Prospect of seaweed developement in South Sulawesi through a mapping study approach

To cite this article: S Yusuf *et al* 2018 *IOP Conf. Ser.: Earth Environ. Sci.* **157** 012041

Prospect of seaweed developement in South Sulawesi through a mapping study approach

S Yusuf[1], M Arsyad[2] and A Nuddin[1]

[1]Departement of Management and Accounting, Faculty of Economics, Muhammadiyah University of Parepare, Jl. Jend. Ahmad Yani Km. 6, Bukit Harapan, Soreang, 91131, South Sulawesi, Indonesia.
[2]Department Agricultural Socio Economic, Faculty of Agriculture, Hasanudddin University, Jl. Perintis Kemerdekaan KM 10, Makassar, 90245, Indonesia.

E-mail: *aryus_umpar@yahoo.com*

Abstract: Seaweed is one of fishery commodities which is extremely potential for foreign exchange income. Indonesia known as a nation which has many areas which are potential to develop seaweed, above all in Province South Sulawesi, encourages the researchers to know the prospect of seaweed production development. Therefore, this paper aims to present the potency of seaweed development in South Sulawesi in order to reduce proverty. The study was carried out in two regencies, namely Bantaeng and Luwu. The study identified the seawed development potency by using mapping study approach with analysis method. The data was obtained by using structured interview. The research result showed that both regencies developed some species of seaweed, they were *Eucheuma cottonii, Eucheuma spimosum* and *Gracilaria* sp. However, the farmers in both areas still used traditional ways. In Bantaeng, the farmer cultivated *Eucheuma cottonii* and *Eucheuma spimosum* utilizing long line method. Meanwhile, in Luwu, the farmer cultivated *Eucheuma cottonii* and *Gracilaria* sp with different method. *Eucheuma cottonii* was cultivated by using long line method, whilst *Gracilaria* sp was by bottom method. Generally, *Gracilaria* sp was cultivated in earthen dam. Consequently, the amount of seaweed production was still low. In addition, in this research founded that some of farmers applied an islamic-based system in cultivating seaweed but it still needs in-depth understanding.

1. Introduction

Indonesia is known as maritime nation with 13,667 islands and becomes major producer of marine cultured seafood products, specially seaweed [1]. Seaweed is one of fishery commodities which is extremely potential for foreign exchange income. In fact, it has been utilized as the main source income [2]. Seaweed is widely used as food, medicine, and important materials in the food industry, cosmetics, and pharmaceuticals [3]. Increasing consumption of seaweed as a food extract, medical use, and bio-refining is expected to drive the demand for seaweed, above all the species *Eucheuma cottonii* and

Glacilaria sp. Both of these seaweed species have a high economic value because it contains compounds used as raw materials for industries and food like agar and carrageenan [3]. Thus, both of these seaweed species are export thing which is used for meeting the global market share, particulary for some big countries, such China, Germany, America, Japan and other countries in Europe. The demand of seaweed for meeting the global market share has achieved 80.64 % and almost increase 15% per annum.

South Sulawesi is the largest producer of seaweed in Indonesia [4]. In South Sulawesi Province, seaweed has become the main means of livehood for fishers' communities. As we known that the production of seaweed in South Sulawesi is improved every year, particularly in two regencies, Luwu and Bantaeng. However, the important thing to be considered is that the development of seaweed farming is extremely affected by various factors, including the availability of socio-economic, resources, public policy, and technology [4]. Therefore, this research aims to investigate the potency and excellent of seaweed development in South Sulawesi in order to reduce proverty.

2. Research Method: Mapping Study Approach

This research was carried out in two districts in South Sulawesi Selatan, Bantaeng and Luwu, in 2016. Both of these districs are known as the largest seaweed producer in South Sulawesi. The researcher choose 115 respondents consisting of 15 respondents from bureaucracy, nine (9) collectors or traders, and 90 farmers. The study identified the seawed development potency by using mapping study approach with analysis method. The data was obtained by using *structured interview*.

3. Results and Discussion

3.1. The Potential of Seaweed Cultivation Development

Based on the research findings in two areas, founded that the seaweed farmers cultivated three kinds of seaweeds, namely *Eucheuma Cottonii, Euheuma Spinosum* and *Gracilaria sp*). In cultivating the seaweed, they used two different methods presented in table 1.

Table 1. The species of seaweed and their cultivation method

The cultivation area	Species	The method used
1. Bantaeng Regency	- *Eucheuma cottonii*	*Long line*
	- *Eucheuma spinosum*	*Long line*
2. Luwu Regency	- *Eucheuma cottonii*	*Long line*
	- *Gracilaria sp.*	*Bottom* or *basic method*

The research result showed that each area cultivated two species of seaweed using traditional ways. In Bantaeng Regency, the farmer cultivated two different species, namely *Eucheuma cottonii* and *Eucheuma spinosum* but both species were cultured by using same method, that was long line method. While, the species cultured in Luwu by farmer were two species, *Eucheuma cottonii* and *Gracilaria sp.* Both species were cultivated differently which *Eucheuma cottonii* was cultivated by using *long line method. and* was cultured using long line method, a seaweed cultivation method using raft (figure 1). Meanwhile, *Gracilaria sp* was cultured using bottom method (figure 2), a seaweed cultivation method by spreading the seaweed from the bottom [5]. Of both methods, the farmer of both regencies tended to cultivate seaweed by applying long line method. The farmers expressed that the usage of long line method was wear-resistant, practical and simple. The usage of long line method was tended to choice the seaweed farmers because simple and wear-resistant [6]. The difference of seaweed cultivation can be seen as follows:

Figure 1. Seaweed cultivation using long line method for *E. cottoni and E. Spinosum*

Figure 2. Seaweed cultivation using bottom method for *Glacilaria* sp.

In cultivating seawed, the researcher founded out that the farmers applied cultivation sytem which had similar procedures with Islamic economy system.

3.2. The Potential of Seaweed Production

Globally, the demand for seaweed production is increasing because of an increasing world population. The result of study indicated that seaweed farming has become the main income source for small-scale fishermen, particularly for both areas in South Sulawesi [2]. Therefore, the seaweed cultivation needs strategic management system to produce raw material with innovation and intervention [7]. Since 2010 utill 2014, seaweed production in Indonesia increase 32% per annum [1]. The research result indicated that seaweed production was potential to meet the sustainability of farmer's livelihood. The third of seaweed species developed have different characteristics, as shown in figure 3 below.

Figure 3. The kinds of seaweed cultivated in Bantaeng and Luwu

Although the farmers cultered the seaweed traditionally, the production of seaweed was very promising. The mapping study result of seaweed production for both areas showed different income. The production of *E. cottonii* was better than other species. The reason expressed by the farmers is suitable with Sukiman, et.al's finding that *E. cottonii* is one of seaweed species that can be harvested faster and has high economic value [3]. The production of developed seaweed can be seen in table 2.

Table 2. Mapping result of Seaweed Production shown by both areas

District	Type of Seaweed Species	Wide range (m^2/ha)	Production (kg)	Net Income (IDR)
Bantaeng	- *Eucheuma cottonii*	337,07 m	1.750	2.837.000
	- *Eucheuma spinosum*	600 m	2.300	1.900.000
Luwu	- *Eucheuma cottonii*	350,00 m	1.661	780.700
	- *Gracilaria sp.*	1.24 ha	1.030	1.986.400

Table 2 presents the production of seaweed species cultured in Bantaeng and Luwu District. Clearly, we can see that there is difference regarding net income for both areas. In Bantaeng, *E.cottonii* has better net income (IDR. 2, 837, 000.- with wide range of 337,07 m^2) than *E. spinosum* (IDR. 1,900,000.- with wide range of 600 m^2. While, in Luwu *Gracilaria sp.* has better net income (IDR. 1,986,400.- with wide range 1.24 ha) than *E. cottonii* (IDR. 780,700.- with wide range of 350.00 m).

4. Conclusion

Seaweed is one of the promising fishery communities that have high economic value. Both Districts in South Sulawesi, Bantaeng and Luwu cultivated three kinds of promising seaweed species namely *Eucheuma cottonii, Eucheuma sp.* and *Gracillaria sp.* However, the farmers still used traditional ways, namely long line and bottom (basic) *method* so that the seaweed cultivation needs strategic management system to produce raw material with innovation and intervention in order to improve the production volume.

Acknowledgment

The authors gratefully acknowledge the Department of Accounting, Faculty of Economy, Muhammadiyah University of Parepare. We would also thank the enemurators who have helped this research.

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