# STRUCTURE AND PERFORMANCE OF RICE SUPPLY CHAIN IN LUMAJANG REGENCY

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#### Abstract

This study aims to identify the structure, pattern, flow, and performance of the rice supply chain. This research is descriptive and analytic research which was conducted purposively in Lumajang Regency. Sampling using the snowballing method, starting from grain farmers in Candipuro and Jatiroto districts. To understand the structure and flow of the rice supply chain using a "rich picture building", to analyze the performance of the grain and rice supply chain, it is measured using the criteria of marketing margin and farmer's share. The results showed that (1) the structure of the rice supply chain was farmers, grain traders, grain millers, rice traders, rice retailers, and rice consumers, (2) the rice supply chain patterns were five, namely (a) farmers – small grain weighers – grain milling – rice wholeselers – rice retailers · consumers, (b) farmers - small grain weighers - large grain weighers – grain milling – rice wholeselers – consumers, (c) farmers - large grain weighers - grain milling (outside Lumajang), (d) farmers (outside Lumaiana) – larae arain weiahers - arain millina rice retailers - consumers, (e) large grain weighers (outside Lumajang) - arain milling - rice wholesalers – rice retailers consumers, (3) there are three flow of rice supply chains, namely product flow that flows in one direction from grain farmers ending to rice consumers, financial flow flows in one direction from rice consumers ending to grain farmers and information flows in two directions. and (4) the performance of the grain and rice supply chain in all supply chain patterns is efficient. Short-supply chain pattern is more efficient.

Keywords: structure, performance, supply chain, rice.

## INTRODUCTION

Rice is a very important crop, both as a source of livelihood for most of Indonesia's population as well as a food raw material. The harvested rice plant, called grain, will be further processed into rice, which is the

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staple food of the Indonesian population. Daulay (2020) states that almost 95% of the Indonesian population consumes rice as their main daily food, even according to Suryana et al. (2009) and Nurul et al, 2020)rice as the main food that has not been replaced, BPS data for 2021 (BPS, 2021) shows that the rice consumption of the Indonesian population in 2021 will increase by 1.12 percent (351.71 thousand tons) compared to 2020, from 31.69 million tons in 2020 to around 32.041 thousand tons. Galuh (2021) predicts the amount of rice consumption is expected to continue to increase until 2045 in line with population growth. This increasing demand for rice must be balanced with rice production. This is because the imbalance between demand and supply for rice will cause unrest in the community, especially in conditions of excess demand. Therefore, the availability of rice must be guaranteed in Indonesia.

The availability of rice is highly dependent on various factors, including the availability of grain, the presence of grain milling, the smooth supply of grain to rice mills, and the distribution of rice to consumers. Furthermore, (Lokollo, 2012 and Sultana 2012) conveyed that people's access to rice is highly dependent on the price of rice and its distribution. The importance of distribution in rice was also stated by Hezekiah (2018) that the distribution of grain to the grain mill company into rice and rice to consumers also determines it. The importance of rice in the economy makes rice no longer seen as a "goods", but as a commodity that enters the supply-demand cycle and develops in line with the growth of companies related to rice, thus creating a supply chain.

The supply chain involves the ongoing relationship between goods, money, and information. Goods generally flow from upstream to downstream, money flows from downstream to upstream, while information flows from upstream to downstream and downstream to upstream (Assauri (2011). The flow of goods from producers to consumers can be directly or through several intermediaries or traders and industries. According to Mailena et al., (2020), The supply chain of agricultural products is more complex because the cultivation and harvesting processes are highly dependent on the seasons and the production centers are widespread in several areas with varying production volumes and quality, and many actors are involved along the supply chain. Generally, business people involved in rice from upstream to downstream are farmers, middlemen, RMU (Rice Milling Unit), collectors, wholesalers, and retailers. Hezekiah (2018) argues that rice can reach consumers through four to six distribution points, namely farmers, middlemen, rice milling companies, large-scale rice wholesalers, small-scale rice wholesalers, and retailers. Kusuma (2021), Primasatya et al. (2020) and Aprillia et al. (2020) stated that basically the flow of rice products is divided into two major flows, namely the flow of grain products from farmers to grain mills and rice product flows from grain mills to rice consumers.

Various kinds of business actors involved in the rice supply chain are summarized in a rice supply chain structure and will lead to various patterns of rice supply chains. The length of the rice distribution chain causes high rice prices and is detrimental to several parties such as farmers and retail traders as well as consumers. Each business person will seek profit by taking into account the costs that have been incurred. This is reflected in the price difference between each of these business actors. According to Syamsudin et al. (2016) that in the supply chain of agricultural products, the marketing system is the most important part of when agricultural products are produced to reach consumers. Prices received and costs incurred by business actors can be used as the basis for supply chain performance analysis. Mirawati and Ira (2021) in their research to analyze supply chain performance using marketing margin and farmer's share criteria.

Lumajang Regency is one of the largest rice-producing districts in East Java. Based on data from the BPS East Java 2021 (Table 1), the development of rice plant area, rice production (GKP), rice (GKG), and rice production during 2018-2020 experienced fluctuations, where in all production decreased in 2019 but increased again in 2020. The decline in rice production in 2019 was due to a decrease in rice harvested land as well as a short rainy season. When viewed from the production of grain (GKP) into GKG and into rice indicates a shrinkage. This depreciation will have an impact on prices in each grain and rice business. Data One Data Lumajang (2022) and the Lumajang Regency Agriculture Office (2020) shows that at the GKP price of Rp.4,600,-, the price of GKG is Rp. 5,500,- and the price of rice at the consumer (district) level is Rp. 10,537.67,-. There seems to be a price difference in each marketing agency. Grain farmers get the lowest price. The magnitude of this price difference is also influenced by the length of the supply chain pattern.

Year	Paddy Land Area (Ha)	Grain Production (Ton GKP)	Grain Production (Ton GKG)	Rice Production (Tons)				
2018	56585.00	498,419	310,596.27	178.420.71				
2019	53,466.40	415,411	283.894.22	163,081.81				
2020	55,724.81	499.503	294,865.05	169,383.95				

Table 1. Rice area, rice production and rice production in LumajangRegency in 2018-2020

Source: BPS East Java, 2021 and One Data Lumajang 2020

In relation to the phenomena that exist in the rice supply chain, this study aims to identify the structure of the rice supply chain, the supply chain flow (product flow, money, and information) and analyze the performance of the rice supply chain (marketing margin, farmer's share) and the transmission of rice prices.

### LITERATURE REVIEW

### a. Supply Chain

"A supply chain includes all activities associated with the flow and transformation of goods from the raw material stage (extraction) to consumption by the end users, as well as the associated information flows both up and down the supply chain" (Monczka et al. 2002 in Chandrasekaran and Raghuram, 2004). Herjanto (2008) states that activities in the supply chain emphasize the fulfillment of consumer needs in which there is a flow and transformation of goods, information flow, and money flow. Research results from Christopher et al. (2021) regarding the rice supply chain in Sigi Regency, shows that the flow of the rice supply chain in Sigi Regency: first is the product flow that flows from upstream to downstream; the second is financial flows from downstream to upstream to downstream or vice versa.

### b. Supply Chain Structure

The supply chain structure is the arrangement of an activity item or a cooperation network for the procurement of goods or services that work together and are interrelated with each other to make and distribute goods or services. Chron (2020) argued that the market structure includes raw material suppliers, manufacturers, intermediaries, and end consumers. Research Stralen and Sri (2021) on the cliffs of Manado, Muammar and Irfan (2020) in East Acehand Armansyah et al. (2019). shows the structure of the rice supply chain is rice farmers, rice millers, wholesalers/distributors, retailers, and consumers.

#### c. Supply Chain Performance

Market performance can be seen from the farmer's share and marketing margin. In this case, the highest percentage of farmers' share and the lowest marketing margin percentage are seen (Evita et al., 2019). To analyzes supply chain performance, Mirawati and Ira (2021) using the criteria of marketing margin and farmer's share.

### d. Marketing Margin

The concept of marketing margin is the price difference at the farm level as a producer with prices at the final consumer level or at the retail level (Anindita and Baladina, 20117). At the macro level, marketing margins reflect market conditions at the marketing agency level. There are at least two market levels, namely the market at the farmer level and the market at the consumer level. Iswahyudi and Sustiyana, (2019) argues that the length of the marketing channel will determine the size of the marketing margin and also the farmer's share received by the farmer

e. Farmer's Share

Farmer's share is the ratio of the share received by farmers to the price paid by the final consumer (Evita et al., 2019, Asmarantaka 2012 and Kohls and Uhl, 2002). Research by Rini et al. (2012) resulted in the conclusion that the farmer's share in all rice marketing channels in Pulau Laut Timur District, Kotabaru Regency is above 40% so it can be said that the rice marketing channel is efficient.

# **RESEARCH METHODS**

This research was deliberately carried out in Candipuro and Jatiroto sub-districts, Lumajang district, with several considerations, including (1) representing wide, medium, and narrow irrigated rice planting areas: (2) there are rice milling companies (RMU) with large, medium and small capacities. . The research method used is a descriptive and analytic method. Sources of data and data collection techniques that will be used as the basis for analysis are primary data by means of interviews and secondary data by means of documentation and observation. According to Sugiono (2014), Nazir. (2010) and Walpole (1995) that the descriptive method is a problem-solving procedure that is investigated by describing the current state of the subject or object of research based on visible facts. The analytical method is used by applying several analyzes related to the field of study by compiling the data first, then analyzing it and conducting a deeper interpretation. The sampling method uses the snowball method. Nazir (2010) explained that snowball sampling is a non-probability technique commonly used for multi-level sampling. The starting point of the respondents who were taken in this study were grain farmers in Candipuro and Jatiroto sub-districts.

The supply chain performance analysis in this study is divided into two parts, namely the analysis of the performance of the grain supply chain and the analysis of the performance of the rice supply chain. The supply chain performance analysis tool uses the criteria of marketing margin, profit share, and Profit Index, with the following formula (Sudiyono, 2002 and Evita et al., 2019) adjusted for the commodity in this study.

MP = Pr - Pf

 $Fs = \frac{\mathrm{Pf}}{\mathrm{Pr}} x \ 100\%$ 

Where:

MP = Marketing Margin (Rp/kg)
Fs = farmer's share (%)
Pr = Price at the consumer level (Rp/kg)
Pf = Price at producer level (Rp/kg)
The rule in the marketing margin, the smaller the value of the marketing margin indicates the more efficient marketing (Sudiyono, 2002), while in the farmer's share the provisions are set. If > 40% is said to be efficient, otherwise if < 40% is said to be inefficient (FsFsDowney and Erickson, 1992). The decision rule for rice and rice supply chain performance in this study is to say that a supply chain performance is more efficient if a supply chain has a small marketing margin value and a large farmer's share compared to other supply chains in the same commodity.</li>

### **RESULTS AND DISCUSSION**

The rice business in Lumajang Regency includes various activities, namely the purchase of grain from producer farmers by collector traders, delivery of grain by four-wheel vehicle transportation, both pick-ups and diesel trucks to the grain milling company, drying process occurs, grain milling into rice, packaging, and warehousing, then the rice is distributed to rice wholesalers and rice retailers, both in the area of the milling company and outside the region, which ends up to consumers. There are several other terms in the rice supply chain institution in Lumajang Regency, including small weighing which replaces the name of grain middlemen, and big weighing which means the same as grain wholesalers.

For grain milling companies, the determination and network of cooperation with suppliers, both producer farmers and grain weighers, is very important regarding the delivery of goods, price agreements, and payment mechanisms as well as market information. Therefore, the good and harmonious relationship between the grain milling company and the weighers and farmers is a parameter in the rice supply flow mechanism. As a whole, the structure and flow of the rice supply chain in Lumajang Regency as shown in Figure 1.



Figure 1. Structure and flows of rice supply chain in Lumaiang Regency

From Figure 1, it can be explained in more detail about the grain and rice business actors who make up the supply chain system and supply chain flow as follows:

1. Rice Supply Chain Structure

The structure of the rice supply chain in Lumajang Regency is analyzed through the business actors who make up the rice supply chain with the role of each actor. Referring to Figure 1, the structure of the rice supply chain in Lumajang Regency is obtained as illustrated in Figure 2.



Figure 2. Supply chain structure in Lumajang Regency

Figure 2 shows that rice supply chain business actors in Lumajang Regency are farmers (rice producers), grain traders (small grain weighers and large grain weighers), grain millers, rice wholesalers, rice retailers, and rice consumers. The perpetrators of rice in Lumajang Regency are the same as their research. Stralen and Sri (2021), Muammar and Irfan (2020) and Armansyah et al. (2019). The differrence is that in this study in Lumajang, there are institutions that make up the structure of the rice supply chain, namely grain weighers or grain traders.

The roles of each of these institutions are as follows:

a. Farmer

Farmers are the rice business actors who start the rice supply chain. In this case, farmers are paddy producers. Paddy varieties planted by

farmers in Lumajang Regency include varieties of cibogo, zinc nutrition, sertani, impari 32, and ciherang. To produce maximum products (quality and quantity) efficiently, farmers apply the jejer legowo planting system. The reasons for applying the jejer legowo technique include (a) the need for relatively few seeds; (b) easier fertilization; (c) better air circulation; and (c) easier plant care. The main fertilizers used by farmers are manure, Urea, and Phonska, and some farmers add ZA and NPK fertilizers. The drugs to eradicate pests and diseases are Antracol Prevaton Insect, Idea, PGPR, Prevathon.

Farmers' land ownership is in the range of 0.25 - 3 Ha, where all of them are cultivated paddy, both on Planting Season I and Planting Season II, then the land is not planted or leaves. The majority of the cropping patterns applied by the farmers are paddy-paddy-berao, only a few farmers apply -palawija-berao. The decision to berao was not due to the unavailability of water resources, but rather because of the local tradition of the community who deliberately took a break from agricultural activities. The production capacity of rice in the first planting season was around 5-6 tons/ha. Not all of these crops are sold by farmers, but some are consumed for their own families, which is around 4-5 Kw. Farmers in Planting Season II produce a range of around 6.5-8 tons/ha. Yield of grain consumption is about 4-7 Kw. In organic farming systems,

Farmers sell their harvests to small grain weights in the form of Harvest Dry Grain (GKP). The reasons farmers sell their harvests in the form of GKP are not having drying facilities, avoiding the risk if it rains, avoiding damage to the grain if it is dried on the road, saving labor costs and so that they can get money quickly.

b. Grain Trader

The structure of the grain/rice supply chain in Lumajang Regency involves traders, both traders with small capital with limited access and traders with large capital with broad access to milling companies. Among producer farmers, grain traders are known as grain weighers. Based on the place of residence, the large grain weigher consists of a large grain weigher within Lumajang Regency and outside Lumajang Regency.

All grain traders sell their goods to grain milling companies in the form of harvested dry grain (GKP). There are several reasons why traders have not carried out the drying process, including (a) they do not have the facilities to carry out the drying process, both on the drying floor and storage warehouse; (b) insufficient capital, while requiring capital to make direct payments to producer farmers; (c) risky, especially purchases during the rainy season; (d) there is no difference or difference that is considered profitable between selling in the form of GKP compared to the price of dry milled grain (GKG), usually only around Rp. 100-200/Kg, and (e) selling in the form of GKP is a longstanding practice. Thus, traders do not give special treatment to the grain they buy from middlemen,

c. Grain Mill

Milling is a form of business that leads to agro-industry activities, so there are various activities carried out, which include:

• conduct a test of raw material for Harvested Dry Unhulled (GKP) obtained from producer farmers and traders/weighers;

• carry out the production process from Dry Harvested Unhulled (GKP) to Milled Dry Grain (GKG) to produce rice products using machine tools and labor;

• conduct a test of the resulting rice product to match the quality standards that consumers want

• carry out packaging with various sizes that have been determined by the milling company

• Storage of production results while still paying attention to storage warehouse standards, so that quality is maintained

• carry out delivery or distribution in accordance with the market share determined by the milling company

Grain milling is spread over several areas in Lumajang Regency, including: Pasirian, Tempeh, Sumbersuko, Rowokangkung and other areas. The status of the grain milling companies include: Limited Liability Company (PT), Trade Affairs (UD), Limited Liability Company (CV) and Farmer Group Association (Gapoktan). The grain mills in this study were UD Rojopolo, Rojopolo Village, Jatiroto District and PT Nagayana Venia Union, Tekung District, UD Tani Jaya, Tempeh District, UD Damai, Labruk Kidul Village, Sumbersuko District.

2. Rice Supply Chain Pattern

Referring to Figure 1, there are five patterns of rice supply chains in Lumajang Regency, namely:



Figure 3. Rice supply chain patterns in Lumajang Regerncy

Note: In Lumajang Regency Outside Lumajang

### 3. Rice Supply Chain Flow

Based on Figure 1, there are three streams of rice supply chain flow in Lumajang Regency, namely, the flow of goods, the flow of finance, and the flow of information. The explanation of the three flows is as follows:

(a) Goods Flow

Grain rice until it becomes rice that is ready to be consumed by consumers in Lumajang Regency flows from upstream to downstream, namely from rice producers to rice consumers. Farmer

is an early producer of raw materials obtained from rice cultivation. Rice crop yields in the form of GKP are sold by farmers directly to (a) middlemen and wholesalers who are outside the village in one subdistrict; (b) middlemen and wholesalers who are in the village in one sub-district. The harvest in the form of GKP is sold to middlemen.

Small grain weighers buying grain from farmers go directly to the harvest location, namely in the fields. The small consideration of village grain in buying grain is not only at the village level but also outside the village. The purchase of grain is done in farmers' fields using hanging scales. On average, small grain weighers buy GKP to each farmer about 2-2.5 tons depending on the farmers' rice fields. The grain that has been purchased by the middleman is sold to wholesalers and some are directly sold to the grain milling company. In transporting grain to wholesalers or to milling companies using pickups.

Grain wholesalers buy grain from various small grain weights. The grain that is accommodated by wholesalers is then sold to the grain milling company in the form of GKP as well. The average grain sold to grain milling companies is around 6-10 tons. The means of transportation used are trucks.

In grain milling, grain is purchased from small grain weights and large grain weights. Processed to become rice. Rice that is ready to be marketed, then the rice is distributed to wholesalers of rice. Rice is distributed to rice wholesalers in sacks (containing 500 kg per sack) and some are packaged in 25 kg, 10 kg, and 5 kg.

Milling generally takes raw materials in the form of Dry Harvest (GKP) for various reasons, namely: (a) having adequate production process facilities, both drying floors, milling machines (RMU), and storage warehouses; (b) guaranteed quality of raw materials to produce rice products according to consumer demand

There are 2 ways of milling to obtain grain, namely: (a) taking grain from traders/weighers on the grounds of having good relations, so that there is a guarantee of certainty of grain availability with the quality desired by the company; and (b) take directly to producer farmers, because producer farmers are members of the Association of Farmers' Groups (Gapoktan).

Locations for grain harvesting by milling companies: (a) harvesting from traders/weighers and farmers in the Lumajang Regency area on the grounds that they already have a good working relationship; (b) taking from traders/weighers, especially milling companies with large engine capacity, taking grain from other areas, including: Kencong District, Kalisat District, Jember Regency, the reason being the unavailability of grain in the region and better grain quality

(b) Financial Flow

Financial transactions in the rice supply chain in Lumajang Regency flow from consumers to farmers. The value of rice purchases by consumers is paid in cash to retailers (stores/supermarkets) according to the volume of purchases multiplied by the price of rice. The price of rice at the retailer is determined by the retailer. Furthermore, the price of rice paid by retailers to rice wholesalers is determined by rice wholesalers. Likewise, with the payment of rice by rice wholesalers to the grain milling company, the grain price transaction is carried out in 2 ways, yes 1) the price is determined by the small grain weigher and the large grain weigher,

Determination of the price of harvested dry grain (GKP) is determined based on (a)prices set based on information from the milling company;(b) the price is based on the percentage of grain, the determination of which is based on an estimate; (c) the price is determined based on the varieties grown by producer farmers, where the sintanor variety has a relatively high price compared to other varieties;

If there is a delay for some reason, but it is paid off relatively quickly, but the trader/weigher who violates the direct payment agreement, the producer farmer will sell his grain to other traders/ weighers.

### (c) Information Flow

The flow of information in the rice supply chain in Lumajang Regency has two directions, namely flowing from the consumer to the farmer and from the farmer to the consumer. Various kinds of information flowing in the rice supply chain, among others, information on the price of grain/rice, and quality of grain/rice.

Farmers obtain price information from various sources: (a) other farmers who are members of farmer groups; (b) farmer groups; (c) traders/weighers; and (d) milling companies. Traders/weighers obtain information on prices and needs from milling companies and other traders/weighers.

### 4. Supply Chain Performance

The supply chain performance analysis in this study is divided into two parts, namely the value of MP and Farmer's Share on (1) farmers: grain flow (farmers to grain milling) and (2) grain milling: rice flow (grain milling to rice consumers). Based on Figure 3, there are four patterns of grain flow in Lumajang Regency:

a) farmers – small grain weighers - grain millers

b) farmers – small grain weighers - large grain weighers - grain millers

c) farmers - large grain weighers - grain mills (outside Lumajang)

d) farmers (outside Lumajang) – large grain weigher – grain millers

Besides that, there are four patterns of rice flow:

- a) grain millers rice wholesalers rice retailers- consumers
- b) grain millers rice wholesalers consumers

c) Grain millers – rice retailers – consumers

The MP and Farmer's share analysis, data on grain prices and rice prices are required. The results showed the price of grain and the price of rice sold as illustrated in Figure 4.



Figure 4. Price of grain and rice on rice supply chain in Lumaiang Regency

### (a) MP and Miller's Share to Grain Farmers

Referring to Figure 4, the value of the marketing margin and farmer's share of grain farmers is obtained as shown in table 2. From table 2 it can be seen that all grain supply chain patterns in Lumajang Regency have a positive marketing margin value and have a farmer's share value above 40%. This means that the performance of the grain supply chain in Lumajag Regency is efficient. However, of the four supply chain patterns, the more efficient pattern is pattern 1, namely farmer - small grain weighing - grain milling (there is one trader) who has the smallest positive MP value and the farmer's share value is above 40%. When viewed from the length of the supply chain, the 1st and 4th supply chain patterns have one-grain weight/trader, only pattern 1

goes through small weights, while pattern 4 goes through large weights. For the 2nd and 3rd patterns, there are both grain traders (grain weighers: small and large). Kotler and Keller (2006) argue that the size of the marketing margin is influenced by the length of the marketing channel. In general, short marketing channels have lower or more efficient MP values than long marketing channels. Thus, the grain supply chain in Lumajang Regency in pattern 1 which is a short marketing channel is more efficient in accordance with existing theory. The results of this study are also the same as the results of the research by Rini et al. (2012).

Table 2. Value of marketing margin and farmer's share of grain inLumajang Regency, 2021

Supply Chain	Price of Grain in	Price of Grain in the	MP	Miller's Share	Ranking
Pattern	Farmers (Rp/kg)	Mill (Rp/kg)	(кр/кд)	(%)	Efficiency
1	4 500	4 700	200	06	1
T	4,500	4,700	200	90	T
2	4,400	4,800	400	92	2
3	4,400	4,800	400	92	2
4	4,400	5,100	700	86	3
5	-	4,700	-		*/

\*/ cannot be ranked because the farmers are from outside Lumajang Regency

(b) MP and Miller's Share on Grain Mill

Grain milling carries out packaging with trademarks that already have a distribution permit and storage in warehouses, including: Dewa Fruit, Seno, Cap Enak, Udang Mas, Abiyu, and Candi Semeru. The average price of rice marketed to rice traders is Rp. 8.700/Kg.

The results of the marginal analysis of product and miller's share on the flow of rice products starting from grain milling to rice consumers in Lumajang Regency are written as shown in Table 3.

Table 3. Value of marketing margin and farmer's share of rice inLumajang Regency, 2021

Supply Chain	Rice prices in Millers	Rice prices in Consumers	MP (Rp/kg)	Miller's share	Ranking of
Pattern	(Rp/kg)	(Rp/kg)	(	(%)	Efficiency
1	8,700	10,880	2.180	79	2
2	8.700	10.830	2.150	80	1
3	8,700	10,880	2.180	79	2

Table 3 shows that the three rice supply chain patterns have a positive MP value and a positive miller's share value above 40%. This means that the performance of the rice supply chain in the two supply chain patterns is efficient, but pattern 2 is more efficient than pattern 1 and 3. This is because the value of MP is the smallest and the value of Miller's share is the highest. Associated with supply chain length, where the first supply chain pattern is shorter than the second supply chain pattern, the results of this study indicate that the shorter the marketing channel is more efficient.

# CONCLUSION

Based on the results of the analysis, it can be concluded as follows:

1. The structure of the rice supply chain in Lumajang Regency is farmers, grain traders, grain millers, rice traders, rice retailers, and rice consumers,

2. There are five rice supply chain patterns in Lumajang Regency, namely:

(a) farmers – small grain weighers – grain milling – rice wholeselers – rice retailers – consumers,

(b) farmers – small grain weighers – large grain weighers – grain milling – rice wholeselers – consumers,

(c) farmers - large grain weighers - grain milling (outside Lumajang),

(d) farmers (outside Lumajang) – large grain weighers - grain milling - rice retailers - consumers,

(e) large grain weighers (outside Lumajang) - grain milling - rice wholesalers – rice retailers – consumers s.

3. There are three flows of rice supply chains, namely:

(a) product flow that flows in one direction from grain farmers to rice consumers,

(b) financial flows flow in one direction from rice consumers ending to grain farmers and

(c) the flow of information flows in both directions.

4. The performance of the grain and rice supply chain in Lumajang Regency in all supply chain patterns is efficient. Short supply chain patterns are more efficient.

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