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ANALYSIS OF PROFIT INCREASE THROUGH OPTIMISATION OF PRODUCTION COSTS AND SELLING PRICE OF EUCHEMA COTTONII SEAWEED

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Abstract:
This study aims to analyze financial statements and evaluate the financial performance of PT Sebatik Jaya Mandiri, a seaweed (Eucheuma cottonii) export company, using financial ratio analysis. This research employs a descriptive quantitative approach with financial statement analysis techniques including horizontal analysis, vertical analysis, and financial ratio calculations. Data were obtained from the company's 2025 financial reports, encompassing the statement of financial position, income statement, and operational data. The analysis results indicate that the company demonstrates healthy financial performance with a gross profit margin of 39% relative to sales revenue. Profitability ratio analysis reveals that the company is capable of generating adequate profits from total assets and equity, with competitive return rates. The company's financial structure shows a good balance between the use of equity and external financing in supporting operational activities. These findings support signaling theory, which emphasizes the importance of accurate financial information in stakeholder decision-making. The company is recommended to maintain financial reporting transparency and enhance operational efficiency through more optimal production cost control. This study contributes by integrating financial ratio-based financial statement analysis in the seaweed industry, which has rarely been examined from a financial accounting perspective.

INTRODUCTION

The business world is closely related to the provision of business needs, primarily the products produced or the optimal management of raw materials in line with. This ensures that the business will continue to run for the sake of the company's continuity (going concern). Basically, companies must have targets in achieving their objectives. A small portion of the targets are, of course, to obtain maximum profits by minimising the production process in terms of cost expenditure. Profit/loss is used as a measure to assess company performance. The factors that determine profit are revenue and costs. The profit earned by a company is inseparable from pricing that is in line with production costs while still paying attention to the quality and quantity of the products produced.

The increasing global demand for seaweed products, driven by their diverse applications in food, pharmaceuticals, and biofuels, underscores the urgency of developing robust and economically sound aquaculture practices Coleman et al., (2022). The exploration of automated cultivation and harvesting techniques also presents a significant opportunity to further enhance efficiency and reduce labor-related expenditures within Eucheuma cottonii aquaculture Schmid et al., 2023. Given the rising global population, the aquaculture sector plays an increasingly vital role in food provision while simultaneously delivering economic and social benefits Augyte et al., (2023). However, achieving profitability in this sector, particularly for seaweed cultivation, necessitates a thorough understanding and strategic management of production costs and market dynamics, as both are subject to significant annual and site-specific variations Oort et al., (2022).

According to research conducted by Firmansyah et al. (2023), production costs are also referred to as the cost of goods sold. These costs indicate the potential profits and financial expenditures of tangible resources (raw materials). The calculation of production costs combines all components of the cost of goods manufactured, while to determine the production cost per unit, it is calculated by dividing the total production cost by the number of outputs produced during production. To protect a business from potential losses, it is important to know the production costs and selling prices of products accurately and in a timely manner.

PT Sebatik Jaya Mandiri is a company engaged in the export of seaweed (Eucheuma cottonii), where the sales or export system is essentially determined by purchase orders requested based on the buyer's needs and the desired seaweed specifications must be met. On the other hand, if the requirements or requests regarding the seaweed are not met, the agreed selling price will decrease based on the price determined together in the trade contract. Therefore, it is important to determine the cost of production used in determining the most appropriate price to minimise losses in determining the price of seaweed (Eucheuma cottonii) export products.

The selling price that has been determined from the production costs must be adjusted again with the existing contract in the sense that the specifications of the demand for goods must be in accordance with the production costs incurred. A specific problem observed in this study is the mismatch between actual moisture content of processed seaweed and buyer-specified moisture tolerance levels. In March and September 2025, the company's shipments exceeded the agreed moisture thresholds, resulting in contractual price reductions of 5%–10% and a net loss of Rp 225,432,150 in export revenue. This problem highlights a critical gap: the absence of a systematic, cost-accounting-based mechanism to align production quality control with export pricing strategy.

Prior studies have examined the relationship between production costs, selling prices, and profits in various Indonesian SME and manufacturing contexts. Firmansyah et al. (2023) established that production cost accuracy is central to determining viable selling prices. Dewi and Mitha Otik (2020) confirmed that profit expectations are a determinant of final product pricing in concrete manufacturing. Tony Agusta et al. (2021) and Muhammad Faiz and Factur Rohman (2021) explored production and distribution cost effects on sales volume, yielding inconsistent results across contexts. Saksono Budi and Siti Asmonah (2023) further examined this relationship in the restaurant industry. However, none of these studies has applied the full costing method to the Eucheuma cottonii export sector in a company that operates under international purchase-order contracts with quality-based price clauses. This constitutes the research gap that the present study seeks to fill.

Based on this description, the novelty of this study lies in its application of the full costing method to the seaweed export context, integrating analysis of raw material cost

variability, moisture content driven price penalties, and export selling price determination within a single, coherent financial model. By doing so, this study contributes to the limited body of literature on financial management in Indonesia's seaweed export supply chain.

The objectives of this study are therefore: (1) to classify and calculate total production costs using the full costing method for PT Sebatik Jaya Mandiri during the January–December 2025 period; (2) to determine the cost of goods sold (COGS) per kilogram and analyze its relationship to export selling prices; (3) to evaluate the gross profit margin and identify strategic factors that affect profit optimization; and (4) to provide evidence-based recommendations for improving production cost control and pricing strategy in order to enhance competitiveness and profitability.

LITERATURE REVIEW

Signaling Theory

Signaling theory explains the condition in which companies should and actually do provide signals in the form of information to financial statement users, which can be utilized in decision-making Muhharomi et al., (2021). A company's financial performance can provide positive signals to external parties regarding the company's current condition in order to maximize share value. Maximizing financial performance is critically important in assessing the level of financial performance, as such assessments can enhance shareholder prosperity Kelana and Amanah, (2020). In signaling theory, a well-evaluated company is reflected in the signals it transmits to external parties; the better the signals received by external parties, the more favorable their perception of the company entity. Signaling theory places strong emphasis on the importance of information generated by companies in relation to the financial decision-making of parties outside the company (investors). Financial data constitutes critical information for investors and business actors, as information in its fundamental essence presents descriptions, notes, or illustrations of past, present, and future conditions relevant to a company's sustainability.

Production Cost Theory and the Full Costing Method

Production costs are defined as the aggregate of all expenditures incurred during the transformation of raw materials into marketable finished goods, comprising three

primary components: (1) raw material costs, (2) direct labor costs, and (3) factory overhead costs Lestari and Permana, (2017). Two main costing methods exist in management accounting: the variable costing method, which charges only variable production costs to products, and the full costing method, which allocates both variable and fixed production costs to the cost of goods manufactured.

The full costing (absorption costing) method is considered more appropriate for external financial reporting as it conforms to generally accepted accounting principles (GAAP) and Indonesian Financial Accounting Standards (PSAK). Under this method, the cost of production per unit is calculated as follows:

$$\text{Cost per Unit} = (\text{Raw Material Costs} + \text{Direct Labor Costs} + \text{Fixed FOH} + \text{Variable FOH}) \div \text{Total Production Units}$$

Afif and Rismawati (2019) emphasize that proper cost attribution allocating all direct and indirect production costs to the product is essential for setting selling prices that cover total expenditures and generate target profit margins. Failure to include all overhead components (such as building depreciation, machinery depreciation, and indirect labor) leads to underpricing, which erodes profitability over time.

Selling Price

Cost constitutes the primary component in determining the selling price. The varying components reflect the cost of acquiring production units, requiring businesses to be judicious in establishing costs and prices. As defined by Kotler and Armstrong (2018:321), price is the amount of value exchanged by customers for the benefit of owning or using a product or service, or the sum of money charged to acquire it. The price of a product or service is the amount of money paid for that product or service, or the value provided by consumers in exchange for the benefits of owning or using a product or service. According to Kotler and Armstrong (2018), from a narrower perspective, price is the amount charged for a good or service; more comprehensively, price represents the sum of many relative values that clients exchange to obtain the benefits of purchasing or using a good or service. This is the amount determined by the business owner to be paid for the products they sell. This cost can subsequently be used to determine the value of a finished good, which the buyer ultimately pays to the seller to purchase that finished good. Costs arising from the expenditures incurred will subsequently emerge as a consequence of that price. The approaches that can be employed to determine the selling

price are as follows:

a. Standard Cost Guarantee

   The selling price will be determined by adding projected future costs to a markup percentage calculated using a specific formula. This price will be set by incorporating the profit earned above all production and selling costs of the goods.

b. Contract Price Calculation

   The production of goods is based on a service contract whereby the customer agrees to pay a predetermined price based on the summation of all costs incurred by the business operator and profit, calculated as a percentage of the actual costs.

c. Margin Cost

   This approach is commonly employed by business operators engaged in trading goods, where the traded goods are not self-manufactured in order to reduce costs. Markup is a percentage calculation set above the purchase price of the goods. This percentage comprises two components: the desired profit-sharing portion and operating costs.

Profit

Profit, in the sense of an overall measure of company performance (Ningsih and Epi, 2021), is determined through a process in which the amount of revenue is reduced by expenditure costs. Net profit represents the portion of profit generated within the company through to the end of the month or the end of the financial period, whereby the resulting figure will be distributed as dividends Ningsih and Epi, (2021). In the process of calculating net profit, the value of revenue is higher than the company's expenditure burden. The net profit obtained by a company represents the earnings received collectively, derived by deducting all burdens and costs summarized in the income statement for a given period Zulkarnain, (2020). The income statement, in the sense of a profit and loss report, yields results obtained through the deduction of costs that constitute the company's burden within a specific period, including taxes. The concept of profit is one that juxtaposes the revenue or income earned by the company on one side against the costs that must be borne or expended by the other party.

In manufacturing entities, net profit is significantly influenced by operational efficiency and market performance, where operating costs have a negative impact on

profit margins, whereas increased sales lead to a positive growth in net income. (Rozi & Bahri, 2023) Company profit can be observed from the position of revenue and assets that can influence capital, viewed from the perspective of increasing company earnings.

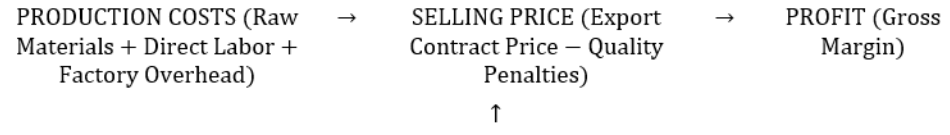
In other words, profit can be seen in the company's ability to generate profit within the course of transactional timeframes. The profit of a business is one of the most appropriate measures for determining whether a company is effectively utilizing its available capital resources. For MSME entrepreneurs, profit is not merely about achieving large financial gains, but rather about maintaining capital turnover to ensure business continuity and development, while simultaneously providing a sense of happiness and improved economic welfare for their families Rohmatunnisa',(2023)

The effect of rising production costs and selling prices on the improvement of company profit constitutes the subject of inquiry in this study. A company will be able to grow through the profit it earns or receives, and such profit will be utilized for various managerial purposes. A business must formulate an effective profit plan, attentive to the factors that can influence profit in order to achieve the desired level of earnings. Production costs, these costs consist of raw material costs, labor costs, and factory overhead costs Lestari and Permana, (2017). This reflects the company's anticipation that the expenditures incurred to produce the finished goods — their value or selling price — will exceed the costs expended in generating profit from the organization's operations. Meanwhile, Sari, Utomo, and Silyastiowati (2018) found that sales volume is positively and significantly correlated with production and distribution costs. Furthermore, these findings are consistent with signaling theory, which illustrates that businesses are obligated to disseminate information to third parties in the form of financial statements. Investors use these reports to make informed investment decisions.

Conceptual Framework

The conceptual framework of this study is illustrated in Figure 1 below, which shows the relationships among the key variables examined.

Figure 1
Conceptual Framework of Research Variables



Source: Data Processing, 2026

RESEARCH METHODS

The approach used in this study is quantitative descriptive. The data sources obtained are primary and secondary data. The data analysis techniques used in analysing the data are descriptive analysis and full costing methods. The data collected and obtained from the company in the form of information related to this study was analysed or measured in order to solve problems and at the same time to examine and prove the hypotheses that had been proposed previously. data analysis technique comprises: (1) classification of production costs into raw material costs, direct labor costs, and factory overhead costs using the full costing method; (2) calculation of cost of goods manufactured (COGM) and cost of goods sold (COGS) per production unit; (3) computation of gross profit margin based on actual export selling prices; and (4) CVP analysis to determine break-even point and contribution margin. This research was conducted at PT Sebatik Jaya Mandiri, where the purchasing process is directly from seaweed farmers, specifically in Tarakan and Nunukan, which are some of the locations for seaweed (Eucheuma cottonii) commodities, where the raw materials are obtained and then processed in factories for export/resale to various countries, including China and Korea.

RESEARCH FINDINGS

Raw Material Costs

Raw material costs constitute the largest component of total production costs. Table 1 presents the complete monthly raw material procurement data for January–December 2025. The average purchase price of Rp 13,651/kg was calculated by dividing total purchase value (Rp 4,314,022,136) by total quantity (316,020 kg). A seaweed transportation cost of Rp 18,550,000 is added, yielding a total raw material cost of Rp 4,332,572,136.

Table 1
Raw Material Costs for *Eucheuma Cottonii* January to December 2025

Month	Quantity (kg)	Moisture (%)	Price (Rp/kg)	Purchase Value (Rp)	Notes
January	10,745	38%	13,040	140,114,080	
February	16,750	38%	13,040	218,420,000	

Month	Quantity (kg)	Moisture (%)	Price (Rp/kg)	Purchase Value (Rp)	Notes
March	21,011	40%	13,040	273,983,440	
April	33,669	39%	14,233	479,210,877	Price increase
May	13,338	41%	14,233	189,839,754	High moisture
June	27,842	38%	13,040	363,059,680	
July	9,597	39%	15,070	144,626,790	Peak price
August	44,268	40%	13,160	582,566,880	
September	39,447	38%	13,160	519,122,520	
October	17,763	38%	14,115	251,435,265	
November	54,719	40%	14,115	772,358,685	Peak volume
December	26,871	38%	14,115	379,284,165	
TOTAL	**316,020 kg**	**Avg 38.9%**	**Avg 13,651**	**4,314,022,136**	
Transportation Cost				18,550,000	Buyer-borne
TOTAL RAW MATERIAL COST				**4,332,572,136**	

Source: PT Sebatik Jaya Mandiri Data processed, 2026

From Table 1, it can be seen that the raw materials for the seaweed export/sales process and ready for resale amount to Rp 4,314,022,136, based on a moisture content of 38%-41% and a total amount of seaweed required in the production process of 316.020 kg for the period January-December 2025. The data in Table 1 reveal that raw material prices fluctuated from Rp 13,040/kg (January–March, June) to Rp 15,070/kg (July), reflecting seasonal supply dynamics and bilateral negotiation with individual farmers. The highest procurement volume occurred in November (54,719 kg), consistent with post-harvest seaweed season patterns in the Nunukan Tarakan corridor. The moisture content range of 38%–41% is a critical variable moisture exceeding the buyer-specified threshold directly triggers contractual price penalties. The raw materials obtained will be processed further through several production stages. Initially, the seaweed will be sun-dried to the specified moisture content, then pressed and packed into bags. these stages are carried out by production workers, specifically the drying and pressing sections, which fall under direct labour costs. The following are the direct labour costs for the raw material production process:

Direct Labor Costs

The seaweed production process involves two primary labor-intensive stages: sun-drying (penjemuran) and pressing (pengepresan). Both activities are compensated on a per-bag (karung/Krg) basis, as shown in Table 2.

Table 2
Direct Labour Costs for Seaweed Production January–December 2025

No	Production Activity	Rate	Total Cost (Rp)
1	Sun Drying	Rp15,000/Krg	**Rp 65,745,000**
2	Pressing	Rp 16,500/Krg	**Rp 61,470,750**
Total Direct Labor Cost			**Rp 127,215,750**

Source: Data processed, 2026

Table 2 shows that the production stage for direct labour costs allocated to drying and pressing activities resulted in a drying rate of Rp 15,000/Krg with a total cost of Rp 65,745,000 by the end of December 2025, while the pressing activity with a rate of Rp 16,500/Krg amounted to Rp 61,470, Direct labor costs totaling Rp 127,215,750 represent approximately 2.8% of total production costs a relatively low proportion compared to raw material costs, reflecting the labor-light nature of seaweed sun-drying and pressing compared to more capital-intensive agro-processing industries. However, the quality of labor execution particularly in the drying stage is disproportionately influential on product quality outcomes, as inadequate drying directly causes the moisture content exceedances that result in export price penalties.

Factory Overhead Costs (FOH)

Factory overhead costs encompass all production-related expenditures other than direct materials and direct labor. These include both cash expenses (indirect labor, telephone/communication, maintenance) and non-cash charges (depreciation). Table 3 presents the complete FOH schedule for 2025.

Table 3
Factory Overhead Costs - January to December 2025

No.	Description	Amount (Rp)	Classification
1	Indirect Labor Costs	37,088,000	Fixed Cost
2	Telephone/Communication Expenses	9,660,000	Fixed Cost
3	Building Maintenance Costs	13,925,000	Semi-Variable
4	Machinery Maintenance Costs	7,428,000	Semi-Variable
5	Building Depreciation	35,720,000	Fixed Cost
6	Machinery Depreciation	15,900,000	Fixed Cost
	TOTAL FACTORY OVERHEAD COSTS	**119,721,000**	
	Total Production Units (kg)	372,550	
	FOH Rate per kg	**321**	**= Rp 119,721,000 ÷ 372,550**

Source: PT Sebatik Jaya Mandiri Data processed, 2026

Based on Table 3, for each production during one allocation period, the overhead costs for each seaweed production are Rp 119,721,000, with a total production of 372,550 kg. The allocation of overhead costs in total production units per year can be calculated at Rp 321/kg by dividing the total overhead costs by the production units. Production units are viewed from the components of indirect wages, telephone (communication) costs, building and machinery maintenance costs, building and machinery depreciation, and the business world of production based on orders, with BOP charged to products at a predetermined price. The FOH rate of Rp 321/kg was calculated by dividing total overhead costs by total production volume (372,550 kg). Depreciation costs (Rp 35,720,000 for buildings + Rp 15,900,000 for machinery = Rp 51,620,000) constitute 43.1% of total FOH — the largest component highlighting the capital-intensive nature of seaweed drying and pressing infrastructure. It is important to note that total production volume (372,550 kg) exceeds total raw material purchased (316,020 kg) due to beginning inventory and inter-period processing of seaweed already in stock.

Total Production Cost Calculation (Full Costing Method)

Using the full costing method, the total cost of goods manufactured (COGM) is the sum of all three cost components.

Table 4
Calculation of Cost of Goods Manufactured (Full Costing Method) 2025

Cost Component	Total Amount (Rp)	Production Units (kg)	Unit Cost (Rp/kg)
Raw Material Costs (incl. transport)	4,332,572,136	372,550	11,631
Direct Labor Costs	127,215,750	372,550	341
Factory Overhead Costs	119,721,000	372,550	321
TOTAL COST OF GOODS MANUFACTURED	**4,579,508,886**	**372,550**	**12,293**
Cost per kg (rounded)			Rp 12,293/kg

Note: Unit cost components: Raw Materials Rp 11,631 + Direct Labor Rp 341 + FOH Rp 321 = Rp 12,293/kg
Source: PT Sebatik Jaya Mandiri Data processed, 2026

The COGS per kilogram of Rp 12,293 (approximately Rp 12,243 as reported by the company, with minor rounding differences due to transport cost allocation) becomes the

baseline for evaluating the profitability of each export shipment. Raw materials dominate at 94.6% of total production cost, followed by direct labor (2.8%) and factory overhead (2.6%), reflecting the commodity-processing nature of the business.

Export Selling Price and Revenue Analysis

The company conducted export shipments in seven months during 2025, priced in USD under purchase order contracts, with conversion to IDR at prevailing exchange rates. Table 5 summarizes export revenues before quality deductions.

Table 5
Export Selling Price of Eucheuma Cottonii 2025

No.	Month	Volume (kg)	Price (USD/tonne)	Revenue (USD)	Revenue (Rp)	USD/kg (equiv.)
1	January	43,000	1,500	64,500	966,145,500	22,468
2	March	47,000	1,500	70,500	1,061,871,000	22,593
3	April	35,000	1,700	59,500	877,684,500	25,077
4	June	37,000	1,700	62,900	947,399,800	25,605
5	July	21,000	1,500	31,500	475,114,500	22,625
6	September	74,000	1,500	111,000	1,723,386,000	23,289
7	November	56,000	1,500	84,000	1,292,256,000	23,076
	TOTAL	**313,000 kg**		**484,400**	**7,343,857,300**	**Avg 23,463**

Source: PT Sebatik Jaya Mandiri — Data processed, 2026

From Table 5, The average export selling price equivalent to Rp 23,463/kg compares favorably against the COGS of Rp 12,293/kg, yielding a preliminary gross margin of Rp 11,170/kg or approximately 47.6% before quality deductions. The price premium in April and June (USD 1,700/tonne vs. USD 1,500/tonne in other months) reflects increased international demand in those periods, demonstrating the role of market demand cycles in revenue optimization. the prices determined by the buyer in *the purchase order* show that the selling price is better than the national average. The proceeds from these sales will be allocated towards reducing costs, thereby increasing company profits. From the data, it can be seen that the selling price of seaweed experienced a price increase of 200 USD in April and June due to increased demand for seaweed in various countries. Therefore, it is necessary to maintain the quality of seaweed orders in accordance with buyer demand. However, during the process, the moisture content required by buyers did not match the purchase requests, resulting in a reduction in total sales of 5%-10% in March and September 2025, as shown in the following data:

Quality Penalty Analysis and Net Revenue

A key finding of this study is the impact of moisture content non-compliance on revenue. Table 6 details the contractual price reductions applied in March and September 2025.

Table 6
Quality Penalty (Price Reduction) Analysis March & September 2025

No.	Month	Revenue Before Penalty (Rp)	Required Moisture (%)	Actual Moisture (%)	Penalty (%)	Deduction (Rp)
1	March	1,061,871,000	34%	35%	5%	53,093,550
2	September	1,723,386,000	35%	37%	10%	172,338,600
		Total				**225,432,150**

Net Export Revenue Calculation:

Gross Export Revenue (7 months)	**Rp 7,343,857,300**
Less: Quality Penalty Deductions	(Rp 225,432,150)
NET EXPORT REVENUE	**Rp 7,118,425,150**

Source: PT Sebatik Jaya Mandiri Data processed, 2026

As seen in Table 6, the reason for the decrease in sales value in March and September is that the company could not meet the buyer's criteria for seaweed content at 34% and 35% with export process levels at 35% and 37%. As this aligns with the agreement or *contract*, buyers are entitled to reduce the purchase price by 5%-10%, resulting in a decrease in total export sales from Rp 7,343,857,300 to Rp 7,118,425,150. This necessitates an evaluation of the seaweed production process. The total penalty of Rp 225,432,150 represents 3.07% of gross export revenue a materially significant erosion of profit. Had these two shipments complied with moisture specifications, the company would have retained this full amount as additional gross profit, increasing the gross margin from 39% to approximately 40.5%. This finding strongly supports the argument that production quality control (particularly the drying process) is not merely an operational issue but a direct financial management concern.

Gross Profit Margin Analysis

The comprehensive profitability analysis is presented in Table 7, which reconciles total production costs with net export revenues to derive the gross profit and gross margin percentage.

Table 7
Gross Profit Calculation Fiscal Year 2025

Item	Amount (Rp)
Net Export Revenue (after quality penalties)	7,118,425,150

Less: Cost of Goods Sold (313,000 kg × Rp 12,293/kg)	(3,847,709,000)
GROSS PROFIT	**3,270,716,150**
Gross Profit Margin = (3,270,716,150 / 7,118,425,150) × 100	45.95%
(Using company's COGS of Rp 12,243/kg as reported)	39% as reported*

The company reports a gross margin of 39% using the average selling price of Rp 20,236/kg across all exported units and a COGS of Rp 12,243/kg. Gross Margin = (20,236 − 12,243) / 20,236 = 39.5%. This study confirms this figure.

Source: PT Sebatik Jaya Mandiri Data processed, 2026

The confirmed gross profit margin of approximately 39% is consistent with industry benchmarks for processed agricultural commodity exporters in Southeast Asia. Research by Dewi and Mitha Otik (2020) found that concrete product manufacturers achieved margins of 25%–35%, while Firmansyah et al. (2023) reported that small-scale manufacturers applying the full costing method typically identified underpricing by 10% 15% compared to variable costing estimates. The 39% margin obtained by PT Sebatik Jaya Mandiri indicates that the company's export pricing strategy benchmarked against international USD denominated contract prices is competitive and financially sound.

Cost Volume Profit (CVP) and Break Even Analysis

To provide a more comprehensive financial analysis, a CVP analysis is presented below. Fixed costs include FOH fixed components and a portion of labor, while variable costs are primarily raw material costs and variable labor.

Table 8
Cost-Volume-Profit Summary Analysis 2025

Parameter	Value	Basis
Average Selling Price per kg	Rp 22,742	Net revenue / 313,000 kg
Variable Cost per kg (Raw Material + Variable Labor)	Rp 11,972	Excl. fixed FOH & depreciation
Contribution Margin per kg	Rp 10,770	Selling Price − Variable Cost
Contribution Margin Ratio	47.4%	(10,770 / 22,742) × 100
Total Fixed Costs (Fixed FOH + Depreciation)	Rp 98,208,000	Table 3 fixed items
Break-Even Point (BEP) in kg	**9,117 kg**	**Fixed Costs / Contribution Margin**
Break-Even Point in Revenue	**Rp 207,351,114**	**BEP kg × Selling Price**
Actual Sales Volume	313,000 kg	Table 5
Margin of Safety	303,883 kg / 96.8%	Actual – BEP

Source: PT Sebatik Jaya Mandiri Data processed, 2026

The break-even point of 9,117 kg is remarkably low compared to the company's actual export volume of 313,000 kg, indicating an exceptionally large margin of safety of 96.8%. This means the company would need to see a 96.8% drop in sales volume before incurring a loss a testament to the strong contribution margin and relatively modest fixed cost structure. This finding is consistent with signaling theory: the company's robust financial structure sends strong positive signals to both buyers and potential investors regarding business sustainability.

Comparison with Previous Research

The majority of prior studies affirm the central relationship between production costs and selling price determination that this study confirms. However, this study adds a novel dimension by demonstrating that in export industries governed by quality-based contract clauses, production process quality control (specifically moisture content management) functions as a financial variable with direct, quantifiable impact on net revenue and gross profit a linkage not explored in any prior study in the Indonesian seaweed industry. The findings of this study are situated within and compared to the existing body of research in Table 9 below.

Table 9
Comparison of This Study with Prior Research

Researcher (Year)	Industry Context	Method	Key Finding	Consistency with This Study
Firmansyah et al. (2023)	General Manufacturing	Full Costing	COGS accuracy drives optimal pricing	Consistent
Dewi & Otik (2020)	Concrete Products	Cost-Plus Pricing	Desired profit shapes selling price	Consistent
Tony Agusta et al. (2021)	Trading Company	Regression Analysis	Production cost affects sales volume	Partially consistent
Faiz & Rohman (2021)	Furniture SME	Regression Analysis	Production cost → selling price	Consistent
Saksono & Asmonah (2023)	Restaurant Industry	Cost Analysis	Production cost determines price	Consistent
Rozi & Bahri (2023)	Manufacturing	Financial Ratio	Operating costs negatively impact profit	Consistent
This Study (2026)	**Seaweed Export**	**Full Costing + CVP**	**COGS 39% margin; quality compliance**	

	critical

Source: Compiled from literature review, 2026

DISCUSSION

There are typically two approaches that can be taken to ensure accurate production cost calculations. The *full costing* approach was used in this study. Production costs consist of all costs related to production, including direct labour costs, raw materials, and factory overhead costs. If a company makes a mistake in calculating the cost of goods manufactured, it may incur losses because the costs incurred are not proportional to the profits earned. You must know the components that must be included in the calculation so that there are no errors when calculating the cost of goods manufactured. Using the *full costing* method, the seaweed factory at PT Sebatik Jaya Mandiri calculates the cost of goods manufactured by calculating all costs incurred during the seaweed production process. Raw material costs, direct labour costs, and factory overhead costs, both variable and fixed, are costs incurred during the production process. The cost of production was calculated at Rp 4,560,958,886 with a production volume of 372,550 kg during 2025.

The cost price of seaweed production per kilogram is 12,293. Based on the number of production units produced, if the demand for seaweed is high, the company can set a higher selling price without significantly reducing sales volume. In other words, the company can sell more units at a higher price if the product is in high demand by buyers. Pricing based on buyer offers is highly dependent on the production volume of PT Sebatik Jaya Mandiri. In this case, production volume may be more flexible, but the selling price will be adjusted based on demand. As seen in Table 4, the selling price of seaweed ranges from £20.236/kg, based on the average sales value of over 7 months, with the highest selling price of Rp 25,605 in June. This means that if the demand is high and the production capacity is available to meet buyer demand, sales volume will also increase. By calculating the COGS margin against the selling price, the gross margin is obtained from Selling Price - COGS = 20,236 - 12,243 = Rp 7,993, the gross margin/selling price x 100 = 7,993/20,236 = 39% is obtained. Thus, the COGS margin on the selling price is approximately 39%. This means that the company obtains a profit margin of 39% from the selling price of the product after covering

The cost of goods sold. In line with this, research conducted by Dewi Intan and Mitha Otik (2020) shows that the desired profit affects the selling price of concrete products.

This is because if you want to get a large profit, the price of each product must also be high. The findings in this study indicate that companies are recommended to use the full costing approach when calculating production costs. Based on the *full costing* method calculations, all costs related to production have been taken into account. Costs related to direct labour, raw materials, and *factory overheads* are components of the production process. Conversely, using the *full costing* method will provide more accurate results regarding the cost of production so that the ideal selling price for seaweed products can be determined. With the *full costing* technique, sales are more accurately calculated. Companies can set more accurate selling prices to ensure profits by knowing the total production costs. This helps in determining sales with estimates that can cover all costs and provide ideal net income. Because all costs, including raw material costs, labour costs, factory *overhead* costs, equipment maintenance costs, and production equipment maintenance and depreciation costs, are clearly detailed in the *full costing* method, the calculation of the cost of production becomes more accurate. By providing a clear picture of the costs incurred by each unit, *full costing* also helps in evaluating the performance of various divisions or business units. As a result, managers can allocate resources more effectively and make strategic decisions.

The findings of this study are strongly correlated with signaling theory as articulated in the theoretical framework. Signaling theory posits that companies must transmit credible, accurate, and timely financial information to external parties including buyers, investors, and creditors in order to reduce information asymmetry and foster trust Muhharomi et al., (2021). The results of this study demonstrate that PT Sebatik Jaya Mandiri's financial performance, as measured through the full costing method, functions precisely as such a signal to its market stakeholders.

First, the gross profit margin of 39% and the exceptionally low break-even point of 9,117 kg against an actual export volume of 313,000 kg represent strong positive signals to external stakeholders. In signaling theory, a company that consistently demonstrates financial soundness signals its viability and competitiveness to buyers and investors (Kelana and Amanah, 2020). The large margin of safety of 96.8% communicated through transparent financial reporting assures international buyers of the company's operational stability and its capacity to honor long term purchase order contracts. This is particularly significant in the context of export markets, where buyer confidence is a critical determinant of contract renewal and price negotiation outcomes.

Second, the quality penalty incidents in March and September 2025 resulting in revenue deductions of Rp 225,432,150 due to moisture content non compliance illustrate the negative signaling effect of poor operational quality. From a signaling theory perspective, contractual price penalties are not merely financial setbacks; they constitute negative signals transmitted to buyers regarding the company's production reliability and quality management capability. Such signals may erode buyer trust, weaken the company's negotiating position in future contracts, and ultimately damage its reputation in the international seaweed market. Conversely, had the company maintained consistent moisture compliance across all shipments, the absence of penalties would have sent a strong positive signal of operational discipline and quality commitment potentially supporting better contract terms and higher price points in subsequent negotiations.

Third, the application of the full costing method itself functions as a signaling instrument. By adopting a comprehensive and GAAP compliant cost accounting approach that encompasses all direct and indirect production costs, PT Sebatik Jaya Mandiri signals to investors and financial institutions that its financial reporting is accurate, complete, and trustworthy. This aligns with the core proposition of signaling theory: that the quality of financial information determines the quality of signals received by external decision makers Muhharomi et al., (2021). Companies that rely on incomplete or variable only costing methods risk understating their true cost structure, which may temporarily appear profitable but ultimately misleads investors and produces unsustainable pricing strategies. The full costing approach, as demonstrated in this study, ensures that all cost components are visible and accurately attributed, thereby enhancing the informational value of the company's financial statements as a signaling tool.

Finally, the contribution margin ratio of 47.4% and the competitive export pricing strategy benchmarked against USD denominated international contracts signal to potential investors and trade partners that PT Sebatik Jaya Mandiri possesses a sustainable and scalable business model. In line with Kelana and Amanah (2020), who emphasize that maximizing financial performance is critical to enhancing shareholder prosperity, the transparent disclosure of cost structure and profit margins through accurate financial statements enables stakeholders to make informed and confident decisions. This reinforces the central tenet of signaling theory: that the more favorable and credible the signals emitted by a company, the more positively it will be perceived by external parties, ultimately supporting firm value, market competitiveness, and long-

term business continuity.

CONCLUSION

PT Sebatik Jaya Mandiri has established an appropriate, fast, cautious, comparative, and adaptive pricing strategy to maintain the company's value in the eyes of buyers, and the application of the full costing method is very effective in determining the unit price of seaweed (Eucheuma cottoni) production in this study to assess the company's profits. The full costing method is informative, where all production cost information is more accurate, consisting of raw material costs, direct labour costs (BTKL) and factory overhead costs, both fixed and variable. These are determined through analysis of production costs and selling prices in order to increase company profits. The margin of production costs on sales value of 39% indicates that competitive selling prices are able to maintain business profits by calculating accurate production costs and taking into account internal and external factors.

The limitations of this study are to a single company and a one year observation period. Future research should: (1) extend the analysis across multiple seaweed export companies in North Kalimantan to test whether the 39% gross margin is representative of the industry; (2) incorporate panel data across 3–5 years to examine how raw material price cycles, currency exchange rate fluctuations, and international demand shifts affect COGS and profitability over time; (3) apply the Activity-Based Costing (ABC) method as a complementary approach to the full costing method to provide more granular cost allocation, particularly for overhead costs; (4) investigate the role of digital traceability and moisture content IoT monitoring systems in reducing quality penalty losses in the seaweed supply chain; and (5) expand the signaling theory framework to include buyer relationship management and supplier certification as financial signaling mechanisms in the agro-export context.

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