

# Supply chain performance of red chili from coastal land farming in the production center of Bantul Indonesia

Susanawati<sup>1\*</sup> and Adnin Jasmin Wafak Hida<sup>1</sup>

<sup>1</sup>Departement of Agribusiness Faculty of Agriculture Universitas Muhammadiyah Yogyakarta Indonesia

**Abstract.** Coastal land can be used by farmers to cultivate plants, including red chilies. Global climate change can affect the productivity of coastal land through changes in temperature so that production of red chilies is disrupted as a result, the supply of red chilies in the market is unstable. Therefore, this research was conducted with aim of describing the red chili supply chain and analyzing the performance of red chili supply chain produced from the cultivation of coastal land in terms of product flow, money flow, and information flow. The location of this research is coastalland in Bantul which was chosen deliberately because it is the highest area for red chili production in coastal land. Sampling of farmers in this study was carried out in stages from district to villagelevel totaling 75 farmers from Manunggal farmer group. Sampling after farmers used snowballsampling technique, so that a total sample of 144 respondents consisted of 75 farmers, 1 auction market, 5 collectors, 21 retailers, and 42 household end consumers. Data analysis was carried out by describing the shape of image for red chili supply chain. Red chili supply chain performance was analyzed using scores and categories for product flow, cash flow, and information flow. The results of analysis show that supply chain of red chili cultivated on coastal land consists of three chains, namely (1) farmer-Manunggal auction market-collector I-retailer I-end consumer; (2) farmer-collector II-retailer II-end consumer; and (3) farmer-collector III-retailer III-end consumer. The best red chili supply chain performance is chain 2. The results of this study can be used as a source of information to choose the best performing supply chain.

## 1 Introduction

Coastal land has the characteristics of land that is unable to store water and nutrients, and is low in organic matter. Thus, costs and special treatment are required for cultivation on coastal sand land [1]. However, on the other hand, beach sand land is easy to process because its texture is loose so farmers save time and processing costs, the land is relatively safe from disease so it has quite potential for farming [2]. Bantul Regency is an area with extensive coastal sand land and is widely used by farmers to grow horticultural commodities, such as red chilies.

---

\* Corresponding author: [susanawati@umy.ac.id](mailto:susanawati@umy.ac.id)

Red chili is a type of plant horticulture important which cultivated in a way commercially because it has a fairly complete nutritional content and economic value tall [3]. Along with the increasing population in Indonesia, the amount of consumption vegetables as well as fruit – fruit also join in increased also with chilli red. The more varies type of food there is, so consumption chilli red will keep going increase [4]. Besides, chili productivity is very high and time needed for relatively short planting, so the economic value of chili quite high [5].

The red chili harvest season in 2022 will occur in Sanden District, Bantul Regency, did not receive any production results maximum because condition bulk rain which tall. The impact of climate change can have a major influence in influencing the dynamics of OPT, fluctuations in temperature and humidity can stimulate the growth and development of OPT

In operate activity chain that supply lasts from Sanden district start from process production, bottleneck on process delivery, obstacle information for each supply chain actor is indicated to be experiencing problems. Therefore thing the influence performance of supply chain which happen in field, so research is needed to analyze red chili supply chain performance.

The performance of the supply chain encompasses all efforts made by supply chain actors to fulfill consumers' needs and desires. According to [6], supply chain performance can be effectively and systematically managed. Three streams must be handled in the supply chain: the flow of products, the flow of money, and the flow of information. The smoothness of the three flows indicates supply chain success. Multiple factors, including sourcing, inventory, facilities, pricing, and transportation, can impact supply chain effectiveness [7]. Performance measurement is essential for evaluating past performance, establishing goals, and determining subsequent programs. [8] have identified many supply chain performance measures, covering product quality, competitiveness, profit level, and market share. The two key indicators of supply chain performance are efficiency and responsiveness [9]. This research was conducted with aim of describing the red chili supply chain and analyzing the performance of red chili supply chain produced from the cultivation of coastal land in terms of product flow, money flow, and information flow.

## 2 Methodology

A descriptive analysis was run to examine the robusta coffee supply chain and the activities of supply chain actors. Meanwhile, supply chain performance analysis applied a score between 1 and 5 for product and money flows and 1 to 2 for information flow. The product flow employed five indicators: product quality [10], number of products, availability of storage facilities [11], means of transportation, and delivery time. Four indicators were utilized to determine the flow of money: the transaction system, the transaction method [12], the site of the transaction, and the time of the transaction. Moreover, five indicators were employed to measure the flow of information: production information, demand information, price information, payment information, and quality information.

Sampling of farmers was carried out in stages starting from the sub-district's own market auction. Retrieval sample farmer taken in a way on purpose based on the number of farmers who have succeeded in cultivating to harvest red chilies in year 2022 in land sand as many as 69 people. As for determining the perpetrators of the red chili supply chain after farmer done with use technique Snowball Sampling that consists from 1 market auction, 5 trader collector, 21 trader retailer, And 42 consumer end in Area Special Yogyakarta.

Supply chain analysis chilli red is done descriptively in the form of a chart to follow description perpetrator's activities chain supply. Analyze supply chain performance by looking at whether product flow, money flow and information flow are smooth or not through several indicators. There are six indicators for product flow, namely amount product, cleanliness product, freshness product,time delivery, tool transportation, and availability place storage product. Four\_ indicator on money flow, namely the transaction system,

method of payment of transactions, place of payment transactions, and transaction payment times. There are 5 information flow indicators, namely production information, information request, information price, information time delivery, and information payment.

The three streams were determined using the Sturges formula, categorized as rough and smooth :

$$Z = \frac{X - Y}{K} \quad (1)$$

Description: Z = Class interval; X = Highest score; Y = Lowest score; K = Number of classes

### 3 Results and discussion

#### 3.1 Red chili supply chain

Supply chain is a concept where there is a regulatory system related to product flow, information flow and financial flow [13]. The supply chain network for red chilies from coastal sand cultivation in Bantul Regency is formed by 3 chains with the following actors: (1) Farmers – Auction Market – Collecting Traders I – Retailer I – End consumer; (2) Farmer – collector traders II – Retailer II – end consumer; (3) Farmers – collector traders III – retailers III – end consumer. In the first chain, the number of farmers who deposit red chilies is as much as 75 farmers, in the second chain there are 4 farmers and in the third chain there are 14 farmer. The three red chili supply chains formed as a whole originate from farmer which combined in group farmer Unity. The flow of red chili products starts from farmers in the Sanden Then through market auction then distributed to trader collectors and retailers to get to the final consumer in Special Region of Yogyakarta. The money flow is the opposite of product flow which where Money will flow from end consumer to going to return to farmer. The flow of information reciprocally or two direction, namely from farmers to consumer or from consumer to farmer. This condition is different from [14] research that the supply chain for cayenne pepper commodities in Kumelembuai Village consists of 5 types of channels that distribute products in the form of fresh cayenne peppers.

#### 3.2 Performance of red chili supply chain

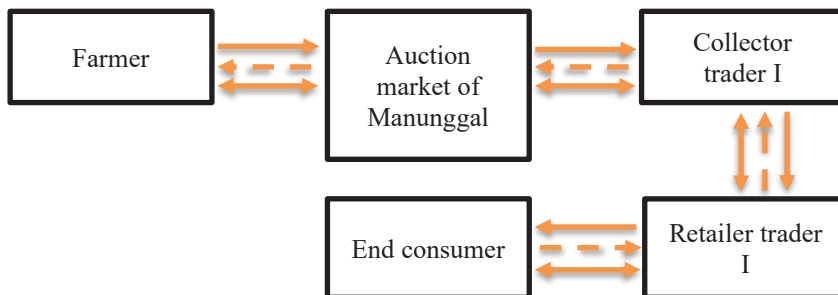
Supply chain performance of red chilies can be measured with see smoothly nope product flow, money flow, and information flow. Performance analysis is based on each chain with the following conditions:

##### 3.2.1 Chain 1: Farmers – Auction Market – Collector trader I – Retailer I – End consumer

The results of the analysis of the six indicators in product flow show that they are in the smooth category for each supply chain actor involved. Money flow in chain 1 is at in category smooth in every supply chain actor. The highest score is among perpetrators of retail I with consumer with score 20.00. Then on score highest second followed by actors that occurs between the collector I and the retailer I with an average score of 19.50. Then the third highest score occurs between auction market with collector I with an average score of 19.00. Last score the lowest occurred between farmers and auction market with an average score of 18.28.

Information flow on chain 1 of red chili farmers to end consumers and vice versa are categorized as smooth at a vulnerable score of 7.50 – 10.0. The information flow that has the highest score exists between collecting traders I and retail traders I with an average of the average score is 9.00 then the second highest score is followed by the actor who occurred between auction market and collecting traders I with an average score of 8.50. Final score Lowest happen between farmer with auction market and retailer I with consumer with score 8.00. Based on results score calculation on product flow, money flow and information flow

in chain 1 can be described and their overall performance can be seen through Figure 1.



**Fig 1.** Performance of chain 1

Description:

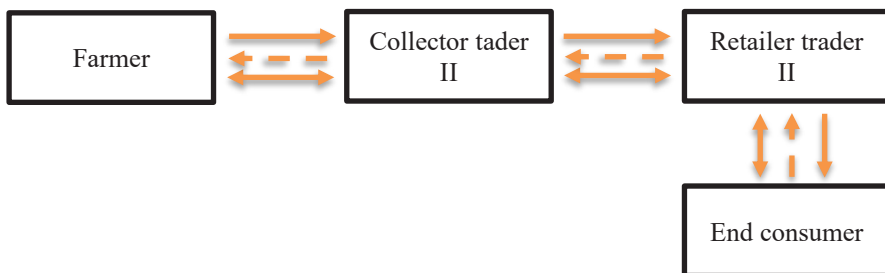
- Product flow smooth
- Money flow smooth
- information flow smooth

### 3.2.2 Chain 2: Farmers – Collector trader II – Retailers II – End consumer

The results of analysis of the six product flow indicators in chain 2 show in category smooth in every actor which involved. The product flow which has highest score among farmers with collectors II with score 28.79. Then on score highest second followed by actor which happened between retailer II with end consumers of the Special Region Yogyakarta with an average of 28.67. And finally the lowest score is between collector traders II with retailers II with an average score 28.53 respectively. Each indicator on product flow which happens from farmer until end consumers of the Special Region of Yogyakarta are considered very appropriate and appropriate so that condition product flow enter into the smooth category.

The results of analysis of four money flow indicators in chain 1 shows being in the smooth category in each supply chain actor involved. The money flow that has highest score is among the retailer I with end consumers with an average score of 20.00 then with the second highest score followed by actors who occurred between farmers and collector trader II with score 19.47. Final score lowest happen between collector tII with retailer II with score 19.20.

The information flow on chain 2 of red chili farmers to end consumers and vice versa are categorized as smooth at a vulnerable score of 7.50 – 10.0. The flow of information that has highest score exists between farmers and collector trader II with an average score of 9.00 Then on score highest second followed by actors between collectors II with retailer II with score 8.95. Final score lowest happen between retailer II with end consumer with score 8.00. The results of [15], the flow of information that is carried out by recording the demand and availability of corn, both in terms of quantity and price can provide accurate information so as to reduce high price fluctuations. Based on the results of the calculation of scores and flow categories product flow, money flow, and information flow, the overall performance of chain 2 can be seen in Figure 2.



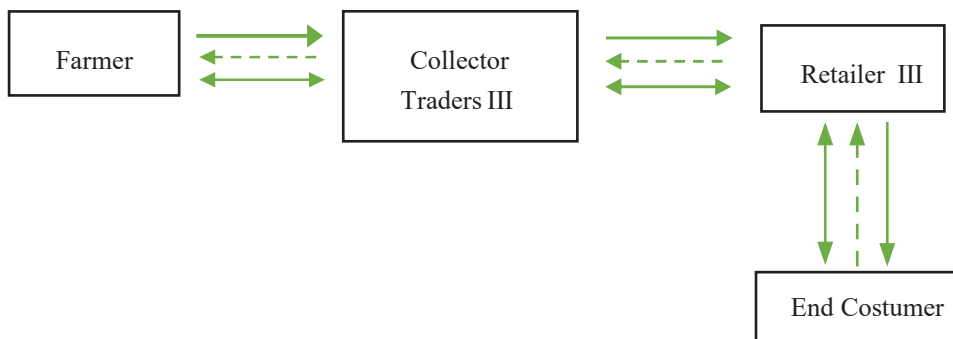
**Fig 2.** Performance of chain 2

Description:  
 Product flow smooth   
 Money flow smooth   
 Information flow

**3.2.3 Chain 3: Farmers – collectors trader III – Retailer III –End consumer**

The product flow in chain 3 is located on smooth category in every supply chain actors which involved. The flow of product which own score highest between collector trader III with retailer III with score 30.00 then on the second highest score followed by the actor that occurs between farmer with collector trader III with an average of 29.18. And finally the score lowest between retailers III and end consumers Special Yogyakarta with average score 29.00. The flow of money on chain 3 is located in category smoothly. The highest score was among retailers I with end consumer with score 20.00 Then on score highest second followed by actors which happen between farmer and collector trader III with average score 19.28. Finally, the lowest score occurred among collecting traders II and retailer II with an average score of 19.25.

The flow of information in chain 3 is categorized as smooth at a score of 7.50 – 10.0. The highest score is among collector trader III and retailer III with score 8.50 Then with the second highest score, followed by actors that occur between farmers and collector trader III and retailer III with end consumer with average score 8.00. Based on the results of calculating the scores for product flow, money flow, and information flow, the performance of chain 3 can be described as follows:



**Fig 3.** Performance of chain 3

Performance of red chili supply chain from the cultivation of coastal land consists of from 3 chain which own condition which different based on actors and flows analyzed. These flows include product flows, money flows, and information flow. On chain 1 own amount actor which moreLots compared to chains 2 and 3. The fewer number of actors involved in the supply chain can minimize obstacles that impact performance supply chain cannot run smoothly. Product flow, money flow as well information flow on 3 chain supply that already analyzed own condition smoothly. On chain 1 own amount actor which more than chains 2 and 3. Red chili supply chain performance overall whole can seen on picture 4.

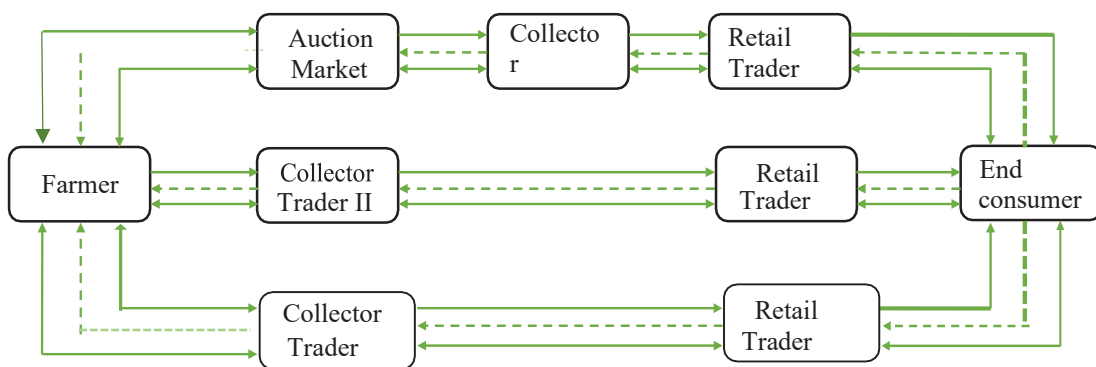


Fig 4. Overall red chili supply chain performance

## 4 Conclusion

Based on the results of the data analysis performed can obtained conclusion that red chili supply chain network formed three chains and five actors. Of the three chains formed, chain one has more number of actors than chain two and three. The product flow of red chili is the most smooth there is on chain 3 with actors are farmer – collector traders III – retailer III – end consumer. The most money flow conditions smoothly, there is on chain 2 with actors are farmer – collector traders II - retailer II – end consumers. The smoothest flow of information is in chain 2 with actors are farmers – collectors III – retailers III– end consumers. By whole performance of red chili supply chain, the best is in chain 2, namely farmers - collector trader II – retailer II – end consumer.

## 5 Suggestion

Based on results the study, there is suggestion which can become consideration namely on the flow of information expected by retailers. The end consumer more active in exchanging related information chili request red so that can increase performance of supply chain. On the side other, on money flow is expected time payment which done by auction market to farmer no experience cancel which so long.

## Reference

1. Widodo, A. S., *Kajian Usahatani Lahan Pantai di Kabupaten Bantul. Jurnal Faperta Universitas Muhammadiyah Yogyakarta*, (2009) 355 -367.
2. Iriani, E., *Prospek pengembangan inovasi teknologi bawang merah di lahan sub optimal (lahan pasir) dalam upaya peningkatan pendapatan petani. Jurnal Litbang Provinsi Jawa Tengah*, **11**, 2 (2013), 231-243.
3. Nurlenawati, N., Jannah, A., *Respon Pertumbuhan dan Hasil Tanaman Cabai Merah (Capsicum annuum L.) Varietas Prabu Terhadap Berbagai Dosis Pupuk Fosfat dan Bokashi Jerami Limbah Jamur Merang*, (2010).
4. Wulansari, F., Rahayu, S., Aulia Qonita, R., *Analisi Rantai Pasok Cabai Merah*

- (*Capsium Annum L.*) di Kabupaten Magelang. *Desember*, **9**, 4 (2021), 114–124.
5. Muhajir, B., Dalimunthe, E. L., Panggabean, A., *Pertumbuhan Dan Produksi Tanaman Cabai Merah (Capsicum annum L.) Terhadap Pemberian Pupuk Organik Pada Berbagai Media Tanam, Agrotekma*, **2**, 1 (2017).
  6. Utami, N. P. V. *Analisis Kinerja Rantai Pasok Ikan Lele di Wilayah Istimewa Yogyakarta. Fakultas Teknologi Pertanian. Universitas Gajah Mada Yogyakarta*, (2016).
  7. Chopra, S., Meindl, P., *Supply Chain Management: Strategy, Planning, & Operations* (3rd ed.). New Jersey: Pearson Prentice Hall (2016).
  8. L.S. Simchi, P. Kaminsky, E.S. Levi, *Designing and Managing The Supply Chain Concept Strategies and Case Studies International Edition*, New York: McGraw-Hill (2009).
  9. T. W. Bernard, S.R. Russel, *Operations Management 7th Edition*, New Jersey: John Wiley and Sons, (2011).
  10. Susanawati, *Rantai Pasok Komoditas Bawang Merah Di Pulau Jawa (Doctoral dissertation, Universitas Gajah Mada)*, (2016).
  11. Aryadi, N.R., *Rantai Pasok Jamur Tiram Di Kabupaten Sleman. Fakultas pertanian. Universitas Gajah Mada Yogyakarta*, (2017).
  12. Saptana, N. Ilham, *Manajemen Rantai Pasok Komoditas Ternak dan Daging Sapi. Jurnal Analisis kebijakan pertanian*, **15**, (2017) 83-98.
  13. N.A. Josine., L.R. Pangemanan, C.B. Pakasi, *Analisis Rantai Pasok Komoditi Cabai Rawit di Kota Manado. Agri-Sosio Eonomi Unsrat*, **14**, 1 (2018) 207–214.
  14. L.S. Tubagus, M. Mangantar, H. Tawas, *Analisis Rantai Pasokan Komoditas Cabai Rawit di Kelurahan Kumelembuai Kota Tomohon. Jurnal EMBA*. **4**, 2 (2016) 613-621.
  15. A.I. Fajar, *Analisis Rantai Pasok Jagung di Provinsi Jawa Barat, Sekolah Pasca Sarjana, Institute Pertanian Bogor*, (2014).