

# Identification of Supply Chain Performance of Anchovy Commodity in Panomboman Village, North Sibolga, North Sumatera Province

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## ABSTRACT

Anchovies are one of the commodities in the fisheries sector in North Sibolga District, Central Tapanuli Regency and have a high selling value. However, the price of this commodity product is not fixed so that fishermen's income is not optimal. The purpose of this study was to identify the performance of the anchovy supply chain in Panomboman Village, North Sibolga District. This study is descriptive qualitative where the data collection methods are interviews, observations, and documentation studies. The results of the study show that the design pattern of the anchovy product supply chain network involves ten main actors, namely fishermen, collectors, wholesalers, retailers, and end consumers. There are three flows, namely the flow of goods from upstream to downstream, the flow of money from downstream to upstream and the flow of information from upstream to downstream and from downstream to upstream. The results of the study showed that the performance of the anchovy product supply chain in the village was considered inefficient because there was a fairly large marketing margin between fishermen and collectors, namely IDR 3,500 upto IDR 8,000/ Kg of anchovy products.

Finally, fishermen formed a group of fishermen and distributed their anchovy production directly to wholesalers.

**Keywords:** Supply chain, anchovies, fisheries

## INTRODUCTION

Fisheries might refer to all activities related to the management and utilization of fish resources and their environment starting from pre-production, production, and processing to marketing, which are carried out in a fisheries business system (see Law of the Republic of Indonesia Number 31 of 2004 concerning Fisheries). Report from the Central Statistics Agency of North Sumatera Province shows, in Central Tapanuli Regency in 2022, the amount of marine capture fisheries production can be seen at 61,898 tons.<sup>[1]</sup> The number of motor boats is 922 units, 714 motor boats, and 42 plank boats. Meanwhile, the number of fishermen in Central Tapanuli Regency in 2022 is 19,942 people consisting of 14,350 permanent fishermen and 5,592 non-permanent fishermen. The data above shows that the contribution of the fisheries sector to the economic growth of Central Tapanuli Regency plays a very important role.

Panomboman is one of the villages that is administratively included in the North Sibolga District, Central Tapanuli Regency. The location of the village on the coast makes it rich in fisheries potential and one of them is the potential of anchovies, and make it as one of the villages that produces and supplies anchovy products in the North Sibolga District. The anchovy processing business in the village is one of the superior commodities from capture fisheries with high selling value, however, the process of catching and processing anchovy products is highly determined by natural conditions such as season and weather. As a result, the quantity and quality of anchovy products by fishermen are difficult to predict. In addition, the price of anchovy products is also relatively unstable or often fluctuates. This has a major impact on the income and welfare of fishermen because there is no certainty about the price of anchovy products produced. However, fishermen are only resigned to the uncertainty of the market price of anchovy products which are set by collectors, because there is no involvement of fishermen in determining the price. The lack of integration of the fishery product supply chain causes fishermen's income to be less optimal.<sup>[2]</sup> The increase in distribution costs caused by the large number of parties directly involved in the anchovy product supply chain network in Panomboman Village also greatly affects the determination of the selling price of fishermen's production to collectors. Therefore, the fluctuating price of anchovy products can be caused by the management of the anchovy product supply chain that is not yet effective and efficient. The channel becomes inefficient because of the large number of supply chain actors involved.<sup>[3]</sup> Integrated supply chain management will increase the overall value generated by these networks.<sup>[4]</sup> The purpose of this study is to identify the performance of the anchovy product supply chain in Panomboman Village, North Sibolga District, Central Tapanuli Regency.

## **MATERIALS & METHODS**

### **Type of research**

The research approach used in this study was a qualitative descriptive research approach. Qualitative research methods were research methods based on post-positivism philosophy, used to research natural object conditions, (as opposed to experiments) where the researcher was the key instrument; data collection techniques were carried out by triangulation (combination), and data analysis was inductive/qualitative, and the results of qualitative research emphasized meaning more than generalization.<sup>[5]</sup>

### **Time and Place of Research**

This research was conducted on June 1 to August 1, 2024 at the Bagan Tancap fishermen's boiling place located in Panomboman, Sibolga Ilir Village, North Sibolga District.

### **Data Types and Sources**

The data required in relation to this research is qualitative data. In qualitative research, data is obtained from various sources, using various data collection techniques (triangulation), and is carried out continuously until the data is saturated.<sup>[5]</sup> The two sources of data required are primary data and secondary data where primary data is obtained directly from parties involved in the anchovy commodity supply chain by conducting interviews, observations and documentation studies. While secondary data is obtained from various literatures related to the object and purpose of this research.

### **Data Collection Methods**

The data collection methods used to obtain data in this study were interviews, observations, and documentation studies.

### **Data Analysis Techniques**

Sugiyono cited Miles and Huberman (1984) as stating that activities in qualitative data analysis were carried out interactively and continuously until completion, so that the data was saturated.<sup>[5]</sup> Activities in data

analysis were data reduction, data display, and conclusion/verification.

## RESULT AND DISCUSSION

### Overview of Research Object

Based on its geographical position, Sibolga City has the following boundaries:

- North, East, and South with Central Tapanuli Regency
- West with Tapan Nauli Bay

Sibolga has an area of 10.77 km<sup>2</sup> or 107,700 Ha consisting of 88,900 Ha of land on Sumatra Island and 18,800 Ha of land in the form of islands. Sibolga City has a tropical climate with a maximum temperature in 2017 reaching 31.65oC. Sibolga City is located on the West Coast of the Northern Part of Sumatra Island, namely in Tapan Nauli Bay, ± 350 Km South of Medan City. Geographically, the Sibolga area is located between 1° 42'1° 46 'North Latitude and 98° 44' - 98° 48' East Longitude. Sibolga City administratively consists of 3 Districts and 16 Villages and has an area of 2,778 Ha or 27.78 Km<sup>2</sup>, with a population of 86,441 people.

There are land, sea, and air transportation facilities and infrastructure (pioneer) in Sibolga City. In addition, there are also electricity, telecommunications and clean water facilities and infrastructure.

Sibolga City, which is a small city on the west coast of Sumatra, has great potential in

the fisheries sector. So far, the economy of Sibolga City has been greatly supported by the large results of marine fisheries. In general, the economy of Sibolga City is still supported by the agricultural sector (28.58%) followed by the trade, hotel and restaurant sector, which is 14.42%.

The agricultural sector mentioned is included in the fisheries sub-sector. The large contribution of these two sectors can be used as a basis for city development which must be supported by various existing facilities. The total production of sea fish in Sibolga City during 2017 was 686 tons and this number increased from 2016. South Sibolga District became the district with the largest amount of sea fish production, namely 238 tons and the lowest 87 tons was owned by Sibolga City District.

### Marketing Margin

Table 1 shows that fishermen need approximately 12 days to catch and process anchovy products. Meanwhile, the time needed by collectors to distribute anchovy products to wholesalers is 6-12 days. The margin between fishermen and collectors is IDR. 3,500 - IDR. 12,000/Kg. In terms of time, the difference is not too big. However, a striking difference is seen in the margin between fishermen and anchovy product collectors.

**Table 1. Marketing Margin of Freshwater Anchovies in Panomboman Village, Sibolga City**

No	Elements of Margin	Value in IDR/Kg					Duration
		H	TH	T	TB	B	
<b>1</b>	<b>Fishermen</b>						
	Marketing costs	93,75	93,75	93,75	93,75	93,75	12 days
	profits	59.500	54.250	42.240	39.280	27.500	
	Selling price	60.000	55.000	42.500	40.000	28.000	
	Margins	59.500	54.250	42.240	39.280	27.500	
	Profit ratio	639	585	452,9	425,6	297,6	
<b>2</b>	<b>Collectors</b>						
	Purchasing price	60.000	55.000	42.500	40.000	28.000	6 days
	Marketing	133,3	133,3	133,3	133,3	133,3	
	Profits	9.866,7	9.866,7	73667,7	3366,7	11886,7	
	Selling price	70.000	65.000	50.000	43.500	40.000	
	Margin	10.000	10.000	7.500	3.500	12.000	
	Profit ratio	74,01	74,01	55,2	25,2	89,02	

Source: Processed Data in June 2024

Description:

H: Fine anchovies

TH: Fine medium anchovies

T: Medium/medium anchovies

TB: Medium large anchovies

B: Large anchovies

Figure 1 shows the anchovy supply chain network in Panomboman Village, Sibolga.

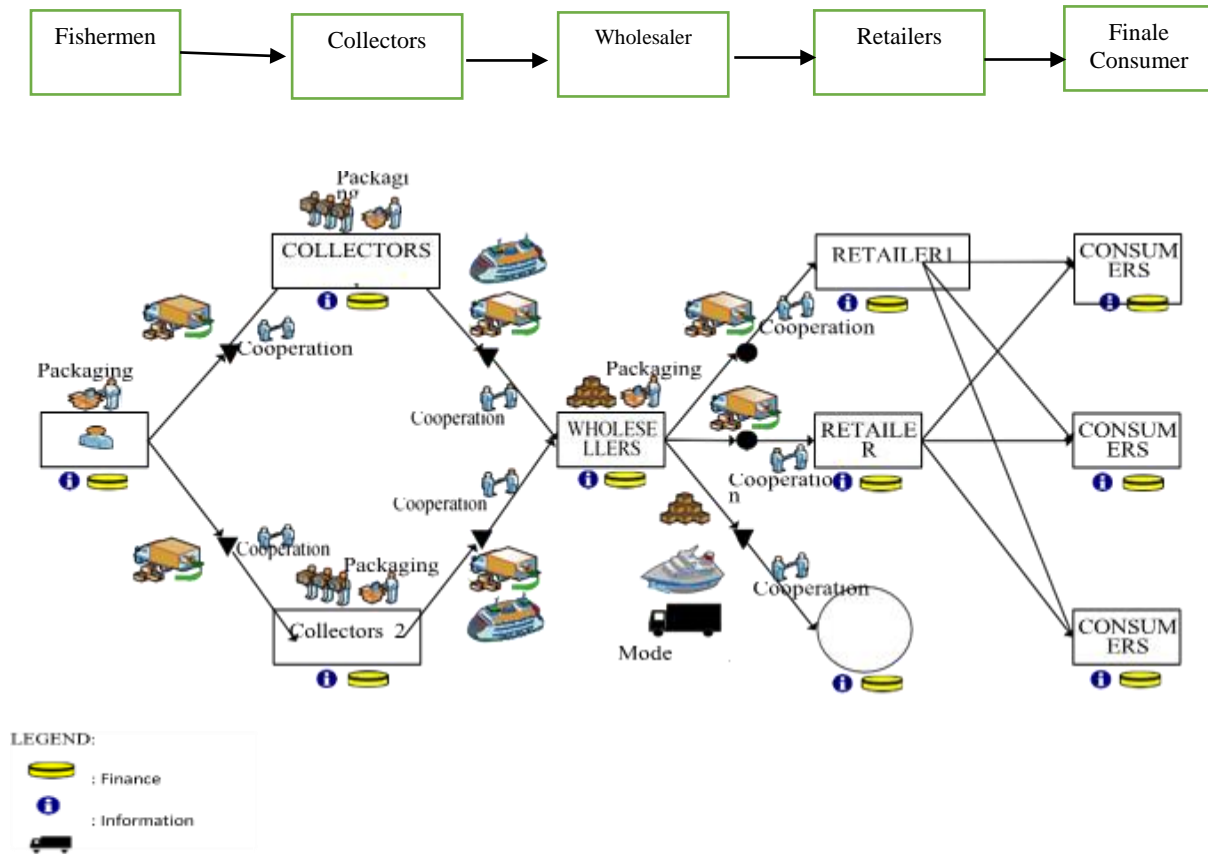


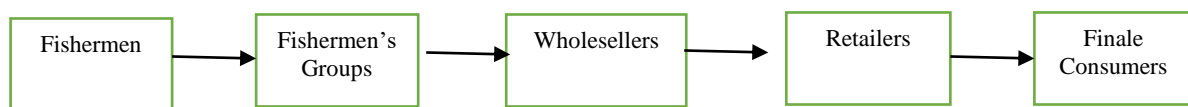
Figure 1. Anchovy Supply Chain Network Model in Panomboman Village

Figure 1 explains that the supply chain network of anchovy products in Panomboman Village starts from fishermen. The time needed by fishermen is 12 days for the process of catching and processing anchovy products. After going through the processing process, anchovy products are then packaged and sold to collectors using trucks at a price of IDR 28,000 - IDR 60,000 / Kg of anchovy. Meanwhile, raw anchovies or raw materials for salted anchovy products are sold to collectors at a price of IDR 300,000 / basket. The average weight of one basket is 40 Kg of raw anchovies. Before the sales process is carried out, there is an exchange of information between the owner fishermen and collectors regarding product prices, inventory, purchase quantities, and types, sizes and quality of products. Furthermore,

within 6 to 12 days, collectors distribute anchovy products to wholesalers in Medan City using trucks at a selling price of IDR 40,000 - IDR 70,000 / Kg of fresh anchovies. Meanwhile, salted anchovy products are sold at a price of IDR. 42,500 – IDR 72,500/ Kg. The exchange of information between collectors and wholesalers is information related to product prices, inventory, purchase quantities, and types of sizes and product quality. Then, within 1-2 days, wholesalers distribute some of the anchovy products to retailers in Ternate City with a selling price of IDR 42,000 – IDR 75,000/ Kg of anchovy. Meanwhile, salted anchovy products and most of the fresh anchovy products are sold to customers in Surabaya. The exchange of information between wholesalers and retailers is information

related to product prices, inventory, purchase quantities, and types of sizes and product quality. Then from the retailers, anchovy products are sold to end consumers within 1 day at a price of IDR 55,000 – IDR 100,000/ Kg of anchovy. The exchange of information between retailers and end consumers is information related to product prices, purchase quantities, and types of sizes and product quality. In the supply chain network of anchovy commodities in Panomboman Village, there is a fairly large

marketing margin between the owner fishermen and the collector traders. Although in terms of time there is not a big difference, the difference in margins is quite large, reaching IDR 12,000 / Kg. In addition, the selling price of raw anchovies as raw materials for salted anchovy products is also considered too low, which is IDR 300,000 / basket. This shows that the collectors enjoy more of the results of anchovy product production than the fishermen in Panomboman Village.



Alternative supply chain network for anchovies in Saolat Village, South Wasile District

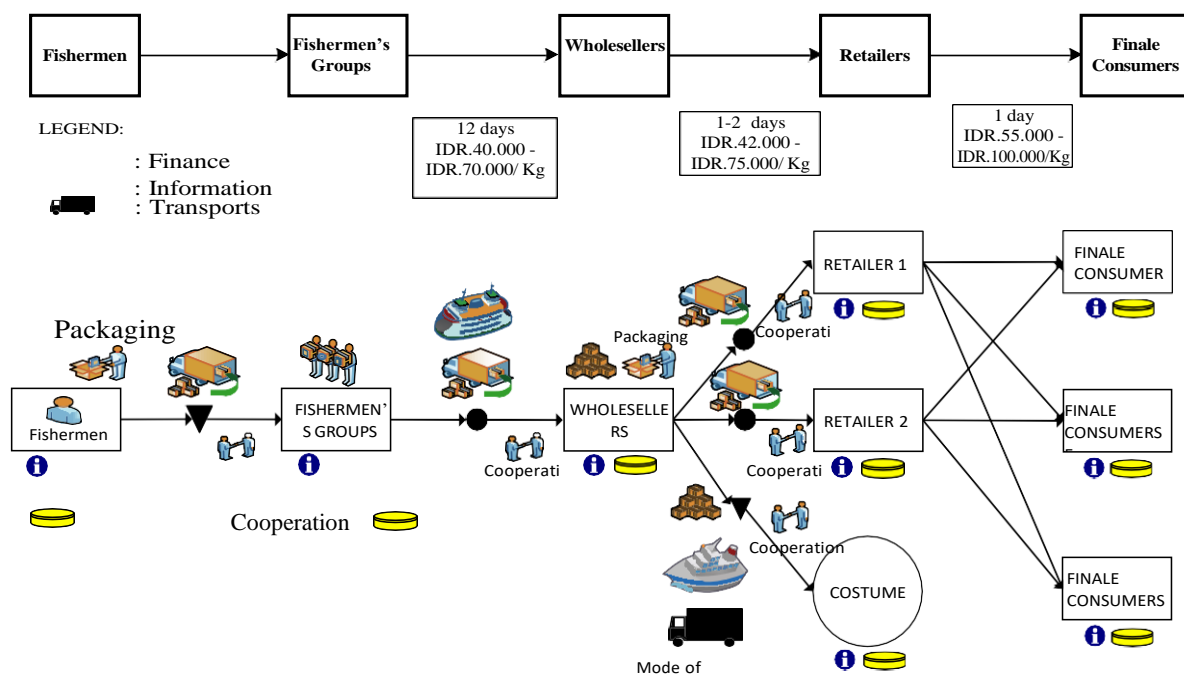


Figure 2. Alternative anchovy supply chain network in Saolat Village, South Wasile District  
Source Data processed, 2021

Figure 2 shows an alternative anchovy supply chain network in Panomboman Village, Sibolga City by eliminating collectors and replacing them with fishermen groups with the assumption that it is more profitable for fishermen because it has cut marketing margins. Figure 2 explains that the position of fishermen

groups is only as a liaison between fishermen and wholesalers directly. Thus, the price of anchovy products is adjusted to the price set by wholesalers so that fishermen get more profit than before without having to go through collectors. The alternative anchovy product supply chain network also explains that fishermen no

longer sell raw anchovies as raw materials for salted anchovy products. Thus, all raw materials are used for processing fresh anchovy products. This is more profitable for fishermen because it can increase the production of anchovy products in one season. This also does not reduce the production results that are distributed later because all the production results of fishermen in Panomboman Village are collected in the fishermen groups that are formed. Although the distribution process to wholesalers takes a little more time and costs because the distance travel is further from the collectors, fishermen still benefit in terms of income because of the fairly large marketing margin cuts. Panomboman Village is one of several villages included in the North Sibolga District. The geographical condition of the village located on the coast makes this village rich in fisheries potential and one of them is the potential of anchovies. This makes Panomboman Village one of the villages that produces and supplies anchovy products in the Sibolga City area. The business of catching and processing anchovies in this village is one of the superior commodities from capture fisheries that has a high selling value. Anchovies or the most familiar in the local community are "ngafi fish" which are small pelagic fish that are most often caught by fishermen in Panomboman Village. The results of interviews with fishermen who were key informants in this study showed that the process of catching and processing anchovy products in Panomboman Village is 12 days during the dark moon season, which is usually carried out in the second to third week when entering the new moon. The anchovy fishing gear used is a *bagan* boat equipped with nets and lights (a boat specifically designed for catching anchovies), with a fishing time of 7 hours in one day starting from 22.00 – 05.00 in the morning. The anchovy production process in Panomboman Village consists of six stages of production processes, namely the washing process, the moving process, the

draining process, the drying process, the sorting process and the packing process. Interview results with fishermen show that the production capacity of anchovies in one season can reach 1,200 - 2,000 kg of anchovy products. The high or low production capacity depends on the catch and weather conditions. For the distribution process to collectors, fishermen usually use vehicles in the form of trucks or pick-ups (adjusted to the amount of product distributed) at a cost of IDR 150,000 / one distribution. After arriving at the collector's warehouse, fishermen sell their products at a price of IDR 28,000 - IDR 60,000 / kg. In addition, fishermen in Panomboman Village also often sell raw anchovies to collectors who are also processors of salted anchovy products at a price of IDR 300,000 / basket. However, the income obtained from the sale of raw anchovies is less than the sales of anchovies produced. Furthermore, from the fishermen, the next supply chain process is the collector. Based on the results of interviews with collectors, it is known that before the buying and selling transaction is carried out, the fishermen's anchovies will be sorted first. Sorting is done by pouring, checking and sorting the type, size and quality of anchovies. Sorting aims to ensure whether the type, size and quality of the product sold by fishermen are in accordance with the specifications set or not. Interviews with collectors revealed that collectors buy anchovies from fishermen at a price difference of IDR 3,500, IDR 5,000, IDR 7,500, IDR 10,000 and IDR 12,000 lower than the selling price to wholesalers in Sibolga City. The determination of the purchase price of anchovies by collectors is based on the purchase price set by wholesalers in Sibolga City. If the purchase price of wholesalers falls, the purchase price set by collectors also falls. Conversely, if the purchase price of wholesalers rises, the purchase price set by collectors also rises. Based on the results of the interview, it is known that collectors are also processors of salted anchovy products. The raw materials for salted anchovy products are obtained

from fishermen in the South Wasile District. Usually, collectors come directly to the fishermen's boats to purchase raw materials for salted anchovies. The price set is IDR 300,000/basket with an average weight of 40 kg/basket.

After the transaction of buying and selling, the raw material of salted anchovies is taken to the production site to enter the production process. According to the collectors, the production capacity in one season can reach 1,000 - 9,000 kg consisting of freshwater anchovy products and salted anchovy products. The high or low production capacity depends on the amount of supply of anchovy products and salted anchovy raw materials from fishermen. For the distribution process to large traders in Sibolga City, collectors use truck transportation with a capacity of 4,000 kg - 5,000 kg for salted anchovy products and freshwater anchovy products. The distribution cost of anchovy products ranges from IDR 1,000,000 - IDR 3,000,000 / one distribution. The distribution process takes  $\pm$  5 hours to reach the warehouse of large traders in Sibolga City. Usually, collectors distribute their products in the morning with a travel time to Sibolga City of  $\pm$  1 hour. After arriving at the wholesaler's warehouse, the collectors sell their products at a price of IDR 40,000 - IDR 70,000 / Kg of freshwater anchovies. While the selling price of salted anchovy products is IDR 42,500 - IDR 72,500 / Kg. Furthermore, from the collectors, the next supply chain process is the wholesaler. Based on interviews with wholesalers, it is known that, before the buying and selling transaction is carried out, the anchovy products will be sorted first by pouring, checking and sorting the types and quality of the anchovy products. After that, the anchovy products are repackaged and arranged neatly in the warehouse. The supply of anchovies obtained, if lucky in one season, can reach  $\pm$  20,000 Kg. The high or low production capacity depends on the amount of anchovy product supply from collectors and fishermen. According to interviews, it is known that the price of

anchovy products is controlled by wholesalers. However, the price determination is based on product quality, market demand and also the demand for other goods in this case raw fish. Furthermore, within 1-2 days the anchovy products will be distributed to retailers at a set price of IDR.42,000 - IDR.75,000/Kg. While some of the freshwater anchovy products and salted anchovy products are exported to Singapore and some are distributed to Medan City. Furthermore, from wholesalers, the next supply chain process is the retailer. Based on the results of interviews with retailers, it is known that the purchasing capacity of anchovy products can reach 100 Kg - 300 Kg in one purchase. While in one month the retailers make purchasing activities 3-4 times.

According to the interview results, retailers usually buy anchovy products at a price of IDR 45,000 - IDR 80,000 / Kg depending on the type and size of the anchovy product purchased. The purchasing process is carried out by ordering in advance via mobile phone. Furthermore, retailers go directly to the wholesaler's warehouse to make cash and debt capital transactions. For the transportation process, retailers usually use motorbikes or pick-up trucks at a cost of IDR 15,000 - IDR 50,000 / one transportation. The anchovies purchased by retailers are then sold to end consumers at a price of IDR 55,000 - IDR 100,000 / Kg of anchovy products. Furthermore, from the retailer, the last process in the anchovy product supply chain is the end consumer. Based on the results of interviews with end consumers, it is known that the purchasing activity of consumers in one week is 1 - 2 purchases with the amount of anchovy products purchased ranging from  $\frac{1}{4}$  Kg - 1 Kg each purchase. According to consumers, the anchovies purchased are only to meet food needs. The type of anchovy size that is often purchased by consumers is the middle or medium size type. Because in addition to its size which is not too big, the price is also cheaper compared to the price of fine-sized anchovy products. Consumers buy middle-

sized anchovy products at a price of IDR 17,500 - IDR 70,000 / Kg depending on the amount of anchovy products purchased. The supply chain of anchovy products in Panomboman Village, Sibolga City involves 5 main actors, namely fishermen, collectors, wholesalers, retailers and end consumers. In addition, there are 3 flows that flow in it, namely product flow, money flow and information flow. Where products flow from upstream to downstream, money flows from downstream to upstream and information flows from upstream to downstream and also from downstream to upstream.

## CONCLUSION

1. The supply chain of anchovy commodities in Panomboman Village involves five main actors, namely fishermen, collectors, wholesalers, retailers and end consumers. In addition, there are three flows, namely the flow of goods flowing from upstream to downstream, the flow of money flowing from downstream to upstream, and the flow of information flowing from upstream to downstream and downstream to upstream.
2. Cooperation between all parties involved in the anchovy product supply chain network is considered quite good, as evidenced by the flow of information that occurs in all parties involved, but the performance of the supply chain is not very efficient. This is due to the fairly large marketing margin between fishermen and collectors, namely IDR 3,500 - IDR 12,000 / Kg of anchovy products. Fishermen are very disadvantaged in terms of marketing margins.
3. The problem faced by supply chain actors is the limited supply of good quality anchovy products, which is caused by the process of catching and processing anchovy products being highly dependent on the season and natural conditions such as weather.

4. There is no organized and sustainable fishermen organization or fishermen group as a liaison between fishermen and wholesalers in the direct distribution of anchovy products.

## SUGGESTION

1. It is better for fishermen to form fishermen groups by coordinating to hold discussions or meetings with fishermen who have the same type of business. This is done to agree on a place to store anchovy products produced by fishermen. Thus, all fishermen's production results can be distributed directly to wholesalers in cities of Sibolga and Medan so that the profits obtained by fishermen will be greater without having to go through collectors because of the marketing margin being cut.
2. The role of the government is very much needed to control and maintain the stability of the market price of anchovy products. This is done in addition to improving the welfare of fishermen also to reduce the mafia - mafia of anchovy products, in this case the wholesaler as the controller of the market price of anchovy products.
3. Further research is expected to continue the identification of the performance of the recommended salted anchovy supply chain in Panomboman Village, Sibolga City.

## Declaration by Authors

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## REFERENCES

1. Badan Pusat Statistik Kabupaten Halmahera Timur. Kabupaten Halmahera Timur dalam Angka 2019. Maba: BPS Kabupaten Halmahera Timur, 2019.
2. Soeratno D, Jan A H. Analisis Model Supply Chain Ikan Cakalang di Kota Manado (Studi Kasus Pada TPI PPP Tumumpa). Jurnal EMBA. 2016; 4(2):602–



612.  
<https://ejournal.unsrat.ac.id/index.php/emba/article/view/13116>. Accessed in February 9, 2020.
3. Saragih A E, Tinaprilla N, Rifin A. Rantai Pasok Produk Beras di Kecamatan Cibeber, Kabupaten Cianjur. *Jurnal Manajemen & Agribisnis*. 2017; 14(3).  
<https://journal.ipb.ac.id/index.php/jmagr/article/view/15456>. Accessed in February 12, 2020.
4. Budiman C, Massie J, Wullur M. Identifikasi Desain Jaringan Manajemen Rantai Pasok Kopra di Kota Manado (Studi di Kelurahan Bengkol dan Kelurahan Tongkaina). *Jurnal EMBA*. 2015; 3(2):65-76.
5. Sugiyono. *Metode Penelitian Kuantitatif Kualitatif dan R&D*. Bandung: Alfabeta, 2013.
- <https://scholar.google.co.id/citations?user=5S-rWZQAAAAJ&hl=id>. Accessed in January 17, 2021.

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