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Abstract. Specific targets for this study is to increase the income of seaweed farmers through increasing regional competitiveness in South Sulawesi Province and an arrangement for alternative policy patterns in the development of seaweed agribusiness in Bulukumba Regency. The research location is in Bulukumba Regency which one of the centers of seaweed production in South Sulawesi Province. This research was descriptive qualitative-quantitative research. The survey research method was used as the basis of the research design. Data collection was carried out using individual interviews and in-depth interviews through Focus Group Discussion (FGD) for socio-economic institutions of seaweed farmers, policymakers and stakeholders. The results showed that the feasibility level of seaweed farming was quite high even though there were variations between regions. The variation in the lower level of profitability of farming in the Bonto Bahari Sub District area which is allegedly caused by the pollution impact caused by the operation of an asphalt processing plant in the local seaweed cultivation area. The institution of seaweed farmers has not yet functioned well even though there are still farmers who do not have a group. It is recommended to develop the seaweed business both in scale and the number of its business units and to conduct a special study of the role of institutions and the environmental impacts that are allegedly caused by asphalt processing plants.

Introduction

Seaweed is one of fishery commodities which is extremely potential for foreign exchange income in Indonesia [1]. The Bulukumba Regency is one of the South Sulawesi seaweed (*Euchema cottoni*) commodity development centers. This is because the Bulukumba district has seven out of ten sub-districts located in areas with 138 km of coastline length and 93,929 ha of water area [2]. Seaweed farming in Bulukumba District has produced quite a lot of seaweed production. The dominant type of seaweed developed is *E. cottoni*. The use of seaweed in various fields causes high market demand both at home and abroad. To anticipate the high market demand, cultivation has been carried out in several regions in the South Sulawesi, for example, the development of seaweed in several regions such as Takalar, Luwu, Pangkep, and also Bulukumba Regency. The government's main concern in the matter of seaweed, in addition to ensuring the availability and stability of seaweed prices, also guarantees good and healthy quality by utilizing local resources. One of the critical factors in the development of seaweed is socio-economic institutions at the level of farmers and partners. In various programs,

farmers are required to have an institution in the form of farmer groups, cooperatives, microfinance and or other microbusinesses, where the institution becomes a place to distribute aid, as well as a forum to interact with participants and program implementers [3]. In connection with this, a careful study is needed to develop an economic study of seaweed agribusiness development in Bulukumba District, South Sulawesi.

2. Methods

This research was carried out in four districts of Bulukumba Regency, namely Gantarang, Ujungbulu, Ujungloe, and Bontobahari District. This study is called the "South Coast of Bulukumba." Determination of the location of the research was done intentionally (purposive sampling) with the consideration that the area was the center of seaweed production in Bulukumba Regency. Sampling was conducted randomly as many as 80 people. This research was carried out for six months, starting June to November 2018.

This study uses a quantitative and qualitative descriptive approach. The survey research methods used as the basis of the research design. Data collection was done using individual interviews and in-depth interviews (in-depth interviews) through Focus Group Discussion (FGD) for economic business institutions, policy makers and stakeholders.

3. Results and discussion

3.1. Farmers profile

Along with farmer, identity describes the condition or condition and status of the person [4]. The character of a respondent will be beneficial in the research process because it can provide information about his farming situation, especially in increasing his farm production and can help in analyzing his farm. Farmer identity that appears in every social interaction is called social interaction, which is part of an individual's self-concept that is formed due to individual awareness as a member of a social group, in which includes important values and emotions inherent in an individual as a member [5].

3.1.1. Age. Productive age ranges from 15-64 years, which is the ideal age for workers. In productive times, generally increasing age will increase income, which also depends on the type of work done. The physical strength of a person to carry out activities is closely related to age because if a person has passed the productive period, his physical strength will decrease so its productivity also decreased and income also fell [6].

Table 1. Range of average seaweed respondent farmers in Gantarang, Ujung Bulu, Ujung Loe, Bonto Bahari, Bulukumba, 2018.

Ages Class	Districts			
	Gantarang	Ujung Bulu	Ujung Loe	Bonto Bahari
27-38	12 (60%)	8 (40%)	6 (30%)	10 (50%)
39-49	5 (35%)	7 (7%)	5 (25%)	7 (35%)
50-61	2 (10%)	4 (4%)	6 (30%)	2 (10%)
≥62	1 (5%)	1 (5%)	3 (15%)	1 (5%)

Table 1 shows that the most massive age range of seaweed respondents is in Gantarang Sub District, which is between the ages of 27-38 years as many as twelve people (60%) compared to Ujung Bulu Sub District as many as eight people (40%), Ujung Loe District as many as six people (30%) and Bonto Bahari District as many as 10 people (50%). Then, the earliest class age > 62 years as many as three people (15%) were in Ujung Loe District, and the remaining one person (5%) was in Gantarang, Ujung Bulu and Bonto Bahari Districts.

3.1.2. Level of education. Farmer education generally influences the way and mindset of farmers in managing to farm. Relatively high education causes farmers to be more dynamic What is meant by competency is the realization of behavior in planning activities to achieve targets [7].

Table 2. Average range of levels of seaweed respondent farmer education in Gantarang, Ujung Bulu, Ujung Loe, Bonto Bahari, Bulukumba, 2018.

Education Level	Districts			
	Gantarang	Ujung Bulu	Ujung Loe	Bonto Bahari
Uneducated	0 (0%)	0 (%)	7 (35%)	3 (15%)
Elementary graduated	15 (75%)	9 (45%)	8 (40%)	15 (75%)
Junior high graduated	3 (15%)	4 (20%)	2 (10%)	0 (0%)
Senior high graduated	2 (10%)	6 (30%)	3 (15%)	1 (5%)
Diploma/bachelor degree	0 (0%)	5 (5%)	0 (0%)	1 (5%)

Table 2 shows that the range of education level of the respondents of the most prominent seaweed farmers is in Gantarang and Bonto Bahari Sub District, namely Elementary-graduated as many as fifteen people (75%) compared to Ujung Bulu District as many as nine people (45%), Ujung Loe District as much as eight people (40%). Then, the smallest level of education in Bonto Bahari Sub District in Senior High School and Diploma/S1 is one person (5%).

3.1.3. Farming experience. The level of experience of farming activities owned by farmers will indirectly affect the mindset. Farmers who have experience working longer will be better able to plan farming better, because they already understand all aspects of the business. So that the longer the experience gained allows production to be higher, the experience of a person in farming is influential in accepting innovation from outside [8].

Table 3. Range of average length of effort for seaweed respondent farmers in Gantarang, Ujung Bulu, Ujung Loe, Bonto Bahari, Bulukumba, 2018.

Farming Experience (Year)	Districts			
	Gantarang	Ujung Bulu	Ujung Loe	Bonto Bahari
0-3	7 (35%)	4 (20%)	3 (15%)	0 (0%)
4-7	2 (10%)	7 (35%)	8 (40%)	0 (0%)
8-11	11 (55%)	9 (45%)	9 (45%)	20 (100%)

Table 3 shows that the most extended working range of seaweed respondent farmers is in Bonto Bahari Sub District, which is 8-11 years as many as 20 people (100%) compared to nine Bulu District in Ujung (47%), Ujung Loe District nine people people (40%) and Gantarang District as many as 11 people (55%). Then, the smallest duration of cultivation in Gantarang District is 4-7 years as many as two people (10%) compared to seven people in Ujung Bulu District (35%), Ujung Loe Sub District as many as eight people (40%).

3.1.4. Number of family dependents. Factors that influence the contribution of income are the number of dependents, if the number of dependents is large, the family's economic burden will be more onerous, thus spurring someone in the household which is a real event experienced by the husband. The nature of work that affects the income of the head of the household is non-permanent [9].

Table 4. Range of average number of families of seaweed respondent farmers in Gantarang, Ujung Bulu, Ujung Loe, Bonto Bahari, Bulukumba, 2018.

Number of family dependents	Districts			
	Gantarang	Ujung Bulu	Ujung Loe	Bonto Bahari
2-1	15 (75%)	9 (45%)	16 (80%)	13 (65%)
5-7	15 (25%)	11 (55%)	4 (20%)	7 (35%)

Table 4 shows that the most significant number of family dependents of seaweed respondents is in Ujung Loe Subdistrict between 5-7 people as many as 16 people (80%) compared to Gantarang District as many as 15 people (75%), Ujung Bulu District as many as 9 people (45%) and Bonto Bahari District as many as 13 people (65%). Then, the smallest number of family dependents in Bonto Bahari District is between 5-7 people as many as seven people (35%) compared to 4 people in Ujung Loe District (20%), Ujung Bulu District as many as 11 people (55%) and Gantarang District 15 people (25%).

3.1.5. Land capital. The land is a production facility for farming, including one of the factors of production and agricultural products. Land is a physical natural resource that has a critical role for farmers [10].

Table 5. Range of average land size of seaweed respondent farmers in Gantarang, Ujung Bulu, Ujung Loe, Bonto Bahari, Bulukumba, 2018.

Farming Area (m^2)	Districts			
	Gantarang	Ujung Bulu	Ujung Loe	Bonto Bahari
100-1,801	18 (90%)	18 (90%)	20 (100%)	17 (85%)
1,801-3,402	1 (5%)	1 (5%)	0 (0%)	2 (10%)
≥3,402	1 (5%)	1 (5%)	0 (0%)	1(5%)

The table shows that the land ownership of seaweed respondents in the 100-1801 m^2 category is mostly owned by the respondent farmers in Ujung Loe Regency, which are as many as 20 people (100%) compared to Gantarang Regency as many as 18 people (90%), Ujung Bulu Regency as many as 18 people (90%) and Bonto Bahari District as many as 17 people (85%). Then, the number of respondents who have a land area of> 3,402 m^2 consists of 3 people, wherein Gantarang Sub District, Ujung Bulu Sub District and Bonto Bahari Sub District there is 1 person (5%), while in Ujung Loe Sub District there are no respondents (0.00%) which has a land area of > 3.402 m^2.

3.1.6. Number of seaweed production. Productivity reflects the work ethic of farmers both in terms of mental and others. Thus the farmer who directly goes to try to improve his performance with various policies that are efficient, able to increase his productivity [9,10].

Table 6. Range of average number of seaweed production in Gantarang District, Ujung Bulu District, Ujung Loe District, Bonto Bahari District, Bulukumba District, 2018.

Number of Seaweed Production	Districts			
	Gantarang	Ujung Bulu	Ujung Loe	Bonto Bahari
500-2,301	14 (70%)	14 (70%)	13 (65%)	15 (75%)
2,302-4,101	3 (15%)	0 (0%)	7 (35%)	3 (15%)
≥ 4,102	3 (15%)	6 (30%)	0 (0%)	2 (10%)

Table 6 shows that the most extensive range of seaweed respondents production is in Bonto Bahari Sub District between 500-2301 Kg/Ha as many as 15 people (75%) compared to 14 Gantarang Districts (70%), Ujung Bulu District as much as 14 people (70%) and Ujung Loe District as many as

13 people (65%). Then, the number of respondents who have the smallest seaweed production is > 4,102, there are 2 people (10%) compared to 3 people in Gantarang Sub District (15%), Ujung Bulu Sub District, 6 people (30%), while in Ujung Loe Sub District there are no respondents with a percentage (0.00%).

3.2. Seaweed farming revenue

Net farm income is the total net income received by farmers. The average net farm income of all respondents can be seen in the table 7.

Table 7. Income of Eucheuma cottoni seaweed farming in Gantarang District, Bulukumba Regency, 2018.

No	Description	Value
1	Production (Kg)	2,423
	Price (IDR)	21,400
	Revenue (IDR)	51,852,200
2	Variabel cost (IDR)	
	Production facilities	
	Seedling cost	19,380,000
	Fuel cost	221,450
	Use of sack's cost	121,125
	Labor cost	2,370,525
	Total variabel cost	22,093,100
3	Fixed cost	
	Depreciations	1,593,256
	Total fixed cost	1,593,256
4	Total cost	23,686.356
5	Income	28.165.844
6	R/C ratio	2,2

Table 7 shows that the revenue of seaweed farming is IDR 51,852,200 in one production of seaweed farming. The total cost incurred by farmers in one period of harvest is IDR 23,686,356 so that the net income amounts for IDR 28,165,844 with R/C ratio of 2.2.

Table 8. Income of *Eucheuma cottonii* seaweed farming in Ujung Bulu District, Bulukumba Regency, 2018.

No	Description	Value
1	Production (Kg)	3,154
	Price (IDR)	21,400
	Revenue (IDR)	67,495,600
2	Variabel cost	
	Production facilities	
	Seedling cost	25,232,400
	Fuel cost	146,775
	Use of sack's cost	157,703
	Labor cost	2,265,480
	Total variabel cost	27,802,358
3	Fixed cost	
	Depreciations	1,868,994
	Total fixed cost	1,868,994
4	Total cost	29,671,352

5	Income	37,824,248
6	R/C ratio	2.3

In table 8 shows that the revenue of seaweed farming is IDR 67,495,600 in one production of seaweed farming. The total cost incurred by farmers in one period of harvest is IDR 29,671,352 so that the net income amounts IDR 37,824,248 with R/C Ratio 2.3.

Table 9. Income of *Eucheuma cottonii* Seaweed Farming in Ujung Loe District, Bulukumba Regency, 2018.

No	Description	Value
1	Production (Kg)	2,423
	Price (IDR)	21,400
	Revenue (IDR)	51,852,200
2	Variabel cost	
	Production facilities	
	Seedling cost	16,260,000
	Fuel cost	131,325
	Use of sack's cost	101,625
	Labor cost	1,535,730
	Total variabel cost	18,028,680
3	Fixed cost	
	Depreciations	1,839,523
	Total fixed cost	1,839,523
4	Total cost	19,868,203
5	Income	31,983,997
6	R/C ratio	2.6

Table 9 shows that the revenue of seaweed farming is IDR 51,852,200 in one production period of seaweed farming. The total cost incurred by farmers in one harvest is IDR 19,868,203 so that a net income amounts IDR 31,983,997 with R/C ratio 2.6.

Table 10. Income of *Eucheuma cottonii* seaweed farming in Bonto Bahari District, Bulukumba District, 2018.

No	Description	Value
1	Production (Kg)	2,310
	Price (IDR)	21,400
	Revenue (IDR)	49,434,000
2	Variabel Cost	
	Production Facilities	
	Seedling Cost	27,720,000
	Fuel Cost	154,500
	Use of Sack's Cost	173,250
	Labor Cost	2,063,295
	Total Variabel Cost	30,111,045
3	Fixed Cost	
	Depreciations	2,339,108
	Total Fixed Cost	2,339,108
4	Total Cost	32,450,153
5	Income	16,983,847
6	R/C Ratio	1.5

Table 10 shows that the acceptance of *Eucheuma cottonii* seaweed farming is IDR 49,434,000 in one production of *Eucheuma cottonii* seaweed farming. And the total costs incurred by farmers in one harvest is IDR 32,450,153 so that a net income of IDR 16,983,847 with R/C Ratio 1.5. This means that when viewed from the value of R/C Ratio from the four districts producing seaweed *Eucheuma cottonii* can be said to be profitable.

4. Conclusion

Seaweed farmers (*Eucheuma cottoni*) in Bulukumba Regency have high business feasibility, although there are variations between clusters based on sub-district areas. This is reflected in the average size of farming profit per cycle which is three months in duration with an RC-ratio level of IDR 28,165,844 (2.2), IDR 37,828,248 (2.3), IDR 31,983,997 (2.6) and IDR 16,983,847 (1.5) for each of the Gantarang, Ujung Bulu, Ujung Loe, and Bonto Bahari Sub-Districts. The low level of profit in Bonto Bahari Sub District is allegedly related to the existence of an asphalt processing plant which according to the information of seaweed farmers in the local area has polluted the waters of the cultivation location. Institution of seaweed farmers in Bulukumba District is relatively not functioning, even some of them do not have farmer groups.

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