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THE EFFICIENCY OF THE AUCTION MARKET OF CHILI IN THE SANDY COASTAL AREA OF YOGYAKARTA PROVINCE, INDONESIA

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ABSTRACT

The auction market of chili in the Kulon Progo Regency has proven to have many benefits to the farmers. The competition among traders in the auction market will elevate the price, making it more profitable to the farmers. However, there are still opportunities to improve the auction market performance. This study was intended to help determine the efficiency of the auction market of chili in the sandy coastal area and its determinant factors. The research was conducted from April to July, 2018. The respondents were 13 managers of all auction markets in the sandy coastal area of Kulon Progo Regency. The research used the Data Envelopment Analysis to know the efficiency of the auction market and binary logistic methods for analyzing its determinant factors. The study showed that most of the auction markets were not efficient. There were only 2 efficient auction markets, namely Auction Group 5 and Gisik Pranaji. This was due to the fact that the two auction markets had complete supporting infrastructure and management training. Both of the auction markets' manager also had a good partnership with the traders in other cities. Meanwhile, the main problem of the inefficient auction market was getting a low selling price in the harvest season. The determining factor of the efficiency is the managers' experience in farming. In fact, managers with long working experience have an impact on their creativity to develop the auction market. This is because such managers with a long experience of chili farming will understand market conditions. The experience is also beneficial for the managers in establishing partnerships with buyers. The other variable, the auction markets' capital, did not affect probability of the auction market to increase their efficiency. To increase their efficiency, it is necessary for the auction markets' manager to follow the various management training and formal education.

Key words: efficiency, auction market, chili, determining factors, experience, capital, training, education

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INTRODUCTION

Agricultural markets have been dominated by traders, thus making the farmers unable to determine the price in the market [1, 2]. Other problems in the agricultural market are price fluctuation, supply competition, lack of economies of scale, lack of promotion, lack of assured market access and an increase of import dependency [3, 4]. The chili farmers in the sandy coastal area of Kulon Progo also experience these problems. The farmers are in a weak bargaining position, so the traders buy the chili at a low price, especially during the harvest seasons [5]. The weakness of farmers' bargaining power is detrimental to them because chili is their main source of income [6]. This condition encouraged farmers to establish the auction market [7].

The auction market of chili in Kulon Progo was the first one of horticultural crops in Indonesia. The first auction market was established in 2003 and several auction markets now exist in the sandy coastal area of Kulon Progo. The auction market conducts an auction process using a closed mechanism. The highest bid price from a trader will be the highest price agreed between the bidders (traders) and the auction market administrators. The competition among traders will elevate the price, making it more profitable to the farmers.

Some research indicates that the auction market has many benefits such as making the markets competitive, enabling the markets to provide the best price and information for the farmer, reducing marketing expenditures, changing the price discovery process and linking small farms with consumer demand [8 - 13]. The situation in which farmers prefer selling chili to the auction market rather than to the traders also happens in the auction market of Kulon Progo. This is because farmers will get higher prices compared to when they sell chili to the traders directly [14]. Another reason is the effectiveness of the marketing function carried out by the auction market [15]. In general, farmers choose to sell their products to the auction market based on price, timeframe and/or payment guarantees and closeness [16].

However, research by Purwandani [17] shows that there is an auction market in Kulon Progo whose performance is less than optimal. Many problems faced by the auction market, like the availability of less extensive warehouse space and the presence of middlemen or collectors. A study conducted by Devi and Subejo [18] showed that the auction market in Kulon Progo still has potential to increase its performance. The way to increase the auction market performance is by minimizing inputs and maximizing output or efficiency [19].

Many researches argue that to increase their efficiency or performance, an organization must focus on management practices [20], human capital [21], leadership competencies [22], increased age or experience [23] and ability to collaborate with other parties [24].

This research tried to increase the efficiency of the auction market and perhaps increase farmers' incomes. Previously, some researches had been addressing the auction market of chili in the sandy coastal area. Nonetheless, there is no research that had examined the efficiency of the auction market as most of the available research examined the

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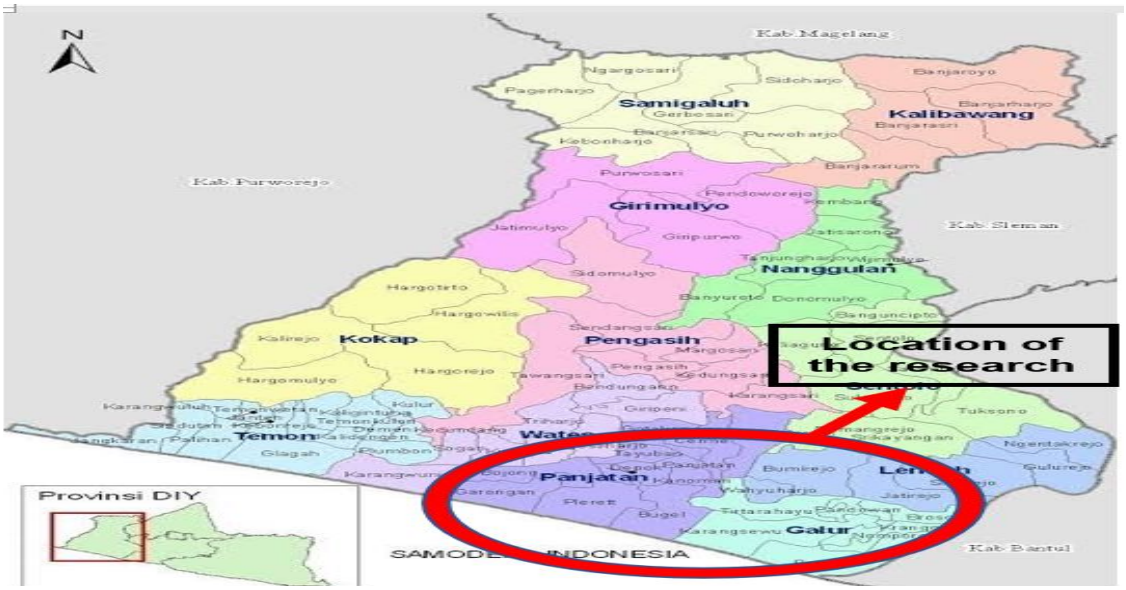
auction market in general. This research also had a big contribution for others, especially, to formulate good management for agricultural marketing institutions. So, this research intended to determine the efficiency of the auction market of chili in the sandy coastal area and its determining factors.

METHODOLOGY

Study area

This research was conducted in Galur Sub-district and Panjatan Sub-district, Kulon Progo Regency from April to July 2018 (Figure 1). The area was chosen by purposive random sampling because it had been the center of chili production in the sandy coastal area and had several auction markets.



Source : Local Government of Kulon Progo Regency

Figure 1: Location of the Research (Galur Sub-district and Panjatan Sub-district, Kulon Progo Regency)

Data Collection

The study used primary data obtained from interviews with all of the auction market managers. The data types which were collected from the interviews included the profile of the auction market (capital, supporting infrastructure, management training, the amounts of chili sold and the price of chili) and experience of the managers in chili farming (how long they had been cultivating chili). This research also used secondary data, which was obtained from the Central Bureau of Statistics' documents.

From the survey, it was found that there were 13 auction markets existing in the sandy coastal area and all of them were sampled for this study (Table 1). From each auction market, a chief manager was interviewed because he was aware of the auction market's activities. In 2015, there were 24 auction market units, many of which have since been closed. This closure happened because the establishment of the New Yogyakarta

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International Airport took over farmers' lands. So, the auction market was not getting chili from the farmers and could not engage in their activities.

Data Analysis

This study applied the following methods to analyze the data: To determine the efficiency of the auction market of chili, the researcher used Data Envelopment Analysis (DEA).

Data Envelopment Analysis works by identifying which units do not use inputs efficiently or do not produce outputs effectively. The purpose of the DEA method was to measure the efficiency level of the decision-making unit (DMU). Each unit in the sample was considered to have a non-negative efficiency level and a value between 0 and 1. Based on the theory, a DEA score of 1 indicates perfect efficiency or use input optimally to produce maximum output. Furthermore, the units with a DEA value of one were used within the envelopes for frontier efficiency, while the units that were in envelopes showed a level of inefficiency [25].

The researcher used 2 (two) inputs and 2 (two) outputs to measure the efficiency of the auction market. The inputs used in this research were the supporting infrastructure (0 if an auction market did not have enough, 1 if it had enough and 2 if it had excessive supply), and management training (0 if the caution market has not applied, 1 if it has applied but did not continue and 2 if it has applied and continued the management training). The supporting infrastructure was measured based on the completeness of the auction market tools like scales, boards, stationery, cardboard, box for the bid and warehouse. The auction market was categorized as not having enough equipment (0) if one of the tools did not exist, especially the warehouse, because this tool was needed for the sale of chili in the auction market. If all of them existed, the auction market was categorized as having enough (1), while if there were additional tools, the auction market was categorized as having excessive supply (2), while management training was seen from the start of implementation and its continuity. The outputs were the amounts of chili sold in a year (kg) and the average chili price in a year (US$).

The basic assumption in this study was a constant return to scale (CRS) by optimizing output. The CRS is also referred to as the CCR model. The CRS approach assumed that the auction market would be able to operate optimally, while the orientation of optimizing output because the auction market was expected to be able to improve services for farmers, especially by increasing the capacity of chili sales and presenting a fair price for farmers.

The CCR-DEA model with output oriented is [26]:

$$\max \emptyset + \epsilon(s_i \sum_{i=1}^{m} + + s_r \sum_{r=1}^{s}) \quad (1)$$

subject to

$$\sum_{j=1}^{n} x_{ij} \lambda_j + -s_i = X_{io} \text{ i} = 1, 2, \ldots, \text{m}; \quad (2)$$

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$\sum_{j=1}^{n} y_{rj} \lambda_{j-} + s_r = \emptyset y_{ro}$ r = 1, 2, …., s; (3)

$\lambda_j \geq 0$ j = 1, 2, …., n; (4)

1) The binnary logistic method was used to find the determinant factors of the efficiency of the auction market of chili.

$EF = \beta_0 + \beta_1 ExM + \beta_2 CA + e$ (5)

where
EF = Auction market's efficiency (0 = if the auction markets were imperfect efficient and 1 = if the auction markets were perfect and efficient)
ExM = Manager's experience (year)
CA = Auction market's capital (US$)
E = error

RESULTS AND DISCUSSION

The auction market's procedure begun with chili harvesting and sorting. This process classified chili into three grades: A for the best quality, B for the medium quality and C for the bad quality. Every grade was sold at a different price in the auction market. The A grade was sold at the highest price, while C grade was sold at the lowest price.

The auction market conducts an auction process using a closed mechanism. The traders place a bid secretly to the auction market administrators by writing their bid on a piece of paper and inserting it into the designated box. The highest bid price from a trader is the highest price to be agreed upon among the bidders (traders) and the auction market administrators in the auction market. The winning bidder immediately packs the chili and markets it to the various regions. The competition among traders elevates the price higher than the conventional sales system, making it more profitable to the farmers.

Efficiency of the Auction Market of Chili

In this study, there were 13 auction markets of chili studied so that there were 13 DMUs. This code shows the order of the auction market from the earliest to the very last. Every auction market in the sandy coastal area of Kulon Progo had different input and output conditions, which affected their efficiency. From the DEA score, the auction market with a score of 1 was included in the perfect efficient category, while the auction market with a value of less than 1 was considered imperfect efficient. Table 2 shows that there are only 2 perfect efficient auction markets (15.38%). The auction markets which achieved efficiency were Auction Group 5 and Gisik Pranaji. This was due to the fact that the two auction markets had complete supporting infrastructure and management training. Although the supporting facilities owned by the two auction markets were still simple, they were more complete than those in the other auction markets. Infrastructure facilities owned by Auction group 5 and Gisik Pranaji were simple auction equipment (scales, boards, stationery, cardboard and box for the bid)

and a little warehouse. All of the equipment was acquired by the self-help activities or assistance from external parties.

The auction market required that a management fee be imposed on every transaction. Every auction market had a different way of management fee scoring, but normally the management fee would rise according to an increase in chili price. As an example, Gisik Pranaji applied a fee price rule of US$ 0.013 per kilogram when the chili price in the auction market was less than US$ 2.00 per kilogram, but when the chili price was less than US$ 3.33 per kilogram, the fee price would be US$ 0.027 per kilogram. The fee price would continue to increase according to the increase of chili price. Gisik Pranaji imposes a management fee of US$ 0.03 per kilogram for chili price above US$ 3.33.

The main use of this fee was to pay the salaries of managers and employees of the auction market. A little portion of the rest of the fee would be used for the development of the auction markets, such as building or procurement of some infrastructure. Bank Indonesia also gave grants to help the auction market build some infrastructures. Unfortunately, until then some of the auction markets did not have any warehouse for agricultural product storage. Consequently, the collected chili would rot if not sold immediately.

In relation to management training, it was noted that all efficient auction markets had received management training, although not continuously. The main courses of this activity included: auction market partnerships with other markets in Yogyakarta Province and outside Java, apprenticeships in auction market management, comparative studies and physical development of auction markets. This condition was in contrast to the inefficient auction markets, most of which had never received management training from the local agricultural officers and Bank Indonesia.

As regards the output aspect, the efficient auction markets, Auction Group 5 and Gisik Pranaji, were able to sell chili at good prices during the harvest season. The farmers got a higher price when they sold their products to the auction markets, than they received from the traders. The gap in price between the auction markets and the traders ranged from US$ 0.13 to US$ 0.30 per kg. This phenomenon happened because the managers had a good partnership with the traders in other cities such as Jakarta and Medan. This was different from the inefficient auction market which did not get the deserved price in the harvest season.

However, the partnership did not give a different effect on the amount of chili that had to be sold. The efficient auction market could sell the chili almost the same as the inefficient auction market. This happened when almost all of the auction market managers conducted meetings with the traders at the beginning of the planting season to discuss the chili varieties to be planted. The production would be bought by the traders during the harvest season.

Each auction market was able to sell different quantities of chili per year. The auction group 1 was the highest because it could sell up to 100 tons per year. Meanwhile, the

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Wahana Tani could sell up to 90 tons per year, followed by the Harapan Tani, the Sidomaju, the Tani Sari and the Sido Dadi which each sell up to 60 tons per year. There are also 2 auction markets, the Gisik Pranaji and the Sewu Rejo Timur, which sell up to 50 tons of chili per year; the auction group 2 and the auction group 5 which sell up to 40 tons per year; and the lowest are the auction group 3 and the Gisik Wonotoro which sell up to 30 tons per year. The difference in sales actually shows the production capacity of farmers who were members of the auction market because every auction market could sell all the chili supply from its farmers.

The Determinant Factors of the Efficiency of the Auction Market of Chili

In theory, the estimation of binnary logistic model did not need to use multicollinearity, heteroscedasticity and normality tests [27]. The Nagelkerke R Square result indicates that 51.3% variation of the dependent variable can be explained by variation of independent variables. However, the Hosmer and Lemeshow test states that p-sig more than 0.05 the model can explain data well (goodness of fit).

The constant a value indicates that the efficiency of the auction market will decrease if there is no internal or external intervention for the auction market. Some of the auction markets did not have good input conditions like “less than optimal infrastructure”, and did not get management training from other parties. So, there is need for a particular activity to optimize some independent variables that affect efficiency.

The variable that has a significant effect on the auction market's efficiency is the managers’ experiences in farming. If the managers’ experiences in farming increase, it will increase probability of the auction market to achieve efficiency. The managers of the Auction Group 5 and Gisik Pranaji had been cultivating chili from 36 and 31 years, respectively. People who repeatedly engaged in certain activities would achieve high levels of activity experience as well as superior activity performance [28]. This is because such managers with a long experience of chili farming would understand the market conditions, both in terms of supply and demand. During the rainy season, the chili price would rise due to the low supply as the demand remained high. Based on their experiences, the managers would direct the auction market to increase the chili price and hence, be profitable to the farmers. On the other hand, the chili price remained affordable for the consumer since the shortened marketing channel lowers the profit margin prices between farmers and consumer.

In addition, the experience was also beneficial in establishing partnerships with buyers. The manager would get to know various potential traders who buy chili on the auction market so that they could later establish intensive communication with these traders. Managers also gained strength in negotiations, especially in conflict resolution. This happened because the managers were familiar with the internal parties (farmer members) and external ones (traders). So, the managers would use different conflict resolution approaches in accordance with the character of the parties involved to solve the problems.

There were some ways which contributed to increasing the managers’ experiences in farming like: follow counseling and formal education. The local agricultural officer and

Bank Indonesia provide counseling for the auction market. The counseling materials related to make Standard Operating Procedure, good service, product and administrative management. It could improve efficiency, service, revenue and business sustainability [29]. So far, support to the auction market had been provided, although not yet continuously. The real impact of various forms of support for the auction market was the improvement of the managers' ability to professionally manage the auction market. This was evident where the auction market that had been established since 2003, namely Gisik Pranaji, still provided many benefits to farmers. This auction market could sell up to 50 tons per year and had many partnerships with traders. Bank Indonesia also gave grants and also increased the auction markets' efficiency.

The other way to increase the managers' experience in farming is to follow the formal education. The creativity or accuracy of a person's decision making in principle is determined by many things, one of which is the level of formal education [30, 31]. People with good education also have an impact on their willingness and ability to find information and learn about the good management processes in an institution.

In fact, managers with good education are good at organizational management. It was proved by the managers of Gisik Pranaji, who graduated from senior high school and made price monitoring divisions. This division had the task of getting information about chili prices in other markets, especially in the Kramatjati market (Jakarta). The auction markets with price monitoring divisions also joined the WhatsApp group made for auction markets in Indonesia. This group shared the chili prices in other areas as a price reference for the auction markets. Good marketing information system had proven to increase the farmers' marketing performance as shown by the higher price [32]. The impact of good education has also been proven by the auction group 5. This auction market has a manager who graduated with an associate degree and this helped to create good management, especially to increase the business scale of the auction market.

The auction markets' capital did not affect probability of the auction market to increase their efficiency. This was caused by the auction markets' capital being very low and tending to be constant. During this time, the auction markets had the opportunity to increase their capital using the fee from the auction process. But, in fact, the fee was used to pay the managers' and employees' salaries. This could be a point of consideration for auction markets' manager to use the fee for auction market activities and infrastructure.

CONCLUSION

Not all auction markets in the coastal area had efficient performance. Only two auction markets were efficient, namely: Auction Group 5 and Gisik Pranaji. The determinant factor of the efficiency was the managers' farming experience, while the auction markets' capital did not affect efficiency.

To increase their efficiency, the auction markets must be led by an appropriate manager who has long business experience. This long business experience would make managers able to make decisions in managing the auction market appropriately. The

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next step is a need for various training activities and mentoring continuously in management aspects for auction markets' managers. The government, both local agricultural officer and Bank Indonesia, could play an active role in management training. The design of the training and mentoring should take the form of legal entities, management of institutional structures, conflict management and negotiations.

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Table 1: Profile of the Auction Market in the Sandy Coastal Area

Names	Address	Since
Auction group 1 (K1)	Garongan 1 Hamlet, Garongan Village, Panjatan Sub-district	2004
Auction group 2 (K2)	Garongan 2 Hamlet, Garongan Village, Panjatan Sub-district	2007
Auction group 3 (K3)	Garongan 2 Hamlet, Garongan Village, Panjatan Sub-district	2007
Auction group 5 (K5)	Garongan 3 Hamlet, Garongan Village, Panjatan Sub-district	2008
Harapan Tani	Pleret 1 Hamlet, Pleret Village, Panjatan Sub-district	2012
Sidomaju	Pleret 2 Hamlet, Pleret Village, Panjatan Sub-district	2012
Gisik Wonotoro	Bugel 1 Hamlet, Bugel Village, Panjatan Sub-district	2010
Gisik Pranaji	Bugel 2 Hamlet, Bugel Village, Panjatan Sub-district	2003
Sewu Rejo Barat	Siliran VI Hamlet, Karangsewu Village, Galur Sub-district	2007
Sewu Rejo Timur	Siliran VI Hamlet, Karangsewu Village, Galur Sub-district	2006
Tani Sari	Siliran V Hamlet, Karangsewu Village, Galur Sub-district	2008
Wahana Tani	Gupit Hamlet, Karangsewu Village, Galur Sub-district	2007
Sido Dadi	Sidorejo Hamlet, Banaran Village, Galur Sub-district	2015

Source: Field survey, 2018

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Table 2: Efficiency of The Auction Market of Chili in the Sandy Coastal Area

Name	DMU	Score	Rank
Tani Sari	1	0.462	9
Wahana Tani	2	0.385	11
Sewu Rejo Barat	3	0.556	7
Sewu Rejo Timur	4	0.556	7
Auction Group 5 (AG5)	5	1.000	1
Auction Group 2 (AG2)	6	0.444	10
Auction Group 3 (AG3)	7	0.333	12
Harapan Tani	8	0.667	5
Auction Group 1 (AG1)	9	0.769	3
Sidomaju	10	0.667	5
Gisik Pranaji	11	1.000	1
Gisik Wonotoro	12	0.333	12
Sido Dadi	13	0.750	4

Source: Field survey, 2018

Table 3: The Determinant Factors of The Efficiency of The Auction Market of Chili in the Sandy Coastal Area

Variable	B	S.E.	Wald	Df	Sig.	Exp(B)
ExM	0.252	0.150	2.820	1	0.093**)	1.287
CA	-0.001	0.004	0.031	1	0.859	0.999
C	-8.507	4.717	3.252	1	0.071**)	0.000
Nagelkerke R Square	0.513		Hosmer and Lemeshow Test			0.924

Source: Field survey, 2018

Notes:

**) significant at the level 90%

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