



Disruption to Supply Chain of Red Chili

Case Study in Cirebon District

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Abstract. Business of red chili was fragile resulting in uncertain and vulnerable supply chain. Once price fluctuation or crop failure, farmers could not buy production's input, the next production of chili declined. Then, disrupted in chili supply chain occurred. The purpose of this study was to figure out the cause of disruption to supply chain of red chili. Research was limited into flows of product. The research used purposive and snowball methods with a qualitative approach by applying an in-depth interview. The results presented condition contributed to disruption of supply chain namely the characteristics of farmers and their fragile business, the pattern of relation and network among farmers and middlemen. Generally, farmers could not fully take the decisions; they were deeply depending on middlemen to run their business. The middlemen determined marketing, pricing for both input factors and product, as well as land leasing. The study affirmed that chili supply chain disruption represented the ineffective institutions linked to chili business. Farmers had difficulties to overcome their complicated conditions, while they were still facing the Covid-19 pandemic situation that could be having more significant impact on their business. The strength of this research was using approaches in economic, institution, and socio-culture.

Keywords: Fragile business · Farmers · Middlemen · Farmers' institution · Disrupted supply chain

1 Introduction

Chilies are one of the important horticulture commodities in Indonesia. Many people in Indonesia are very keen on foods that contain chili peppers. They consume chili either in the form of fresh chili, chili paste and chili powder. Chili is consumed as a mixture or as a complement to their food. Chili is also utilized as raw material in industries such as in the herbal medicine industry. Chili peppers contain many nutrients and vitamins, counting calories, protein, fat, calcium, vitamin A, vitamin B1, and vitamin C [1]. The ingredient of red chili peppers also has L-asparaginase and capsaicin, as anti-cancer. Swastika et al. [2].

The average consumption of chili per capita was about 5.16 kg per year in 2010. This chili consumption was higher than other vegetables, such as consumption of tomatoes, potatoes, and red onion those are respectively about 3.13 kg, 3.69 kg, and 4.56 kg per capita per year. Therefore, many farmers in this country are cultivating red chili due to

its high economic value and yet still a promising agribusiness potential. However, their unstable availability causes a relatively big amount of price fluctuation. This phenomenon is essentially because of a disparity quantity of supply and demand in the market. Price of chili will decrease if supply exceeds demand, and contrarywise, the price drive to increase when the amount of demand surpasses the supply. Fluctuation of price is frequently added beneficial to traders rather than to farmers as generally growers cannot immediately alter time of producing and selling toward gain a valuable marketing price.

According to Karyani et al. in agribusiness of chili, the actors that play important role in production sub-system have been mostly the farmers. However, the operation of farming has heavily affected by other sub-systems. In the meantime, the puniest sub-system in the red chili business has been marketing sub-system. [3], This is happened since the farmers ought to deal with a monopsonistic market, namely the middlemen, which generates a revenue risk. For that reason, it is necessary to support farmers to enact risk mitigation, and there should be institutional supports to buildup farmers' trading standpoint.

The farmers were unable to sell their agricultural product to the market or to other parties. If they do so, it would be rejected by middlemen in district level. Middlemen determined the price; hence farmers were price taker or they just accepted that price. Farmers also often sell their agricultural products to the middlemen before harvesting if they urgently need cash [4]. The farmers have no choice in selling their agricultural products except to the middlemen; though they know that price below market price.

The higher dependency of farmers to middlemen could bring risk of production operation as well as of revenue risk to farmers. This operation of production of chilies is undoubtedly not an impartial product of the farming, but related to upstream business and downstream business as a unified system in chili business. Farmers have no adequate access to upstream and downstream business. When they do not have sufficient money to buy input for farming, then they could not run the farming of red chili. In turn, the next period of supply decline. Simultaneously, supply chain of red chili was vulnerable. Accordingly, the chili business in this district was so fragile.

The COVID-19 pandemic has employed unprecedented shocks on chili supply chains. The bottlenecks ranging from procurement or production input and facility including labor, farm production, processing, transportation, logistics, and market. The demand of red chili shifted considerably both as intermediate product and final product while farmers still figured out the consequences in each element of their daily life. The sustainability of these chili businesses is also depended to the characteristics of the farmers and of their business, as well as the role of institutions linked chili business. Therefore, it is important to systematically study those problems in economic, socio-culture, and institution perspectives of red chili business and supply chain. This is the uniqueness of our research.

2 Research Methods

Conducted in Cirebon District, the research was limited into flows of product. This research used purposive and snowball methods with a qualitative approach by applying an in-depth interview and field observation. In-depth interview was carried out to the

farmers, extension workers, chairman of farmers' institution, and middlemen related to chili business. They were 104 persons of farmers were chosen by purposive sampling methods that doing chili business; more than five years, farm was not more than five Hectare (Ha) of land planting red chili; and involved in farmers/ institution more than three years. Farmers' institutions observed those doing activity regularly. Data and information observed using data both primary and secondary.

3 Results and Discussion

3.1 Flow of Chili Product

The chilies were marketed by certain middleman. Farmers were unable to sell their chili product to the market, other parties or other middlemen. In the transaction, the middleman determined the price, so that, the farmers were price taker; they just accepted that price. The farmers had no choice in selling their chili products except to the certain middleman; though they knew that price below market price. Farmers also often sold their agricultural products before harvesting if they urgently needed cash. The farmers harvested chili by picking its fruits and putting them in sacks. There was no sorting and grading that's farmers did. The chilies product was collected at farm, then carried by middlemen using truck to the house of middleman in order to further weighed and sold. From Cirebon, chilies were sold in a fresh product. Sacks of chilies were sold by middleman to subdistrict market. Then, chilies were marketed by trader to district marketplace, and next to cities outside Cirebon by wholesaler.

The middlemen set the price of the product unilaterally, and paid to the farmer for the chili harvest after deducting farmers' debts to the middleman. It could be said that farmers acted as the price taker, and the middleman acted as the price makers.

Flow pattern of red chili marketing in Cirebon District can be described as in Fig. 1.

3.2 Characteristics of Farmers and Their Business

Farmers' business of chili was characterized by small scale farming. On average, half of the farmers had land 0.25 Hectare (Ha) to 1.00 Ha; others didn't have land. The landless farmers did rent land from middlemen or from the administration of rural land. About 90% of farmers produced chili as the main commodities. They did multiple cropping depends on the main season of chili commodities. Farmers were never processing chili products such as chili sauce or chili powder. The level of education of farmers

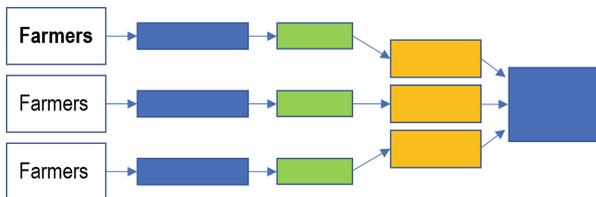


Fig. 1. Flow of marketing red chili product.

Table 1. Farmers characteristics

1	Average Age	56.6 years
2	Formal school years	Elementary: 82,69% Junior High School: 12,5% Senior High School: 4,80% Graduate: 0
3	Training/Courses	Never: 100% 1–3 times: 0 > 4 times: 0
4	Chili business (land)	< 0,5 Ha: 27,88% 0,5–1 Ha: 69,23% > 1 Ha: 2,88%
5	Joint Farmers group/ institution	100%

described that they were dominated by elementary schools (43%), junior high school (24%), senior high school (19.5%), graduate 3.5%, and illiterate 9.7%. The average age of farmers showed that farmers older than 55 years (32%), at 40–54 (27%) and at 15–21 (28.3%). Generally, farmers joined in Farmer's Institution. Chili business of farmers were characterized by small farming, multiple cropping depends on the main season of chili commodities, never processing the harvest; price taking, low level of education, age more than 40 years, joined in farmer's group institution. The characteristics of farmers and their land are shown in Table 1.

Even though farmer knew the higher price of chili in the market, they confessed their reluctant to sell the product to the market besides the commitment to sell chili to middleman. This finding related to Karyani et al. [3] stated in their study of large red chili. They said that the farmers find it troublesome to transport and bear transportation costs if the chili is sold directly to the market. The farmers felt that the presence of middlemen who came by vehicle offered the convenience of transporting chili from their farming location, so that farmers did not need to rent a vehicle to transport their chili.

Next, the farmers chose to sell their chili products to middlemen because they could immediately earn money right after harvest instead of bothering to market the product and also avoiding the risk of wilting and rot difficult to sell. Subsequent reason that there was an entanglement of relationships between chili farmers and middlemen that could not be ignored because of the interdependence for common needs. Farmers depended on middlemen as a source of borrowing money and also selling farmers' products. Middlemen needed farmers as a source of income, got profit from the sale of farmers' products and also in exchange for capital loans to farmers. This condition showed us that for farmers, the role of formal financial institutions was still low and farmers' access to finance was relatively small. [5–7]. Ass said by Sulistyowati [8], in addition to lending money to the needs of other means of production and capital, middlemen also provided information and directions about commodities or products requested by the market and

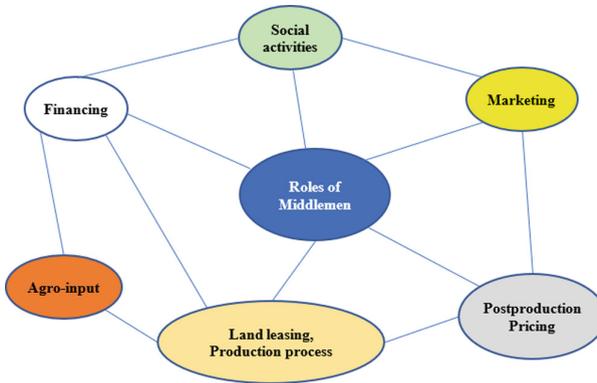


Fig. 2. The roles of middlemen in chili business.

applicable technologies. Therefore, transaction costs could be reduced. In addition, intermediaries also played a role in connecting the market chain in order to optimally meet market demand. However, all agreements between farmers and middlemen did not use formal agreements or contracts in writing. So, they were based solely on custom or oral talks. This was because transactions with farmers in general were on a small scale, so formal agreements were considered troublesome and expensive.

3.3 Relation and Network Among Farmers and Middlemen

Relations and networks could be described that a number of farmers sold all their products only to one middleman; while other groups of farmers also had their own middlemen. Farmers could not exchange their middleman and sold the product to others. Farmers were also unable to sell their product to market because it was rejected by trader. The role of the middlemen ranging from financing, marketing, pricing, land leasing, and socially involving. The roles of middleman in Chili business in Cirebon District can be described as in Fig. 2.

Farmers seemed to only have options for the operation of their farming business with money loans for middlemen including for their daily living expenses. Farmers did not get formal credit from the bank. Farmers borrowed money from middleman without collateral and complicated administrative procedures; then that money would be repaid after harvesting the commodities. On the other hand, the existence of middlemen also considered can help farmers with the role that he had; both in the context of farm business and also in urgent financial daily needs. We also found that both farmers and middlemen were maintaining the relationship between each other. Sometimes farmers complain of their weakness and dependence on the behavior of the middlemen, sometimes the farmers feel the presence of the middlemen can helps them in continuing their farm business and helps them when they need money.

Financing and marketing are the classic problems in agricultural economic activity in developing countries. Our research found that they were the only party that financing farmers' farm business as well as farmers' family needs of cash. The findings were also stated that farmers were unable to sell their agricultural products unless to a certain

middleman whom they borrowed money both for the farm business and daily needs. The price of the transaction was determined by middlemen. The farmers did not have other choices; they had to receive the price of their agricultural products. That price was set below the market price.

The research findings consider that the roles of middlemen in rural areas especially for farmers were financing, marketing, pricing the product after harvesting, land leasing for farmers, and socially involving. Middlemen in Waled District had a role as a collector, buyer, liaison, and marketer. They also rent out its agricultural land to farmers and lend money to farmers without interest rate, but requiring payment with farmers' production at harvest. The price of the product was determined unilaterally by middlemen. So, farmers were as 'price taker' or the recipient of the price, while the middlemen were the 'price maker'. It could be said that the farmer's bargaining position was weak; they were in an unequal position. Farmers had no choice but accepting the price of middlemen even though farmers knew the price of the production market. Farmers did have no choice for financing their farming unless by supporting money from the middlemen for buying means of production in which it would be reimbursed after harvesting. Farmers and their family demanded cash for schooling costs for their children, medical expenses, and other social activities by borrowing money from middlemen without complicated administrative procedures.

3.4 Institutional Economic Linked to Chili Supply Chain

This study found that chili supply chain disruption represented the ineffective institutions linked to chili business. It considered that several incentive power, assistance with numerous policy instruments have been applied by the government to support the transformation of farmers' group into farmers' economic institutions. However, so far it has not been functioning as supposed to be. The study affirmed the finding of Harniati et al. [9]. They pointed out that the key approaches in the transformation of farmers' group into economic institution were (1) by establishing agribusiness circumstances, (2) by shifting the behaviour of farmers toward entrepreneurship capacity, (3) by developing productive business managed jointly in the business scale to fulfil demand of market in gaining profitable and efficient farming.

The study confirmed Arsyad et al. [10] research that stated the middleman role was an essential part in the smallholder society. First, middleman role was as a financial or capital provider. They provided access to investment for smallholders who were not proficient to acquire formal credit mostly from banks. Second, the role was as a provider for the means in the production process. The middleman provided farming inputs for farmers. Third, the role was of post-production/marketing. Fourth was a part of the socio-religious event. Smallholders needed cash for schooling payment, health care, donation or dues for socio-religious occasion. Next, Arsil et al. [11] stated that in numerous nations over the worldwide that support to home-grown farming have been an escalating concern involving the growth of the local food drive as another possibility of marketing. Other important issues mainly in terms of marketing were a feeble of marketing agencies and institutional attribute [10], improvement of market co-integration, the shortage of getting into market knowledge for both farm input and output, Arsyad and Kawamura, [12], also stated that the needed to obtain new selling strategies and innovations [10].

Additionally, Doherty et al. [13], considered thoughtful (1) the architecture, or networks and institutions, of commercialization, authority and certification and (2) the marketing performs and strategies, intended to resonate with and develop cognitive association amongst consumer; the orientation of agricultural production is sturdily and straightly related to decline countryside poverty [14].

Our findings were different from findings of research of Quincieu, 2016 in Aprilianti and Purwanegara [15]. They describe that in agriculture of Indonesia, there were four major buyers namely cooperatives, farmers groups, brokers and rural markets. Every buyer had a specific trading pattern. (1) Agricultural cooperatives were units or service centers that responsible for providing farm credit with low interest schemes to aid their members, production input and incentive share, marketing the product, and other economic happenings. Cooperatives enabled farmers to work together among the farmers, pool their resources and together strengthened themselves to yield a plenty of cultivated crops. (2) A group of farmers was a basic unification letting member to shape a joint production arrangement. The objective of establishing farmer's groups is to reinforce the role of farmers, developing farmer's capabilities and self-assurance so that they turn out to be strong, autonomous stakeholders and associates to other shareholders. Such groups afford farmers with better united bargaining power. Farmers can improve skill and know-how through experience and information sharing as teamwork in the attention of increasing their farm doings. Group leaders should reassure members to trade some of the products to the group. The group leaders sell some product to selected vendors through official agreement. Lastly, the marketing linkage in rural regions was dominated by brokers. (3) farmers were required to manage their farms and their daily needs. Farmers plunged as sufferer to price discrimination taken by the brokers (4) In rural area, market was characterized by direct selling of small quantities product of farmers to village brokers, then to retailers which sold the product to rural consumers. Rural market form part of a trade linkage was generally arranged on specific weekdays that commonly matter at a central place in a village or district center, or adjacent to the village's access road [15].

Furthermore, this study confirms findings [16] that the determining factors of the performance of institutional economic performance are farmers' oldness, level of education, farming experience, scale of enterprises, and role of unified farmer's group. The performance of farmers' economic institutions can be developed through (1) enhancing the participation of young farmers which have moderately higher level of education (2) optimizing extension performance, training and apprenticeship; (3) improve the capacity of board and members; (4) and thorough support to optimize the role of farmers' institutions as an economic institution.

4 Conclusions

The results presented condition contributed to disruption of supply chain, they were the characteristics of farmers and their fragile business, the dominant role of the middlemen, and the pattern of relation and network among farmers and middlemen and the ineffective institutional economics. Generally, farmers could not fully take the decision; they were deeply depending on middlemen to run their business. The middlemen determined

marketing, pricing for both input factors and product, as well as land leasing. The study affirms that chili supply chain disruption represents the ineffective institutions linked to chili business. Farmers face difficulties to overcome their complicated conditions. The shocks of Covid-19 pandemic are still unfolding cause the significant impact that worsening disruption to supply chain.

This study suggests that to overcome the disruption of red chili supply chain, supports for strengthening economic institution are needed to increase farmers bargaining power. Furthermore, supply chain management for red chili needs to be implemented in conjunction with assistance for farmers in order to be able to implement this business technique.

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