Perfecting policies of chili agribusiness to support food security: evidence from Indonesia districts

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Abstract. The availability of chili supply to meet domestic demand is very important, especially mitigating the volatility of chili prices. The fluctuating development of chili prices implies that the maintenance of chili supply is very important in maintaining food price stability. It is because decreased of chili productivity will lead to price increases with increased demand, while excess supply also causes prices to drop, especially at the farm level. The districts of Jember and Banyuwangi as the largest chili suppliers in East Java need to make strategic policies so that production, productivity, and prices of chilies do not fluctuate from time to time. The purpose of this study was to develop a chili agribusiness development strategy to support food security in Jember and Banyuwangi. The analytical tools used are SWOT analysis and Analytical Hierarchy Process (AHP). Based on the results of the analysis, it was found that the main policy priorities in Banyuwangi Regency were increasing information on prices and chili products, strengthening the commitment of farmers, traders and industry, and increasing trust among industry players. Whereas in Jember Regency, namely strengthening the commitment of farmers, traders and industry, minimizing distribution barriers, and ease of obtaining funds.

1. Introduction

The development of the agricultural sector is very important to support food security in Indonesia. In line with the development concept of agricultural sector, the food plant subsector has a significant role [1]. The availability of supply of chilies, both large and small, in meeting domestic demand is very important, especially in mitigating the volatility of chili prices. The price of red chili in the domestic market in July 2017 decreased slightly, namely by 8.66% compared to June 2017. However, when compared to July 2016, the price of red chili has decreased significantly, namely by 16.12%. The districts of Jember and Banyuwangi, as one of the largest chili suppliers in East Java, need to make strategic policies so that production, productivity, and prices of chilies do not fluctuate from time to time. The fluctuating development of chili prices implies that the maintained supply of chili is very important in maintaining food price stability [2-4]. The integration of the chili commodity value chain based on bioeconomics from upstream to downstream supported by the availability of adequate infrastructure and institutions is the main prerequisite for increasing agricultural commodity productivity [5, 6].

The districts of Jember and Banyuwangi, as one of the largest chili suppliers in East Java, need to make strategic policies so that production, productivity, and prices of chilies do not fluctuate from time to time. The fluctuating development of chili prices implies that the maintenance of chili supply is very important in maintaining food price stability and food security [7], especially in Jember and Banyuwangi. The integration of the chili commodity value chain from upstream to downstream supported by the availability of adequate infrastructure and institutions is the main prerequisite for...
increasing the productivity of chili commodities [8, 9]. This is because decreased productivity will lead to price increases with increased demand, while excess supply also causes prices to drop, especially at the farm level [6]. Apart from being caused by the climate anomaly, the distribution or marketing chain also greatly determines the price volatility of chilies. In accordance with the concept of bioeconomics that has developed from 2009 to the present, it can be seen that the agricultural economy can grow and develop through the use of research and development of life science and biotechnology. Bioeconomics can be defined as knowledge-based production and utilization of biological resources, processes, and biological principles to provide goods and services in a sustainable manner in all sectors of the economy. This involves three elements namely (1) efficient use of renewable biomass and bioprocesses to achieve sustainable production; (2) Use of enabling and convergent technologies, including biotechnology; and (3) Integration across sectors such as agriculture, health, and industry. Its cross-sectoral nature offers a unique opportunity to comprehensively address interrelated social challenges such as food security [10].

Some of the reasons for low agricultural productivity are the low education of farmers, difficulty in accessing financing for rural areas, lack of skills, lack of access to information, and lack of application of agricultural technology. There are still many farmers who still use past traditions in carrying out agricultural practices. Meanwhile, in terms of access to finance, most farmers are unable to get the loans they need to invest, so they cannot increase productivity through the use of better production facilities. Likewise, the skills of farmers are also considered low because they only rely on the current harvest to finance the operations for the next planting period. Considering that the contribution of agribusiness and agriculture is very important, conditions in the future need a breakthrough to create a better impression for agriculture in line with efforts to maintain food security and sovereignty in Indonesia [11]. The lack of access to information has made farmers simply rely on market information from buyers, which has resulted in inequality of information and difficulty in negotiating. Likewise, the low application of agricultural technology for farmers. So it becomes very important to change the mindset of farmers who are adaptive to market dynamics and technology. The aim of this research is to develop a strategy in chili agribusiness development to support food security in Jember and Banyuwangi.

2. Material and Methods

2.1 Material

The structure, behavior, and performance paradigm is a tool used to analyze the market and the relationship between market structure, market behavior, and market performance [12]. The SCP paradigm is based on two theories, namely industrial organization theory and price theory. Industrial organization theory explains the use of the degree of vertical integration, industry maturity, government participation, cost structure, and firm diversification. Market structure refers to how the market functions is the concept behind industrial organization theory. Based on industrial organization theory, market structure has an influence on corporate strategy and decision making in terms of strategic bid management [13]. According to [14], it is best to explain how a company operates based on the type of market operating in it and only focus on the company itself and its components. Meanwhile, on the other hand, price theory is related to economic activity in creating added value for trade in goods and services between different economic actors [15].

The main elements in the market structure consist of market share, market concentration, and barriers to market entry. Eaton and [16] state that concentration and entry barriers which are characteristics of a market will affect the profitability of a company. Market behaviour is the policy in pricing and product characteristics adopted by market participants and competitors. Market behaviour grouping consists of behaviour in price strategy, product strategy (efficiency, technological progress, and sustainability in distribution). Therefore, to measure the performance of the industry through profitability.

The structure is considered more important than the performance variable. Market structure can explain performance well such as the ratio of concentration and freedom to enter the market. According to [17] market behaviour is a performance or a reflection of the nature of industrial competition in a market. In general, the basic substance of the SCP theory, namely market structure and company
behaviour, is the company's performance. In particular, [18] argues that a market structure with a high level of concentration will encourage companies to behave collusively rather than compete with one another. Market structure and behaviour will affect the performance of a market which is reflected in price, efficiency, and level of innovation.

2.2. Methods
This type of research is qualitative research and the determination of the research location was carried out deliberately or purposive sampling, namely in Jember and Banyuwangi Regencies. The sampling technique is stratified random sampling by arranging the population into various strata to ensure fair representation of various types of market participants. The stratification involves three groups of producers or farmers, both large chili and cayenne pepper or small chili, wholesaler or wholesaler, and homogeneous retailer. Some of the respondents who were the object of the research were 40 chili farmers, large and small, 10 big traders and 20 small traders, 5 industry people, and 25 consumers in Jember and Banyuwangi Regencies. So that the total respondents are 100 people in each district. In developing a chili resilience policy strategy, analysis tools of strength, weakness, opportunity, threat (SWOT), and Analytical Hierarchy Process (AHP) are used.

3. Results and Discussion
The fluctuating development of chili prices implies that the maintenance of chili supply is very important in maintaining food price stability. The integration of the chili commodity value chain from upstream to downstream supported by the availability of adequate infrastructure and institutions is the main prerequisite for increasing the productivity of the chili commodity. Apart from being caused by climate anomalies, the distribution or marketing chain also greatly determines the price volatility of chilies.

Based on the results of the interview, the respondent's profile was 82% male, then 18% were female. The farmers in Jember and Banyuwangi districts are dominated by male farmers than female farmers. On the other hand, chili farmers in Jember and Banyuwangi Regencies can also be classified into age levels. 34% of farmers are vulnerable at the age of 50-59 years, 29% of farmers are at the vulnerable age of 40-49 years, 18% of farmers are at the vulnerable age of 60-69 years, aged 30-39 years there are 11%, 5% of farmers are at aged 70-79 years and only 3% of farmers are vulnerable to the age of 20-29 years. Farmers in Jember Regency are more dominated by farmers aged 50-59 years. Age level can also be a factor to increase farmer productivity. From an institutional perspective, 36% of Jember and Banyuwangi chilli farmers are members of farmer groups and another 64% are not affiliated with farmer groups. Some of the benefits obtained from the existence of farmer groups include assistance in nurseries, capital, and fertilizers. The existence of counseling carried out by farmer groups also has a positive impact on the knowledge of chili farmers in farming. So it is expected that the productivity of chili farming in Banyuwangi can increase. Sufficient chili stocks are expected to offset the volatility of chili prices in the market.

The internal weakness factors examined in this research are the availability of chili raw materials in the market which is strongly influenced by the season so that the price fluctuates. The unpreparedness of the apparatus in planning the program to increase the competitiveness of chilies and the minimal budget is also a factor of weakness in the chili trade chain in Jember and Banyuwangi Regencies. On the other hand, the egocentric attitude of economic actors in making decisions and concerns over the emergence of conflict from members (the Association of Chili Farmers/traders) are a factor of weakness that can hinder the trade chain of chili commodities in Jember and Banyuwangi Regencies. The external factors included in this research are regional and global economic conditions which tend to be stable so that the demand for chilies will be higher. The development of derivative products made from chili, which is increasingly being enhanced, supported by easier marketing mechanisms, can also expand the market size of this commodity. All of these opportunities will further support the chili trade chain if strengthened by the government’s contribution in the formulation of appropriate policies. The obstacles faced in the chili trade chain are communication and coordination between economic actors in the chili
market which has an impact on the accessibility of information on the price and availability of chili and other goods that support the production of chili and its derivative products. On the chili farmer side, the availability of a chili farmer/trader umbrella organization has the potential to hinder the distribution channels of this commodity.

Based on Table 1, the greatest strength component lies in the potential of natural resources and supporting infrastructure for chili farming. The cultivation of chilies is relatively easy compared to other commodities so that it does not require a lot of infrastructures. The component of the internal weakness factor that has the lowest score is the egocentric attitude of each economic actor in the chili trade chain. An egocentric attitude if linked in the institutional economy paradigm can lead to increased transaction costs, but if this attitude can be suppressed, it will increase social capital among economic actors. In this case, the value of an egocentric attitude means that social capital appears in the chili trade chain in Jember and Banyuwangi Regencies.

Table 1. The results of the mapping of internal strengths and weaknesses in the chili trade chain in Jember and Banyuwangi regencies

| Strength factor | Weight | Score | Value |
|----------------|--------|-------|-------|
| 1 Human resource potential which each region | 0.07   | 2.74  | 0.19  |
| 2 The suitability of government policies regarding increased production and competitiveness of chili | 0.05   | 1.79  | 0.09  |
| 3 An understanding of the production flow chili | 0.09   | 3.01  | 0.27  |
| 4 Understanding the chili distribution flow | 0.07   | 2.58  | 0.18  |
| 5 The quantity of human resources | 0.07   | 2.89  | 0.20  |
| 6 Availability of infrastructure | 0.08   | 2.97  | 0.24  |
| 7 Participation of members (farmers) and community support | 0.06   | 1.81  | 0.11  |
| **Total** | **0.49** | **17.79** | **1.28** |

| Weakness factor | Weight | Score | Value |
|-----------------|--------|-------|-------|
| 1 Availability of chili raw materials | 0.08   | 2.89  | 0.23  |
| 2 The egocentric attitude of farmers / traders / consumers in making decisions | 0.05   | 1.84  | 0.09  |
| 3 There is no standard price for chili raw materials (seeds, fertilizers, medicines, etc.) | 0.07   | 2.84  | 0.20  |
| 4 The lack of budget allocation | 0.05   | 1.73  | 0.09  |
| 5 Concerns on conflicts of members (association of farmers / traders chili) | 0.09   | 3.13  | 0.28  |
| 6 Unpreparedness of the apparatus in planning the program to increase the competitiveness of chili | 0.05   | 1.77  | 0.09  |
| 7 Fluctuating of chili prices | 0.08   | 2.91  | 0.23  |
| **Total** | **0.47** | **17.11** | **1.21** |

Source: Primary data, processed, 2019

Referring to the results of the calculation of internal factors, the strength component has a greater value than the weakness factor by a difference of 0.07 points. This fact indicates that the internal potential, especially the potential for natural resources and the number of human resources as well as the availability of infrastructure, minimize the weaknesses in the availability and benchmark prices of raw materials as well as fluctuations in the price of chili in local and regional markets. Therefore, there is a need for real efforts in terms of benchmark prices for chili production inputs such as seeds, fertilizers, and pesticides so that they can support agricultural productivity.
The lowest opportunity value for the external factor component is government policy. It has been discussed previously that there is no specific policy to support trade in chili commodities, especially in Jember and Banyuwangi Regencies. From the results of the mapping, the opportunity factor shows that the high demand for chilies is supported by a marketing mechanism that is easier to use optimally even though the role of government policy is relatively small. The results of the mapping of the components of the internal factors of barriers which are presented in Table 2 show that the highest obstacle is information on the production and marketing mechanisms of chili and processed products. So far, the chili derivative products marketed in Jember and Banyuwangi Regencies are relatively minimal and tend to be less varied. The lowest component is the availability of shelter institutions for chili farmers or traders. The constraints in the availability of a shelter agency are relatively less hindering the chili trade chain. Based on the results of the identification of the external potential in the chili trade chain in Jember and Banyuwangi Regencies, it shows that the opportunity value is greater than the value of the resistance with a difference of 0.23 points. This situation indicates that the chili commodity institutions in Jember and Banyuwangi Regencies are sufficiently capable of taking advantage of external opportunities and able to stem the obstacles.

Table 2. The results of the mapping of external factors, opportunities and constraints in the chili trade chain in Jember and Banyuwangi Regencies

| External factor | Weight | Score | Value |
|-----------------|--------|-------|-------|
| Opportunities   |        |       |       |
| 1. The dynamics of regional and global economic growth | 0.11   | 2.91  | 0.31  |
| 2. Increasingly high demand for chili | 0.12   | 3.32  | 0.40  |
| 3. Easy chili marketing mechanism | 0.11   | 3.14  | 0.36  |
| 4. Chili policy adjustment provisions | 0.07   | 2.00  | 0.14  |
| 5. The mechanism for business development and diversification using chili as raw material | 0.10   | 2.77  | 0.28  |
| Total           | 0.51   | 14.14 | 1.48  |
| Threats         |        |       |       |
| 1. Communication and coordination constraints between related parties | 0.09   | 2.55  | 0.24  |
| 2. Information regarding the price and availability of raw materials for chili production | 0.08   | 2.27  | 0.19  |
| 3. Information regarding the prices of other goods to support the chili production process | 0.10   | 2.82  | 0.29  |
| 4. Information about the production and marketing mechanisms of chili and its processed products | 0.12   | 3.14  | 0.36  |
| 5. The availability of institution shade for chili farmers / traders | 0.08   | 2.14  | 0.17  |
| Total           | 0.48   | 12.91 | 1.26  |
| Difference of opportunities and threats | 0.23 | | |

Source: Primary data, processed, 2019

Based on the mapping results in the SWOT matrix, the results show that the strategic position of the chili trade chain in Jember and Banyuwangi is in quadrant I which is indicated by the value of internal factors is 0.07 and external factors are 0.23. The position in quadrant I is a very profitable position where the chili commodity has the strength so that it can take full advantage of the existing opportunities. The strategy adopted is to support appropriate and focused policies by improving the quality of human resources and supporting facilities so that they can meet increasing market demands due to the stability of the local, regional and global economy.
In developing a chili food security strategy using AHP. The strategy using AHP was obtained from the results of interviews with policy makers in Jember and Banyuwangi Regencies, namely the Agriculture Office, the Trade Office, and also involved several farmer groups. Figure 1 shows the highest priority weight in the chili agribusiness policy strategy in Jember and Banyuwangi Regencies. The successful implementation of agribusiness programs and policies is highly dependent on several factors, namely planning, organizing, actuating, and controlling. Planning is a systematic and orderly arrangement of steps to achieve organizational goals or solve certain problems. Planning is the first step in the management process because by planning future organizational activities, all resources in the organization are focused on achieving organizational goals. Organizing is defined as the activity of distributing tasks to people involved in organizational activities, according to their HR competencies. Organizing can be defined as harmonizing different groups of people, bringing together various interests, and utilizing all abilities in a certain direction. Good planning and organizing is meaningless if it is not followed by the implementation of responsible organizational work.

![Figure 1. Weighted priority strategy for chili agribusiness policies in Jember and Banyuwangi Regencies (consistency index 0.5)](image)

Implementation of work must be in line with the work plan that has been prepared. Every actor in the organization must work in accordance with the duties, functions, and roles, skills, and competencies of each HR to achieve the vision, mission, and work program of the organization that has been set. Controlling is not just controlling the implementation of programs and organizational activities, but also supervising so that if necessary it can make corrections. The supervisory process as part of control will record the organization's progress towards the expected goals. Through effective supervision of organizational activities, quality control efforts can be carried out better.

4. Conclusion

The results of the analysis of the alternative chili agribusiness strategies in Jember and Banyuwangi Regency show that trade and marketing are still the main priorities in the development of chili quality in Indonesia. Some of the top ranks in the strategic alternatives are the role of formal institutions in marketing followed by quality standard management, determination of selling prices, and market expansion which occupies the priority of all alternatives in the development of quality chili. This result is in line with the important role of quality in export commodities in particular, which will affect
competitive advantage and ultimately improve the welfare of farmers and other chili farming actors. The application of standards and quality should be carried out integratively from upstream to downstream so that it is in accordance with the export quality standards required by the export destination country. Moreover, the upstream sector has a significant effect on the export quality value of chilies. If the cultivation process has gone well, it will produce good quality chilies in accordance with the expected quality standards. Ease of access to funds is also the main problem that requires policy synergy between the government and banks in assisting farmers in overcoming capital difficulties.

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