

The Study of Seaweed Cultivation Development in Bone District

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ABSTRACT

Some cultivators depend on the owners of capital, such as traders and entrepreneurs, so there is dependence on the owners of the capital. This study aims to determine the main factors that influence the development of seaweed cultivation; measure the contribution of these main factors to the development of seaweed cultivation, and determine the strategy for developing seaweed cultivation in Tanete Riattang District. East. Data were collected using observation, interview, and participatory rapid appraisal methods. Data were analyzed qualitatively. The results show that the main factors that influence the development of seaweed cultivation are the availability of 85.9% land with decent conditions, labor, business feasibility of 1.34 based on OI/Ratio analysis, access to capital, marketing results, post-harvest handling, and local government policies. Together and integrated, the main factors contribute to supporting and hindering the development of seaweed aquaculture. Possible development strategies These are land management and construction design of cultivation methods, application of long line and floating raft methods in offshore waters, activating extension of the "behavior" system (training and visits), setting planting schedules, technical guidance on cultivation and business management, forming Joint Business Groups (KUB), planning cultivation locations by involving stakeholders, zoning coastal and marine areas, forming partnerships between cultivators and entrepreneurs, and providing capital assistance with a revolving system and credit with interest subsidies.

Keywords: Seaweed, cultivation, behavior, government.

INTRODUCTION

The development of the fishery sector has experienced rapid progress in terms of increasing production, increasing exports, and increasing foreign exchange as well as improving the standard of living of the community, especially fishermen, fish cultivators, and fish processors. Various fishing activities have been oriented to profit (Adisasmita, 2006). One of the fishery commodities that have good prospects and provide benefits for farmers is *Eucaema cottonii* or *Kappaphycus alvarezii* seaweed. The potential of seaweed resources in the waters of South Sulawesi is quite large and the need for seaweed at home and abroad is quite high (Suharsimi, 2013). Therefore, seaweed cultivation is a very good business opportunity for optimal employment of families and coastal communities.

Seaweed cultivation is a new job that is labor-intensive and is increasingly in demand because of simple and easy cultivation and post-harvest technology and the use of relatively low capital so that it can be carried out by farmers and their families (Soebarini & SZ, 2003). This condition is supported by the selling price of seaweed which tends to improve, its high growth rate, and its short maintenance time so that farmers can earn income 6 times a year (Anggadireja et al., 2006). This ease of business factor becomes the foundation of hope for fishermen with

small capital so that many of them switch from fishing business to seaweed cultivation in coastal waters.

Bone Regency is one of the areas with potential for the development of seaweed cultivation. This area has 10 sub-districts located on the coast of Bone Bay with a coastline of 138 km with an area of 93,929 hectares of water (Dinas Kelautan dan Perikanan Kabupaten Bone, 2021). The ten coastal sub-districts in Bone Regency are potential areas for the development of seaweed cultivation. All of these problems are caused by internal factors of cultivators and factors outside of cultivators (external). If these problems are studied more deeply, they can be grouped into three aspects, namely social, economic, and environmental. These three factors can affect the development of seaweed cultivation.

Based on initial observations in the Tanete Riattang Timur sub-district, an interesting social aspect to observe is the social characteristics of seaweed cultivators. They come from various groups such as fishermen, farmers, traders, entrepreneurs, employees, and other coastal communities who do not have adequate basic knowledge and skills about seaweed cultivation techniques. Some of them make seaweed cultivation their main livelihood and some make it a side livelihood. Another interesting social characteristic is the role of family and community members which is high enough to give rise to intensive social interaction and the creation of mutually beneficial working relationships (Friedman, 1992). Family members and other communities participate in the process of preparing production facilities, installing seeds, and drying seaweed. From the economic aspect, it is interesting to observe the limited capital and access to financial institutions.

Some cultivators depend on the owners of capital, such as traders and entrepreneurs, so there is dependence on the owners of the capital. Seaweed cultivators who do not have capital tend to only work as workers and earn income based on a profit-sharing system. The development of seaweed cultivation is also inseparable from environmental influences. The environmental condition that is interesting to observe is the occurrence of "ice-ice" disease at the change of seasons from the rainy season to the dry season. Based on preliminary observations, it is known that at the change of seasons and during the dry season the growth of seaweed is not good.

The installation of piles, the size of the stretched rope, and the spacing of the plants are not guided by the existing technical instructions. Seaweed cultivation activities that are not by the technical guidelines have an impact on suboptimal production and the emergence of irregularities that have the potential to cause conflicts in the use of water areas (Kusnadi, 2006). The potential for conflict is also caused by the increasing number of cultivators. The increase in the number of cultivators causes competition to get locations that have the potential to trigger conflicts both between cultivators and cultivators and with other parties such as fishermen, shipping lanes, and coastal tourism.

Starting from the description above, it is necessary to conduct an in-depth analysis or study on how to develop seaweed cultivation by paying attention to the main factors that influence both the social, economic, and environmental aspects. Thus, the results of this study will provide an overview of the main factors that influence and how they contribute to the development of seaweed cultivation, and how the strategy for developing seaweed cultivation is. This study is expected to be a reference for the development of seaweed cultivation so that seaweed cultivation can develop and become a regional superior product and contribute to

increasing the income and welfare of cultivators in particular and coastal communities in general.

METHOD

This type of research is qualitative research using a case study approach. Qualitative research prioritizes descriptions in verbal or descriptive form by providing an accurate description of the characteristics of a particular individual, condition, symptom, or group, or to determine the frequency or spread of a symptom with other symptoms in society. According to (Suharsimi, 2013), descriptive research is research that explains, analyzes, or describes variables (conditions, circumstances, or situations) both past and present (currently happening).

Eucheuma cottonii seaweed cultivation in Tanete Riattang Timur District, Bone Regency. Factors that influence the development of seaweed cultivation such as land availability and water quality, human resources/labor availability, business feasibility, aspects of capital, market access and information, postharvest technology, and local government policies need to be known and measured their contribution in determining strategy. seaweed cultivation development policy. The research design is descriptive qualitative and quantitative. The strategy of developing seaweed cultivation was analyzed through SWOT analysis.

This research was carried out for three months, from January to March 2021 in Tanete Riattang Timur District, Bone Regency. The selection of this research location was based on the consideration that this area has quite large water potential, quite high seaweed production, and a large number of seaweed cultivators. The size of the research sample is determined by the characteristics of the population. According to Suharsimi (Suprianto et al., 2018), if the population is more than 100 people, the sample can be determined as 10% - 15% or more. The population in this study was the entire population of *Eucheuma cottonii* grass cultivators in the Tanete Riattang Timur sub-district which came from 6 villages, namely 150 people.

From this number, purposive sampling was carried out, namely sample research with certain considerations (Singarimbun & Effendi, 1989). The population of 150 people spread over six villages each taking 30% or 45 seaweed cultivators who are considered representative and can represent all seaweed cultivators in the area. This is by Bungin's (2001) opinion that although it is difficult to set rules on sample size, 30% of respondents are the minimum number stated by research methodologists. According to (Sugiyono, 2017), the main data in qualitative descriptive research is information in the form of explanations and reactions of related variables or as a cause and effect picture. The rest is additional data such as documents and others.

Identification of strengths/weaknesses and opportunities/threats. Prior to the SWOT analysis, the External Strategic Factor Analysis Summary (EFAS) and the Internal Strategic Factors Analysis Summary (IFAS) were identified. At this stage, a study of the factual conditions of the field and trends that may occur is carried out. The results of this study are used to identify strengths, weaknesses, opportunities, and threats to the development of seaweed cultivation. Analysis SWOT. In determining the best policy, weighting (score) is carried out on each SWOT element based on the level of importance and condition of the area or region. The weights or values given range from 1-3. Strength and opportunity elements are given a value of 1 which means not important/not big, 2 means important/big, and 3 means very important/very big. Weaknesses and threats are given the opposite value, namely 1 very important/very big, 2

means important/big, and 3 means not important/not big. After each SWOT element is given weight or value, the elements are linked together to obtain several development strategies (SO, ST, WO , and WT). The weights of each strategy are summed to produce a ranking of strategies.

RESULT AND DISCUSSION

The condition of the waters of the Tanete Riattang Timur District is technically still suitable for seaweed cultivation locations. Based on the results of observations and measurements of several water quality parameters, both those carried out directly at the research site and the results of relevant previous studies, the following can be stated: 1) The bottom of the waters is sandy loam with coral fragments (Surachmat, 2004). This is to the opinion of (Anggadireja et al., 2006) that such bottom waters are suitable for seaweed cultivation. 2) The average water brightness is 2.83 m or by the opinion of (Anggadireja et al., 2006) that the good water brightness for seaweed cultivation is 2-5 meters. 3) Temperature and salinity are on average 30,13 C and 28 – 33%. 4) The movement of water includes wave height and current speed. Based on a survey by the JICA Japan team, wave heights of 0.5 – 1.3 m and a current speed of 0.02 – 0.26 meters/second were obtained, while the results (Surachmat, 2004) obtained wave heights of 0.4 – 1.95 meters.

Waters can be utilized optimally with the long line method using anchors and raft methods. The seaweed cultivation method carried out by cultivators at the research site is the long line method using bamboo or wooden stakes. This method can only be applied in waters where it is still possible to install bamboo poles or logs, even though if you use the long line method using anchors, then offshore waters can be exploited to the fullest (Mubarak, 1991). The condition of the waters of East Riattang Tanete can be described as follows: the length of the coastline is 10.8 km with an area of 7,776 ha, and the area of water that has been used for seaweed cultivation is 37.5 ha and is limited to coastal areas only. Thus, the untapped water potential is still quite large.

Policies and attention from local governments on fisheries management in water areas are quite large. Based on factual conditions in the field that the development of seaweed cultivation is quite significant and has the potential to cause conflict with various parties, the Bone Regency Government has issued a Regional Regulation (Perda) concerning Fisheries Business Permits and Circular Letters of the Regent. Although the policy has not been maximized, the Regional Regulation and the Regent's Circular have become the basis for law enforcement in cultivated areas (Soekartawati, 1991). Seaweed cultivation is profitable. Based on the analysis of seaweed cultivation at the research site by using the Revenue Cost Ratio (R/C Ratio) analysis, the R/C Ratio is 1.34. R/C/Ratio 1, 34 means that every 1 rupiah expenditure will generate 1.34 rupiah or it can be said that the business is profitable and worth continuing. Based on the business analysis, it can be stated that the seaweed cultivation business has had a positive impact on the economic activities of the community. This provides an opportunity for increased economic activity that can have an impact on increasing the income of farmers which in turn can improve the welfare of coastal communities.

There is no spatial planning for the use of coastal and marine areas so there is the potential for conflict. Spatial planning or zoning of coastal areas is an effort to regulate the use of aquatic resources so that resources can be utilized properly without causing degradation or loss of function. In addition, people's assumptions about the common property regime need to be supported by a clear legal umbrella so as not to cause conflict with various parties. Respondents' answers about the threat element for the development of seaweed cultivation can be seen in Table 30. Based on the data in Table 30, it can be found that 88.89% of respondents stated that the absence of spatial planning for the use of coastal and marine areas is a threat to the sustainability of seaweed cultivation in the Tanete Riattang Timur District.

Seaweed prices fluctuate. The crucial thing that can threaten the development of seaweed cultivation is price fluctuations. In the middle of 2007, the price of grass had reached Rp 15,000, -/kg dry causing an increase in the number of cultivators. However, this price did not last long and tended to decrease until it reached Rp. 6,000, -/kg, and during the research, it rose to Rp. 7,000, -/kg, then decreased again in the price range of Rp. 5,500, - - Rp. 6,000, -/kg. The occurrence of seizure of cultivated land (Jamal, 1992). Along with the rapid increase in the number of cultivators, people are competing to use the sea for cultivation land and admit that the land is theirs. People who do not get a cultivation location, try to get land without paying attention to the interests of other parties. They even fought with cultivators who were the first to think that the sea was common property.

Another phenomenon that occurs is that some people trade the locations they have mastered for other people. Therefore, local governments should issue policies for structuring coastal and marine areas to prevent potential conflicts from arising. In addition, the policy can support the development of grass cultivation in the future. Lack of guidance and counseling by relevant agencies (Hartati, 2003). Coaching and counseling are needed to change people's behavior. Guidance and counseling to coastal communities, especially the cultivating community, is not only technical guidance on cultivation but also non-technical guidance, such as business management and how to access capital and marketing results.

Ice-ice disease on seaweed. A serious threat to successful cultivation is ice-ice disease. This disease attacks the thallus and causes the thallus to turn white and rot and then detach from the hanger. Based on the results of research by (Rani et al., 2009) in Tonra Waters, Bone Regency, it was found that the "ice-ice " disease attacked *K. alvarezii* seaweed from September to October. This is thought to be due to changes from the rainy season to the dry season which allow changes in the nutrient content in the waters. This disease arises due to changes in environmental conditions such as currents, temperature, brightness, and seasonal changes that are not suitable for seaweed growth which causes a decrease in the resistance of cultivated seaweed. Ice-ice disease attacks can cause crop failure and result in losses for cultivators.

The strength-Opportunities strategy is a strategy that uses all strengths to seize and take advantage of opportunities as much as possible. The greatest potential strength possessed in the context of developing seaweed cultivation in Tanete Riattang Timur District, Bone Regency, is (1) cultivation techniques are simple and easy to implement, (2) cultivators are still very interested in cultivating seaweed, and (3) ease of labor, (4) seaweed cultivation can be carried out on a small business scale, and (5) drying technology well done. This strength factor is a potential for the development of sustainable seaweed cultivation. Based on these strength factors, a strategy was chosen for the development of sustainable

seaweed cultivation, namely, (1) land arrangement and construction design of cultivation methods carried out by cultivators, (2) application of the long line and floating raft methods in deeper offshore waters.

The weakness-Opportunities strategy is a strategy that minimizes weaknesses to take advantage of existing opportunities. Factors that become a major weakness in efforts to develop seaweed cultivation in East Tanete Riattang District, Bone Regency, are; (1) cultivators lack capital and lack of understanding to get access to capital, (2) cultivators do not manage business finances properly, (3) there are differences in the perception of farmers towards the sea as a shared resource, and (4) lack of knowledge and skills regarding the feasibility of the cultivation location, seed quality, and the recommended spacing (Kartasmita, 1996). The strategy chosen is (1) to provide capital assistance with a revolving system and credit with interest subsidies, and (2) to guide cultivation techniques and business management.

The Strength-Threat strategy is a strategy that uses strength to overcome threats. The greatest potential strength possessed in the context of developing seaweed cultivation in Tanete Riattang Timur District, Bone Regency, is cultivation techniques are simple and easy to implement; cultivators are still very interested in cultivating seaweed; ease of labor; seaweed cultivation can be carried out on a small business scale; and drying technology well done. The strategy chosen is to establish a Joint Enterprise Group; arrange a schedule for seaweed planting and activate the extension of the "behavior" system (training and visits).

The weakness-Threat strategy is a strategy that minimizes weaknesses and avoids threats that arise. Factors that become a major weakness in efforts to develop seaweed cultivation in East Tanete Riattang District, Bone Regency, are: cultivators lack capital and lack of understanding to get access to capital; cultivators do not manage business finances properly; there are differences in the perception of farmers towards the sea as a shared resource; and lack of knowledge and skills regarding the feasibility of the cultivation location, seed quality, and the recommended spacing. The strategies chosen are to plan the location of cultivation activities by involving stakeholders; to make spatial planning/zoning of coastal and marine areas and to form partnerships between cultivators and entrepreneurs.

CONCLUSION

Based on the results of research and discussion, the following conclusions can be drawn: factors that influence the development of seaweed cultivation in Tanete Riattang Timur District are; land availability is 85.9% with decent water quality, human resources, and labor availability, business feasibility is 1.34 based on OI/Ratio analysis, access to capital, marketing results, post-harvest handling, and local government policies. Together and integrated, the main factors contribute to supporting and hindering the development of seaweed aquaculture.

Seaweed cultivation development strategy is; land management and construction design of cultivation methods, application of the long line method and floating rafts in offshore waters, activating extension of the "behavior" system (training and visits), arranging planting schedules, conducting technical guidance on cultivation and business management, forming a Joint Business Group (KUB), making plans for cultivation locations by involving stakeholders,

making spatial planning/zoning of coastal and marine areas, forming partnerships between cultivators and entrepreneurs, and providing capital assistance with a revolving system and credit with interest subsidies.

Further research is needed on; (1) the extent to which the impact of widespread coastal communities carrying out seaweed cultivation activities on changes in the welfare level of coastal communities, and (2) why seaweed farmers in Tanete Riattang Timur District choose and consider the right time to carry out seaweed cultivation activities at the time of the rainy season. Along with the proliferation of seaweed cultivation activities along the coast of Bone Bay, the long-term policy strategy that needs to be taken by district or cross-district governments together and in an integrated manner is to issue regional regulations on management and spatial planning/zoning of coastal areas. The aim is to regulate the utilization of coastal and marine resources so that the potential of the waters of Bone Bay can be utilized optimally and at the same time prevent conflicts with various parties.

REFERENCES

- Adisasmita. (2006). *Partisipasi Masyarakat dalam Pembangunan*. Erlangga Publisher.
- Anggadireja, T., Zalnika, A., H. Purwoto, S., & Istini. (2006). *Rumput laut. Penyebar Swadaya*. Penerbit Ende.
- Bungin, B. (2001). *Metodologi Penelitian Kualitatif Aktualisasi Metodologi Menuju Varian Kontemporer*. PT. Raja Grafindi Persada.
- Dinas Kelautan dan Perikanan Kabupaten Bone. (2021). *Dinas Kelautan dan Perikanan Kabupaten Bone*.
- Friedman, J. (1992). *Pemberdayaan: Politik Pembangunan Alternatif*. Penerbit Blackwell.
- Hartati, S. (2003). *Kajian Pemberdayaan Petani Rumput Laut dan Kontribusinya terhadap Kesejahteraan Masyarakat Pesisir di Pulau Panggang*. Program Pascasarjana IPB. Bogor.
- Jamal, E. (1992). Aspek Ekonomi Pengembangan Usaha Budidaya Rumput Laut di Indonesia. *Forum Riset Agroekonomi*.
- Kartasasmita, G. (1996). Pembangunan untuk rakyat: memadukan pertumbuhan dan pemerataan. *Economic Development--Indonesia; Economic Policy; Economic Conditions-1945*.
- Kusnadi. (2006). *Filosofi Pemberdayaan Masyarakat Pesisir. Pers Humaniora*.
- Mubarak, H. (1991). Potensi Produksi Karaginophyta Indonesia. *Prosiding Rapat Kerja Ilmiah. Teknologi Pasca Panen Rumput Laut. Kementerian Pertanian Republik Indonesia*.

- Rani, Petrus.P-M, Tjaronge, M., & Mun Imah, M. (2009). Musim Tanam Rumput Laut di Perairan Tonra, Kabupaten Bone, Pantai Timur Sulawesi Selatan. *Jurnal Penelitian Balai Riset Perikanan Budidaya Air Payau*.
- Singarimbun, M., & Effendi, S. (1989). *Metode Penelitian Survey*. LP3ES.
- Soebarini, & SZ. (2003). *Prospek Agribisnis Rumput Laut (Eucheuma cottonii) Dalam Meningkatkan Pendapatan Petani Di Kabupaten Takalar*. Program Pascasarjana Unhas. Makassar.
- Soekartawati. (1991). *Agribisnis*. Rajawali Pers.
- Sugiyono, P. D. (2017). *Metode Penelitian Bisnis Pendekatan Kuantitatif, Kualitatif, Kombinasi, dan R&D (Ke-3)*. Alfabeta.
- Suharsimi, A. (2013). *Prosedur Penelitian : Suatu Pendekatan Praktik (Edisi Revisi)*. Jakarta: Rineka Cipta. <https://doi.org/10.1017/CBO9781107415324.004>
- Suprianto, S., Arhas, S. H., & Salam, R. (2018). The Influence of Learning Media and Classroom Management Toward Students Learning Achievement in Office Administration Program at Public Vocational Schools in Tanete Riattang Subdistrict of Bone District. *Jurnal Ad'ministrare*, 5(2), 137–146.
- Surachmat, A. (2004). *Studi Dampak Pengoperasian Sero Terhadap Benih Ikan Kerapu (Epinephalus spp) di Perairan Kabupaten Bone*. Program Pascasarjana Universitas Hasanuddin.