

# Business plan for the establishment of seaweed nursery in Poteran Island: a case study in fish farmers group

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## Business plan for the establishment of seaweed nursery in Poteran Island: a case study in fish farmers group

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**Abstract.** The potential of seaweed in Sumenep is quite vast; however, it is not followed by efforts to develop nursery support units. Even though the supply of edible seeds with "affordable" selling prices is crucial to the success of seaweed farming. To produce quality seaweed seeds technology input is needed, which affects the price of seedlings. The purpose of this study is to analyze the methods of determining the cost of seaweed nursery production and formulate alternative selling price policies that are appropriate for a seaweed nursery business. Data collection methods used were direct interviews, filling out questionnaires and observations within three months. Data analysis uses the costing method (HPP) by determining the full cost (full costing) and variable costs (variable costing). Use these two methods to compare the cost of production, which gives the lowest unit price. To determine the sales pricing policy that is suitable for seaweed nursery business, we use the cost-plus pricing method approach and the break-even analysis method. The results showed that the determination of the HPP of seaweed seeds using the Full Costing method and the Variable Costing method differed per kg, where the lowest HPP value was obtained from the Variable Costing method. The selling price policy for seaweed seeds produced is lower than the price of seaweed seedlings produced by farmers (market price).

### 1. Introduction

Seaweed becomes an export commodity for it has a significant opportunity to develop because of its promising prospects. In Indonesian about 555 species of seaweed have been identified and are being commercially utilized and cultivated [1]. The demand for seaweed as raw materials tends to be increasing along with the producing development of its substance. Sumenep, is a productive seaweed area in East Java Province, regarding the vast land of its benefits to be a cultivation spots [2,3].

The seaweed production of Sumenep in 2013 has reached 569,651.41 tons. With this vast amount of potentiality, the supporting development unit of cultivation business, especially seeding provision, is not followed up by right efforts. Thus, a good seeding provision could be a way to determine success for seaweed cultivation business. [4,5] expressed that generally seaweed cultivators in Sumenep use seeds from their own harvest (not from seaweed farming seeds). Furthermore, the cultivators purchase the seeds from others if they fail to harvest or the producing quality of the seaweed is not well enough.

The existence of seaweed nursery farm is considered as an upstream sub-system in agribusiness concept, so it is attentive to be taken care of. In line with that, the success of agribusiness concept is determined by the capability of each sub-system. The existence of seaweed nursery farm has purposed to obtain good quality seeds, unified, and easy to handle. A group of fisherman *Bahari Mandiri* located



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in Poteran Island is striving for nursery farm. The appropriate pricing will directly affect the demand of seaweed seeds, while the seaweed farmers often use the seeds from the harvest. If the pricing of the seeds is too high, then there will be no farmers intending to purchase, and most of them will likely use the harvest as a seed. In that case, it is necessary to have the right method in the product pricing to estimate the selling price of each produced seed.

Furthermore, [6] states that fixation of products/services must always guarantee the sustainable life of a company, it is because establishing company does not mean for a year or two but for a long period of time. The determination of the main cost must be calculated based on the cost consideration. In principle, the selling price of a product must cover; the production cost, marketing expense, and expended administration cost, and desired profits. Other than the determination of selling price, the cost information per product unit is useful for making any marketing decision, as the competitive fulfillment and contract offerings. Meanwhile, the pricing determination consists of two; it is full costing or variable costing [7]. The purpose of this study is to analyse the seaweed nursery pricing production methods with full costing and variable costing and formulize the alternative policy of appropriate pricing for a seaweed nursery business. The benefit of this study is hoped to have a good quality seaweed seeds with a selling price that reflects the production cost. Therefore the cost is affordable for seaweed farmers.

## 2. Methods

The location of the study is determined intentionally (purposive), it is in a seaweed nursery farm of a group of fisherman *Bahari Mandiri* in Poteran island. The main source data of this study is primary data in the form of quantitative and qualitative, which comes from the in-charge management of the seaweed nursery unit of a fisherman group *Bahari Mandiri*. The data collection is being carried out through direct interviews, questionnaires, and observations conducted every week within three months.

The data analysis used to answer the first problems in this study is the main price determination method with full costing and variable costing. These both methods aim to compare which method is giving the lowest production cost per unit.

The main production cost, according to the *full costing* method, consists of:

Raw materials cost	IDR XXXX
Labor cost	IDR XXXX
Fixed manufacturing overhead cost	IDR XXXX
Variable manufacturing overhead cost	IDR XXXX
<b>The main Production cost</b>	<b>IDR XXXX</b>

The main production cost, according to the *variable costing* method, consists of:

Raw materials cost	IDR XXXX
Labor cost	IDR XXXX
Variable manufacturing overhead cost	IDR XXXX
<b>The main production cost</b>	<b>IDR XXXX</b>

The second problem, in determining the proper selling price fixation policy to seaweed nursery business, it uses the *cost-plus pricing* approach and *break-even analysis* method, [8] mentioned. The policy selection of selling price fixation will be based on the social purpose of a fisherman group *Bahari Mandiri*, it is selling a good seaweed seed quality with affordable price toward seaweed farmers, by still giving a profit to seaweed nursery unit of a fisherman group *Bahari Mandiri*.

The cost-plus pricing method formulizes as following:

$$\text{Main production cost per unit} = \text{main cost} / \text{production total} \quad (1)$$

$$\text{selling price} = \text{total cost} + \text{profit margin} \quad (2)$$

$$\text{selling price} = \text{purchasing cost} + \text{mark up} \quad (3)$$

The break-even analysis method formulizes as following:

$$BEP (unit) = TFC/MR$$

$$BEP (value) = fixed\ costing / (1 - variable\ costing/sale) \quad (4)$$

### 3. Results and Discussions

#### 3.1 The Cost Categorization of Seaweed Seed Production

The calculation of the determining seaweed seed main cost production on fisherman group Bahari Mandiri is based on the cost number applied on the process of resulting a good and qualified seed. It is done in order to maintain the sustainable and surviving seaweed nursery of the fisherman group Bahari Mandiri. The cost categorization of seaweed seed is classified based on the implementation process, thus the construction provision, planting, and seed provision also preservation and harvesting.

#### 3.2 The Construction Provision Cost of Cultivation

The cultivation construction costs are a cost incurred due to the cultivation construction provision in the form of rafts and made from bamboo, and the cultivation construction is commonly called a floating bamboo raft. Other equipment which is part of seaweed cultivation construction, is span rope, ballast or anchor and floats.

According to Table 1, the most cultivation construction provision cost of seaweed nursery comes from bamboo, which is 33.78% of construction total cost. Next is anchor labor cost for each 16.89%. The cultivation construction material, especially bamboo and float are economically 1.5-year-old, or it is used around 25 times. Meanwhile, nylon span rope and anchor rope could turn to 5 years old, or it is used around 72 times. For anchor and concrete ballast could reach ten years old or 144 times of usage.

**Table 1.** The cultivation construction provision cost (40 rafts unit) on seaweed nursery of fisherman group Bahari Mandiri in 2016

Materials	Unit	Total	Value (IDR)	%
Bamboo Ø 8-10 cm	Trunk	120	3,000,000	33.78
Raft joint straps PE Ø 4 mm	kg	20	800,000	9.01
Anchor rope PE Ø min. 8 mm	kg	4	160,000	1.80
Span rope PE Ø 4 mm	kg	20	800,000	9.01
Plastic rope (panjang 45 cm)	kg	20	340,000	3.83
Primary float (jerigen plastik 25 ltr)	pc	12	600,000	6.76
Secondary float/ nylon rope (plastic bottle 600 ml)	pc	360	180,000	2.03
Iron anchor/concrete ballast (berat min. 50 kg)	pc	12	1,500,000	16.89
Labor	HOK	25	1,500,000	16.89
<b>Total Construction Cost</b>			<b>8,880,000</b>	<b>100.00</b>

Notes: exchange rate USD 1 = IDR 14,225

#### 3.3 The Seaweed Seed Planting Cost

The seaweed planting cost is the second attempt done from seaweed cultivation process, and it is after the making of cultivation construction. It is included the seaweed seed provision in this attempt. The seaweed seed provision is a starting step in producing good quality seaweed seeds. From this initial seeding, the varieties selection is implemented to produce seaweed seeds that have stability and steady quality (high growth and healthy).



The early seeds used by the fisherman group *Bahari Mandiri* comes from seaweed cultivated by the local seaweed farmers around the area (Poteran Island). It is more considerable to plant from the seeds of Poteran Island because they are quite adaptive to the water environment in Poteran Island.

**Table 2.** The seaweed seed planting cost of fisherman group Bahari Mandiri in 2016

Description	Unit	Volume	Price (IDR)	Value (IDR)
Seed (8.640 points/tier)	kg	864	2,000	1,728,000
Seed bonding (wholesale per nylon rope)	rope	360	500	180,000
Nylon span rope bonding to rafts	HOK	4	70,000	280,000
Total planting cost				2,188,000

Table 2 describes that the needs for two blocks seaweed seed are 864 kg with the weight of the grain for 100 gr per average tier. The amount of cost for purchasing the seeds is IDR 1,728,000,- with a seed price for IDR 2,000,- per kg. According to [4,9], the average seaweed seed need for each farmer in Poteran Island is 159 Kg. If every farmer attempts the cultivation eight times in a year, then they need the seed for about 1,272 kg per year. Based on this, seaweed nursery business certainly has significant economic potential, because the number of seaweed farmers in Poteran Island is quite many moreover if they are given orientation to supply the seeds for seaweed farmers in Sumenep.

### 3.4 Maintenance and Harvesting Cost

The maintenance cost in seaweed cultivation only involves three labor costs to control the cultivation construction from the damage of the waving strike, broken off rope anchor, barnacles or moss cleaning, and reattaching off rope of the hook. The seaweed control is done 2-3 times/day for a week since planting. After a week planting, the control is sufficiently done once a day, or 3 times a week until harvesting [10,11]. The tool for this attempt to control is 1 unit of a boat.

The harvesting cost attempt only covers a labor cost in doing the seaweed harvesting. Some tools needed for this attempt are a bamboo basket, carrying pole, and scale. Because the seaweed is meant to produce seeds, so there is no need for drying and inventorying tools. This attempt was made by taking off the span rope from the rafts and releasing seaweed bonds from the hook. In the end, the seaweed harvest is gathered into a bamboo basket to weight.

**Table 3.** The maintenance and harvesting cost on seaweed seed production in fisherman group Bahari Mandiri in 2016

Description	Unit	Total	Price (IDR)	Value (IDR)
Maintenance	HOK	14	70,000	980,000
Harvesting				
Span rope release	HOK	4	70,000	280,000
Transport to harvesting location	HOK	2	70,000	140,000
Point rope release (8.640 points/tier)	HOK	4	50,000	200,000
Total maintenance and harvesting cost				1,600,000

The labor force for maintenance and harvesting of seaweed production is done by men, Except for the release of point rope/tier, by women. Table 3 shows that the most labor cost happens to maintenance activities, for 61.25% of total maintenance and harvesting cost. The maintenance activity has a significant role in keeping good seed quality.

### 3.5 The Primary Production Price Determination of Seaweed Seed With Full Costing Method

The calculation of seaweed main production cost is done after the fourth phase of the seaweed production process, in which the accumulation step, produced seeds that have been stable or have reached a steady quality regarding the growth and health. Meanwhile, the calculation of main production cost on level 1 – 3 (stage selection variety) is applied in every step.

**Table 4.** The main production cost of seaweed seeds with full costing method

Description	Value
Raw material cost (seaweed seeds)	IDR 1,799,173
Labor cost	IDR 2,055,000
Steady manufacturing overhead cost	IDR 299,655
Variable manufacturing overhead cost	IDR -
Main production cost	IDR 4,153,828
Main production cost (HPP) per unit	IDR 1,387

Table 4 shows that main production cost per unit of the best seaweed seed produced by fisherman group *Bahari Mandiri* in full costing method is IDR 1,387 per kg. The calculation result is obtained from the used seed for accumulation (ready seeds), it is 864 kg with the price of the grain as IDR 2,082 per kg. That seed price is obtained from the main production cost from the development step with the total number of production is 2,995 kg.

In the seaweed accumulation step, the main production price with full costing method is produced by summing the raw material cost (seaweed seed), steady and variable labor cost, and manufacturing overhead cost, regarding a constant and variable characteristic. The main production cost per seed is obtained by dividing the total production cost with the total number of production (superior seaweed seeds) on the 1-time production process of best seed production.

### 3.6 The Production Price Determination of Seaweed Seed with Variable Costing Method

On the initial production price determination (HPP) of seaweed seed with variable costing, it is obtained by summing the raw material cost (seeds), labor cost with variable characteristic, and variable overhead cost. The main production price per unit of seaweed seed is obtained by dividing the total number of production cost with the number of production (ready seeds) on the 1-time production process of best-produced seeds.

**Table 5.** The main production price of seaweed seeds with variable costing method

Description	Value
Raw material cost (seaweed seeds)	IDR 1,799,173
Labor cost	IDR 2,055,000
Variable manufacturing overhead cost	IDR -
Main production cost	IDR 3,854,173
Main production price (HPP) per unit	IDR 1,287

Variable overhead cost on initial production price determination (HPP) to produce seaweed seeds with variable costing is worth "0", because the budgeting variable cost in producing best seaweed seed on fisherman group *Bahari Mandiri*, only happens to the labor force and the needs of seeds. The following table shows the main product price calculation of seaweed seed with variable costing method, for the best seaweed seeds produced by the fisherman group *Bahari Mandiri*.

Table 5 shows, the main production price per unit of best seaweed seed production, obtained from the nursery unit of fisherman group *Bahari Mandiri* with variable costing calculation is worth IDR 1,287,- per kg. The calculation result is obtained from the used seeds for accumulation (ready seeds), it 864 kg with the price of the seed is IDR 2,082,- per kg. The seed price is obtained from the main production cost of the development step, with the total number of production is 2,995 kg.

Based on the calculation result done on the initial product price determination (HPP), in resulting the best seaweed seed, at the nursery unit of fisherman group *Bahari Mandiri* with full costing method and variable costing, it indicates the difference of HPP value, which is IDR 100,-. For this case, the initial production price determination (HPP) with variable costing is giving HPP value per unit lower than the full costing method.

### 3.7 The Policy of the Best Seaweed Seeds Sale Price Determination

The determination policy on selling price of seaweed seed done by the nursery unit of fisherman group *Bahari Mandiri* refer to the main production cost (HPP), it will be a loss when a company sets a price below the main production cost (HPP), for the sustainability of the company may not be guaranteed [6]. In that case, the selling price determination based on the cost plus pricing method is IDR 2,000,- per kg of seeds. The given profit margin or markup of the pricing determination is IDR 713,- or 35.7% of the selling price. Those numbers are identified to be ideal regarding the social aspect, in which the proposed pricing policy can still be affordable to seaweed farmers, and they are still able to purchase the quality seeds.

**Table 6.** The estimated analysis of seaweed cultivation business (manufacturing calculation) with the price of seed IDR 2,000, - per kg

Description	Volume	Unit	Price (IDR)	Value (IDR)	% to production value
Production	2,995	kg	1,500	4,492,500	100
Steady cost					
Tools diminishment and cultivation construction				299,655	5
Sub Total				299,655	5
Variable cost					
Seeds	864	kg	2,000	1,728,000	29
Labor				2,055,000	34
Sub Total				3,783,000	63
Total cost				4,082,655	68
Receipt				4,492,500	
Revenue				409,845	7
Efficiency	1.1				
Capital productivity (%)	10.0				
Break even point (BEP)					
BEP receipt (IDR)	1,897,390				
BEP production (Kg)	1,265				
BEP price	1,363				

Table 6 describes, if the seed price is worth IDR 2,000/kg, then seaweed farmers will receive earnings of IDR 409,854, - for one planting time (30 – 40 days) with the raft width of 500 square meters. This value is considered as real earning (manufacturing), because all of the costs are calculated, including the labor application of the family.



#### 4. Conclusions

The initial pricing production determination of seaweed seed production on the nursery unit of fisherman group *Bahari Mandiri* with full costing and variable method, each obtains IDR 1,387,- (USD 0.098) per kg. Other than that, the lowest principal production pricing value (HPP) of seaweed seed production on the nursery unit of fisherman group *Bahari Mandiri* is generated from the calculation based on the variable costing method. The policy of selling price value determination of seaweed seed production on the nursery unit of fisherman group *Bahari Mandiri* is worth IDR 2000,- (USD 0.14) per kg, with profit margin or markup, for IDR 713,- (USD 0.05) or 35.7% of selling price. Those numbers are identified to be ideal regarding the social aspect, in which the proposed pricing policy can still be affordable to seaweed farmers, and they are still able to purchase the quality seeds.

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