally culture business gives the profit as much as 17.19 % which is above the bank loan interest, 12 %.

## 3) Payback Period (PP)

This analysis is intended to know how much time needed to get the fund invested for the trevally culture back. The calculation indicates that the invested fund could be regained in 0.88 year or 10.56 months (2.13 of production process).

$$\begin{aligned} \text{PP} &= \frac{\text{Total Operational Cost}}{\text{Net Gain}} \\ &= \frac{\text{Rp.736.377.366}}{\text{Rp.840.000.000}} \\ &= 0.88 \text{ year} \\ &= 10.56 \text{ months} \end{aligned}$$

Thus, the trevally culture business is feasible to do since the capital return is shorter than 3-year business period.

## 4) Net Present Value (NPV)

Net Present Value reflects the money received from the invested funds.

Febryanto W (2008) uttered that a business could be run if the NPV is  $\geq 0$  and if the NPV equalled to 0, the business would return the Social Opportunities of Capital or it is at the break even point. If NPV is  $< 0$ , the business is not feasible to do. The present study showed that the trevally culture in Amurang district (Table 3) received the NPV as much as Rp. 47.939.193,- for the investment period with a Net B/C Ratio of 1.17 at the discount rate of 12% reflecting that the trevally culture investment is financially feasible.

## 5) B/C Ratio (Benefit Cost Ratio)

B/C Ratio is a value or benefit obtained from each possible cost spent, the ratio between total gain and total cost. The higher the B/C ratio the higher the profit is obtained. The BCR value of the trevally culture in Amurang district is

$$\begin{aligned} \text{BCR} &= \frac{\text{Gain}}{\text{Cost}} \\ &= \frac{840.000.000}{716.803.000} \\ &= 1.17 \end{aligned}$$

Net B/C of 1.17 means that each expenditure of Rp 1 will give a benefit of Rp **1.17**. This value is obtained from total inflow divided by total outflow multiplied by discount rate.

To know the efficiency rate of a business, the total gains is divided by the total expenditure, where

B/C Ratio  $> 1$  : Efficient

B/C Ratio = 1 : Break even

B/C Ratio  $< 1$  : Inefficient

Hence, the feasibility ratio value of 1.17 indicates that the trevally culture business Amurang district, South Minahasa regency has fulfilled the feasibility requirements.

## 6) Break Even Point (BEP)

This analysis is intended to know how many product should be sold or how much the selling price is that the company does not get loss. The result shows that to reach the BEP, the production of 3-year trevally culture business is 18,409 kg or 6,136 Kg per year with a selling price of Rp.35,066,- per kg.

Present field condition indicates that the trevally culture business in Amurang district for 3 years produced 21,000 kg fish for 10 units of FNC with selling price of Rp. 40,000/Kg, so that the fish culture got some profit.

$$\begin{aligned} \text{a. Production BEP} &= \frac{\text{Total Operational Cost}}{\text{Product Unit Price}} \\ &= \frac{\text{Rp.736.377.366}}{\text{Rp.40.000}} \\ &= 18.409 \text{ Kg} \end{aligned}$$

$$\begin{aligned}
 \text{b. Production Price BEP} &= \frac{\text{Total Operational Cost}}{\text{Total Production}} \\
 &= \frac{\text{Rp.736.377.366}}{.21.000 \text{ Kg}} \\
 &= \text{Rp.35.066}
 \end{aligned}$$

7) Return On Investment (ROI)

This analysis is done to know the capital strength invested in the entire assets in order to get profit.

$$\begin{aligned}
 \text{ROI} &= \frac{\text{Net Gain}}{\text{Total Investment}} \\
 &= \frac{\text{Rp. 103.622.634} \times 100\%}{\text{Rp.65.550.000}} \\
 &= 1.58 \%
 \end{aligned}$$

8) Internal Rate of Return (IRR)

IRR used to discount the entire net cash flow and salvage value, will generate the same amount of the present value as the investment project (Sutojo, 2002). The interest rate of IRR reflects maximum interest rate that could be paid by the fish farmer for the capital used. The IRR value of the trevally culture business in Amurang district is 85.27% indicating that the business could return the capital with an interest rate of 85.27% per year (>discount Rate) so that the trevally culture business is still feasible to do up to the interest rate of 85.27% per year.

**3. Cash Flow Analysis of Investment Feasibility**

This analysis describes the projection of gain and expenditure flows of the floating net cage system-trevally culture business for 3 years. Based on the cash flow analysis, the trevally culture in Amurang district, South Minahasa regency has given some profit, and it could result from low gains due to limited number of seedlings and trash fish caught around Amurang waters. The cash flow projection of the trevally culture in Amurang district is given in Table 03.

**Table 3.** Trevally Culture Business Feasibility in Amurang District.

Description	Year			
	0	1	2	3
<b>CASH IN FLOW</b>				
Production/unit/year (Kg)		700	700	700
Production/10 Unit		7.000	7.000	7.000
Price/Kg		40.000	40.000	40.000
Gain		280.000.000	280.000.000	280.000.000
<b>CASH OUT FLOW</b>				
Investment Cost	65.550.000			
Variabel Cost	94.277.500	94.277.500	94.277.500	116.897.360
Fixef Cost		49.381.000	49.381.000	49.381.000
Taxes15 %		42.000.000	42.000.000	42.000.000
Total Cost	159.827.500	185.658.500	185.658.500	185.658.500
Surplus/Deficit	(159.827.500)	89.627.625	89.391.931	84.430.578
DF 12%	1	0,51	0,51	0,51
PV	(159.827.500)	47.939.193	47.939.193	47.939.193

**IV. Conclusion**

The trevally culture in Amurang district is feasible to do since the financial analysis exhibits positive NPV, IRR > DF, Net B/C > 1, and payback period in the range of project period. However, the profit gained was not optimal yet because the the utilization capacity of the business strength was only half the normal capability. The main cause was low seedling supply and limited food availability.

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