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Financial Analysis of *Eucheuma cottoni* in Bontang Kuala Village, Bontang City

Analisis Usaha Budidaya Rumput Laut Eucheuma cottoni di Kelurahan Bontang Kuala Kota Bontang

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Abstract

Research analysis of the *Eucheuma cottoni* seaweed cultivation business was conducted in July-September 2022 located in Bontang Kuala Village, Bontang City. The purpose of this study was to analyze the *E.cottoni* seaweed cultivation business financially by calculating production costs, revenue, and profits from the *E.cottoni* seaweed cultivation business, and analyzing the feasibility of *E.cottoni* seaweed cultivation business in Bontang Kuala Village, Bontang City. The selection of the location of this research was carried out intentionally with the consideration that there were *E.cottoni* seaweed cultivation business actors in Bontang Kuala Village, Bontang City, and the determination of respondents was carried out by census. Date using analysis with the formula Total cost (TC), Revenue or gross income (TR), profit analysis (π), Financial analysis Net Present Value (NPV), Net Benefit Cost Ratio (Net B/C), Internal Rate of Return (IRR**),** and Payback period. The results showed that the investment value incurred by *E.cottoni* seaweed cultivators was 77,726,000 with the largest investment cost being the drying floor of IDR 30,000,000 and the smallest investment cost being a knife of IDR 24,000. The revenue obtained by *E.cottoni* seaweed cultivators was 345,600,000/year with the selling price of dried seaweed at the time of this research carried out at IDR 8,000/kg of the amount of dried seaweed production of 34,560 kg/year. NPV obtained from the calculation of 429,564,890. Net B/C generated in the seaweed cultivation business in Bontang Kuala Village is 6.53. The IRR value obtained is 137%. The payback period (PP) value obtained based on calculations is 1.5 years or 18 months. Based on the calculation obtained NPV>0, Net B / C>1, IRR>OCC (3%) seaweed cultivation in its business in Bontang Kuala Village the development of its business is feasible and can be continued because it can still cover the operational costs incurred and make a profit.

Keywords: Analysis, Cultivation Business, Seaweed, Revenue, Financial

Abstrak

Penelitian analisis usaha budidaya rumput laut *Eucheuma cottoni* dilaksanakan pada bulan Juli – September 2022 berlokasi di Kelurahan Bontang Kuala Kota Bontang. Tujuan penelitian ini untuk menganalisis usaha budidaya rumput laut *E.cottoni* secara finansial dengan menghitung biaya produksi, penerimaan dan keuntungan dari usaha budidaya rumput laut *E.cottoni*, serta menganalisis kelayakan usaha budidaya rumput laut *E.cottoni* di Kelurahan Bontang Kuala Kota Bontang. Pemilihan lokasi penelitian ini dilakukan secara sengaja dengan pertimbangan terdapat adanya pelaku usaha budidaya rumput laut *E.cottoni* di Kelurahan Bontang Kuala Kota Bontang, penentuan responden dilakukan secara sensus. Date menggunakan analisis dengan rumus Total biaya (TC), Penerimaan atau pendapatan kotor (TR), analisis keuntungan (π), Analisis finansial *Net*

Present Value (NPV), *Net Benefit Cost Ratio (Net* B/C), *Internal Rate of Return* (IRR**)** dan Payback period. Hasil penelitian menunjukkan bahwa nilai investasi yang dikeluarkan oleh pembudidaya rumput laut *E.cottoni* yaitu 77.726.000 dengan jumlah biaya investasi terbesar adalah lantai penjemuran sebesar Rp 30.000.000 dan biaya investasi terkecil adalah pisau sebesar Rp 24.000. penerimaan yang diperoleh pembudidaya rumput laut *E.cottoni* yaitu 345.600.000/tahun dengan harga jual rumput laut kering pada saat penelitian ini dilakukan sebesar Rp 8.000/kg dari jumlah produksi rumput laut kering sebanyak 34.560 kg/tahun. NPV yang diperoleh dari hasil perhitungan sebesar 429.564.890. Net B/C yang dihasilkan dalam usaha budidaya rumput laut di Kelurahan Bontang Kuala yaitu sebesar 6,53. Nilai IRR yang diperoleh sebesar 137% Nilai *Payback Period* (PP) yang diperoleh berdasarkan perhitungan sebesar 1,5 tahun atau 18 bulan. Berdasarkan perolehan perhitungan diperoleh NPV > 0, Net B/c >1, IRR > OCC (3%) budidaya rumput laut dalam usahanya di Kelurahan Bontang Kuala perkembangan usahanya layak dan dapat dilanjutkan karena masih dapat menutupi biaya oprasional yang di keluarkan dan memeperoleh keuntungan.

Kata kunci: Analisis, Usaha Budidaya, Rumput Laut, Penerimaan, Finansial

1. Introduction

Bontang Kuala is an urban village located in the North Bontang sub-district. Bontang Kuala is better known as a village on the water, and there is a part of the village area that is directly adjacent to the sea. Its people utilize natural aquatic resources to improve welfare and the economy (Fausayana et al., 2018). The present and future economic value of fishery resources is seen from the components and ecosystems of production factors that produce an output (Fitriyana, 2020). Community welfare in Bontang City is related to the ownership of livelihood assets and capital (Handoko et al., 2022). One of the livelihoods of the fisheries community is by doing seaweed cultivation of *E.cottoni* as a superior commodity. Utilization in addition to food products as well as medicines sourced from the potential of seaweed commodities (Kordi, 2010).

Opportunities as a potential market that can be developed in the future, based on the minimal effort made on the seaweed commodity (Sarmin et al., 2021). The success of seaweed cultivation is by choosing the right location for planting seaweed. Seaweed cultivation seen from the technical aspects of this business is very easy to do, besides that seen from the prospect of seaweed cultivation business is very promising because starting with capital that is not too much then it can generate high profits from seaweed cultivation (Anggadiredja et al., 2011). The potential of the seaweed business is growing to meet the needs within the country and abroad (Yuliana, 2017).

The cultivation of seaweed species *E. cottoni* in its business is valuable in economic calculations with low production costs. Short maintenance period of 45 days, seaweed commodities are very worthy of being called a commodity "future" (Estu & Kusnendar, 2015). Running the business of cultivating seaweed *E.cottoni* requires the right calculation to obtain benefits, this study aims to analyze the business of cultivating seaweed *E.cottoni* financially.

2. Material and Method

2.1. Time and Place of Research

The research method was conducted by survey through in-depth interviews related to the problem as the object in question (Fitriyana et al., 2022). Study data results from direct interviews with one respondent, namely the only *E. cottoni* seaweed cultivator who survives cultivation in Bontang Kuala Village, Bontang City. This research was conducted in July - September 2022 which took place in Bontang Kuala Village, Bontang City.

2.2. Data Analysis

Data analysis is the interpretation of data information that is easy to understand for the reader. The tabulated data information was then processed and analyzed based on the research objectives. The results of the research objectives were carried out by calculating all the financing of the *E. cottoni* seaweed cultivation business. The data needed are production data, production costs, prices, and revenues. The data will be analyzed using business feasibility analysis, namely profit and loss analysis and business financial analysis. Calculation of business feasibility analysis of seaweed cultivation using the following formula:

2.2.1. Total Cost

Total cost with analysis with the formula Hamid et al. (2019):

$$TC = TFC + TVC$$

Description:
TC = Total Cost (IDR/year)
TFC = Fixed Cost (IDR/year)
TVC = Variable Cost (IDR/year)

2.2.2. Total Revenue

Total revenue uses the formula Gilarso (2003):

$$TR = P \times Q$$

Description:
TR = Total Revenue (IDR/year)
P = Price (Rp/kg)
Q = Output (Kg)

2.2.3. Profit Analysis

Profit analysis uses the formula Lukito & Prayogo (2007):

$$\pi = TR - TC$$

Description:
Π = Profit (IDR/year)
TR = Total Revenue (IDR/year)
TC = Total Cost (IDR/year)

2.2.4. Net Present Value (NPV)

The NPV of a project is the difference between the PV of benefit flows and the PV of cost flows Gilarso (2003), so NPV can be written as follows:

$$NPV = \sum_{t=0}^{t=n} \frac{Bt - Ct}{(1+i)^t}$$

Description:
Bt = Gross social benefit (IDR/year)
Ct = Gross social cost (IDR/year)
i = Discount rate (%)
t = Year
n = Project life (year)

The NPV assessment criteria are as follows: NPV > 0, the project is viable (profitable); NPV < 0, the project is not viable (profitable).

2.2.5. Net Benefit Cost Ratio (Net B/C)

Benefit eligibility uses the formula Gray et al. (1992):

$$\text{NET B/C} = \frac{\sum_{t=0}^{n} \frac{Bt - Ct}{(1-i)^t}}{\sum_{t=0}^{n} \frac{Ct - Bt}{(1-i)^t}}$$

Description:
Bt = Gross cost-benefit (IDR/year)
Ct = Gross social cost (IDR/year)
i = Discount rate (%)
t = year
n = Project life (year)

The Net B/C assessment criteria are as follows: *Net* B/C > 1, the project is viable (profitable); *Net* B/C < 1, the project is not viable (profitable).

2.2.6. Internal Rate of Return (IRR)

Internal Rate of Return / IRR (Pasaribu, 2012) can be formulated as follows:

$$\text{IRR} = i' + \frac{NPV'}{NPV' - NPV^{"}} \text{ x } \left(i^{"} - i'\right)$$

Description:

i' = Interest rate that produces NPV > 0 (%)
i" = Interest rate that results in NPV<0 (%)
NPV' = NPV at interest rate i (IDR)
NPV" = NPV at interest rate i (IDR)

The following are the IRR criteria: IRR > OCC, the project is viable (profitable); IRR < OCC, the project is not viable (profitable).

2.2.7.Undiscounted Investment Criteria

The Payback period is to see how long the capital invested in a project can return over some time (Rangkuti, 2000). The following is the Payback Period formula (Kordi, 2008):

$$\text{Payback Period} = \frac{\mathbf{I}}{\mathbf{Bt}}$$

Description:
I = Total Investment
Bt = Average net benefit per year

3. Result and Discussion

3.1 Business Overview

The cultivation business in Bontang Kuala Village is the *E. cottoni* seaweed commodity using the long line method, which is the use of long ropes that are stretched as a method, then tied to stakes that are stuck. The ropes used are 30 span ropes, one span rope has a length of 200 m. The steps of the long-line method in seaweed cultivation include Land Preparation Aquaculture (Kordi, 2008). The cultivation method is carried out in the seaweed commodity.

The planting method used is the long line method (hanging rope). After determining the planting method, the next activity was to install ironwood piles with a height of 2 m, as a barrier so as not to be carried away by currents or sea waves. Two piles were used in one lane/span. After the piles have been installed, the next activity is the heating of the rope. The rope used in one lane/span is 200 m long and in 1 span requires 30 buoys. The buoys used are used mineral water bottles to save costs.

3.2. Investment Cost Analysis

Investment costs are expenditures made at the beginning of the business with a large enough amount of a series of seaweed cultivation businesses. Investment tools used in seaweed farming include ropes, iron poles, drying floors, guardhouses, boat engines, boats, tarpaulins, drying mats, and buoys. The tools used are partly assistance from the government such as boats, ropes, and drying floors, so this study uses the assumption that the tools used are purchased by the farmers themselves.

The results of interviews with respondents obtained the age of investment equipment ranged from 1-20 years. The total investment costs incurred in *E.cottoni* seaweed cultivation business activities in Bontang Kuala Village amounted to IDR 77,726,000, with the largest amount of investment costs, is the drying floor of IDR 30,000,000 and the smallest investment cost being a knife of IDR 24,000. Details of the amount of investment costs incurred in the *E.cottoni* seaweed cultivation business in Bontang Kuala Village can be seen in Table 1.

Table 1. Investment costs of seaweed farming

No.	Description	Unit	Investment Cost (IDR)
1	Rope	Roll	3.600.000
2	Ulin Pole	Unit	5.700.000
3	Drying Floor	Unit	30.000.000
4	Guard House	Unit	25.000.000
5	Boat Engine	Unit	4.500.000
6	Boats	Unit	7.000.000
7	Tarpaulin	Unit	840.000
8	Drying Mat	m	150.000
9	Buoys	Unit	900.000
10	Knife	Unit	24.000
Total			77.726.000

3.3. Operating Cost

Operational costs are costs incurred during the production process of the *E. cottoni* seaweed cultivation business. Operational costs consist of two types of costs, namely fixed costs whose amount is not influenced by the size of the output produced, and variable costs whose amount is influenced by the size of the output produced. The number of fixed costs incurred in *E. cottoni* seaweed cultivation business activities in Bontang Kuala Village for 5 years ranged from IDR 35,010,000-39,510,000, with the largest amount of fixed costs being labor and the smallest fixed costs being oil changes.

The total costs incurred in the *E.cottoni* seaweed cultivation business activities in Bontang Kuala Village amounted to Rp. 138,015,000/year, with the largest amount of fixed costs incurred in seaweed seeds and the smallest fixed costs are sacks. Details of operational costs incurred in the *E.cottoni* seaweed cultivation business in Bontang Kuala Village can be seen in Table 2.

Table 2. Operational costs of *Eucheuma cottoni* seaweed cultivation in Bontang Kuala Village

No.	Description	Year				
		1	2	3	4	5
Fixed Costs						
1	Oil Change	420.000	420.000	420.000	420.000	420.000
2	Boat Maintenance	3.000.000	3.000.000	3.000.000	3.000.000	3.000.000
3	Sunbathing Care	1.500.000	1.500.000	1.500.000	1.500.000	1.500.000
4	Guardhouse Maintenance	3.000.000	3.000.000	3.000.000	3.000.000	3.000.000
5	Labour	25.200.000	25.200.000	25.200.000	25.200.000	25.200.000
6	investment tool replacement					
	Tools 1 year	1.890.000	1.890.000	1.890.000	1.890.000	1.890.000
	Tools 2 years		3.600.000		3.600.000	
	Tools 3 years			4.500.000		
Total		35.010.000	38.610.000	39.510.000	38.610.000	35.010.000
Variable Costs						
1	Seedlings	75.000.000	75.000.000	75.000.000	75.000.000	75.000.000
2	Sacks	1.365.000	1.365.000	1.365.000	1.365.000	1.365.000
3	Petrol	4.050.000	4.050.000	4.050.000	4.050.000	4.050.000
4	Plastic Ice Wax	7.200.000	7.200.000	7.200.000	7.200.000	7.200.000
5	Consumption	50.400.000	50.400.000	50.400.000	50.400.000	50.400.000
	Total	138.015.000	138.015.000	138.015.000	138.015.000	138.015.000
Total Operating Expenses		173.025.000	176.625.000	177.525.000	176.625.000	173.025.000

3.4. Reception

The number of lanes used for seaweed planting media is as many as 12 lanes, in one lane there are 800 points of seaweed planted for one point produces ±3 kg of wet seaweed. The amount of wet production obtained was 28,800 kg/cycle so the dry seaweed production obtained was 5,760 kg/cycle. Respondents said during the interview that wet seaweed experienced shrinkage of approximately 20%, after drying for 3-4 days obtaining dry seaweed production of 34,560 kg/year with the selling price of dry seaweed at the time of this study conducted at IDR 8,000/kg, so that the amount of revenue from the sale of dry seaweed can be obtained IDR 276,480,000 / year. Details of revenue from sales obtained in the *E.cottoni* seaweed cultivation business in Bontang Kuala Village can be seen in Table 3.

Table 3. Sales revenue from seaweed cultivation

No.	Description	Production Volume (Kg)	Price (IDR)	Total Sales revenue (IDR)
1	Cycle	5.760	8.000	46.080.000
2	Year	43.200	8.000	276.480.000

3.5. Profit Loss

Profit and loss analysis aims to determine whether the *E. cottoni* seaweed cultivation business in Bontang Village is experiencing profits or losses, from the results of profit and loss analysis can be seen in Table 4.

Table 4. Profit and loss analysis

Uraian	Tahun				
	1	2	3	4	5
Penerimaan					
Jumlah Produksi	34.560	34.560	34.560	34.560	34.560
Harga	8.000	8.000	8.000	8.000	8.000
Penjualan	276.480.000	276.480.000	276.480.000	276.480.000	276.480.000
Nilai Sisa	7.580.000	360.000	1.500.000	360.000	700.000
Total Penerimaan	**284.060.000**	**276.840.000**	**277.980.000**	**276.840.000**	**277.180.000**
Pengeluaran					
Biaya variabel	138.015.000	138.015.000	138.015.000	138.015.000	138.015.000
Biaya Tetap	35.010.000	38.610.000	39.510.000	38.610.000	35.010.000
Depresiasi	10.969.000	10.969.000	10.969.000	10.969.000	10.969.000
Total Pengeluaran	**183.994.000**	**187.594.000**	**188.494.000**	**187.594.000**	**183.994.000**
Keuntungan	**100.066.000**	**89.246.000**	**89.486.000**	**89.246.000**	**93.186.000**

The calculation of profit and loss analysis obtained the average total revenue in the 5 years ranged from IDR 276,840,000 to 284,060,000, which was obtained from sales revenue plus the residual value of investment

equipment. Expenditures are obtained from the summation of non-fixed costs, fixed costs, and depreciation so that the average total expenditure ranges between IDR 183,994,000-188,494,000. The profit obtained based on the profit loss analysis above for 5 years ranges between IDR 89,246,000-100,066,000. The data shows according to the opinion of the profit loss calculation that seaweed cultivation is profitable (Hendri, 2018).

3.6. Discounted Investment Criteria

The discounted investment criteria used in the financial analysis of aquaculture in Bontang Kuala Village are NPV, IRR, and Net B/C. can be seen in Table 5.

Table 5. Discounted investment criteria

No.	Description	Value	Criteria
1	NPV	429.564.890	NPV>0: Worth it
2	IRR	137%	IRR>3%: Worth
3	Net B/C	6,53	Net B/C >1: Worth it

The NPV generated in the seaweed farming business in Bontang Kuala Village for five years of business, amounting to IDR 429,564,890 NPV>0 indicates that the profits obtained from seaweed farming can cover the operational costs that have been incurred, so the seaweed farming business in Bontang Kuala Village is feasible (profitable).

The IRR generated from seaweed farming in Bontang Kuala Village is 137%. OCC is taken from the highest BRI bank annual interest rate. IRR>OCC (3%), indicating that the profit earned from seaweed farming in Bontang Kuala Village can cover the operational costs that have been incurred, so the business is feasible (profitable).

Net B/C generated in the seaweed cultivation business in Bontang Kuala Village is 6.53. Net B/C>1, which indicates that any investment and operational costs incurred can be covered by the revenue earned and able to generate profits, so that seaweed farming in Bontang Kuala Village is feasible (profitable). Payback Period (PP) obtained based on calculations of 1.5 years or 18 months which indicates that the value of PP < ½ the age of the business, meaning that the investment used in seaweed cultivation business can return within 1.5 years or 18 months and can generate profits, so that the operational costs incurred can be covered (Table 6).

Table 6. Payback period of seaweed cultivation business

No.	Description	Payback Period (PP)
1	Year	1,5
2	Month	18

4. Conclusions

Analysis of seaweed aquaculture business based on financial feasibility, with NPV value of IDR 429,564,890, IRR of 137%, Net B/C of 6.53, and payback period of 1.5 years or 18 months.

5. Suggestion

Suggestions in this study on the cultivation of *E.cottonii* seaweed in Bontang Kuala Village, Bontang City need to be developed again, as well as the role of government agencies regarding the development of seaweed cultivation needs to be considered again because in terms of business analysis seaweed cultivation is very helpful also for the community economy.

6. References

Anggadiredja, J., Zatnika, T.A., Purwoto, H., Istini, S. (2011). *Rumput laut (pembudidayaan, pengolahan dan pemasaran komoditi perikanan potensial).* Penebar Swadaya. Jakarta.

Estu, N., & Kusnendar, E. (2015). *Agribisnis rumput laut*. Penebar Swadaya, Jakarta.

Fausayana, I.I., Muhidin., Sidu, D., Arimbawa, P. (2018). Cultivation of seaweed *Eucheuma cottonii* on longline with floating inverted mosquito net model. *AACL Bioflux,* 11(4):1009-1014.

Fitriyana. (2020). Komoditi perikanan nelayan tangkap pada era new normal di Kota Bontang Provinsi Kalimantan Timur. Prosiding Seminar Nasional: 391- 402.

Fitriyana., Helminuddin., Yudha. (2022). Economic analysis of giant shrimp cultivation in the Ngusa Taka Group in Sengkong Village, Sesayap Hilir District, Tana Tidung Regency. *Budapest International Research and Critics Institute-Journal,* 5(2): 13115-13123

Gilarso. (2003). *Pengantar ilmu ekonomi*. Kanisius:Yogyakarta.

Gray, C., Simanjuntak, P., Maspaitella, P.F.L., Varley, R.C.G. (1992). *Pengantar evaluasi proyek*. PT Gramedia Pustaka Utama. Jakarta.

Hamid., Suandi, E., Maulana, I.H. (2019). *Pengantar ekonomika mikro*. UPP STIM YKPN. Yogyakarta.

Handoko, D.K.D., Fitriyana., Susilo, H. (2022). Karakteristik sosial ekonomi hubungan patron klien pada masyarakat nelayan purse seine di Kelurahan Berbas Pantai Kecamatan Bontang Selatan Kota Bontang. *Journal Perikanan*, 12 (3): 408-417

Hendri. (2018). *Untung berlipat dari budidaya rumput laut tanaman multi manfaat*. Lily Publisher: Yogyakarta

Kordi, M.G.H. (2010). *A to Z budidaya biota akuatik untuk pangan, kosmetik dan obat-obatan*. Andi Offset. Yogyakarta.

_____. (2008). *Budi daya perairan*. PT Citra Aditya Bakti: Bandung.

Lukito, A., & Prayogo, S. (2007). *Panduan lengkap lobster air tawar*. Penebar Swadaya: Jakarta.

Pasaribu, R.B.F. (2012). *Bahan ajar ekonomi pembangunan*. Depok: Fakultas Ekonomi, Universitas Gunadarma. Jakarta.

Rangkuti, F. (2000). *Business plan teknik membuat perencanaan bisnis dan analisis kasus*. PT Gramedia Pustaka Utama, Jakarta.

Sarmin, S., Dangnga, M.S., Malik, A.D. (2021). Development strategy of seaweed (*Eucheuma cottonii*) cultivation in border area - Sebatik Island. *Buletin Ilmiah Marina Sosial Ekonomi Kelautan dan Perikanan.*

Yuliana. (2017). Feasibility analysis seaweed (*Eucheuma cottonii*) long line system in the Village District of Pa'jukukang Rappoa Bantaeng. *Journal of Social and Development Sciences*, 8(1): 6-12.