

Seaweed marketing value chain in Southeast Sulawesi Province, Indonesia

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Abstract. Seaweed cultivation industry in Southeast Sulawesi Province is currently experiencing various challenges in production and marketing aspects, significantly affecting product competitiveness, cultivator income, and the well-being of entrepreneurs and coastal communities. These challenges also show the presence of aquaculture potential in the region that has not been fully optimized. Therefore, this study aims to analyze seaweed marketing value chain in Southeast Sulawesi Province. The analysis results showed that marketing of the commodity consisted of 3 value chains, including: (a) cultivator - collector trader - local large-scale trader - exporter/agro-industry (I), (b) cultivator - large-scale collector trader - exporter/agro-industry (II), and (c) cultivator - collector trader - non-local large-scale trader - exporter/agro-industry (III). The income received by cultivators in Chain I was IDR 14,000/kg, while a value of IDR 14,500/kg was obtained in Chains II and III. This result showed that cultivators received more benefits when marketing through Chains II and III. Furthermore, the highest margin among all participants was observed in the collector trader, with a value of IDR 1,200/kg in Chain I and IDR 1,500/kg in Chain III.

Key Words: aquaculture, industry, profit.

Introduction. Seaweed is a flagship commodity in the aquaculture sector, known for its ease of cultivation, several benefits, and wide market share in both domestic and international markets. In addition, there has been a significant increase and diversity in the use of its products, necessitating improvements in quantity and quality. These improvements can be achieved by paying comprehensive attention to various aspects, including aquaculture production facilities, cultivation processes, harvesting, drying, warehousing, marketing processes, agro-industry processing, and consumer delivery. In Indonesia, seaweed processing industries are predominantly situated in the Western part, particularly in Java, while the primary producers are mainly located in the Eastern part, such as Sulawesi, Bali, and East Nusa Tenggara. Despite the domestic processing of raw materials, 80% of the commodity is still exported in dried form (Saleh & Sebastian 2020).

According to previous reports, Indonesia is the second-largest producer of the commodity in the world after China, with a production volume of 9.6 million tons in 2020, equivalent to 27.5% of the total global production of 35 million tons (FAO 2020). Furthermore, Southeast Sulawesi Province is one of the main seaweed-producing regions within the country, with a production of 296,748 tons valued at IDR 851,276,654,000 in 2021. Seaweed production volume in Southeast Sulawesi Province from 2010 to 2021 is presented in Figure 1 (Department of Maritime Affairs and Fisheries of Southeast Sulawesi Province 2023).

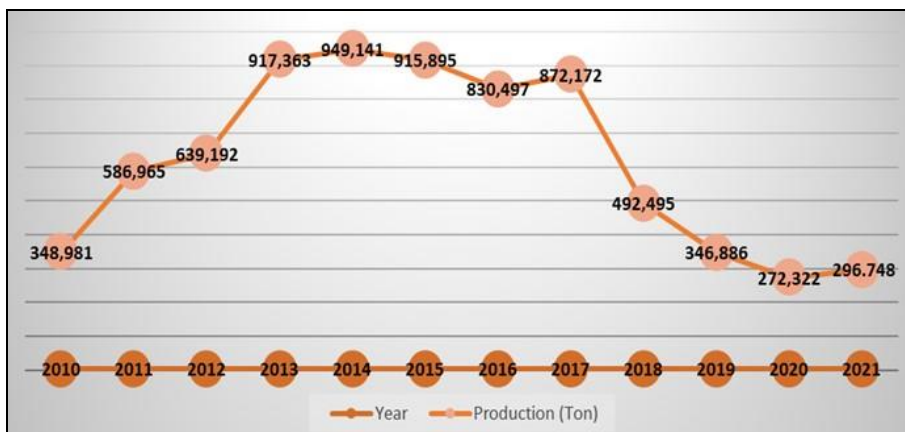


Figure 1. Seaweed production in Southeast Sulawesi Province, 2010-2021 (Department of Maritime Affairs and Fisheries of Southeast Sulawesi Province 2023).

Figure 1 illustrates a continuous decrease in the volume of seaweed produced in Southeast Sulawesi Province, particularly in 2018, 2019, and 2020, with a slight increase observed in 2021. This trend is suspected to stem from genetic factors (Campbell et al 2022) and inadequate biosecurity measures in waters, leading to reduced or failed production. The decline is also associated with fluctuating prices, causing instability in income of cultivator and diminishing interest in plant cultivation. An upturn in production does not translate to increased income for cultivators without a concurrent increase in seaweed prices (Limi et al 2018). Consequently, the decreased production has also impacted the overall value of the commodity in the region.

Figure 2 presents value of seaweed production in Southeast Sulawesi Province from 2010 to 2020 (Department of Maritime Affairs and Fisheries of Southeast Sulawesi Province 2023).



Figure 2. Value of seaweed production in Southeast Sulawesi Province, 2010-2020 (Department of Maritime Affairs and Fisheries of Southeast Sulawesi Province 2023).

The diminished value of seaweed production, as depicted in Figure 2, shows a lack of competitiveness in Southeast Sulawesi Province. This situation is likely attributed to marketing practices that are heavily dependent on non-local and international markets, where prices are dictated by buyers, leading to price instability. The cultivators are also in a precarious position and subject to the influence of capital owners who control seaweed marketing networks (Nuryadi et al 2017). Therefore, this study aims to assess seaweed marketing value chain in Southeast Sulawesi Province. The results are essential for developing strategies to elevate community livelihoods (Muthalib et al 2017). The results can also provide a foundation for the government to formulate equitable and sustainable fisheries development policies, prioritizing economic benefits and the welfare

of local and rural communities (Saleh & Sebastian 2020). Value chain concept, elucidating how an organizational unit manages resources, regulate costs, and enhances efficiency, underscores the importance of seaweed business institution in adding value for cultivators and stakeholders. Recognizing the entire process, including value activities and profits (margin), shows the visible role of seaweed business institution. Nuryadi et al (2019) emphasized that boosting added value in seaweed businesses required a significant focus on institutional aspects.

Material and Method

Description of the study sites. This study was carried out from June to October 2023 in Southeast Sulawesi Province, recognized as one of the national seaweed centers. Data collection was performed in Konawe Selatan and Bombana Regencies, both known for their seaweed production in Province. In 2022, Konawe Selatan Regency recorded a production volume of 37,288 tons valued at IDR 186,440,000,000, while Bombana Regency reported 17,458 tons with value of IDR 50,122,613,000 (BPS 2023).

Data were obtained through field surveys and direct interviews with cultivators of the plants and participants in the plant value chain, including traders. A total of 26 respondents participated in the procedures, comprising 20 cultivators and 6 traders, selected using the maximum likelihood estimation method.

Statistical analysis. The data in this report was subjected to value chain analysis, a strategic analysis tool used to gain insights into competitive advantages, identify opportunities for increasing consumer value, enhancing business efficiency, and to comprehend the relationships between cultivators, traders, and other entities (Marisa et al 2018). In the course of conducting seaweed marketing value chain analysis, the following determinations were performed:

- a. Marketing margin analysis was executed to ascertain the margin of each seaweed marketing institution. The formula used was as follows:

$$M=H_p-H_b$$

where: M = marketing institution margin;
 H_p = selling price (IDR/kg);
 H_b = purchase price (IDR/kg);

- b. Margin for each marketing channel was examined to determine the total margin from each seaweed marketing institution. The formula used was as follows:

$$M_t=M_1+M_2\dots M_n$$

where: M_t = marketing channel margin;
 M_1 = margin of 1st marketing institution;
 M_2 = margin of 2nd marketing institution;
 M_n = margin of the nth marketing institution;

- c. Profits of each marketing institution were computed using the formula:

$$\Pi=ML-TC$$

where: Π = marketing institution profit (IDR/kg);
 ML = marketing institution margin (IDR/kg);
 TC = total marketing costs incurred by each institution (IDR/kg);

- d. Marketing profits from each institution were determined using the formula:

$$\Pi_t = \Pi_1 + \Pi_2 + \dots + \Pi_n$$

where: Π_t = marketing channel profit;
 Π_1 = profit of 1st marketing institution;
 Π_2 = profit of 2nd marketing institution;
 Π_n = profit of nth marketing institution;

Results. Seaweed marketing value chain in Southeast Sulawesi Province comprised three models, as outlined below:

1. Cultivator - Collector Trader - Local Large-scale Trader - Exporter/Agroindustry.
2. Cultivator - Large-scale Collector Trader - Exporter/Agroindustry.
3. Cultivator - Collector Trader - Non-local Large-scale Trader - Exporter/Agroindustry.

Among these 3 marketing chains, Chain I significantly dominated, comprising 67% of the respondents, followed by marketing Chain II at 27%, and marketing Chain III at only 8%. Furthermore, the prevalence of marketing Chain I, depicted in Table 1, stemmed from enduring partnership networks between traders and cultivators. Large-scale traders played an essential role by providing capital to collector traders for nurturing cultivators and supplying the necessary operational capital.

Marketing margins for each value chain are presented in Tables 1, 2, and 3.

Table 1
Seaweed marketing analysis in marketing value Chain I

| No | Type of institution | Price (IDR/kg) | Share (%) | | |
|-------|------------------------|----------------|-----------|--------------|----------------------|
| | | | Price | Profit share | Marketing cost share |
| 1 | Farmer/Cultivator | | | | |
| | a. Selling price | 14,000 | 73,684 | | |
| 2 | Collector trader | | | | |
| | a. Purchase price | 14,000 | | | |
| | b. Transportation cost | 200 | | | 4,000 |
| | c. Labor cost | 250 | | | 3,200 |
| | e. Packaging cost | 250 | | | 3,200 |
| | f. Storage cost | 100 | | | 8,000 |
| | g. Total cost | 800 | | | 18,400 |
| | h. Selling price | 16,000 | | | |
| | i. Profit | 1,200 | | 7,500 | |
| 3 | Large-scale trader | | | | |
| | a. Purchase price | 16,000 | | | |
| | b. Transportation cost | 800 | | | 2,938 |
| | c. Labor cost | 750 | | | 3,133 |
| | e. Packaging cost | 400 | | | 5,875 |
| | f. Storage cost | 400 | | | 5,875 |
| | g. Total cost | 2,350 | | | 17,821 |
| | h. Selling price | 19,000 | | | |
| | i. Profit | 650 | | 3,421 | |
| 4 | Exporter/Agroindustry | | | | |
| | a. Purchase price | 19,000 | | | |
| MP | | 5,000 | | | |
| Total | | | 73,684 | 10,921 | 36,221 |

Table 2

Seaweed marketing analysis in marketing value Chain II

| No | Type of institution | Price (IDR/kg) | Share (%) | | |
|-------|------------------------|----------------|-----------|--------------|----------------------|
| | | | Price | Profit share | Marketing cost share |
| 1 | Farmer/Cultivator | | | | |
| | a. Selling price | 14,500 | 76,316 | | |
| 2 | Large-scale trader | | | | |
| | a. Purchase price | 14,000 | | | |
| | b. Transportation cost | 1,000 | | | 2,950 |
| | c. Labor cost | 900 | | | 3,278 |
| | e. Packaging cost | 600 | | | 4,917 |
| | f. Storage cost | 450 | | | 6,556 |
| | g. Total cost | 2,950 | | | 17,700 |
| | h. Selling price | 19,000 | | | |
| | i. Profit | 2,050 | | 10,789 | |
| 3 | Exporter/Agroindustry | | | | |
| | a. Purchase price | 19,000 | | | |
| MP | | 4,500 | | | |
| Total | | | 76,316 | 10,789 | 17,700 |

Table 3

Seaweed marketing analysis in marketing value Chain III

| No | Type of institution | Price (IDR/kg) | Share (%) | | |
|-------|------------------------------|----------------|-----------|--------------|----------------------|
| | | | Price | Profit share | Marketing cost share |
| 1 | Farmer/Cultivator | | | | |
| | a. Selling price | 14,500 | 76,316 | | |
| 2 | Collector trader | | | | |
| | a. Purchase price | 14,500 | | | |
| | b. Transportation cost | 300 | | | 3,333 |
| | c. Labor cost | 350 | | | 2,857 |
| | e. Packaging cost | 250 | | | 4,000 |
| | f. Storage cost | 100 | | | 10,000 |
| | g. Total cost | 1,000 | | | 20,190 |
| | h. Selling price | 17,000 | | | |
| | i. Profit | 1,500 | | 8,824 | |
| 3 | Non-local large-scale trader | | | | |
| | a. Purchase price | 17,000 | | | |
| | b. Transportation cost | 400 | | | 3,250 |
| | c. Labor cost | 400 | | | 3,250 |
| | e. Packaging cost | 400 | | | 3,250 |
| | f. Storage cost | 100 | | | 13,000 |
| | g. Total cost | 1,300 | | | 22,750 |
| | h. Selling price | 19,000 | | | |
| | i. Profit | 700 | | 3,684 | |
| 4 | Exporter/Agroindustry | | | | |
| | a. Purchase price | 19,000 | | | |
| MP | | 4,500 | | | |
| Total | | | 76,316 | | 42,940 |

Discussion. Tables 1, 2, and 3 showed that the prices received by cultivators in marketing Chain I differed from II and III. In Chain I, farmers received a selling price of IDR 14,000/kg, while value of IDR 14,500/kg was obtained in II and III. This variance

occurred because cultivators in Chain I received capital from collector traders, with the consequence that the harvest must be sold to the merchant, even at a lower price. This underscored the ongoing challenge faced by seaweed cultivators in Indonesia, where approximately 60–70% maintained binding relationships with traders to secure capital for seed procurement, production facilities, and the education and healthcare needs of their children (Azis 2011; Neish 2007). Henriques and Carcamo (2019) emphasized that ensuring the sustainability of seaweed availability as raw material for agroindustry required focused attention on small-scale cultivators in terms of funding, innovation, marketing, education, and social justice. Furthermore, fisheries businesses necessitated financial support from banks and the government (Musadar & Nuryadi 2023). Nuryadi et al (2023) also argued that achieving success for seaweed cultivators required robust cultivation management, cooperative support with capacity, the ability to build cooperation, and financial strength.

Based on the analysis results concerning marketing chain aspects and margins, it became evident that there was diversity in the income received by each value chain participant. A more comprehensive depiction of seaweed marketing value chain in Southeast Sulawesi Province is shown in Figure 3.

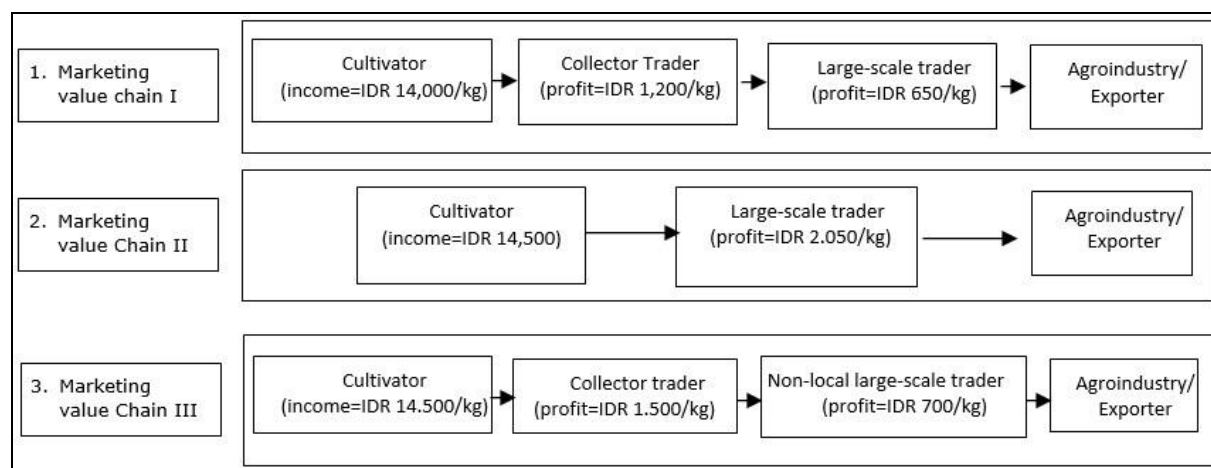


Figure 3. Seaweed marketing value chain in Southeast Sulawesi Province.

Figure 3 illustrated that the collector trader obtained the largest margin in seaweed marketing chain in Southeast Sulawesi Province, both in chains I and II, excluding III. This was because the collector trader directly purchased the products from the farmers and collected them directly from their homes. However, cumulatively, large-scale traders oversaw numerous collector traders, and even the large-scale merchants in marketing Chain II were the same as Chain I. The analysis suggested that the most influential actors determining prices in seaweed marketing value chain in Southeast Sulawesi Province were the large-scale traders and exporters. Meanwhile, farmers and small traders at the village level had weaker bargaining positions.

The analysis of marketing system aspects showed that seaweed farmers sold their harvest to collector traders (both small and large traders), and there was no direct marketing through cooperatives or to agro-industry. However, Wibowo et al (2014) stated that further processing of dried seaweed into ATC (Alkali Treated Cottonii), could increase its value by 5 times, SRC (Semi Refined Carrageenan) increased to 7 times, and processing it into pure carrageenan RC (Refined Carrageenan), could elevate it up to 18 times. Cooperative movements are expected to play a crucial role in supporting seaweed cultivation activities by increasing bargaining power and countervailing power against various forms of greed and injustice (Nuryadi et al 2017).

Developing the sustainability of seaweed cultivation businesses required integrated planning and management, comprising the government, universities, agro-industry, and seaweed farmers, considering economic, institutional, and technological factors (Nuryadi et al 2019). The supply chain in Indonesia is a vertical collaboration comprising seaweed farmers, traders, producers, and exporters (Mulyati & Geldermann

2017). To enhance competitiveness, efforts, such as improving the promotion of products domestically and internationally, enhancing product quality, facilitating access through banks, and developing infrastructure are necessary (Natalia & Nurozy 2012).

Market mechanism weaknesses, specifically at the initial stage of marketing value chain (farmers and collector traders), contributed to price uncertainty at the farmer level. The potential seaweed market depended not only on the final product sector but also on the cultivation method or the origin (Brayden et al 2018). Therefore, farmers must prioritize efficiency and business productivity to achieve a substantial difference between costs and revenues, ultimately increasing their income. Meanwhile, in the development of seaweed agro-industry, specifically in terms of providing raw materials and marketing, the existence of cooperatives through patterns remained hopeful (Nuryadi et al 2020).

In the domain of seaweed businesses, institutions played crucial roles as providers of capital, information, and inputs, with these functions currently being executed by traders (Ramadan et al 2018). An immediate priority was to fortify the institutions of coastal communities through cooperatives, representing a tangible manifestation of the economy of people (Sirait 2018). Furthermore, within the context of the blue economy, intensifying efforts in seaweed cultivation could propel economic growth, augment income of farmer, and contribute to the sustainable preservation of the ocean and the environment (Freitas et al 2022).

A study related to institutions and policies conducted in Malaysia underscored the low educational level of seaweed cultivation practitioners and the transient nature of jobs in the plant sector as factors impeding the understanding and implementation of government policies at the farmer level (Cicilia et al 2021). Investigation conducted in Alaska emphasized that the management necessitated policies ensuring the development of a fair and sustainable seaweed industry. These policies must prioritize the economic benefits and interests of local communities and rural areas, reduce legal barriers in policy implementation, and promote cooperative business development (Miller 2021).

Conclusions. In conclusion, the analysis results of seaweed business value chain in Southeast Sulawesi Province showed that:

1. The seaweed marketing in Southeast Sulawesi Province comprised 3 chains: (a) farmers - collector trader - local large-scale traders - exporters/agroindustry; (b) farmers - large-scale collector trader - exporters/agroindustry; (c) farmers - collector trader - non-local large-scale traders - exporters/agroindustry.
2. The income received by seaweed farmers in value chain I was IDR 14,000/kg, while IDR 14,500/kg was obtained in II and III. Therefore, farmers were encouraged to participate in marketing within value Chains II and III.
3. The highest margin among all seaweed participants was held by collector traders, amounting to IDR 1,200/kg in value chain I and IDR 1,500/kg in III.

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Conflict of interest. The authors declare that there is no conflict of interest.

References

- Azis H. Y., 2011 [Optimizing seaweed processing in the coastal areas of Bantaeng in South Sulawesi]. PhD Dissertation, Postgraduate School, Bogor Agricultural University. Bogor. 163 pp. [In Indonesian].
- Brayden W. C., Noblet C. L., Evans K. S., Rickard L., 2018 Consumer preferences for seafood attributes of wild-harvested and farm-raised products. *Aquaculture Economics & Management* 22(3):362–382.

- Campbell C. I., Mateo J., Rusekwa S. B., Kambey C. S. B., Hurtado A., Msuya F. E., Cottier-Cook E. J., 2022 An international evaluation of biosecurity management capacity in the seaweed aquaculture industry. *Journal of Environmental Management* Volume 304:114112. doi: 10.1016/j.jenvman.2021.114112.
- Cicilia S. B., Kambey A., Iona Campbell B., Elizabeth J., Cottier-Cook B., Adibi R. M., Nor C., Azhar Kassim D., Ahemad Sade D., Phaik-Eem Lim A., 2021 Evaluating biosecurity policy implementation in the seaweed aquaculture industry of Malaysia, using the quantitative knowledge, attitude, and practices (KAP) survey technique. *Journal marine Policy* Volume 134: 104800. doi: 10.1016/j.marpol.2021.104800.
- Freitas M. V., Pacheco D., Cotas J., Mouga T., Afonso C., Pereira L., 2022 Red Seaweed pigments from a biotechnological perspective. *Journal Phycology* 2(1):1–29. doi: 10.3390/phycolgy2010001.
- Henriques L. A., Carcamo A. F., 2019 Stakeholder's multidimensional perceptions on policy implementation gaps regarding the current status of Chilean small-scale seaweed aquaculture. *Journal Marine Policy* 103:138-147.
- Limi M. A., Sara L., La Ola T., Yunus L., Suriana, Taridala S. A. A., Batoa H., Hamzah A., Fyka S. A., Prapitasari M., 2018 The production and income from seaweed farming after the sedimentation in Kendari Bay. *AACL Bioflux* 11(6):1927-1936.
- Marisa J., Syahni R., Hadiguna R. A., Novialdi, 2018 [Analysis of value chain strategy for competitive advantage through cost management approach in the fish processing industry]. *Journal of Animal Science and Agronomy Panca Budi* 2(2):7-17. [In Indonesian].
- Miller L., 2021 Legalizing local: Alaska's unique opportunity to create an equitable and sustainable seaweed farming industry. *38 Alaska Law Review* 313-340 (2021). Available at: <https://scholarship.law.duke.edu/alr/vol38/iss2/6>.
- Mulyati H., Geldermann J., 2017 Managing risks in the Indonesia seaweed supply chain. *Clean Technologies and Environment Policy* 19:175-189.
- Musadar, Nuryadi A. M., 2023 Young farmer empowerment model based on freshwater fishery business in Southeast Sulawesi Province, Indonesia. *AACL Bioflux* 16(2):970-978.
- Muthalib A. A., Putra A., Nuryadi A. M., Afiat M. N., 2017 Seaweed business conditions and marketing channels in coastal district of Southeast Sulawesi. *The International Journal of Engineering and Science (IJES)* 6(10):35-41.
- Natalia D., Nurozy, 2012 [Competitiveness performance of Indonesian fishery products in global markets]. *Trade Research and Development Scientific Bulletin* 6(1):69-88. [In Indonesian].
- Neish I. C., 2007 Assessment of the seaweed value chain in Indonesia. A Project Implemented by Development Alternatives, Inc., US Agency for International Development, Jakarta. 35 pp.
- Nuryadi A. M., Rosmalah S., Muthalib D. A., Hartati, Zarliani W. O. A., Zulkarnain M. I., Rijanto D. A., 2023 A management design for cooperative-based seaweed cultivation business in Southeast Sulawesi Province, Indonesia. *AACL Bioflux* 16(4):1878-1886.
- Nuryadi A. M., Hartati, Alimusa L. O., 2020 Planning model seaweed agroindustry raw materials in Southeast Sulawesi Province, Indonesia. *AACL Bioflux* 13(6):3637-3646.
- Nuryadi A. M., Sara L., Rianda L., Bafadal A., 2019 A model for developing seaweed agribusiness in South Konawe, Southeast Sulawesi, Indonesia. *AACL Bioflux* 12(5):1718–1725.
- Nuryadi A. M., Sara L., Rianda L., Bafadal A., Muthalib A. A., Hartati, Nur M., Rosmalah S., 2017 Agrobusiness of seaweeds in South Konawe. *AACL Bioflux* 10(3):499-506.
- Ramadan, Alwi L. O., Yusria W. O., 2018 [Availability of institutions in the development of seaweed farming (*Eucheuma spinosum*) in Kawite Wite Village, Kabawo District, Muna Regency]. *Jurnal Ilmiah Membangun Desa dan Pertanian* 3(1):1-9. doi: 10.33772/jimdp.v3i1.6674. [In Indonesian].

- Saleh H., Sebastian E., 2020 Seaweed nation: Indonesia's new growth sector. Monash University, Caulfield Campus. Australia-Indonesia Centre. Volume 1, ISSN 2652-5879. 19 pp.
- Sirait R. A., 2018 [Strengthening the role of fishermen's cooperatives: manifestation of people's economy]. Buletin APBN. Pusat Kajian Anggaran Badan Keahlian DPR RI Vol. III, Edisi 12. ISSN 2502-8685. 16 pp. [In Indonesian].
- Wibowo S., Warinangin R., Darmawan M., Hakim A. R., 2014 [Processing technique: ATC from seaweed, *Eucheuma cottonii*]. Self-help spreader. Jakarta. 76 pp. [In Indonesian].
- *** Badan Pusat Statistik (BPS) Provinsi Sulawesi Tenggara, 2023 [Southeast Sulawesi Province in figures]. Badan Pusat Statistik Provinsi Sulawesi Tenggara. <https://sultra.bps.go.id>. 684 pp. [in Indonesian].
- *** Department of Maritime Affairs and Fisheries of Southeast Sulawesi Province, 2023 [Maritime and fishery statistics of Southeast Sulawesi Province]. DKP Southeast Sulawesi, Kendari, Indonesia. <http://dkp.sultra.net> [Last accessed on 24 November 2023]. [In Indonesian].
- *** Food and Agriculture Organization (FAO), 2020 The state of world fisheries and aquaculture 2020. Sustainability in action. Rome. 206 pp. doi: 10.4060/ca9229en.

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