

Seaweed Supply Chain Management In South Konawe Regency

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Abstract

Indonesia is known as an archipelagic country. Most of Indonesia's territory is the ocean. Considering that the territory of Indonesia consists of many islands, the potential for the development of seaweed cultivation is very large. This study focused on the supply of seaweed in the Tinanggea district, South Konawe Regency. The purpose of this study was to determine the supply chain mechanism and the performance of the seaweed supply chain in the South Konawe Regency. The method used in this research was descriptive qualitative and quantitative methods, namely research by describing the situation in the field through direct interviews, sampling techniques were carried out using snowball sampling. The results showed that the condition of the seaweed supply chain in Tinanggea District, South Konawe Regency had not been running well. The target market has an unclear target due to the finding of a problem that farmers do not yet know the quality of seaweed needed by the seaweed processing industry. Measurement of supply chain performance using a marketing efficiency approach shows that the supply chain has not yet achieved optimal performance, one of the two marketing channels has a low cost-to-profit ratio even though the margin and farmer's share are high.

Keywords: Seaweed, Supply Chain Management, Supply Chain Performance.

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I. Introduction

The world's need for seaweed continues to increase. According to Atmadja et al, (1996), the increasing world demand for seaweed is in line with the increasing use of seaweed for various purposes, including in the fields of industry, food, textiles, paper, paint, cosmetics, and pharmaceuticals (medicines). Apart from that, seaweed can be used as animal feed, fertilizer, and so on. Seaweed extracts act as biostimulants mainly due to the presence of plant hormones (R.Sasireka *et al*, 2016). World seaweed production is currently dominated by Asian countries such as China, Indonesia, the Philippines, South Korea, North Korea, and Japan (FAO, 2018). The world organization for food and agriculture FAO (Food and Agriculture Organization), wrote in the 2016 World Fisheries and Aquaculture report, that the world's consumption of seaweed is around 31 million tons with the most consumption being for food.

McHugh (2003), Bixler & Porse (2011), Anis *et al*. (2017), revealed that seaweed is a versatile plant species that can be used for various purposes, such as fresh, dry, powdered or flakes, salted canned, liquid extract or as ready and can be consumed directly by humans or can be used as food ingredients, fertilizers, biofuels, cosmetics and medicines, and others.

With the increasing world market demand, especially seaweed, both in the form of dried seaweed and in the form of semi-finished processing, the Indonesian government through the 2018-2021 development action plan has a program on the development of seaweed cultivation in all areas that have the potential for the development of seaweed cultivation. However, after this program was established, Indonesian seaweed production decreased compared to previous years.

Indonesia's seaweed production from 2017 has begun to decline until now. In 2017 Indonesian seaweed production began to decline until now. In 2017 the total production of Indonesian seaweed was 10.5 million tons, in 2018 it was 9.2 million tons and in 2019 it was 8.5 million tons (KKP, 2018 and BPS, 2021). Less effective in land use, causing a decrease in the volume of grass production. Based on data from the Ministry of Maritime Affairs and Fisheries, Indonesia has an area for seaweed cultivation activities reaching 1,110,900 ha, but the

development of seaweed cultivation only utilizes an area of 222,180 ha or 20% of the potential area (BPPT, 2021). Based on this, the government facilitates the development of more efficient seaweed in the future. As stated by Alejandro H. Buschmann (2017), in optimizing and developing more efficient seaweed, it is necessary to overcome several fundamental obstacles to achieve its potential contribution, there are critical aspects, such as improving the value of seaweed biomass, along with proper consideration of the ecosystem services that seaweed farming can provide. Additional considerations are environmental risks associated with climate change, pathogens, epibionts, and grazers, as well as the preservation of the genetic diversity of cultivated seaweeds.

Types of seaweed that are popularly developed in Indonesia today, such as *Eucheuma cottonii*, *Eucheuma spinosum*, and *Gracilariaverucosa* all belong to the red algae group. Of the three types of seaweed, the most widely developed in Indonesia is *Eucheuma cottonii* or commonly called *Kappaphycusalvareezi* which can be used as raw material for industrial purposes. This type of seaweed can produce carrageenan which is widely used as a gelling agent, emulsifier, thickener, stabilizer, and binder. The market demand, especially the domestic market and the international market, for this product is very broad, especially those engaged in industry, both food and non-food. The potential for the development of seaweed cultivation in Southeast Sulawesi Province, especially in the South Konawe Regency is very large but requires collaboration between stakeholders to compete in the global market. The establishment of mutually supportive cooperation in the supply chain can provide benefits to all those involved in these activities, especially for producers, namely seaweed farmers. Seeing the conditions mentioned above, it is necessary to know the supply chain mechanism, and the performance of the seaweed supply chain in the South Konawe Regency.

II. Materials and Methods

This research was conducted in Tinanggea District, South Konawe Regency. This research was conducted purposively because, in South Konawe Regency, the center of seaweed production is Tinanggea District. This research was conducted from January to April 2021.

Sampling was carried out using snowball sampling, based on the survey results it was found that the number of inter-regional traders was 2 people and local traders were 8 people, and seaweed farmers who were producers were 120 people. Considering that the population of seaweed farmers is quite large, the number of samples can be done with $120 \times 10\% = 12$ people. The total number of samples in this study was 22 people. Data collection methods in this study are primary data and secondary data. Primary data collection is done through direct interviews with all parties involved in the supply chain. Secondary data is data obtained from relevant agencies, such as the Central Statistics Agency, previous research journals, and literature books related to this research.

The focus of this study is to determine the management of the seaweed supply chain in South Konawe Regency, especially in Tinanggea District. The data analysis method used in this study is the method applied by Van Der Vorst (2006), namely the qualitative method of the Food Supply Chain Network (FSCN) to analyze supply chain performance with a marketing efficiency approach, through marketing margins and Farmer's share.

1. Marketing margin

Marketing margin according to Hanafiah and Saefudin (1986):

$$M = Hp - Hb$$

Description:

M = Marketing margin (IDR)

Hp = Selling price (IDR)

Hb = Purchase price (IDR)

2. Farmer's Share

To calculate Farmer's Share, use the Anggraini (2006) formula:

$$Fs = \frac{pf}{Pr} \times 100\%$$

Description:

Fs = percentage of the price received

Pf = price of seaweed at farm level

Pr = price of seaweed at the retail level

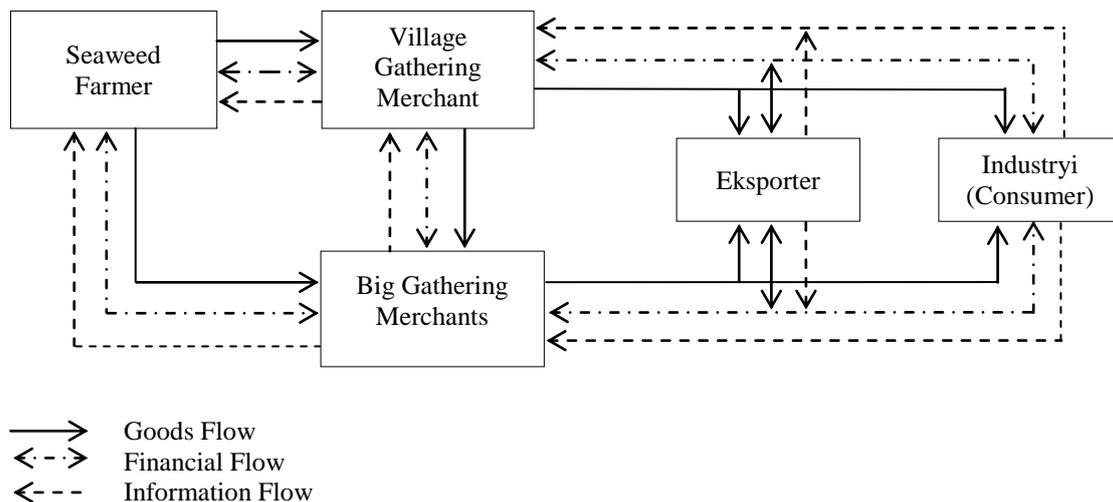
In the analysis of marketing margins and farmer's share, the only comparison is made between one marketing channel and another. The marketing channel that has a small marketing margin and the largest farmer's share is the most efficient, and the marketing channel that has the largest marketing margin and small farmer's share is the inefficient marketing channel.

III. Results and Discussion

The activities of the seaweed marketing system in the South Konawe Regency are carried out by supply chain actors quite well. Seaweed marketing starts from seaweed farmers as producers selling their products to village collectors or directly to inter-regional collectors. Meanwhile, village collectors will generally distribute their proceeds to wholesalers or inter-city traders or directly to the seaweed processing industry outside Konawe Selatan Regency. Wholesalers will distribute most of the seaweed to seaweed exporters in Kendari City, Makassar City, South Sulawesi.

Seaweed Supply Chain Mechanism in Tinanggea District, South Konawe Regency

Supply chain management is all activities related to the flow of material, information, and finance along the supply chain. In the seaweed supply chain in Tinanggea District, South Konawe Regency, there are three mechanisms. The mechanism of the seaweed supply chain in Tinanggea District, South Konawe Regency is described as follows:



Picture 1. Flow patterns and marketing channels of the seaweed supply chain in South Konawe Regency

Based on Figure 1 above regarding the marketing channels of the seaweed supply chain in Tinanggea Sub-district, South Konawe Regency, it shows that five marketing institutions are consisting of:

1. Seaweed farmer
Seaweed farmers are institutions or links that act as the main producers in the main supply of seaweed in Tinanggea District
2. Village collectors
Village collectors are intermediary institutions between wholesalers and producers.
3. Big collectors
Large collector traders are marketing institutions that obtain supply materials from village traders and or directly from producers and are institutions that function as suppliers for exporters and seaweed processing industries.
4. Exporter
The exporter is an institution whose main purpose is to market seaweed abroad.
5. Industry
The industry is the final institution or end consumer of seaweed marketing in Tinanggea District, South Konawe Regency.

Seaweed Supply Chain Performance in South Konawe Regency

Supply chain performance is a measure of a process that occurs in the supply chain. Performance measurement is a tool to see the level of the supply chain that is being run, for the measurement is done by looking at the level of marketing efficiencies such as marketing margins and farmer's share.

1. Marketing Margin
Marketing margin describes the costs incurred by each member of the supply chain from the profits earned by each member of the supply chain. The amount of marketing margin differs between marketing agencies because each marketing agency has different activities with other marketing agencies.

The largest total marketing margin is in channel one of IDR. 3,000/kg, channel one is the longest channel in distributing dried seaweed from farmers to village collectors, followed by wholesalers then to exporters, and/or continued to consumers (industry). Meanwhile, channel two is a shorter channel than channel one, with a total margin of IDR. 2,500/kg. Channel two of its marketing channel does not involve village collectors, otherwise, it is the same as channel one.

The highest marketing costs occur in channel one, this happens because the marketing distribution is quite long compared to channel two. The total cost of marketing on channel one is IDR. 1,900/kg while in the dual-channel the marketing cost is IDR. 1,700/kg. The biggest marketing advantage is in channel one of IDR. 1,300/kg and the profit on channel two is IDR. 800/kg.

Table 1. The margin of Seaweed Marketing Channels in Tinanggea District, South Konawe Regency

Supply Chain Actors	Chanel	
	I	II
Farmer		
Selling price (IDR)	13,500	14,000
Village Gathering Merchant		
- Purchase Price (IDR)	13,500	
- Selling Price (IDR)	14,000	
- Cost (IDR)	200	
- Profit (IDR)	500	
- Margin (IDR)	500	
Wholesalers		
- Purchase Price (IDR)	14,000	14,000
- Selling Price (IDR)	16,500	16,500
- Cost (IDR)	850	850
- Profit (IDR)	150	150
- Margin (IDR)	1,000	1,000
Exporter		
- Purchase Price (IDR)	15,500	15,500
- Selling Price (IDR)	17,000	17,000
- Cost (IDR)	850	850
- Profit (IDR)	650	650
- Margin (IDR)	1,500	1,500
Total marketing costs (IDR)	1,900	1,700
Total Profit (IDR)	1,300	800
Total Margin (IDR)	3,000	2,500

Source: Primary Data after processing, 2021

2. Farmer's Share

Farmer's Share is an indicator that measures how much of the share received by seaweed farmers as remuneration for the final selling price in the marketing channel. The larger the value of the farmer's share reflects an increasingly efficient supply chain, but it does not indicate that marketing is running efficiently.

The highest farmer's share is found in channel two of 82.4%, meaning that the share received by seaweed farmers in the Tinanggea sub-district is equal to the marketing agency so that the share of prices received by seaweed farmers is smaller than what consumers pay.

The difference in value is due to the price difference at the cultivation level. In channel one, the smallest farmer's share value compared to channel two is 79.4%. This channel has a lower value because it involves many marketing institutions as a result of the dependence of farmers' capital on village collector traders so that farmers are obliged to sell their seaweed production to village collector traders.

Table 2. Farmer's Share analysis on seaweed marketing channels in Tinanggea District, South Konawe Regency

Marketing channel	Farmers Selling Price (IDR/Kg)	Selling Price at Consumer Level (IDR/Kg)	Farmer's Share
Channel I	13,500	17,000	79.4%
S Channel II	14,000	17,000	82.4%

Source: Primary Data after processing, 2021

IV. Conclusion

Based on the results of the research above, the following conclusions can be drawn:

1. The condition of the seaweed supply chain in Tinanggea District, South Konawe Regency is currently not running well. The target market has an unclear target because farmers have not been equipped with the ability to understand seaweed that has the quality expected by the industry. The supply chain network

- management has not gone well, because it was found that some farmers have capital dependence on village-level traders. For farmers who do not have capital dependence, sales can be made directly to wholesalers.
2. The performance of the seaweed supply chain is measured using marketing margin and farmer's share indicators. The supply chain performance measurement has not yet reached optimal performance, one of the two marketing channels has a low cost-to-profit ratio even though the margin and farmer's share are high. Channel one has the highest marketing margin of IDR. 3,000/Kg. and the lowest farmer's share was 79.4%. In channel two, the lowest marketing margin is IDR. 2.500/Kg and the highest farmer's share is 82.4%.

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