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## CHILI SUPPLY CHAIN AND PRICING MANAGEMENT IN SUMOWONO CENTRAL JAVA

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### ABSTRACT

*The agricultural sector is now getting a lot of attention as the price of agricultural commodities, especially chilli, always fluctuates and tends to be high. This study aims to describe the price mechanism and distribution pattern of chili in Central Java with case study of Sumowono District. This study uses secondary and primary data. The results showed that the price gap between producers and consumers is quite large and so far enjoyed by intermediary traders. This fact indicates the inefficiency of supply chain, unavailability of auction market, and management of price by government which not yet optimal. The long chili supply chain is characterized by an unsuccessful institution linked to chili farming. Whereas if the institutions associated with agriculture can run well, such as cooperatives, it will be many functions that can be done. The reason is because cooperatives also play a role in securing the chili supply chain. Recommendations in this research are alternatives related to chilli supply chain, farmer's welfare and price stability of chili. To improve the chili supply chain, farmer welfare and price stability, there are three main things to note: institutional, price setting and behavioral change. For institutional cooperation is required between government agencies, agricultural services, trade and farmer groups. Then for the pricing need to be a standard price that is a reference for farmers and consumers. Behavior change is done by marketing from farmers to consumers. Meanwhile, the government must also play a role to control the price so that the price of chili can be set every harvest period. With good price condition, farmers have enough capital to prepare the facilities and infrastructure so that it does not depend on the middleman anymore.*

Keywords: Chili, Supply chain management, Central Java, price.

### Introduction

Performance of the economy can be seen from at least two indicators such economic growth and inflation. In general, economic growth in Central Java has increased from year to year, and even in several years its growth above the national economic growth. In terms of inflation, it is seen that the Central Java government has succeeded in reducing inflation. The low rate of inflation is mainly supported by the Central Java regional inflation control policy. At the end of fourth quarter of 2016, inflation stood at 2.36% (year on year - yoy) lower than the previous quarter of 2.72% (KER BI, 2017).

Central Java's economic growth rests on three main sectors namely manufacturing industry, agriculture, and trade. In accordance with RPJMD Central Java, the agricultural sector received more attention as it relates to food security. The agricultural sector grew by 3.02% (year on year) in the third quarter of 2016, and increased significantly to 8.75% in the fourth quarter of 2016 (KER BI, 2017). The agricultural activity growth is caused by the enhancement of loan growth and credit quality. The growth of agricultural credit in the third quarter of 2016 reached 8.11% and increased to 9.65% in the fourth quarter of 2016. Improved credit quality was indicated by a decline in non-performing loans (NPLs) of 11.40% in the third quarter of 2016 became 10.17% in the 2016 quarter 4.

The government regulation and agricultural credit facilities are expected to be able to push the productivity of the agricultural sector and also produce stable and good agricultural exchange rate. Productivity and price of the agricultural sector, especially food commodities are different from the other sectors. Theoretically price determination is influenced by supply and demand, but food commodities tend to have a stable demand. So, the price fluctuation problem of food commodity is mainly due to the supply side that is production and distribution.

In terms of production, the previous researches (Chambers and Bailey, 1996; Tomek, 2000) showed that there are two factors that significantly affect the price of food commodities in the United States namely harvest disturbance and storage/inventory behavior. Tomek (2000) also found that there is a cyclical pattern of systematic variance between cropping patterns and commodity prices. Variance of price enlarged during the growing season and reduced at the time of harvest. Because food commodities are durable goods, the right storage technology will reduce fluctuation in food commodity price.

On the other hand, the production of the agricultural sector is also strongly influenced by weather conditions. One of the bad weather conditions due to La Nina is the high rainfall or high humidity. This condition can affect the agricultural production especially horticultural crops such as onions and peppers. The decline in the production of horticultural crops reflected in the rising its commodity prices.

The increasing price of food commodities/horticulture in Central Java contributed significantly to inflation and also has a quick response to a variety of shocks (Prastowo et.al. 2016). Data in 2016 showed that in October, November and December, red chili contributed the highest monthly inflation respectively 0.12%, 0.14% and 0.10%. The price of chili, which consists of a large red pepper, curly red pepper, and cayenne pepper, tend to fluctuate continuously. In 2016, the increase in the price of chili was not only happening in Central Java but also in 17 provinces in Indonesia (KER BI, 2016).

Other factors that cause fluctuations in the price of chili are the distribution or supply chain management. Chain of distribution channels, transport costs, and also the behavior of traders are very influential on price volatility. Due to weather conditions is an external factor, and then the distribution is the most likely to be managed and governed by the regulation.

The long distribution channel of chili is a phenomenon that is obtained in the preliminary survey. The majority of supply chain of chili is still dominated by the middlemen, or wholesalers who make the profit margins and the difference in price from one chain to another chain becomes very high.

Based on this phenomenon, the study purposes to (i) describe the price mechanism and distribution pattern of chili in Central Java with case study Sumowono, (ii) identify the effect of supply chain management to price determination of chili and its impact on inflation, and (iii) recommend the strategy of chili supply chain management due to reducing inflation.

## **LITERATURE REVIEW**

### **SUPPLY CHAIN MANAGEMENT FOR AGRICULTURAL COMMODITIES**

Agricultural commodities which distributed from farmers, distributors, retailers, until the consumers represents whole activity coordination of supply chain, starting from farmers until consumers. Supply chain consists of farmers, distributors (for example, wholesalers), brokers, and retailers, who later on distribute the commodities to the consumers (Heizer and Render, 2015). As well as the other commodities, distribution of agricultural commodities from the farmers to the consumers not only involve the distributors and merchants, but also require distribution services such as load or transportation, storehouse, bank, and insurance. Even, for the continuity of the information, many of them use communication devices such as telephone, e-mail, internet, etc. (Kotler and Keller, 2009). All of them should be managed well so that the supply chain can run smoothly and the consumers can access the commodities with the reasonable price. Besides that, the attention to things that can cause loss and give terrible effect to supply chain is also needed.

According to Gaonkai and Viswanadhain in Jaffee et.al (2008), there are three main disadvantages that potentially bring negative effects toward supply chain. Those three main disadvantages are deviations, disruptions, and temporary or permanent. Deviations is caused by fluctuations in key parameter such as costs, demand, and logistics, which can differentiate value. While, disruptions happens because of the changing of supply chain structure due to the misuse in production, marketing, or distribution facility, that are caused by natural or human factors. The last one, temporary or permanent is related to the disability of some or all supply chain, inside or outside the company.

Zailani et.al (2012) clarify that practicing Sustainable Supply Chain Management (SSCM) can bring positive effect toward supply chain performance, both seen from economic or social perspective. SSCM implementation in business will give significant value toward both organization or external environment, in form of retrenchment in the use of resource and time. Indirectly, SSSCM has given contribution toward the country in accelerating sustainable development.

According to Suryani, et al (2016), the use of supply chains in the distribution of chili to consumers in the village Kumelembuat, Tomohon city is quite efficient. This occurred because farmers, wholesalers, market traders, retailers and consumers gain an unobtrusive profit, which can be seen from positive marketing margin of each chain. Meanwhile, according to Ayu et al (2015), the most efficient use of supply chain of chili is involving 5 chains, starting from farmers, foundations, wholesalers, retailers and consumers. Yunita et al in his research (2015), explains that supply chain management of chili is needed to make the supply chain system of chili well and smooth, enabling the parties involved to understand and take into account the costs to be borne. However, to make this happen, the role of wholesalers in traditional markets needs to be eliminated.

From those researches, it can be argued that proper supply chain management of chili is needed so that consumers can obtain chili at a reasonable price. Besides, all middleman intermediare can get positive profit margin. Otherwise, consumers will get chili with high price and farmers enjoy low welfare.

### **VOLATILE FOOD INFLATION AND FOOD DISTRIBUTION**

In general, inflation is increasing price of commodities continuously. Theoretically inflation can be raised from supply (cost push inflation) and demand (demand pull inflation), and inflation expectation. The factors of cost-push inflation are exchange rate depreciation, impact of foreign inflation, increasing of administered price and negative supply shocks cause of natural disasters and distribution disturbance (Bank Indonesia, 2017). On the other hand, the factor of demand-pull inflation is the demand of goods and services is higher than supply.

Many indicators can measure the measurement of inflation. The most useable indicator is consumer price index (CPI). CPI inflation in Indonesia is classified into individual consumption by purposes, which are foodstuffs; processed foods, beverages and Tobacco; housing; clothing; health; education and sports; and transportation and communication. One of the important factors of inflation in Indonesia is a foodstuff. Volatile food inflation in Indonesia tends to be high and unpredictable because of production and distribution matters.

The inflation rate depends on various factors that differ between one country and others. Rayner, et.al (2011) argue that the determining factor of inflation in some countries in East Asia different from those in Australia. In East Asia such as China, South Korea, Indonesia, inflation is determined by the price increase of agricultural commodities, which in turn pushed up food prices, causing inflation rate. Meanwhile, in Australia, inflation is determined partly by the appreciation of the exchange rate, the price of imported food, the floods and Cyclone.

Mizanur (2015) states that the volatile food inflation in Bangladesh due to demand factors (population increase), supply factors such as the price of rice and wheat locally or imported, and non-economic variable, namely the involvement of many agents, brokers, corruption, political uncertainty, and low business confidence. Bhattacharya (2016) found different things. Volatile food

inflation in India caused by rising production costs, purchase price, taxes, and also levies charges the sale of food in of large and retail. The price increase is also a result of a limited marketing tool and a competitive market.

Some previous researches also show the strong connection between distribution cost and commodities price, which furthermore contribute to inflation rate. According to Parstowo et.al (2008), agriculture commodities price fluctuation is affected by schokk from demand side, which depends on harvest cycle, distribution, and nature's condition. His finding shows that primary commodity tends to have longer distribution chain, less efficient, and disruption toward distribution affects perishable commodity price like chili. While Susila and Munadi (2008) show that there are three main factors that determine retail price of agriculture commodities, particularly sugar, which are import price, farmers benchmark price, and distribution cost. Import price rising will be followed by retail price rising, although it is not too elastic. The same thing also happens to distribution cost which evidently affect retail price.

In Europe, according to Bukeviciute (2008), supply chain strengthening for food is needed due to fluctuation and differences in food price and agriculture commodities. Strategy done for supply chain strengthening is aimed for profitable efficiency that can decrease the price. Besides that, it can also change bargaining power and reduce competition.

## DATA AND STUDY METHOD

This study chose Sumowono in Central Java as case study because it has a significant contribution to production of food commodities. One of the centers of food commodities (especially chili) area is in Sumowono. This study used the secondary and primary data. The secondary data was collected from Indonesia Statistics, Agriculture Ministry, and Trade ministry. The primary data was collected through the questionnaire, in-depth interview and focus group discussion. Questionnaire was gathered from 50 chili farmers who live in four villages namely Jlegong, Catak, Candi Garon and Kebon Agung. The in-depth interview was used to know better about the real condition. The key person who involved in in-depth interview are 8 farmers from Jlegong, Catak, Kebon Agung, Candi Garon; one middleman; 4 staff of Sumowono agriculture office; 2 vice chairman of Semarang trade bureau. The last method is focus group discussion. Focus group discussion was used to compare the policy makers and farmers' opinion and perception.

## DATA DESCRIPTION, ANALYSIS AND DISCUSSION

Data description and analysis started with farm chili condition in Indonesia, along with its role for welfare and price stability. This description hopefully will give general description about the need and problem of chili farm in national scale. Description and analysis of SCM condition in Sumowono will be elaborated in the next section

Based on data, it is seen that chili field can be found more in Java than outside Java. The high growth of harvested area in Java, 13.03 % in 2014 and 10.91% in 2015, shows that chili can be regarded as interesting commodity. Averagely, harvested area of chili in period 2011-2015 tends to increase 5.54%, with growth harvested area in Java (6.87%) higher than outside Java (4.07%).

Chili production between Java and outside Java are nearly comparable. Started from 2013, chili production in Java increasing rapidly and it brings significant contribution.

**Table 1. Chili production in Indonesia 2010-2015**

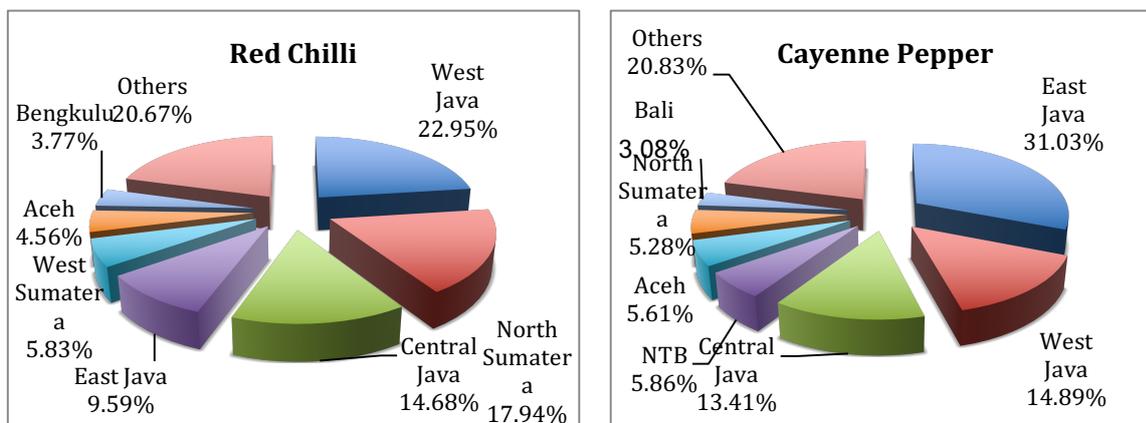
Year	Java (Ton)	Outside Java (Ton)	Contribution of Java (%)	Contribution of outside Java (%)
2010	676,772	652,092	50.93	49.07
2011	763,454	719,625	51.48	48.52
2012	881,039	775,485	53.19	46.81
2013	964,679	761,703	55.88	44.12
2014	1,027,320	847,755	54.79	45.21
2015	1,050,966	864,154	54.88	45.12

Source: Chili Outlook, 2016

The increasing of chili production happens due to new varieties as a result from research done by Balai Penelitian Tanaman Sayuran, which are Lembang, Tanjung 1, Tanjung 2, and Kencana (Outlook cabai 2016). Those four varieties have high productivities and resistant to pests.

Red chili production centers in Indonesia, based on average production 2011-2015 are West Java (22.95%), North Sumatera (17.94%), Central Java (14.68%) and East Java (9.59%). While cayenne pepper production centers can be found in East Java with contribution (31.03%), West Java (14.89%), Central Java (13.41%), and Nusa Tenggara Barat (5.86%).

**Picture 1. Chili Production Centers in Indonesia**



Source: Chili Outlook 2016

While seen from chili use and consumption in Indonesia, it is showed that chili consumption growth had decreased 11.48% in 2013, and still decreased 10.24% in 2014, while in 2015 increased 5.15%. If it is seen from difference between chili consumption per capita each year and chili availability per capita each year, Indonesia is in a surplus state. Chilli consumption in Indonesia relatively stable with average consumption range 3.03 kg/capita/year. On the other hand, average chili availability is 6.7 kg/capita/year. The biggest surplus happened in 2014, which was 4.69 kg/capita/year. This condition represents good potential for chili to be exported or been non-primary commodity as processed chili.

Seen from its types of use, Indonesia does not use much processed chilli both as food or non-food ingredients. Almost all chilli consumption in Indonesia is done in fresh form. Processed chilli in Indonesia has not got enough target or market. This pattern significantly affects the price, because when the processed chilli is available in the market and the consumer ready to consume it, the price tend to be more stable.

The following are average price of red chilli during 2010-2014 in Indonesia. Tabel 2 shows that the price gap between producer and consumer are quite big. The biggest price gap happened in 2012 when producer's price was Rp. 19,206.89/kg while consumer's price was Rp. 54,919.00/kg. Therefore, the price gap was Rp. 35,712.11/kg.

**Table 2.Red chili price 2010-2014**

Year	Producer Price (IDR/kg)	Growth (%)	Consumer Price (IDR/Kg)	Growth (%)	Margin (IDR/kg)
2010	16,343.10	5.13	31,260.75	47.55	14,917.65
2011	17,184.06	5.15	47,669.34	52.49	30,485.28
2012	19,206.89	11.77	54,919.00	15.21	35,712.11
2013	19,523.00	1.65	52,030.00	-5.26	32,507.00
2014	19,237.19	-1.46	44,519.00	-14.44	25,281.81

Source: Chili Outlook 2016

The big price gap represents at least two things. The first one is, the farmers receive very low price. This facts will cause farmers' welfare getting worse. The low price that is enjoyed by the farmers actually reflected from farmers' exchange rate toward agriculture commodities generally. The second one is, the high producer's price. The high producer's price represents the long supply chain. The long supply chain makes additional price happens in every spots of supply chain, so that when chilli arrive in end user, the price that should be paid by the consumers will be very high.

This problem becomes more unfair because the one who enjoy the price gap, the difference of price between price of producer and consumer, is trade intermediaries. This fact shows inefficiency of supply chain, unavailability of auction market, and pricing management by government that has not been optimal yet. This condition is clarified with fact that red chilli is one of commodities that form inflation.

**CHILI SUPPLY CHAIN MANAGEMENT DI SUMOWONO, CENTRAL JAVA**

To understand chilli supply chain management in Central Java based on case study in Sumowono, the description of supply chain management will be started with product flow, information flow, and will be ended with cahs flow.

Chilli product flow in Sumowono can be explained from the types of curly chilli, teropong chilli, and cayenne pepper. While the quality of chilli can be seen from fresh physical appearance, well-defined colour, smoothness, free from pests or diseases, and spicy-flavoured. Following is data about chilli production volume:

**Table 3. Data of chili production volume**

Village	Field Ownership Data (M2)	Population (Plants)	Production Volume (ton)
Jlegong	78,000	156,000	93.60
Kebon Agung	74,000	148,000	88.80
Catak	45,000	90,000	54.00
Candi Garon	95,000	190,000	114.00
Total	292,000	584,000	350.40

Source: Questionnaire 2017

Data in tabel 3 shows that in 4 villages in Kecamatan Sumowono there are 292,000 m2 land area for chilli, with plant population 584,000 plants and production volume 350.40 tons. Candi Garon village has the biggest productivity (114 tons) because it has the largest chilli farm. Based on the calculation, it is known that the results of chilli in those four villages is not optimal, because the productivity per hectare is 12 tons. According to the good farming standard, it should be 14-16 tons of fresh chilli. The lack of productivity is caused by some factors such as poor seed supply, inadequate maintenance, poor cultivation of land, disease or pests and poor harvesting method (due to season).

The information flow theoretically can be divided into two parts that are horizontal and vertical. Horizontal information flow that tells from the description of farmer group, type of seed, land management to cultivation technique. The following is data about farmer group:

**Table 4. Data about farmer group**

Village	Group Name	Members (Farmers)	Activities	Field Ownershi p
Jlegong	Sidodadi 1	52	Farmer group meeting, money	78,000
Kebon Agung	Sido Subur 2	37	savings and loan,environment	74,000
Catak	Sido Subur 2	30	development irrigation,chili	45,000
Candi Garon	Sido Utomo	56	marketing management.	95,000

Source : Questionnaire 2017

In terms of agricultural cultivation, based on the results of questionnaires and in-depth interview, it is found that farmers feel the burden of rising prices of manure, chemical fertilizers, seeds, plastic mulch, which is influenced by the increase of wage of unloading. At the time of the interview, it is revealed that from the input side of chili farming there are some increase of input cost.

The other obstacles that influence input cost are the controlling of thrips (*Tabaci lindeman*) and leaf spotting diseases (*Cercospora capsici* Heald et. Wolf). This pest control requires intensive treatment by spraying every 2-3 once and the cost is quite high reaching Rp 2,082,000.00

To fulfill the production cost as a solution for the continuity of chili cultivation, farmers need additional money by borrowing on middlemen around Rp. 2,000,000.00 – Rp. 5,000,000.00 to keep the chilli plants safe until harvest time. This causes symbiotic mutualism between the farmer and the middleman to occur.

Farmers' land in the sample area have an average of 2,000 m<sup>2</sup>. With intensive maintenance, the land is able to produce wet picking chilli 2,400 kg with price Rp. 12,000.00 (average price of the first quarter of 2017). Thus the income of farmers is Rp. 28,800,000.00 for 4 months planting season. If it is calculated with production costs then the farmers will get the profit Rp. 15,768,000.00 for each planting season. With this amount of profit, farmers are able to return the debt to the middleman before the harvest is over.

The high production cost of chili pepper is responded by the farmers by reducing the cost of land processing by the system of mutual help. The role of the government through counseling program by the kecamatan counseling officers of BPK (Balai Penyuluh Kecamatan), participating in helping farmers with good cultivation techniques and pest control procedures.

This table shows chilli supply volume in kecamatan Sumowono.

**Table 5. Volume of red chili and ceyenne pepper supply in kecamatan sumowono period: Januari 2016 until Januari 2017**

No	Village	Area (Ha)	Production (ton)	Margin (Rp/kg)
1	Bumen	43.3	606.2	10,000 – 25,000
2	Candigaron	50.2	702.8	12,000 – 28,000
3	Duren	42.5	590.5	11,000 – 25,000

4	Jubelan	38.6	522.4	10,000 – 27,000
5	Kebon Agung	59.7	776.1	12,000 – 26,000
6	Kemawi	42.6	553.8	11,000 – 27,000
7	Kemitir	32.6	423.8	10,000 – 26,000
8	Keseneng	38.8	465.6	10,000 – 26,000
9	Lanjan	33.4	434.2	10,000 – 25,000
10	Losari	41.3	495.6	10,000 - 27,000
11	Mendongan	42.4	424.0	9,000 - 26,000
12	Ngadikerso	50.7	608.4	9,000 – 25,000
13	Piyanggang	42.2	590.8	10,000 – 25,000
14	Pledokan	32.4	453.6	10,000 – 27,000
15	Sumowono	52.5	735.5	12,000 – 23,000
16	Trayu	34.3	411.6	9,000 - 25,000

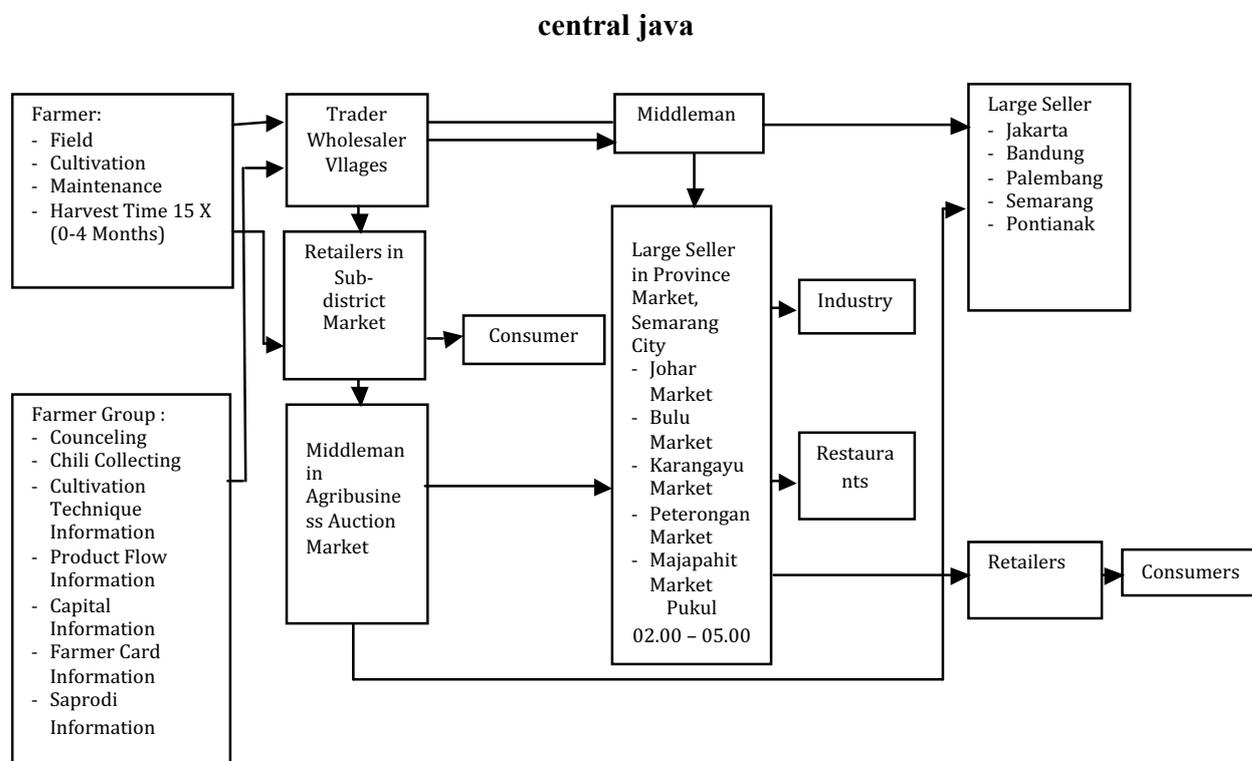
Source : Mantri Statistik 2017

Vertical information flow analysis attempts to see supply chain conditions from farmers to consumers. Based on questionnaires and in-depth interview. Sumowono farmers through farmer groups have a major role in providing quality chili. Selection of superior seeds, intensive maintenance in accordance with standardized cultivation techniques in groups, has resulted in optimal chili crops.

Generally farmers together pick chili in the morning or afternoon. Chili crops from farmers and farmer groups are collected to village collectors, some of those chillies are bought and taken by retailers in the sub-district market and partly taken by large traders outside the province. Chillies from sub-district retailers are sold to middlemen in agribusiness auction markets, but there are also chillies from the supply of village collectors purchased by retailers in the sub-district market and directly sell the chili to consumers. Another supply chain shows that wholesale traders in the agribusiness auction market supply chili to large city traders within provinces as well as to intergroup traders. Large urban traders in demand-based provinces also distribute chili to industries and restaurants, but they also distribute the chili directly to retailers and the retailers will sell them to consumers. In addition, there is another distribution mechanism that the middlemen take chili directly from the collecting merchant which is then marketed directly to wholesalers outside the province.

Below is SCM diagram based on case study in Sumowono.

Picture 2. Supply chain management diagram flow of chili farmers in central java



The last thing discussed in chili SCM is the financial flow. This financial flow addresses the fixing of chili prices, payment systems and terms of payment. Based on the results of in-depth interview, it was found that farmers wanted to get money from the sale of chilies to immediately sell the chilies without being able to determine the price of chili from the crop. Farmers' price level is influenced by the distance of farmers' domicile distance to the sub-district market and the auction market of district agribusiness. The cost of transportation from the village to the sub-district market is Rp. 30/kg – Rp. 50/kg, plus the retribution cost Rp. 1,500.00 –Rp. 2,000.00 plus the wage of loading. While, the cost of transportation to the auction market agribusiness sub-district reached Rp. 75.00 – Rp. 100.00/kg, retribution fee Rp. 2,500.00 – Rp. 3,000.00 and also coupled with the wage of loading. The cost of transportation, retribution, and wage of this transportation force causes the farmers to choose to hand over the marketing process to the collector and wholesaler. Another problem is that farmers can never obtain information on the certainty of their prices, so farmers tend to give price fixing to traders collecting village and middlemen.

In the financial flows, the price gap from farmer level to retailer in 4 villages is analyzed as case study.

**Table 6. Red chili price in farmer, wholesaler, middleman, and retailer in central java (Jlegong, Kebon Agung, Catak, and Candi Garon Village) (Rupiah)**

Level	Jlegong	Kebon Agung	Catak	Candi garon
Farmer	30,000	30,000	30,000	30,000
Wholesaler	32,000	32,000	32,000	33,000 - 35,000
Middleman	32,000	32,000	32,000	35,000
Retailer	35,000	35,000 - 40,000	35,000 - 40,000	40,000
Consumer	40,000	42,000	42,000	45,000

Source: Questionnaire

Table 6 shows the price of chili at farmer level in 4 villages of Jlegong, Kebon Agung, Catak, and Candi Garon are similar, at Rp. 30,000.00/kg. While the highest price of wholesaler in Candi Garon village, Rp. 33,000.00 – Rp. 35,000.00. This is because the middlemen in Candi Garon village directly marketed to the Main Market of Agribusiness and also paid directly to middleman in Semarang City. From the interviews with the Chairman of Farmers Group and several farmers, high price gap is influenced by market participants. In Candi Garon many wholesalers who sell the chili directly to big cities with high price gap, and besides that the level of middleman competition obtaining chili in Candi Garon is quite tight.

**Table 7. System and payment period of chili selling in sumowono**

Level	Jlegong		Kebon Agung		Catak		Candi garon	
	System	Payment Period	System	Payment Period	System	Payment Period	System	Payment Period
Wholesaler Farmer	Cash	Direct	-	-	-	-	-	-
Middleman Farmer	-	-	Cash 1 Day	Directly or After the chili sold	Cash 1 Day	Directly or After the chili sold	Cash	Added with loan
Wholesaler Middleman	Cash	Direct	-	-	-	-	-	-
Farmer Retailer	-	-	Cash 1 Day	Directly or After the chili sold	Cash 1 Day	Directly or After the chili sold	-	-
Middleman Retailer	Cash	Direct	Cash 1 Day	Directly or After the chili sold	Cash 1 Day	Directly or After the chili sold	Cash	Added with loan

Source: Questionnaire 2017

Table 7 shows the payment system in Jlegong Village in cash from farmers to collectors with the process of entrusting chili to the coordinator as a temporary collector, and then purchased the village collecting traders in cash. Based on information from Temanggung middleman, chili is then purchased retailers in various markets in the Temanggung City with cash payments. Farmers of Kebonagung and Catak village also have a cash payment system, although it is delayed by 1 day. Because the middlemen never come directly to the village, chili marketing chain system in Candi Garon village is shorter. This is very helpful to farmers and gain better profit than farmers in other villages. In the Candi Garon Village, many middlemen comes directly to the farmers and act as direct marketers in Semarang city market.

Period of payments always made with a one day delay occurs in the Jlegong and Kebon Agung village for waiting chili sold out first. The payment period for the sale of chilies to Candi Garon farmers is paid by middleman to the farmers by taking into account with the loaned capital for the development of chili planting area. The amount of installment of capital loan in accordance with the ability of the farmer there is no coercion, if the farmer enjoys large profits loan capital is repaid, but if the farmers gain little profit or loss, farmers would have to pay the installments as much as they can.

## DISCUSSION

From the description of data and analysis in the previous section, it is clear that there are five main problems, namely (i) low purchase price from farmers and high price to be paid by consumers, (ii) low purchase price from farmers causing poor farmer welfare, (iii) low welfare makes farmers be dependent to middleman, who are willing to pay first, (iv) the high of the price gap between the purchase price of the farmer and the price paid by the consumer indicates a long supply chain, and (v) chili is one of the largest contributors to inflation both in national and Central Java levels.

The problem of price and long supply chain is due to several things. Based on the in-depth-interview with Sumowono sub-district BPK it was found that the agribusiness auction market in Ngasem and Soropadan did not work. The function of the auction market is as a market for agricultural commodities, so that with good market management, it is expected that there will be a fair price for both farmers and traders. The auction market is not running because there is no technical team implementing UPTD (Unit Pelaksana Teknis Daerah) that can manage the auction market according to its function and benefit. Information from district level, Ngasem auction market district level does not work because the elements of bidders do not have the capacity to carry out auction activities because many obstacles, especially culture of the marketing group (village collectors, district collectors, and middlemen) are conditioned by the groups of investors that set the rule of services.

While the findings based on in-depth interview at the provincial level, there is no activity in Soropadan auction market because the commodity needs cannot be presented on an ongoing basis. The standard of auction price is determined by the investor to schedule the auction running. But the government is not operationally able to obtain the realization of the desired target, because the auction market manager from the government is not able to set the auction price standard. Findings from interviews with the Department of Commerce indicate that the cause of the auction market is stalled because the manager feels the loss, the income target is not in line with the realization.

The long chili supply chain is characterized by unsuccessful institutions associated with chili farms, such as farmer groups, savings groups, farm cooperatives, Badan Usaha Milik Desa (BUMD), Badan Penyuluh Kecamatan (BPK), Mantis (Mantri Statistik), and business actors.

Whereas if the institutions associated with agriculture can work well, such as cooperatives, there will be many functions that can be done. The partnership between cooperatives and chili farmers will be done by forming associations ranging from group members, cluster groups, farmer groups and farmer group associations (gapoktan).

The cooperative also plays a role in securing the chili supply chain, by buying chillies from farmers and supporting chili farmers getting access to finance from initial production capital, to obtaining the proceeds from the sale of chili harvest. Cooperatives can also mediate between chili farmers and industry groups, by guarding the commodity contract system according to the desired standards, pricing, securing the supply chain, organizing with a negotiated partnership pattern in the chili processing industry. Thus, an efficient marketing model will be obtained as a strategy as an efficient marketing process and in favor of farmers' benefits. BPK is the spearhead which always provide education to the farmers to be able to increase the carrying capacity of land for chili cultivation, will increase production and meet market needs. In order to achieve the results that BPK standards encourage farmers to use cultivation technology as well as use of production facilities, to launch land preparation, handle yields of harvested and post-harvest as well.

If this institution works well it can strengthen the rural economy, increase the role of farmers' performance and encourage the development of agribusiness behavior, through active counseling programs.

The big difference in price of chilli has been enjoyed by intermediary traders. Meanwhile, chili farming did not enjoy it. Most of the proceeds from the sale of peppers by farmers are used to cover the cost of purchasing seeds, fertilizers, wages of agricultural laborers, and other operational costs that are always increasing.

So far, the government has not set a fair market price of chili. Chili prices have been allowed to follow the market. Similarly, the provincial government has not coordinated well in the management of the auction market so that the auction market is only a transit market only. The condition is utilized by the broker so that the market chain increases. It leads to market monopoly, price information is not transparent, supply information is not clear, there is no open auction, no management control of the auction market management.

Meanwhile, coordination between UPTD (Regional Technical Implementation Unit) is not able to accommodate chili price increase. As the present, conditions of price differences differ widely between farmers and consumers. This is influenced by the restribusi of the market, transportation and lifting service at the time of lowering the chilli from the car and raising the chili to the truck, which will be brought out of province and outside the island.

## CONCLUSION AND RECOMMENDATION

The highlights of this research result is low purchase price from farmers and high price to be paid by consumers and long supply chain management. The low price causing poor farmer welfare. While the long chili supply chain is characterized by unsuccessful institutions associated with chili farms. If this institution works well it can strengthen the rural economy, increase the role of farmers' performance and encourage the development of agribusiness behavior, through active counseling programs.

Based on the results of the discussion, this study provides several alternative recommendations related to chili supply chain, farmer's welfare and stability of chili price. To improve the supply chain of chili, farmers' welfare and price stability, there are three main things that must be considered, which are institutional, price setting and behavior change.

From the institutional side there are two things that need to be developed. The first is a farmer's barn. The role of farm granaries for farmer groups is participatory to secure the supply of chili, by making chili farming groups intensively. The role of farm granaries can be expanded, including: holding a wide field of chili farming, inventorying members of farmer groups in cooperation with Mantri Statistik focusing on chili cultivation, supplying of quality chili seeds in groups, setting the standard pattern of cultivation according to the reference of the BPK, synergizing between group members for the management of the field in mutual assistance, conducting integrated field observations to conduct balanced fertilization activities, pest and disease control, handling the harvest in time. The second is farmers' cooperatives. Farmer cooperation is not only a unit of savings and loan but also coordinates the supply volume of chili that can be marketed continuously, providing assurance for farmers to sell the commodities smoothly and get the rewards properly, with standard price in favor of the farmers.

The second thing that can be done is to set the standard price. Determination of price standard should be started from the beginning of procurement of chili commodity, concerning quality, chili size, chili type, and market demand. The last thing recommended is behavior change. Changes in behavior associated with community habits consume fresh chili and need to start getting used to the consumption of processed chili. The government can socialize and encourage behavior changes that processed chili will produce the same tasty taste with fresh chili. In addition to taste, government socialization can be emphasized on joint efforts to maintain the price stability of chili due to continuous and constant supply. On the other hand, the government can provide technical guidance for the processing of chili for farmers.

Instead, the three parties should cooperate well, ie the farmers, cooperatives and government. The farmers should have the availability of pepper plant land, capital, production facilities supported by cooperatives and government. These results are recorded by the Statistician mantri, in cooperation with PPL so that the availability of chilli will be sure and continuous. Government support, ie from agriculture and trade services, in the form of securing the price of chili by buying and fixing the price of chili that has been collected by the cooperative and acts as a chili granary in the region.

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