

Social Economic Conditions of Seaweed Farmers in Jeneponto Regency

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Abstract—Designing the right strategies for the business development of seaweed cultivation in Jeneponto Regency requires a variety of information. One of the required information is the socio-economic information of seaweed farmers. This study aimed to describe the socio-economic conditions of seaweed farmers in Jeneponto Regency. Research data were collected through direct interviews with seaweed farmers. Socio-economic data were collected from the Bangkala, Tamalatea, and Binamu districts. Interviews were conducted using structured questionnaires, and in-depth interviews were carried out to obtain detailed information from seaweed farmers. The results showed that seaweed farmers generally had a low level of education. Most of them graduated from elementary school were young category (33-44 years old), had a large family (≥ 4 people) and a low level of spending (\geq Rp 693,000/month), had not received seaweed cultivation training, had a narrow cultivation land for seaweed (≤ 2500 m²), had profit and production which was in the medium category (501 kg - 1500 kg), and often cooperated with other farmers in seaweed cultivation activities.

Keywords—social economic, seaweed, farmers

I. INTRODUCTION

Indonesia is an archipelagic country with the largest coastline of 81,000 km and has an abundant and very diverse biological resource [1]. This shows the potential magnitude of aquatic resources as a source of benefits for Indonesia, especially to improve the welfare of its community. One of the aquatic resources owned by Indonesia is seaweed. The government has placed seaweed as one of the commodities that are favored in the revitalization program of the maritime and fisheries sector. In addition, seaweed resources in Indonesia are very abundant, which is about 666 species and 55 species of which are known to have high economic value [2].

South Sulawesi Province is one of the provinces in Indonesia that has a high potential of aquatic resources because it has a long coastline. An aquatic resource that is currently being developed in South Sulawesi Province is seaweed cultivation. Seaweed is a source of income for coastal communities. Seaweed is one of the important commodities in the world trade because of its utilization which can be used as a source of food, medicine and industrial raw materials [3].

The development of seaweed cultivation can be carried out along the coast so that it has the potential products to be developed in areas that have a long coastline. South Sulawesi Province is the province that has the largest seaweed production in Indonesia, with a total seaweeds production of 3,292,009 tons in 2015 [4]. The type of seaweed produced in South Sulawesi Province is *Glacilaria* sp. and *Eucheuma cottonii* [5]. Moreover, seaweed is a low-level plant, generally grows attached to certain substrates, does not have true roots, stems or leaves, but only resembles a stem called the thallus. Seaweed is one of the fishery commodities and as the main source of agar, alginate, and carrageenan which is often used in the cosmetics, pharmaceutical and food industries and other industries such as the textile, paper, pasta, photography, and canning industries [6]. This makes seaweed has a good prospect in improving the economy in Indonesia.

Seaweed is one of the leading commodities in Jeneponto Regency. In 2016, seaweed production in Jeneponto was 17,044 tons, with the highest production found in three sub-districts, namely Bangkala (24%), Tamalatea (30%) and Binamu (17%) [7]. However, it is generally recognized that the quality of seaweed commodities in this region is still low. The low quality of seaweed is a threaten for seaweed farmers to maximize their profits. Furthermore, seaweed cultivation also has many obstacles such as in site selection. The site selection of a location in the seaweed cultivation business must be free from the influence of strong winds, large waves and industrial or household pollution. Moreover, it should not experience large salinity fluctuations, contain nutrients for the growth of seaweed, allow to apply cultivation methods easily, and are easy to reach [8]. Another obstacle is that the seaweed cultivation business scale is still relatively small, the seaweed market prices are fluctuating, and the cultivation season. The coastal location of Jeneponto Regency which is directly facing the Flores Sea results in strong winds so that the ability of coastal communities as traditional fishermen has limited areas and limited seasons for cultivation [9].

Mahatama & Farid revealed that when the seaweed industry is developed, the seaweed can contribute significantly to the economic growth, increase the incomes and the welfare of the community [10]. To maximize profits on the seaweed business, we need information about the

socio-economic conditions of seaweed farmers. The profile of seaweed farmers is important to know as an input in making the right strategy for seaweed management in an area, especially in Jeneponto Regency.

Several studies on seaweed cultivation in Jeneponto had been carried out, such as Mala et al. which conducted a comparative analysis of the growth of brown seaweed (*Kappaphycus alvarezii*) affected by epiphytes [8], Mahatama & Farid which conducted research on the competitiveness and marketing channels of seaweed in Jeneponto [10], and Radjab et al. which examined the seaweed farming communities as an alternative to the survival of the coastal community in Jeneponto Regency [9]. As a framework for realizing Indonesia as a global maritime axis, the Ministry of Maritime Affairs and Fisheries established three main policies on maritime and fisheries development in 2015-2019, one of which is to implement responsible, competitive and sustainable marine and fisheries resource management principles [4]. Research related to socio-economic conditions of seaweed farmers in Jeneponto Regency is still lacking so this research is needed for the sake of the right decision making in the development of seaweed cultivation business. This study aims to determine the socio-economic conditions of seaweed farmers in Jeneponto Regency. It is hoped that this research can provide information for relevant agencies for better decision making.

II. METHODOLOGY

The tools used to collect research data were questionnaires, stationery kits, and cameras to document research activities. This research was conducted for 3 months from June 2018 to August 2018 in Jeneponto

Regency. The object of this study was the seaweed farmers. The data used in this study were primary data and secondary data.

1. Primary data was obtained through direct interviews with seaweed farmers using questionnaires. Interviews were conducted using structured and mandatory questionnaires to obtain detailed information from seaweed farmers. Primary data collected were about education, social, and economics of seaweed farmers in Jeneponto Regency.
2. Secondary data was obtained through literature studies and using data from related agencies such as the Statistics Indonesia and the Marine and Fisheries Office of Jeneponto Regency. Interviews were carried out on seaweed farmers by taking 50 seaweed farmers as a sample in 3 sub-districts in Jeneponto Regency. The selection of samples of seaweed farmers is made randomly.

The locations of interviews were distributed in three sub-districts of Jeneponto Regency, namely Bangkala, Tamalatea and Binamu Districts (figure 1). The location was chosen based on the consideration that these sub-districts had high seaweed production. Seaweed business is spread in coastal villages such as Sidenre, Biringkassi, Bulo-Bulo, Pabiringe, Arungkeke, Kampala, Punagaya, Bontorannu, Bahari, Mallasoro, Bontosunggu, Bontojai, West Tonrokassi, Tonrokassi, Pao, Garassikang, Bahrimanurung, and Tuju village. The data collected is then analyzed descriptively to explain the percentage of data and the socio-economic condition of seaweed farmers in Jeneponto District. Data collected is then displayed in pictures and graphics.

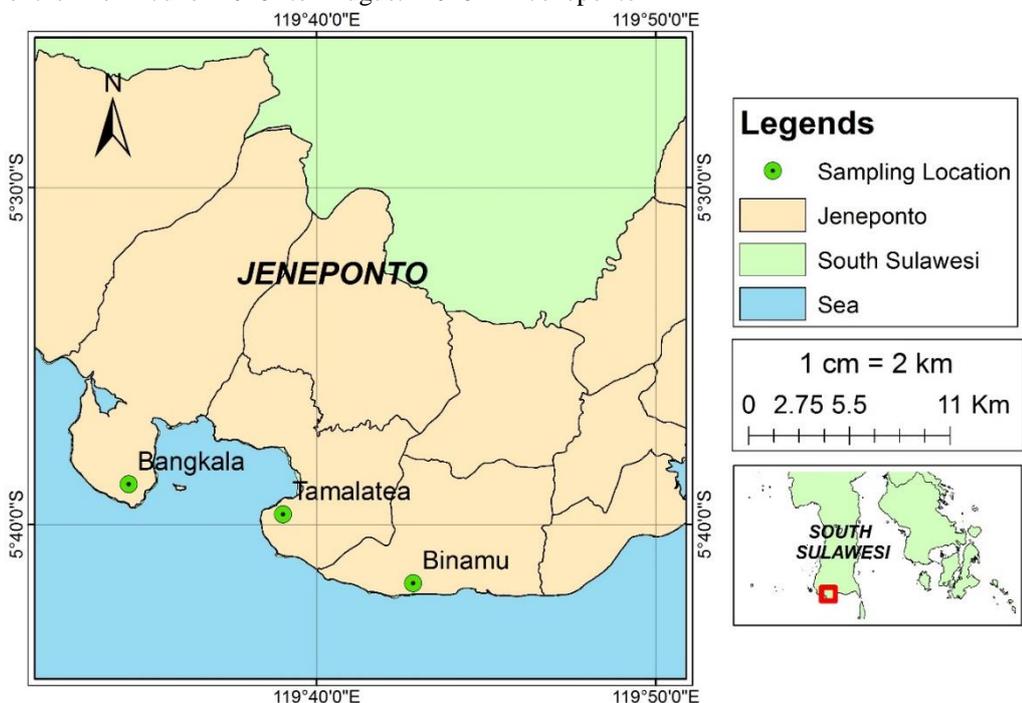


Fig. 1. Research locations in Jeneponto District

III. RESULTS AND DISCUSSION

Jenepono Regency has a geographical location of 5°23'12"-5°39'35" N and 119°29'12"-119°56' 44.9" E and is bordered by Gowa Regency in the north, the Flores Sea in the south, Takalar Regency in the west, and the Bantaeng Regency in the east. Jenepono Regency has a coastline length of 114 km with a potential cultivation area of 8,150 ha. This makes Jenepono Regency as a potential area for developing seaweed cultivation [11]. Jenepono Regency is one of the regency with the highest number of seaweed production in South Sulawesi Province. In 2012-2016, the amount of seaweed production in Jenepono Regency fluctuated as shown in figure 2. In 2016, seaweed production was the highest production, with total seaweed production of 17,044 tons, contributing 47% of the total fishery production in sea and land in Jenepono Regency.

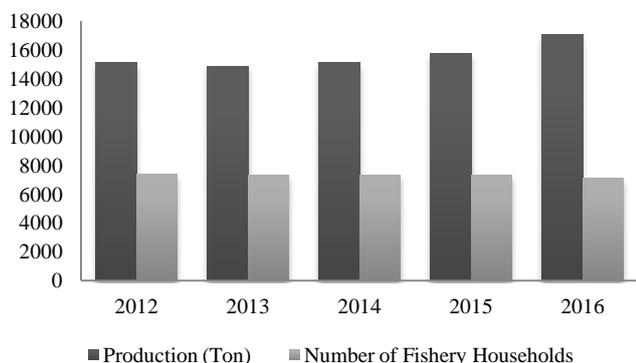


Fig. 2. Production and number of fishery households of seaweed cultivation in Jenepono 2012-2016 [7]

In general, seaweed cultivation business was spread evenly in the coastal areas of Jenepono Regency. Although it was one of the highest seaweed producers, processing of seaweed in Jenepono was still done traditionally by seaweed farmers. In figure 2 it was known that the number of fishery households of seaweed cultivation in Jenepono Regency in 2012-2015 was 7.388 and experienced a decline in 2016 with the number of fishery households as many as 7.105 RTP. The decreasing in the number of fishery households was likely due to some fishery households changed their livelihoods from seaweed farmers to other jobs.

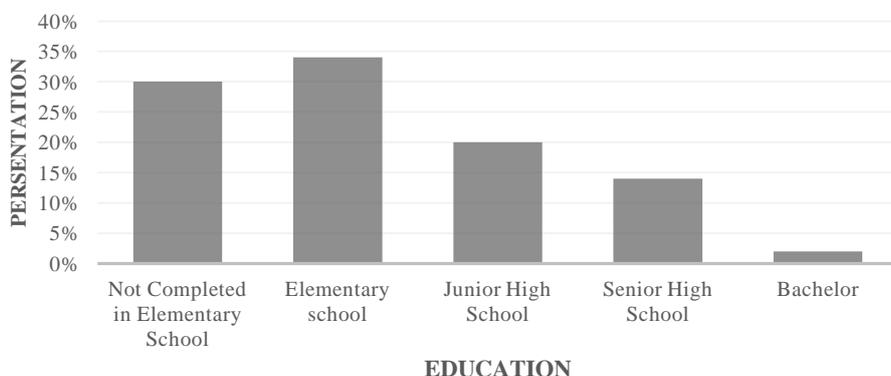


Fig. 4. Education of seaweed farmer in Jenepono

A. Age

Most seaweed farmers were male. The wife of a seaweed farmer did activities such as tying seaweed seeds and drying crops. Seaweed farmers were distributed in coastal villages such as the villages of Sidenre, Biringkassi, Bulu-Bulu, Pabiringe, Arungkeke, Kampala, Punagaya, Bontorannu, Bahari Beach, Mallasoro, Bontosunggu, Bontojai, Tonrokassi Barat, Tonrokassi, Pao, Garassikang, Bahrimanurung, and Tuju. The age of seaweed farmers was in the range of young to old age. Included in the young category was age <34 years, the normal category was 34-44 years old, and the old category was >44 years old. Most of the seaweed farmers have a young age group, with an age range of 33-44 years (figure 3). With a young age, seaweed farmers had a lot of stamina and could do the work of seaweed cultivation well.

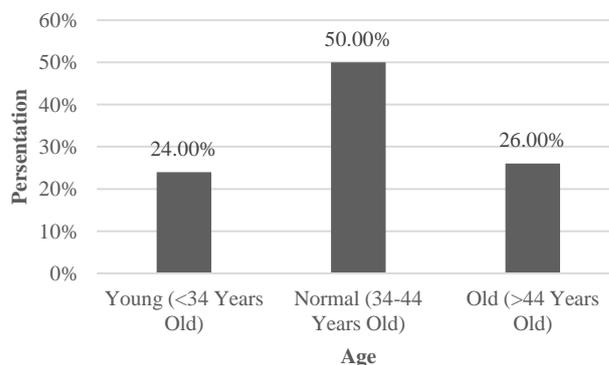


Fig. 3. Age of seaweed farmer in Jenepono

B. Education

Seaweed farmers had the last level of education. Generally, the last education of seaweed farmers was the elementary school, with about 34% of the total seaweed farmers (figure 4). It can be seen from the illustrated below that the level of education of seaweed farmers was still low. This education criterion could influence the management of seaweed cultivation activities. The higher the level of education of seaweed farmers, will be seen as the better the seaweed cultivation business activities, and it could improve the welfare of these farmers. According to Basrowi & Juariyah, people who had a low level of education tend to have a low socioeconomic level [12].

C. Spending

Most of the seaweed farmers had a large number of family members, namely more than 4 family number. This showed that most of the seaweed farmers needed relatively high finance to support their family members. Figure 5 showed the average monthly spending of seaweed farmers to meet their daily life needs, from low to high categories. Most of the seaweed farmers had a high spending level of Rp 693 000/month, so they needed a large income to be able to live a prosperous life. The high level of spending on seaweed farmers was also due to the fact that the families of seaweed farmers often spend their money on less needed things. Muflikhati et al. reported that fishermen's families often spend a lot of money when they got a high income and used part of their income to spend their own needs, for example, to seek entertainment, drink, or just eat in a stall with their friends, so the income that could be spent on family needs was reduced [13]. The thing that needed to be done by seaweed farmers to increase their income was to improve the quality of seaweed that was cultivated so that they could compete in the market to get maximum income.

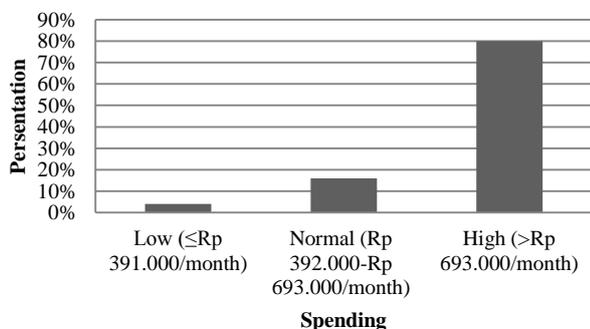


Fig. 5. Monthly spending of seaweed farmer in Jeneponto

D. Training

Most seaweed farmers in Jeneponto Regency had a lot of experience in managing seaweed cultivation, which was more than 10 years. But in reality, many of the seaweed farmers had never received training or counseling from the government and did not have the motivation to develop their seaweed cultivation business. In figure 6, we could see the high percentage of seaweed farmers who were never given training in seaweed cultivation. This showed that the competence of seaweed farmers was still low. Ginting et al. reported that aspects of fisherman competence in environmental, financial and entrepreneurship management programs by traditional fishermen were still weak [14]. One solution that could be done was by implementing a partnership program between seaweed farmers and government agency. The implementation of the partnership program is carried out with training activities that provide knowledge about the forms of the seaweed industry, as well as mentoring activities to provide technical guidance to improve the seaweed farmers skills in developing the seaweed industry in the form of seaweed cultivation and processing of seaweed crops.

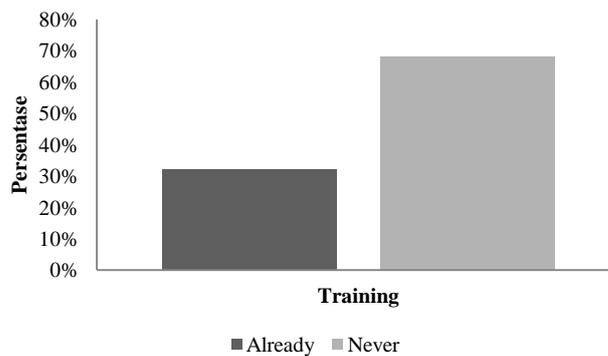


Fig. 6. Seaweed cultivation training for seaweed farmer in Jeneponto

Seaweed farmers in Jeneponto Regency had not utilized information media in developing their cultivation business. Business management and processing of seaweed were still done traditionally based on the local and traditional knowledge they had from neighbors, relatives, parents, and other seaweed farmers around the area. Most of the seaweed farmers claimed that they often discuss seaweed cultivation process or technique with other farmers and others who understand it better. Seaweed farmers said that their main motivation in seaweed cultivation business that is to increase income and because seaweed cultivation is the main source of income in meeting their life needs.

E. Cultivation Land

Most of the status of seaweed cultivation land was self-owned land, and a small portion was land that was leased, profit sharing or as a worker on the land. The land used in seaweed cultivation had an area that varied from narrow categories to large areas, could be seen in figure 7. Based on the data obtained, it was known that the seaweed cultivation area used in Jeneponto Regency had a high percentage in the narrow category, namely < 2500 m², as much as 48% of the total sample. This showed that in terms of land area, it was necessary to be improved to encourage the development of seaweed cultivation in Jeneponto Regency.

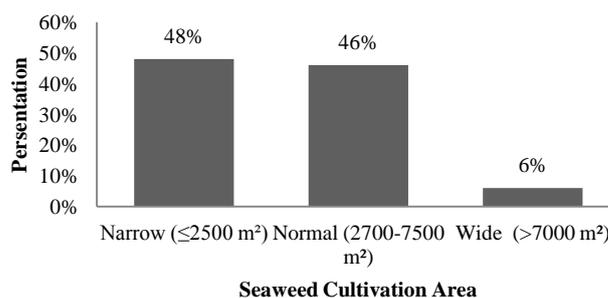


Fig. 7. Seaweed cultivation area of seaweed farmer in Jeneponto

F. Harvest and Profit

Based on the data collected, it is known that most seaweed farmers had used a large investment in the business. As many as 86% of seaweed farmers used investment with a high category of Rp 2,521,000. Irmayani et al. who conducted research on the analysis of seaweed cultivation in Jeneponto Regency revealed that the initial costs which included the costs of purchasing machinery,

boats and cultivation equipment reached Rp 5,700,000 [15]. The amount of investment used in making seaweed cultivation should encourage the seaweed farmers in developing and increasing the benefits of seaweed cultivation.

Yields and profits obtained by most seaweed farmers were included in the normal category (figure 8), namely harvests of 501 kg - 1,500 kg and profits ranging from Rp. 4,700,000 - Rp. 10,300,000. According to Arsyad et al. that the low income of seaweed farmers is related to production and quality constraints that are influenced by the degradation of seed quality, pest and disease attacks, and postharvest problems [16]. In addition, Hasriyanti also revealed that seaweed farmers would experience losses at the first harvest, but in the second harvest and so on would gain significant profits [11]. This is because in the second planting season and so on farmers no longer buy seeds. According to seaweed farmers, information on market prices for seaweed was obtained from collecting traders and from factories.

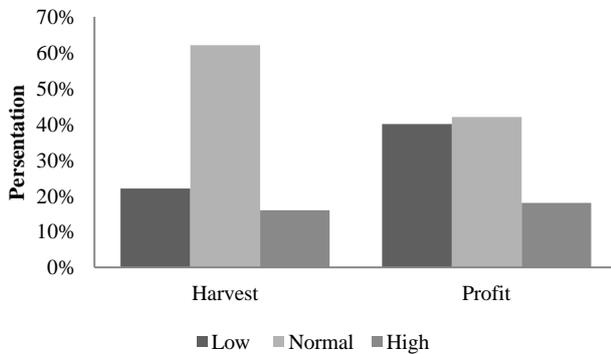


Fig. 8. Harvest and profit of seaweed farmers in Jeneponto Regency

Efforts to maximize profits were always carried out by seaweed farmers in various ways. Seaweed farmers were trying to increase production in several ways such as increasing the stretch of seaweed, adding to the location of cultivation, paying attention to the weather, and adding seeds. The quality and number of seeds used in cultivation would affect the growth and production of seaweed [15]. According to Ratnawati et al., there are several factors that influenced seaweed production, namely the distance between rope rises, the distance between clumps in rope rises, pests, ice-ice disease, seed weight, the origin of seeds and sources of contamination [17]. To overcome the failure of seaweed harvest, seaweed farmers generally regularly check the condition of seaweed, harvest faster, replace seedlings, plant seaweed again, sink seaweed, sell seaweed in wet conditions, provide reserve seeds, reduce float and clean moss. Good seaweed has many branches and is lush; there is no white and smooth spot disease without any peeling defects [18]. In an effort to overcome the abundance of seaweed production in the peak season, usually, seaweed farmers increase the intensity of sales of seaweed. Seaweed harvesting is handled by drying using the net. The waste produced is then cleaned and the moss removed.

G. Social Interaction

Seaweed farmers often work together and help each other in processing seaweed cultivation around their area.

Based on figure 9, social interactions carried out by seaweed farmers were generally at a moderate level. This showed that cooperation was needed between seaweed farmers. Social interactions carried out by seaweed farmers were like helping each other in the harvest process, binding seaweed seeds to a stretch of rope, and exchanging information about the source of seeds and prices. Social interaction carried out by seaweed farmers can increase their income and support the success of seaweed cultivation activities.

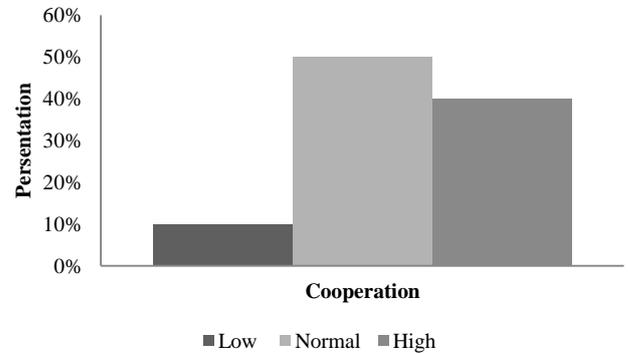


Fig. 9. The intensity of the collaboration carried out by seaweed farmers in Jeneponto Regency

IV. CONCLUSION

The socio-economic conditions of seaweed farmers in Jeneponto Regency are diverse. Seaweed farmers generally have a low level of education (graduated from elementary school), were young (33-44 years old), had a large family (high people) and a high level of spending (Rp 693,000/month), had not received seaweed cultivation training, have a narrow cultivation land for seaweed (2500 m²), had profit and production which was in the medium category (501 kg - 1500 kg), and often cooperated with other farmers in seaweed cultivation activities. Training on seaweed cultivation and good financial management for seaweed farmers were needed in order to maximize the benefits of their seaweed cultivation activities. In addition, the role of the government was needed in terms of providing capital assistance and development of seaweed processing centers in order to improve the quality of seaweed produced in Jeneponto Regency.

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REFERENCES

- [1] M. Measey, "Indonesia: a vulnerable country in the face of climate change," *Glob. Major. E-Journal*, vol. 1, no. 1, pp. 31-45, 2010.
- [2] R. Dahuri, "Paradigma baru pembangunan Indonesia berbasis kelautan," *Naskah Orasi Ilm. Pengukuhan Guru Besar Tetap Ilmu Pengelolaan Sumberd. Pesisir dan Lautan. Inst. Pertan. Bogor, Bogor*, 2003.
- [3] H. Indriani and E. Sumiarsih, "Budidaya Daya Pengolahan dan Pemasaran Rumput Laut." Penebar Swadaya, Jakarta, 2005.

- [4] Kementerian Kelautan dan Perikanan, "Kelautan dan Perikanan dalam Angka Tahun 2016," Jakarta, 2017.
- [5] W. Hidayati, "Analisis struktur, Perilaku dan Keragaan Pasar Rumput Laut *Eucheuma cottoni*: Kasus di Kecamatan Mangarabombang Kabupaten Takalar Provinsi Sulawesi Selatan," *Inst. Pertan. Bogor. Bogor*, 2009.
- [6] S. Yusuf, M. Arsyad, and A. Nuddin, "Prospect of seaweed development in South Sulawesi through a mapping study approach," in *IOP Conference Series: Earth and Environmental Science*, 2018, vol. 157, no. 1, p. 12041.
- [7] Dinas Kelautan dan Perikanan Kabupaten Jeneponto, "Data Statistik Perikanan Tangkap Kabupaten Jeneponto," Jeneponto, 2017.
- [8] L. Mala, G. Latama, A. Abustang, and A. Tuwo, "Analisis Perbandingan Pertumbuhan Rumput Laut *Kappaphycus alvarezii* Varietas Coklat yang Terkena Epifit di Perairan Libukang, Kabupaten Jeneponto," *J. Rumput Laut Indones.*, vol. 1, no. 1, 2016.
- [9] M. Radjab, S. Djibe, and R. Renita, "Kajian Komunitas Petani Rumput Laut sebagai Alternatif Kelangsungan Hidup Masyarakat Pesisir Kabupaten Jeneponto," *SOCIUS J. Sociol.*, vol. 12, no. 1, pp. 22–39, 2016.
- [10] E. Mahatama and M. Farid, "Daya saing dan saluran pemasaran rumput laut: kasus Kabupaten Jeneponto, Sulawesi Selatan," *Bul. Ilm. Litbang Perdagangan.*, vol. 7, no. 1, pp. 55–72, 2013.
- [11] Hasriyanti, "Pemetaan Wilayah Produksi Rumput Laut di Kecamatan Tamalatea Kabupaten Jeneponti," *J. Sainsmat*, vol. 3, no. 2, pp. 176–184, 2014.
- [12] Basrowi and S. Juariyah, "Analisis Kondisi Sosial Ekonomi dan Tingkat Pendidikan Masyarakat Desa Srigading, Kecamatan Labuhan Maringgai, Kabupaten Lampung Timur," *J. Ekon. dan Pendidik.*, vol. 7, no. 1, 2010.
- [13] I. Muflikhati, S. U. Hartoyo, A. Fahrudin, and H. Puspitawati, "Kondisi Sosial Ekonomi dan Tingkat Kesejahteraan Keluarga: Kasus di Wilayah Pesisir Jawa Barat," *J. Ilm. Kel. Kons*, vol. 3, no. 1, pp. 1–10, 2010.
- [14] B. Ginting, M. A. Nasution, S. Subhilhar, and R. H. Harahap, "Analysis Of Weaknesses Of Coastal Community Economy Empowerment Program (Pemp) And National Program Of Community Empowerment Of Independent Marine And Fisheries (Pnpm-Mkp) On Traditional Fishermen In Indonesia," 2018.
- [15] Irmayani, S. Yusuf, and M. Nispar, "Analisis Kelayakan Usaha Budidaya Rumput Laut di Desa Mallasoro Kecamatan Bangkala Kabupaten Jeneponto," *J. Bisnis Perikan. (Journal Fish. Business)*, vol. 1, no. 1, 2014.
- [16] M. Arsyad, A. Nuddin, M. Y. Zamhuri, and S. Yusuf, "The Poverty Reality of Coastal and Agriculture: How Severe the Seaweed Farmers and Cocoa Smallholders Are?," *Int. J. Agric. Syst.*, vol. 2, no. 2, pp. 119–131, 2015.
- [17] E. Ratnawati, A. Mustafa, and R. Daud, "Faktor Pengelolaan yang Mempengaruhi Tingkat Produksi Rumput Laut *Kappaphycus alvarezii* di Perairan Pantai Selatan Provinsi Sulawesi Selatan," *J. Ris. Akuakultur*, vol. 5, no. 3, pp. 491–504, 2016.
- [18] K. O'Connor, *Seaweed: a global history*. Reaktion Books, 2017.