

Socioeconomic Characteristics of Seaweed Cultivation Business in Southeast Sulawesi Province, Indonesia

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ABSTRACT

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The seaweed cultivation business in the fisheries sector remains the livelihood of coastal communities; thus, it must be designed based on welfare improvement, business sustainability, and regional development. The various efforts must begin with studies on the characteristics of the farmers and seaweed businesses. Therefore, this study analyzes the characteristics of seaweed cultivation businesses from socioeconomic aspects. The research was conducted in two regencies in Southeast Sulawesi Province: South Konawe Regency and Bombana Regency, as the research location's main parameters. This study employed quantitative descriptive analysis. The data was obtained through field surveys on seaweed farmers and seaweed trading business actors. This research emphasizes social aspects, including age, education, business experience, and family dependents, while the economic aspects focus on capital and marketing. The results revealed that the seaweed farmers in Southeast Sulawesi Province are mainly those of working age with relatively fewer family dependents and excellent experience but a low level of formal education. This phenomenon makes several parties, including the authorities and universities, obliged to take action to improve farmers' quality and skills to be more agile and innovative. Moreover, Most seaweed farmers obtained capital from traders; consequently, they had to sell their harvest to traders below the market price. Therefore, developing a partnership system supporting and protecting groups of farmers, traders/cooperatives, and the seaweed agroindustry with additional capital and technological support from the government and universities is recommended.

Keywords

Coastal
 Economy
 Poverty
 Resilience
 Seaweed

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Introduction

Southeast Sulawesi is one of the provinces in Indonesia that is successful in developing seaweed cultivation businesses, as indicated by its seaweed production ranked the 4th largest in Indonesia in 2013, producing 917,363 tons [1]. Since experiencing a peak production period in 2014, unfortunately, seaweed production in Southeast Sulawesi Province has declined. Fig. 1 outlines seaweed production trends from 2010 to 2020.

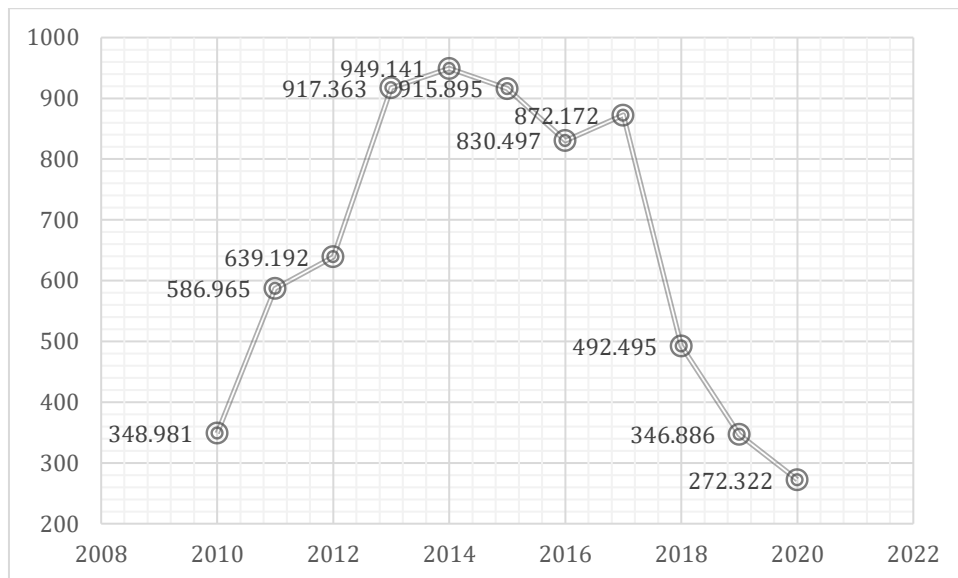


Fig. 1. Seaweed Production of Southeast Sulawesi Province in tons

Fig. 1 presents the seaweed production of Southeast Sulawesi Province from 2010-2020. The production fluctuated, with a trend to significantly decrease in the last three years (2018-2020). This condition indicates problems in the seaweed cultivation business in Southeast Sulawesi Province. Developing seaweed commodities is one of the strategic planning targets in the national fisheries.

The local communities in coastal areas and small islands manage the seaweed cultivation business in Southeast Sulawesi Province. In most cases, they utilize the longline method due to its ease of use, efficiency, and ability to produce good quality products. Related to post-harvest handling, most seaweed production in Southeast Sulawesi Province can only cultivate limited

to the drying process, which traders will then manage industrial domestic and foreign demands.

These problems of decreasing production to post-harvest management require methods and governance strategies to increase production, product quality, added value, business efficiency, and farmers' income, leading to improved community welfare. These issues are crucial not only to increase production and productivity but also to increase local household income and living standards [2]. Ref. [3] argued that an increase in seaweed production without being followed by an increase in prices could not simultaneously affect farmers' income. The bargaining position of seaweed farmers is also very weak due to the control of capital owners who have mastered the seaweed marketing network [4].

Government agencies and private institutions have implemented several plans to increase the income of seaweed farmers. However, poverty and low income remain the common issues faced by coastal communities. Based on this background, an additional in-depth analysis is required related to the characteristics of seaweed farmers in managing their business both from the social and economic aspects. These factors are essential because the socioeconomic characteristics of farmers in different communities influence their farming businesses' productivity and income [3]. Furthermore, in-depth information on cultivation characteristics is also necessary to formulate a strategic action plan for the empowerment and cultivation development programs.

Hence, this study outlines a current overview of the socioeconomic conditions of seaweed farmers, the characteristics of farmers in managing a seaweed cultivation business, and the different issues they face. Furthermore, this research will provide solutions for farmers, governments, and private institutions, providing alternatives for improving their livelihood.

Methods

This research was performed in Southeast Sulawesi Province. Farmer data was obtained in South Konawe Regency focused on four seaweed center villages: Bungin Permai Village, Lakara Village, Akuni Village, Tinaggea village, and Bombana Regency in Waemputtang village and Laeya Village. The respondents in this research are seaweed farmers and marketing actors. The data were obtained through Field surveys and interviews, where a survey is managed by observing the cultivation or marketing activities. Interviews were performed thoroughly following the different socioeconomic characteristics of the farmers. The examined social aspect includes education, business experience, age, and institutions, and the economic aspects include the capital and marketing system. The data were assessed descriptive-quantitatively using descriptive analysis.

Result and Discussion

The results of the study will be elaborated by explaining several vital aspects, such as social aspects, which include the characteristics of seaweed farmers from the aspects of age, education, business experience, and institutional and economic aspects, which include capital, marketing, and income.

A. Characteristics of Seaweed Farmers

Identification of the characteristics of seaweed farmers was performed on randomly selected respondents by looking at aspects of age, education, business experience, and the number of family supports. The detailed identification results are shown in Fig. 2, showing aspects of age, education, business experience, and number of family dependents.

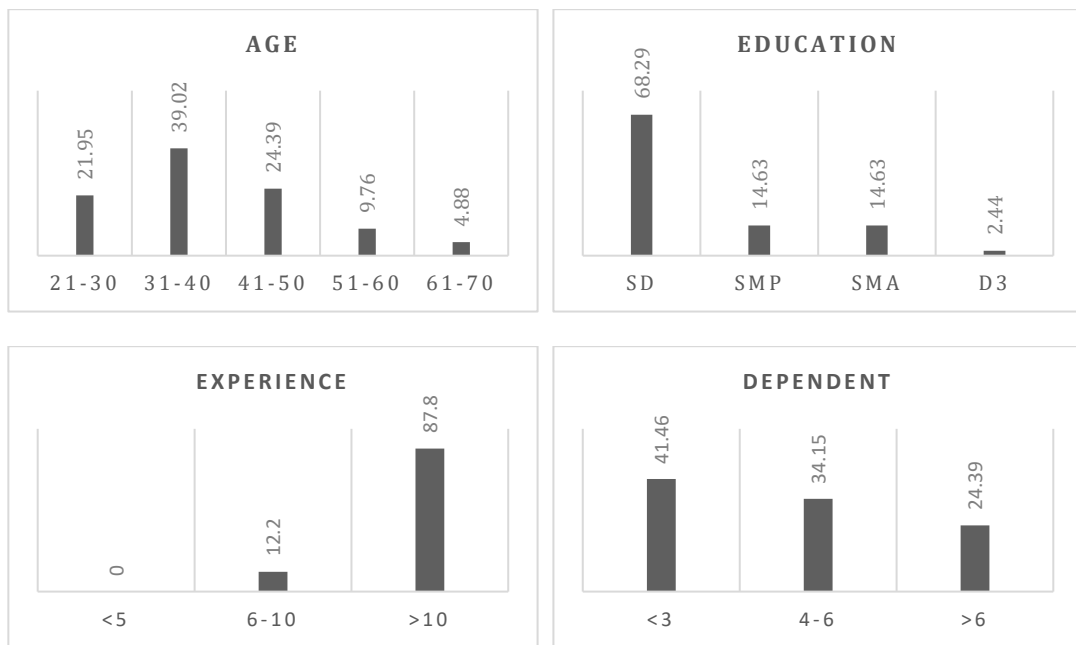


Fig. 2. Characteristics of Seaweed Farmers in Southeast Sulawesi Province

Fig. 1.a. illustrates the average age of seaweed farmers in Southeast Sulawesi Province is 31-40 years old. This result indicates the current trend of the seaweed cultivation business in Southeast Sulawesi Province, which is still prosperous based on workers' perspectives, as most of the farmers are of working age and will still be able to do the business for the next 10-20 years.

On the contrary, from the educational aspect, it is illustrated that the level of formal education achieved by seaweed farmers, in general, is relatively low, provided that the elementary school level reached a high percentage with 68.29% of the total respondents. This trend will undoubtedly impact business development because low education can affect the absorption and adoption of developments in cultivation technology innovations and business

systems. As a result, efforts are needed to increase the knowledge of farmers. Research related to the institutions and policies conducted in Malaysia highlighted the low level of education of farmers and temporary employment status in the seaweed cultivation business are the triggers for the slow process of policy implementation from authorities to the farmers [6]. The human capital development program that involves the seaweed cultivation process to seaweed processing is part of the consequence of increasing demands for seaweed products, both quality and quantity, as well as alternatives in facing global competition and high labor mobility between business sectors. According to Ref. [7] and [8], the drivers of economic growth are the accumulation of knowledge, continuous technological flows, and industrial innovations, which are the key to successful and sustainable economic growth in a country. The workforce acquires skills and becomes valuable resources from their achievements and awards [9]. According to Ref. [10] and [11], workforce skills emerge as an essential indicator of social aspects where this indicator has a direct influence on the performance of a business or industry. Ref. [12] claimed that human resources quality affects agribusiness and agroindustry's success.

Ref. [13] mentioned that, besides natural resources, several factors influence the competitive advantage of fishery commodities. Those factors are included the availability of human resources, knowledge resources (science and technology), capital resources, infrastructure resources, the state of demand and quality demands, the existence of related industries and internationally competitive supporters, relations, and coordination with suppliers, especially in maintaining the value chain. Moreover, the sustainability of seaweed raw material supply is primarily determined by the quality of human resources as the seaweed cultivation actors, so it is necessary to increase the quality of human resources through coaching programs both from the government and private sectors. For an effective and efficient coaching program, seaweed farmers must develop a cultivation support group. Ref. [14] argued that there are three recommended priority strategies in managing seaweed cultivation project, which includes streamlining the role of the government or related institutions for enriching the human capital, increasing financial resources, and implementing a market partnership structure.

Despite the formal educational aspect explained above, the business experience factor presented in Fig. 1.c should also be considered. It shows that most seaweed farmers in Southeast Sulawesi Province are fully equipped with practical skills and adequate experience for more than ten years. This condition has a positive impact on the success of the cultivation business. In other words, their farmers are knowledgeable on business know-how, understand the threats and weaknesses, can minimize potential failures, and have experience determining success. This experience can also be seen in the nuclear family's participation in managing the

cultivation business, as most of them usually begin the venture at a very young age. This experience allows farmers to manage their farms well and overcome existing obstacles. Experience also influences farmers' attitudes in making decisions related to innovations, as it takes courage to bear risks [12]. Based on the survey result captured in Fig. 2.e, it can be noticed that the number of family dependents is relatively small, with a percentage of 41.46%. Also, it should be noted that the family members, including wives and children, are participating in the cultivation process, especially during the process of tying seedlings, which is a process of drying and removing seaweed from the ris rope during harvesting. According to Ref. [15], seaweed cultivation technology is relatively simple, with low capital investment and a high product turnover rate. The seaweed can be harvested within five weeks and easily run by women or children.

B. Characteristics of Seaweed Cultivation Business

Identification of the seaweed cultivation business characteristics is conducted by analyzing capitalization aspects, production facilities availability, and marketing systems.

1. Capital System and Provision of Production Facilities

The capital system of seaweed farmers in the research area consists of two models: capital with its sources and borrowed capital from traders who buy gross seaweed products. The analysis results capturing the capital system aspect are presented in Fig. 3.

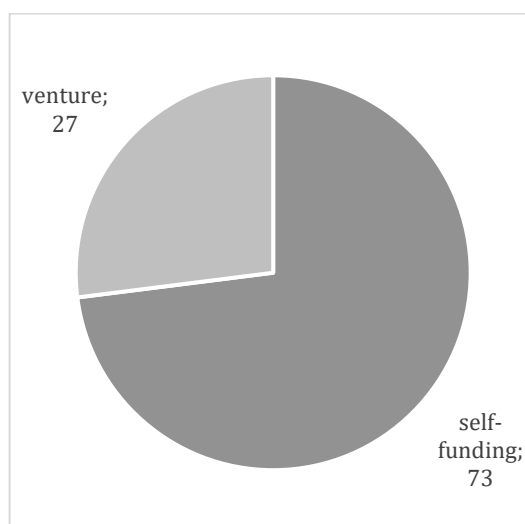


Fig. 3. Source of Business Capital

Based on the results of business capital aspects shown in Fig. 3, in most cases, the farmers rely on traders' capital to manage their business, as presented by 73% of the total respondents. Fig. 3 also indicates that seaweed farmers' independence in managing cultivation activities has not been guaranteed. The consequence of utilizing traders' capital is the existence of an obligation to sell their crops below the market price. The interview results show that the sales margin

gap between producing with personal savings and borrowed capital is around Rp.1,000 to Rp.2,000-/kg. According to Ref. [16], to increase competitiveness, efforts need to be made, including increasing promotion, improving product quality, encouraging banks to facilitate access to capital, and increasing infrastructure development.

In running their business, seaweed farmers must prioritize the concept of business efficiency and productivity so that farmers will get a significant margin between high costs and revenue which will later increase their profit. This issue occurred due to facing difficulties in acquiring capital resources. The business capital of seaweed farmers is expected to be supported by government policies by directly allocating capital through government programs and implementing government policies to facilitate the capital acquisition. Around 60-70% of seaweed farmers bind contracts with traders as they can provide a convenient lending option for procuring seeds, production facilities, and even for the children's education fees and health expenses [17],[18]. The role of seaweed traders is also challenging to eliminate when the seaweed marketing site is beyond the coverage, so a partnership strategy should be developed between farmer groups, traders/cooperatives, and agro-industrial managers. The existence of the seaweed agroindustry also becomes crucial in simplifying the marketing chain.

The field survey result shows that the capital is primarily used for seed procurement. The availability of raw materials becomes the most priority factor in the development of the seaweed business, indicating that the existence of seaweed farmers is fundamental to maintaining the supply of raw materials in the agroindustry. Ref. [19] argued that the main challenge in the agroindustry is the availability of raw materials, which is not only about the quality but also quantity or consistency of availability. Ref. [20] stated that the consistent availability of seaweed products as an agro-industrial raw material could be achieved if small-scale seaweed farmers are well monitored in funding, innovation, marketing, education, and social justice.

2. Characteristics of the Marketing System

Based on the results of marketing system aspects, it is reported that seaweed farmers sell their crops to small traders and wholesalers first, with no approach to corporates or directly to the agroindustry. Ref. [21] stated that if dried seaweed is further processed into ATC, the value will increase five times; similarly, if processed into SRC, the value increases to 7 times, and if it is processed into pure carrageenan in the form of RC the value can increase up to 18 times.

The sustainability of the seaweed cultivation business must be developed through integrated planning and management between the government, industrial sector, and seaweed farmers by considering economic, institutional, and technological factors [22]. It

is due to Indonesia's seaweed supply chain pattern involving vertical collaboration between farmers, traders, producers, and exporters [23]. To improve competitiveness, strategies need to be created by increasing product promotion by the agroindustry, both domestically and internationally, improving product quality, encouraging banks to facilitate access to capital, and increasing infrastructure development [16]. Studies conducted in Alaska show that seaweed management requires policies that can protect the fairness and sustainability of seaweed industry development. It will prioritize economic benefits and the interests of local and rural communities, reduce legal barriers in policy implementation and promote cooperative business development [24].

Conclusion

Seaweed farmers in Southeast Sulawesi Province are dominated by working-age farmers with excellent experience and relatively few family dependents but with a low formal education level. Thus, it requires the role of various parties, including the government and universities, in improving the quality and skills of farmers to be more innovative and adaptive to the development of innovation and technological developments in seaweed cultivation businesses. The source of capital for seaweed farmers is dominated by the source of capital from traders with result to the seaweed harvest must be sold to traders at a lower price, so that building partnership system that supports and protects each other between groups of farmers, traders/cooperatives and seaweed agroindustry with the support of the government and universities in the aspects of capital and technology is recommended.

Conflict of Interest

The authors declare that there is no conflict of interest.

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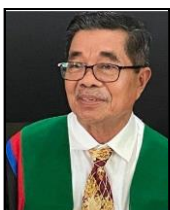
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