

# Supply Chain of Pomelo Orange

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**Abstract:** *The limitation number production of Pomelo Orange in Pangkep District is uncertainty in supply chain arrangement. This research aims to analyze supply chain of Pomelo Orange in Padang Lampe and Punranga village, Ma'rang Sub-district, Pangkep District. Research design on farmer, merchant collector, retailer are chosen purposive sampling and home industry selected in total sampling. The analysis is qualitative analysis that descriptive identification from questionnaire, describe flow of the supply chain. The result of research show that there is the main perpetrators and perpetrators on supply chain Pomelo Orange. The flow of principal cultivators starts from the farmer until wholesalers and consumers there is also a flow of goods from the supporting actors to the main perpetrators. The flow of information is obtained from the main actors as well as the supporting actors. The flow of money starts from the consumer with the farmers and the main actors to the supporting actors. It was concluded that the supply chain of pomelo orange had the main perpetrators and supporters. The three flow of supply chain of pomelo orange is the flow of products, money, and information in research location looks good eventough the demand flow of products as much 17,86% unfulfilled.*

**Keywords:** Supply chain, pomelo orange

## 1. Introduction

Pomelo orange is a commodity agriculture that has good bright prospects within domestic market and export market. But farmers orange pomelo has not realized this potential. By therefore, a farmer system is needed know about the prospect of the orange pomelo so farmers can try farming pomelo and business of processed products pomelo orange or fruit sales fresh.

According to data from Food Crops Department and Livestock (2016), in 2012, market share pomelo oranges by 63% of total production to Java (parent market) using container as many as 650 containers, to the local market and Makassar 21%, the remaining 16% to Kalimantan Island and Sulawesi. In 2015, the market share of citrus pomelo increased by 85% of total production to Java Island (the parent market) and the remaining 15% spread to the local market in Sulawesi area.

Limited supply of fruit supply orange pomelo in Pangkep Regency resulted high uncertainty in the supply chain. The form of supply chain arrangement is very necessary got special attention. Needs to be approach in the supply chain of orange pomelo di Pangkep district is expected to be provides an overview of the availability of citrus supplies pomelo as a consideration of supply management the pomelo orange chain in delivering the product from producer to consumer as well as with consumers more easily get the product from producer. By knowing the supply chain of oranges pomelo in Padang Lampe Village, District Ma'rang, Pangkep District, able to provide the optimal solution for product precision, accuracy place and market needs.

## 2. Review of Literature

### a) Pomelo Citrus Plants (*Citrus Maxima Merr.*)

Grapefruit, grapefruit or pomelo are oranges are the largest fruit producers. Pomelo name suggested by the Ministry of Agriculture for oranges this has nothing to do with Bali. This orange including the kind that is able to adapt well in

dry and relatively disease-resistant areas, especially Citrus Virus Phloem Degeneration (CVPD) that once destroyed the crop oranges in Indonesia (Suharijanto, 2011).

Fresh orange pomelo fruit much containing water can be consumed directly after shelled by hand or mixed in rujak. The outer part of the skin that contains a lot oil glands. In Vietnam, interest is used to make perfume. Wood used for tool handle. The pomelo oranges are quality the fruit is still low kept for utilized leaves, flowers, fruit and seeds for cough medicine, fever and indigestion (Suharijanto, 2011).

### b) Supply Chain

According to Van der Vost (Purba, 2015: 5-6) defines a supply chain is a a series of activities (physical and decision making) connected by channels of goods and information and related to flows of money and opposite property with organizational limits. Therefore, management of the supply chain is important to creating integration from planning, coordination, and oversight of all processes business and activities within the supply chain delivering the expected value of consumers with the lowest possible cost to the supply chain overall at the same time meet the requirements of other actors in the supply chain.

The supply chain or supply chain is a system through which a business organization delivers goods or services to customers. This chain is also a network of interrelated organizations that have the same objective as effectively and efficiently as possible to provide the procurement or distribution of such goods or services (Indrajit, 2002).

Supply chain management is coordination of materials, information and intermediate financial flows participating companies. Supply chain management is also defined as all kinds of activities basic commodities until the final product sale to consumer. Supply chain management is alternative strategies that provide solutions within facing environmental uncertainty for achieve competitive advantage through reduction of operating costs and service improvements consumer and consumer satisfaction. Management supply chain is the process of value creation added goods and services that focus on efficiency and the

effectiveness of inventory, cash flow, and flow information (Anatan dan Ellitan, 2008).

According in Kalakota (2001), supply chain management is the coordination of materials, information and financial flows between participating companies. Supply chain management can also mean all kinds of commodity products to the sale of end products to consumers to recycle used products, namely:

- The flow of goods involves the flow of physical products from suppliers to consumers through the chain, as well as the backflow of product returns, services, recycling and disposal.
- The flow of information includes demand forecasting, order transmission and order status reporting, this flow goes both ways between the end consumer and the raw material provider.
- Financial flows include credit card information, credit terms, payment schedules in ownership designation and delivery.

### 3. Material and Methods

Selection of the location of this study was conducted the Scatter Plot or XY Plot is done in Desa Padang Lampe due to the total production level orange pomelo and land area in the area high. In addition, the village of Punranga was also made as the location of research because there is location where the orange processing industry is home pomelo. The timing of the study began in May until July 2017.

This study focuses on the supply chain orange pomelo in Padang Lampe Village and Village Punranga, Ma'rang District, Pangkep District. Writing the results of this study conducted on a descriptive or qualitative. The population is all over farmers, collecting traders, retailers and home processing industries in the Village Padang Lampe and Punranga District Ma'rang Regency of Pangkep. Type of sample used is purposive sampling for farmers, traders collectors and retailers. Total technique sampling is used for home industry processing. The type of data collected is primary data in the form of direct interviews with respondents through questionnaires according to the variables studied and secondary data in the form of data from institutions / agencies or related parties directly with this research (Padang Lampe Village and Punranga Village, Food Crops Department and Pangkep District Farm).

### 4. Result and Discussion

#### a) Overview of Research Sites

Pangkep regency is an area Level II located in the western part of Sulawesi South. Citrus-producing center in the District Pangkep is in Ma'rang Sub-district. Sub-districts Ma'rang is located 0° to 10° LU 37° east and 40° up to 42° BB. Padang Lampe Village and Punranga Village is a village in the Sub-District Ma'rang. Pangkep District which is 9 km away from the capital district and 15 km from the City Pangkajene capital of Pangkep District.

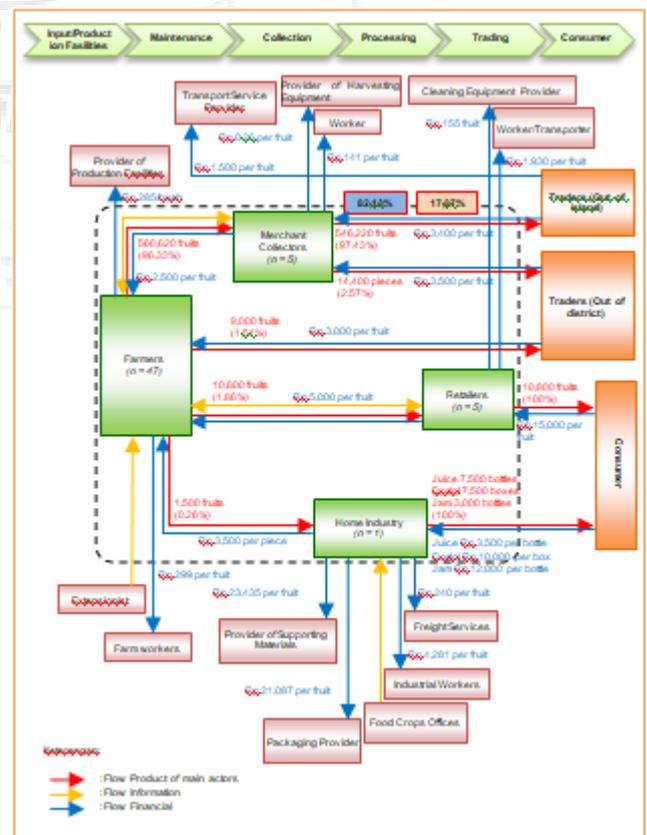
Area of Padang Lampe Village and Punranga Village is a lowland with altitude ranges from 2-15 meters above sea

level. At the western end of this village there is still a tidal influence especially in the season dry. That is why in the west end of the ground water there is still little influence of sea water with levels the highest salt BP3K monitoring results Ma'rang Sub-district, once reached 10 ppm, at the height of the dry season. But this condition rarely occurs only in long droughts. But people aged the highest 2 ppm.

Population in Padang Lampe and The village of Punranga in 2016 is 6,328 inhabitants with a population density of 446 inhabitants / km<sup>2</sup> and has a total of 2,100 households head of family. Among the two villages, the Village Padang Lampe is a village that has the densest population of 4,042 inhabitants with a population density of 346 soul / km<sup>2</sup> and the number of households is 1,351 heads family.

#### b) Supply Chain of Pomelo Orange

The supply chain of pomelo oranges in Padang Lampe Village and Punranga Village, Ma'rang District Pangkep District consists of several actors supply chain. The supply chain actor who involved are the main actors and supporters Each supply chain participant performs activities according to their respective roles. Corresponding with the opinion of Chopra and Meindl (2007), chains the supply has dynamic properties however involves three constant streams, that is, the product flow or goods, information flow and money flow. The supply chain of pomelo oranges in Padang Lampe Village and Punranga Village, Ma'rang Sub-District, Pangkep District, 2016 can be seen in Figure 1.



**Figure 1:** Supply Chain of Pomelo Orange in Padang Lampe Village and Punranga Village, Ma'rang District, Pangkep District, 2016.

Figure 1 shows that there are four main actors in the pomelo orange supply chain in the study area consisting of farmers, collecting traders, processing household industries and retailers while the supporting actors in the supply chain of pomelo oranges consist of providers of production facilities, transport service providers, agricultural equipment, laborers, extension workers, farm laborers, supporting material providers, packaging providers, industrial workers and food crops agencies. The supply chain of orange pomelo also explains that there are three streams, namely:

- (1) The flow of pomelo oranges begins with farmers as producers. Farmers supply pomelo orange to collecting merchants as much as 560,620 units (96.33%), retailers (local) 10,800 pieces (1.86%), merchants (outside regencies) of 9,000 (1.54%) and home industry processing as many as 1,500 pieces (0.26%). So the total production of pomelo farmers as much as 581,920 pieces. Collecting traders supply pomelo oranges to traders (outer islands) of 546,220 fruits (97.43%) and traders (outside regencies) as many as 14,400 pieces (2.57%). Merchant retailers sell pomelo oranges to 10,800 fruits supplied by farmers. Home industry before being sold to consumers, pomelo oranges obtained from farmers are processed first in the form of juice, fruit dodol and jam. home industry processed 1500 pomelo oranges by producing fruit juice as much as 7,500 bottles, dodol as much as 7,500 boxes and 3,000 bottles of jam to the consumer.
- (2) The flow of information occurring in the supply chain of orange pomelo located at the research location indicates that the flow of information or communication is well integrated. Communication activities are done via telephone or when both parties meet each other directly. Farmer information to the collecting merchant and the retailer he delivered includes pomelo oranges ready to be harvested and marketed to the consumer because the farmers only on the maintenance of pomelo orange trees until ready for harvesting the pomelo fruit. Farmer information to the collecting merchant and the retailer he delivered includes pomelo oranges ready to be harvested and marketed to the consumer because the farmers only on the maintenance of pomelo orange trees until ready for harvesting the pomelo fruit. Farmer information to the collecting merchant and the retailer he delivered includes pomelo oranges ready to be harvested and marketed to the consumer because the farmers only on the maintenance of pomelo orange trees until ready for harvesting the pomelo fruit. Information collecting merchants and retailers to farmers is the quantity of demand for pomelo oranges to farmers as well as information on price agreements. Merchants collectors to wholesalers inform the fulfillment of quantity and delivery time of pomelo oranges. In addition, large traders informed the demand for quantity and quality of the desired pomelo before the collecting merchant harvested the pomelo orange on the farmland of the orange pomelo farmer. Information on pricing, collecting merchants and retailers of mutual negotiations to obtain collective agreements is calculated on the basis of the costs incurred by each party in order for them to benefit. Extension workers

are assigned to inform the cultivation of pomelo oranges in accordance with standard operational procedures. The Food Crops Agency provides technical training of the home industry processing industry on the processing of pomelo fruit into a product in order to get its own added value and consumers can enjoy pomelo orange in the form of processed products.

- (3) The money flow begins from the farmers to buy production facilities such as, fertilizers, pesticides and herbicides to support the process of raising pomelo crops with a cost of Rp 285 of the fruit, farm laborer wage of Rp 299/fruit, pomelo selling price to collecting merchants amounting to Rp 2,500/piece, to a retailer of Rp 5,000/fruit, to traders (outside the district) of Rp 3,000/fruit and household industries of Rp 3,500/fruit. Collecting traders buy pomelo oranges at farmers amounting to Rp 2,500/ piece, incur the cost of harvesting equipment such as bamboo gala Rp 2,500/gala. Receiving merchant collectors from traders (outside the island) of Rp 3,400/ fruit and traders (outside the district) of Rp 3,500/fruit. Retailers pay a fee of Rp 155/piece to laborers and labor wages of Rp 1,930/piece. The acceptance of retailers from consumers amounted to Rp 15,000/ piece. The household processing industry incurs costs for supporting materials of Rp 23,435/piece, packing providers of Rp 21,087/fruit, transportation services of Rp240/fruit and industrial laborers of Rp 4,281/piece. Household processing industry acceptance from consumers in the form of juice of Rp 3.500/bottle, dodol Rp 10,000/box and jam of Rp 12,000/ bottle.

**c) Supplier Chain Activity**

Activity in the supply chain begins with the demand from the consumer and ends with the payment activity by the consumer once the demand is met. In the supply chain of Pomelo oranges in Padang Lampe Village and Punranga Village, Ma'rang Sub-district, Pangkep District there are 2 types of perpetrators, the main actors and the supporting actors. The activities of the main actors in the supply chain of orange pomelo can be seen in Table 1.

**Table 1: Main Activity of the Pomelo Orange Supply Chain in Padang Lampe Village, Ma'rang District, Pangkep District, 2016**

No.	Main Actors	Activity
1.	Farmers	<ul style="list-style-type: none"> <li>✓ Buying production facilities for the maintenance of pomelo oranges</li> <li>✓ Perform maintenance of pomelo orange plants</li> </ul>
2.	Merchant collector	<ul style="list-style-type: none"> <li>✓ Sorting</li> <li>✓ Harvesting</li> <li>✓ Collect and buy pomelo orange farmers</li> <li>✓ Transporting crops</li> <li>✓ Sell pomelo oranges to trades (out-of-island) and trades (out-of-district)</li> </ul>
3.	Retailers	<ul style="list-style-type: none"> <li>✓ Purchase orange pomelo from collecting merchant</li> <li>✓ Harvesting</li> <li>✓ Freight</li> <li>✓ Cleaning</li> <li>✓ Sell pomelo oranges to consumers</li> </ul>
4.	Home Industry	<ul style="list-style-type: none"> <li>✓ Pomelo purchase from farmers</li> </ul>

	Processing	<ul style="list-style-type: none"> <li>✓ Process pomelo orange into a processed product made from raw pomelo orange</li> <li>✓ Selling processed pomelo orange products to consumers</li> </ul>
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Table 1 shows each of the key actors of the orange supply chain pomelo performing activities according to their role. The activities of supply chain actors include:

1. Farmers

Pomelo orange production facilities, among others, fertilizers, pesticides, herbicides and agricultural tools. Farmers can obtain the needs of these production facilities through kiosks / shops of agricultural production facilities in the local area. Farmers play a role in the maintenance of orange pomelo in his farming land include: pruning, fertilization, watering and pest control.

2. Merchant Collector

Post harvest activities conducted by collecting traders are sorting, harvesting and hauling. Pomelo orange purchases to farmers by collecting traders deal directly with farmers. The sorting process is done before the pomelo fruit is picked by looking at the orange pomelo whether the orange is in accordance with the criteria desired by the collecting merchant. After that, collecting merchants also harvest pomelo oranges directly in the farmers' land. Furthermore after harvesting, pomelo orange is transported to the collecting merchant's warehouse before transporting to containers to be marketed in Java Island such as Pasar Induk Keramat Jati Jakarta and Mekar Mulya Panyileukan Bandung Market.

3. Retailer

Local reseller traders are retailers who buy oranges directly to pomelo orange farmers. Merchant retailers who harvest pomelo orange bought in farmers farming farms sold to consumers in the area Pangkep precisely on the edge of along the wa Ma'rang Sub-District. transportation is also carried out by the retailer from the farm location of the farmer pomelo farmer to the kiosk where the sales to the final consumer. cleansing of fruit is also done. so that the dirt and chemicals attached to the clean fruit and maintained its condition before being sold to the final consumer.

4. Home Industry Processing

The pomelo orange home industry chooses to buy pomelo orange raw material from the pomelo orange farmer. Orange pomelo processed into processed products, among others, juice, lunkhead and fruit jam pomelo. Production of processed orange pomelo done if processed pomelo orange food products (made by order).

In addition to the main actors in the supply chain of orange pomelo, there are also supporting actors in the supply chain of orange pomelo. The activity of the actors supporting the supply chain of orange pomelo can be seen in Table 2.

**Table 2:** Activities of Supplier Supporters of Pomelo Orange Supply Chain in Padang Lampe Village and Punranga Village, Ma'rang, Pangkep District, 2016.

No.	Supply Chain Supporters	Activities
1.	Consumer	<ul style="list-style-type: none"> <li>✓ Consume orange pomelo</li> <li>✓ Consuming processed pomelo orange products</li> </ul>
2.	Trades (Out-of-island)	<ul style="list-style-type: none"> <li>✓ Pomelo purchase from merchant collectors</li> <li>✓ Sell pomelo oranges to retailers</li> </ul>
3.	Provider Of Production Facilities	<ul style="list-style-type: none"> <li>✓ Provide production facilities (fertilizer, pesticides and herbicides) required for pomelo orange farm</li> </ul>
4.	Extensionist	<ul style="list-style-type: none"> <li>✓ Technical guidance to citrus farmers about pomelo citrus cultivation</li> <li>✓ Technical guidance to citrus farmers about pomelo citrus cultivation</li> </ul>
5.	Farm workers	<ul style="list-style-type: none"> <li>✓ Provide services for the maintenance of farmland pomelo farm until ready to harvest managed by farmers</li> <li>✓ Provide services for harvesting of pomelo orange on farmland of pomelo orange ready to be transported to out of island</li> </ul>
6.	Provider of transport services	<ul style="list-style-type: none"> <li>✓ Provide container transport services (out-of-island) pomelo orange collecting merchants</li> <li>✓ Provide pomelo orange transport service from farmer farming field to home industry of orange pomelo processing</li> </ul>
7.	Provider of supporting materials	<ul style="list-style-type: none"> <li>✓ Provide foodstuff (sugar, margarine, Benzoate, citric acid) needed by household processing industry of pomelo</li> </ul>
8.	Packaging Provider	<ul style="list-style-type: none"> <li>✓ Producing food packaging as per pomelo orange home industry</li> </ul>
9.	Food Crops Offices	<ul style="list-style-type: none"> <li>✓ Provide training and assistance to business actors in the household processing industry of pomelo oranges in terms of production</li> <li>✓ Inform home industry owners of local exhibitions</li> </ul>
10.	Workers of home industry	<ul style="list-style-type: none"> <li>✓ Provide services for processing activities of pomelo oranges managed by the owner of household processing industry pomelo orange</li> </ul>
11.	Workers /Transporter	<ul style="list-style-type: none"> <li>✓ Provide services for harvesting activities until transporting pomelo oranges to pomelo orange sale locations</li> <li>✓ Perform cleaning of pomelo oranges before being marketed to consumers</li> <li>✓ Marketing pomelo oranges to end consumers</li> </ul>

Table 2 shows that each actor supporting the supply chain of orange pomelo performs activities according to his role. The activities of supply chain actors include:

1. Consumers

Consumers consist of two consumers who consume pomelo fruit and consumers who consume processed products pomelo orange. Consumers usually purchase pomelo orange from retailers who are on the edge of the road posor Ma'rang Sub-District are aligned along the road. While the consumption of processed products

- such as orange juice pomelo, dodol and jam ordered to home processing industry orange pomelo.
2. Trades (Out-of-Island)  
Trades (Out-of-Island) make direct transactions to collecting merchants on the quantity, price and quality before or after the orange pomelo arrives at the parent market.
  3. Provider of Production Facilities  
Provider of production facilities is an individual economic institution in Pangkep District that provides saprodi such as fertilizers, pesticides and herbicides in meeting the needs in managing farmland farming farmer pomelo farmers in the study site.
  4. Extensionist  
Extension agent is an extension of the local government of Pangkep District in terms of providing guidance to citrus farmers in pomelo cultivate farmland pomelo.
  5. Farm Workers  
Farm workers play an important role in the farming of pomelo in Padang Lampe Village, Ma'rang Sub-District, Pangkep District. Farmers need to provide services in maintaining farmland managed by citrus farmers until pomelo pomelo orange is ready to be harvested. In addition, provide harvesting services of pomelo fruit.
  6. Provider of Transport Services  
This provider of transport services transporting pomelo oranges that have been harvested by the collecting farmers' laborers in the warehouse while the merchant collectors are till the out-of-island harbors are destined. While other transport services in the form of pick-up cars that transport orange pomelo from farmers farming to the home industry processing orange pomelo.
  7. Provider of Supporting Materials  
Provider of supporting materials is an individual economic institution that provides various kinds of food/cake needed by home processing industry of pomelo orange.
  8. Packaging Provider  
Packaging providers are individual economic institutions that provide a variety of food packaging or processed agricultural products required by the household processing industry of pomelo oranges. Packaging processed pomelo orange products ordered at the request of the home industry owner processing pomelo orange.
  9. Foods Crops Departement  
Food Crops Departement plays a role in technical training in processing pomelo oranges to the home processing industry of pomelo oranges. This training was given to the owner of home processing industry of pomelo orange. In addition, village pedeguards also play a role in informing owners of the home industry of pomelo oranges about the exhibitions held by the local government.
  10. Workers of Home Industry  
Workers of home industry play a role in providing services in producing pomelo oranges into processed products in the form of juice, dodol and jam. Processing done in the form of processing pomelo

orange until the packaging of products ready to be marketed to consumers.

11. Workers/transporters  
Workers/transporters participate in harvesting pomelo oranges in pomelo orange farming until transport to pomelo orange selling site at kiosk along Ma'rang subdistrict. In addition, the reseller merchant worker also cleans the pomelo oranges that have been harvested before being marketed to the consumer.

## 5. Conclusion

The three supply chain flow in the research location looks good, the flow of pomelo orange is 82.13% fulfilled by 17.87% unfulfilled pomelo orange demand from collecting traders to wholesalers because the total production of pomelo oranges produced by farmers is not only supplied to merchant collectors only, retail and home industry agents, the supply chain of pomelo orange supply chain is well integrated between the monopoly supply and money flow in accordance with the agreement of supply chain actors.

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## Author Profile



**Andi Putrianisa Nurfadilah** was born in Sengkang, South Sulawesi, Indonesia on January 27<sup>th</sup>, 1992. She got her Bachelor Degree (S.P) in 2015 at Faculty of Agriculture of Hasanuddin University, Indonesia. In 2015 until now, she continued her study get her Master Degree in Agribusiness Study Program at Faculty of Agriculture at Hasanuddin University, Makassar, Indonesia. This paper is a part of her thesis which is supervised by Prof. Dr. Ir. Muslim Salam, M.Ec and Dr. Ir. Mahyuddin, M.Si.