Competitiveness Analysis of *Gracilaria Sp* . in Bone Bay, South Sulawesi Province

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Abstract- To increase people's income and to find out the origin of Gracilaria Sp. Who has good quality, the government establishes the development of seaweed commodities as one of the entrances to progress and as a superior commodity. This research was conducted to analyze the marketing competitiveness of Gracilaria Sp. in Bone Bay, South Sulawesi Province. The competitiveness of seaweed marketing was analyzed using the Policy Analysis Matrix (PAM) method.

This research conducted in Bone Bay, South Sulawesi Province, from November 2018 to April 2019. The location was taken purposively by considering the existence of seaweed farmers in each district. This research is descriptive quantitative by using primary and secondary data. The number of samples used was 37 respondents

The results of the study show (1) the business of marketing seaweed gracilaria Sp. in Teluk Bone has comparative competitiveness. When viewed from the value of Social Profitability (SP), which is definite and Domestic Resources Cost Ratio (DRC) smaller than one. (2) Marketing of Gracilaria seaweed Sp. in Teluk Bone has a competitive value that would see from the benefit of Private Profitability (PP). In each has a positive value and Cost Ratio (PCR), that smaller than one. (3) Grass sea Gracilaria Sp. in Teluk Bone has a very high level of competitiveness. It indicated by a positive value (4+) of each farmer in Palopo City and Bone Regency that needs to get the main priority to develop. one of them is by increasing the value-added from processing (Half-Finished) especially who came from Palopo City because it was superior in quality compared to Bone Regency

Index Terms- Gracilaria Sp. Marketing, Competitiveness, Comparative and Competitive

I. INTRODUCTION

Seaweed is one of the leading commodities in the fisheries revitalization program, besides shrimp and tuna. Several things into consideration in their advantages, including the opportunity of a broad to open export market, relatively stable prices, and there are no restrictions or trade quotas for seaweed. Cultivation technology is simple to master; the cultivation cycle is relatively short and quickly provides benefits. Capital requirements are relatively small, which is an irreplaceable commodity because there are no synthetic products. The effort to cultivate seaweed classified as a labor-intensive business so that it can absorb labor.

South Sulawesi Province has become one of the provinces that have experienced a significant increase in the field of seaweed cultivation. Which is likely to continue to increase because seaweed is one of the superior commodities of this region. The area of seaweed cultivation in this area reaches an area of 46, 354.6 ha, which spread across several districts. Based on 2016 data, South Sulawesi seaweed production reached 3,409,048, 2 tons (DKP of North Sulawesi Province 2016).

Seaweed developed in South Sulawesi by farmers consists of 2 (two) species cultivated in the sea (*Eucheuma cottoni* and *Spinosium sp*) and one species cultivated in ponds (*Gracilaria sp).* *Gracilaria* is one type of agar-producing seaweed (agarophyt) that widely found in Indonesian waters, especially South Sulawesi. *Gracilaria* seaweed generally contains called agarophytes as a result of its primary metabolism. Gelatin is obtained by extracting plant in an acidic or basic atmosphere and being produced and marketed in various forms, for example, flour gelatin, gelatin paper, and gelatin and processed into multiple types of snacks, pudding, jelly, and used as an additive in the pharmaceutical industry. Gelatin fiber content is relatively high so that gelatin consumed as diet food. Through specific processes gelatin is also produced for use in the laboratory as a bacterial culture medium or tissue culture (Angkasa *et al* . 2011).

Gracilaria seaweed as one of the leading commodities, its production continues to be driven in the coastal areas of Bone Bay and Makassar Strait. Based on data from *Gracilaria Sp.* 2016 shows the high productivity of *Gracilaria sp.* reached 76,771.90 tons in Palopo City and 87,397.80 tons in Bone Regency.

Although it designed as superior seaweed in South Sulawesi. Related to the issue of seaweed competitiveness, it still needs to be the main focus for improvement because it has a smaller market share. It happens because the production efficiency is still low and has not been able to meet increasingly high export quality standards.

The increasing international trade intensity makes productivity and competitiveness even more essential to note. Importing countries apply various requirements, especially concerning quality requirements for imported seaweed commodities in guaranteeing and protecting and consumer satisfaction.

The existence of quality standards set by each exporting country will affect the costs incurred by marketing agencies in the

process of collecting raw materials. The export process itself which will affect the amount set in the marketing process seaweed gains substantial profits. So, in the efforts to improve farm efficiency and marketing plant, competitiveness and marketing by region are very important. Deep understanding of this matter is essential, and therefore, it is necessary to research the problem in question. In detail, this study aims to: (a) analyze the financial and economic benefits of seaweed farmers *Gracilaria Sp.* (b) Analyze the competitiveness of the marketing of *Gracilaria Sp.* at the farmer level, (c) Analyzing the competitiveness level of *Gracilaria Sp.* At the level of the cultivator.

II. RESEARCH METHOD

The research will be conducted in November 2018 - April 2019. The research location is in Palopo City, South Sulawesi Province. Peng uptake or placement locations is done intentionally *(purposive),* taking into account the existence of farmers seaweed *Gracilaria Sp.* Cultivator samples take in a *simple random sampling* where each population has the same opportunity to sample. The number of samples taken was 37 respondents.

Data analysis method

The analytical tool used in this study is the *Policy Analysis Matrix* (PAM) developed by Monke and Pearson (1995). The stages in preparing PAM Tables are as follows:
1. Identify all inputs used in the production process.
2. Allocate *tradable* inputs and *non-tradable* inputs.
3. Calculate the shadow prices of inputs, outputs, and exchange rates
4. Analyzing comparative and competitive advantages with the PAM model.

Policy Analysis Matrix **(PAM)**

The PAM model is used to analyze profits (private and social) and competitiveness (comparative and competitive advantages) with the formulations in Table 1.

Table 1. Matrix of policy analysis (*policy analysis matrix*)

Description	Output Receipt	Cost		Advantage
		Input Tradable	Domestic Factor	
Private Price	A	B	C	D
Social Prices	E	F	G	H
Divergence	I	J	K	L

Source: Pearson et al. (2005)

Information :

Private Profit (D) = (A) - (B + C)
Social Benefits (H) = (E) - (F + G)
Transfer Output (I) = (A) - (E)
Transfer Input (J) = (B) - (F)
Transfer Factor (K) = (C) - (G)
Net Transfer (L) = (D) - (H) = I - (J + K)
Private Cost Ratio (PCR) = C / (AB)
Domestic Resource Cost Ratio (DRC) = G / (EF)
Nominal Output Protection Coefficient (NPCO) = A / E
Nominal Input Protection Coefficient (NPCI) = B / F
Effective Protection Coefficient (EPC) = (AB) / (EF)
Profit coefficient (PC) = D / H
Producer Subsidy Ratio (SRP) = L / E

Profit Analysis

Profit analysis consists of private profits (*Private Profitability / PP*) and social benefits (*Social Profitability / SP*). *Individual Profitability* (PP) shows the difference between revenue and costs received or paid by farmers. A PP value greater than zero (PP> 0) means financially profitable, or the commodity has a competitive advantage.

Private Profitability **(PP): D = A - (B + C)**

= Private Receipt - (Input *Tradable* Fee (Private + *Non Tradable* Private Input Fee) .... (1)

Social Profitability (SP) shows the difference between revenue and costs calculated at social prices. If the SP value is more significant than zero (SP> 0), then it is economically profitable, or the commodity has an advantage comparative.

Social Profitability **(SP): H = E - (F + G)**

= Social Receipts - (Social Tradable Input Costs + Non Tradable Social Input Costs) .... (2)

Comparative and Competitive Efficiency or Excellence Analysis

The level of business efficiency of a commodity can see from two indicators, namely comparative advantage, and competitive advantage. Competitive advantage can see from the value of the *Private Cost Ratio* (PCR). The ratio between domestic factor costs and value-added output from input costs traded on individual prices. If the PCR value is smaller than one (PCR <1), it indicates that the exploitation of the commodity is financially efficient or has a competitive advantage when there is government policy.

Private Cost Ratio (PCR) = *C / (A - B)*

= Private *Non-* Tradable Input Fee

Private Receipt - Input Cost for Private Tradable ...... (3)

The comparative advantage of a commodity can see from the value of the *Domestic Resource Cost* (*Domestic Resource Cost* or DRC). The ratio of input costs that cannot trade with value-added output from input costs bought at economical prices. If the DRC value is smaller than one (DRC <1), then the business is commodities are economically efficient or have comparative advantages in conditions without policy.

Do mestic Resource Cost Ratio = *G / (E - F)*

= *Non Tradable* Social Input Costs

Social Receipts - Social *Tradable* Input *Costs* ... (4)

Competitiveness Assessment Matrix

Competitiveness is reflecting in the range of commodities, including very high, high, medium, low, or very low competitiveness. These criteria are presenting in Table 2.

Table 2. Criteria for Assessing Competitiveness

Indicator	Value criteria				
PP	+	-	-	-	-
SP	+	+	-	-	-
PCR	+	+	+	-	-
DRC	+	+	+	+	-
Combined Value	4+	3+ and 1-	2+ and 2-	1+ and 3-	4-

Source: Kohari et al., 2005

Information :
PP: *Private Profitability*
PS: *Social Profitability*
          PCR : *Private Cost Ratio*
DRCR : *Domestic Resource Cost Ratio*
4+ : Very High
3+ and 1- : High
2+ and 2- : Moderate
1+ and 3- : Low
4- : Very Low

The difference in the range of competitiveness in a commodity can be used to determine the priority scale of development of the related commodity, namely (Kohari et al., 2005):
   a. Products that have very high competitiveness are prioritized to develop.
   b. Commodities that have high competitiveness are still prioritized to develop, but more prioritized products that have very high competitiveness.
   c. Commodities with moderate competitiveness have two possibilities that would be developed and cannot extend. depending on whether the field studies are due to policy distortions or market failures.

   d. Meanwhile, commodities that have low or very low competitiveness should not need to develop.

III.   RESULTS AND DISCUSSION

Business Description of *Gracilaria* Seaweed Cultivators *Sp* . in the Gulf of Bone

Cultivation of seaweed gracilaria sp. carried out in ponds located on the coast and near rivers. Cultivation is carried out with a one-time crop system to harvest several times.

Table 3. The stocking of Rata Land, Age, and Seaweed Production

No.	Regency / City	Description	total
1		Average arable land area (ha)	1.1
2	Palopo	Average plant age (days)	48
3		Average production (Kg / Production)	6,652
1		Average arable land area (ha)	1.0
2	Bone	Average plant age (days)	48
3		Average production (Kg / Production)	4.964

Source: Primary Data After Processing, 2019

The cultivated seaweed stocked in ponds with a size of 1 - 1.1 ha. Before conducting stocking, farmers usually do land preparation so that the quality of the plant produced has good quality, and can receive in the export market. Cultivation is carried out for 48 days, then harvested.

Macroeconomic Assumptions

The macroeconomic assumptions used in the *Policy Analysis Matrix* (PAM) analysis are nominal interest rates (% per year). Which obtained from information on formal credit interest rates (state banks, regional government banks, national private banks, foreign banks, and mixed banks, commercial banks, and other credit institutions). The nominal interest rate used is the average private interest rate for capital originating from formal credit institutions in the research location at 6% per year

For social interest rates (% per year), obtained from the sum of assumed *social opportunity cost of capital* of 15% per year plus the national inflation rate in the year of the study. It consistent with the historical experience of Southeast Asian countries when they are at the same stage of development as Indonesia today. Based on data from Bank Indonesia on July 15, 2919, the national inflation rate in June 2019 was 3.28%. Thus the social interest rate was at the amount of 18.28% (Bank Indonesia, 2019). The exchange rate used to study is by the assumption of the State Expenditures Budget, which is in 2019 amounting to Rp. 14,129.00 per $ (Bank Indonesia, 2019).

Policy Analysis Matrix* (PAM) *Gracilaria* Seaweed Cultivator *Sp.

Competitiveness of *Gracilaria Sp.* can know by using the *Policy Analysis Matrix* (PAM). The following are the results of the PAM analysis.

Table 4. Policy Analysis Matrix of Gracilaria Seaweed Cultivators Sp. in the Gulf of Bone

Districts/ City	Description	Reception Output	Cost		Advantage
			Input Tradable	Domestic Factor	
Palopo (N 23)	Private	27,620,983	2,035,000	4,424,783	21,161,200
	Social	281,965,696	2,035,000	5,967,791	273,962,904
	Divergence	(254,344,713)	0	(1,543,009)	(262,801,704)
Bone (N 14)	Private	17,375,000	804,730	1,241,786	15,328,485
	Social	126,252,707	1,868,613	2,875,714	121,508,379
	Divergence	(108,877,707)	(1,063,884)	(1,633,929)	(106,179,895)

Source: Primary Data After Processing, 2019

Analysis of Private Profits and Social Benefits

Private profit or *Private Profitability* (PP) is an indicator of the financial efficiency of a commodity. Based on table 4 above from 2 regencies / cities after going through the calculation of Input-Output, price and budget on private prices and and Input-Output, prices and budget at social prices, where individual and social input-output consists of fertilizers, medicines, labor, working capital, land rent, and total production, while the price is the price of fertilizer/kg, medicines/liter, labor/day, working capital/ha, land rent, and seaweed prices/kg.

Table 4 shows that *Gracilaria Sp.* in Palopo City has a PP value that is greater than zero, which is Rp. 21.1612 million, condition showed that farmers financially profitable business or have a competitive advantage. In other words, when the production is reasonable, and the price of seaweed is Rp. 4,152 turns out to cover production costs.

Social profit or *Social Profitability* (SP) is an indicator of the social efficiency of commodities under conditions of policy implementation. The calculation results show the SP value is greater than zero, which is equal to Rp. 273,962,904 . It means that seaweed farmers have a comparative advantage. The SP value nominally obtained if all seaweed produced by the cultivator is assumed to export. So, farmers will benefit more from selling their seaweed from the global market compared to the domestic market. In Table 4 for Palopo City, it can seem that the divergences produced are all negative, except *tradable inputs*. This negative divergence occurs because the social price of seaweed is higher than the price received by farmers. For divergence, *tradable inputs* indicate that the social price of *tradable inputs is* equal to the price received by farmers. Negative divergence in income value also

occurs because the seaweed farmers' financial income is smaller than their social income. This condition indicates that seaweed farmers in Palopo City, South Sulawesi, lost the opportunity to earn a profit per ha of Rp 252,801,704,

Private benefits acquired by farmers in Bone Regency, which are the results of an analysis of Rp. 15,328,485 which indicates that the value of PP is greater than zero, meaning that the cultivator's business is financially profitable or has a competitive advantage. In other words, when the production is normal, and the price of seaweed is Rp. 3,500 turns out to cover production costs. Whereas from the social benefits, the SP value is Rp. 121,508,379. This condition means that farmers seaweed has a comparative advantage. The SP value nominally obtained if all seaweed produced by the cultivator is assumed to export. So, farmers will get greater profits if they can export seaweed.

From the divergence value produced by seaweed farmers *gratulation sp.* in Bone Regency, everything is negative. Negative divergences occur because the price of seaweed social is higher than the price received by farmers. Negative divergence in income value occurs because the seaweed farmers' financial income is smaller than their social income. This condition indicates that seaweed farmers in Bone Regency, South Sulawesi, lost the opportunity to earn a profit per ha of Rp. 106 , 179,895 .

The differences income of seaweed farmers shows seaweed farming in each research location, especially in Bone Regency still faces many obstacles in increasing the production and quality of seaweed. The main constraints faced by farmers/cultivators in each research location are pests and diseases, degradation of seed quality after harvest, level of drought, and level of cleanliness.

Analysis of comparative advantage and competitive advantage

Comparative advantage and competitive advantage are indicators of the level of efficiency of seaweed farmers *Gracilaria Sp.* Competitive advantage can see from the value of the *Private Cost Ratio* (PCR) and the value of the Domestic *Resource Cost Ratio* (*Domestic Resources Cost Ratio* or DRC)

Private Cost Ratio is the ratio between domestic factor costs and value-added output from input costs traded on individual prices. If the PCR value is smaller than one, it indicates commodity is financially efficient and has a competitive advantage. While the Domestic Resource Cost Ratio is the ratio between domestic input costs and revenues minus *tradable inputs* at social prices. If the DRC value is smaller than one, it indicates that a commodity is socially efficient and has a comparative advantage. Complete information about the importance of PCR and DRC can see in Table 5.

Table 5. Value of Competitive and Comparative Advantage Parameters of *Gracilaria* Seaweed *Sp.*

Regency / City	Parameter	Value
Palopo	PCR	0.17
	DRCR	0.02
Bone	PCR	0.07
	DRCR	0.02

Data Source: Primary Data After Processing, 2019

Based on Table 5, it can see that social benefits represent the difference between revenues and all costs incurred in the seaweed cultivation business of *Gracilaris Sp.* Per hectare at shadow prices (social), i.e., rates that are influenced by government policies such as subsidies and taxes.

The DRC value obtained by domestic facts / tradable inputs, so that the value derived from each seaweed cultivator is 0.02 and 0.02 respectively for Palopo City and Bone Regency. The results of this analysis state that the farmers of Palopo City and Bone District have comparative advantages. That means if to get an added value of 100 $, additional internal factor costs of 2 $ are needed for Palopo City and 2 $ for Bone Regency or in rupees of Rp. 28,258 for Palopo City and Rp. 28,258 for Bone Regency.

Comparative advantage is only used to measure the benefits of economic activity in terms of the whole society or general. Therefore, in the development of relevant concepts to measure financial feasibility, the idea of competitive advantage is used.

Analysis of competitive advantage is used to measure financial feasibility. Based on table 5, it can see that seaweed cultivation businesses from Palopo City and Bone Regency have

a PCR value <1, which is equal to 0, 17, and 0.07. The results of the analysis state that farmers in Palopo City and Bone District have competitive advantages; this means to increase added value output of Rp. 100,000 in special prices requires additional domestic factor costs of Rp. 17,000 for Palopo City and Rp. 70,000 for Bone Regency.

Coconut Farming Competitiveness Matrix Assessment

Competitiveness is reflecting in the range of commodities, including very high, high, medium, low, or very low competitiveness. Based on the analysis and interpretation above, each indicator of competitive advantage and comparative advantage, namely *Private Profitability (PP), Social Profitability (SP), Private Cost Ratio (PCR)* and *Domestic Resources Cost Ratio* (DRC) given positive or negative values. For example, if a profitable PP has given a positive value, conversely if the loser is giving a negative value. The combined positive and negative values of the four indicators used as competitiveness assessment criteria, as in Table 6.

Table 6. Matrix for Assessing the Competitiveness of Gracilaria Seaweed Cultivators Sp. in the Gulf of Bone

Districts/ City	Indicator	Value	Criteria	Meaning	Combined Value	Competitiveness
Palopo (N 23)	PP	21,161,200	+	Competitive	4+	Very high
	SP	273,962,904	+	Competitive		
	PCR	0.17	+	Competitive		
	DRCR	0.02	+	Competitive		
Bone (N 14)	PP	15,328,485	+	Competitive	4+	Very high
	SP	121,508,379	+	Competitive		
	PCR	0.07	+	Competitive		
	DRCR	0.02	+	Competitive		

Source: Primary Data After Processing, 2019

The results of the assessment in Table 6 show the PP value of Rp. 21,161,200 and PCR 0.17 included in the decisive criteria, which means that they have competitiveness, while the SP value is Rp. 273,962,904 and DRCR 0.2 also included in the critical measures, which means that farmers in Palopo City have competitiveness and cultivators in Bone Regency, showing PP value of Rp. 15,328,485 and PCR 0.07 included in decisive criteria, which means they have competitiveness while the SP value is Rp. 121,508,379 and the DRCR value of 0.02 also included in critical standards, which means that it also classified as having competitiveness. So that if the costs are combined, there will be a positive value of 4. The combined values indicate that *Gracilaria Sp.* in Palopo City and Bone Regency, the competitiveness is very high, but seaweed farmers from Palopo City are superior.

IV. CONCLUSION

This study concludes that the business of marketing seaweed *gracilaria Sp.* The farmers in Teluk Bone have comparative competitiveness when viewed from positive *Social Profitability* (SP) and smaller than one *Domestic Resources Cost Ratio* (DRC). Cultivators of seaweed *Gracilaria Sp* in Teluk Bone has competitiveness that describes from the value of the positive *Private Profitability (PP)*, *Cost Ratio (PCR)* and the marketing of *Gracilaria Sp.* Teluk Bone has a very high level of competitiveness. It is indicated by positive values (4+) from Palopo City and Bone Regency that needs to get the main priors to develop. One of them is by increasing the value-added from processing (Half-Finished), especially from Palopo City, because it is superior in quality compared to Bone Regency.

V. ACKNOWLEDGMENT

The implementation of this research is something to be grateful. The author expressed many thanks to all those who helped specifically for the Center Marine and Fisheries Education, the ministry of maritime Affairs and Fisheries for support was given starting from the beginning of this study to the publication of thid journal.

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