Impact of contract farming on price: a case study of red chili farmers in Magelang regency

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Abstract. Contract farming is a price control through the agreement of sale arrangement between farmer and firm taken before the starting of production process. Red chili price has a great fluctuation due seasonal production. The objective of the study is to analyze the influence factors red chili price on contract farming. The study compares the constraints on participation, and the impact to the price of red chili between contract and non-contract of farmers. The study carried out in Magelang District, Central Java Province on June to August 2019. Survey method was used with purposive sampling method to 45 respondent of non-contract farmers and 40 respondent for contract farmer. The data analysis used were statistical t-test and coefficient of variation. The results of the study indicated that farmer with contract farming has the minimum price of IDR 9000 per kg and increasing following market price, while the selling price of non-contract farming based on the market price which always fluctuated. Factors affect contract farmers are offering fixed price, and market guarantee while the non-contract farmers are least of information about contract farming. Contract farming should be promoted to sustain chili production and farmer income.

1. Introduction
Red chili is one of the important commodities for the Indonesian economy, because according to BPS data, this causes half of inflation in July 2019 at 0.15% [1]. In terms of prices, red chili often experiences very high and fluctuating price spikes, this condition is indicated by the coefficient of diversity (KK) of monthly prices for May 2018 to May 2019 which is high at 13.82%. The increase in the price of red chili in the high market can be seen in May 2019 which is 27.00% or as much as Rp. 40,291 / kg, a significant increase compared to April 2019 which is as much as 20.72% or as much as Rp. 31,724 / kg, but when compared to May 2018 the price of red chili has increased by 1.06% [2].

The factor causing the increase in the price of red chillies is the availability on the market that cannot meet the needs of the community at certain seasons. Community needs require a red chili harvest area of about 11,000 ha / month, and in the festive season the area of the red chili harvest area that must be available ranges from 12,100-13,300 ha / month [3]. Based on data on harvested area and production, red chili harvested area experienced a growth of 2.07% compared to 2015 which amounted to -6.52%, and the growth of this harvested area increased in 2017 by 15.51%. For production growth in 2016 increased by
0.04% compared to 2015 amounting to -2.73%, and increased significantly in 2017 amounted to 15.37% [4]. Increased production growth and harvested area have not been able to control the price of red chilies. Another effort is needed to control prices, one of which is through contract farming partnerships.

Contract farming is an effort made to control prices through sales arrangement agreements between farmers and companies which are carried out before the production process begins. Contract farming is contractual arrangements for a fixed period of time between farmers and companies agreed verbally or in writing before the production process begins, from providing material or financial resources to farmers and establishing one or more product or process requirements, for the production of agricultural land owned or controlled by farmers, who give the company legal rights to (most) crops in terms of marketing [5].

This study provides an empirical analysis of the impact of red chilies contract farming on price stability in Magelang Regency. This problem is relevant to policy decisions on controlling food prices that cause inflation. Contract farming is considered to be able to maintain the stability of the price of red chili, so that it can be used as a policy and program as an effort to control prices.

2. Methodology
The field survey was conducted by the author in Magelang District, Central Java Province which is one of the centers of red chilies in June to August 2019. The author conducted semi-structured interviews and price surveys with 40 contract farmers who have contractual relationships with Indofood and 45 non-contract farmers from the same village (total 85 farmers) to get monthly chili price information. The sample is representative. The informants were chosen based on discussions between the writer and the farmers' group. The authors also conducted interviews with growers.

The results of interviews and data obtained from all samples were then tested by t-test statistics and variation coefficient. T-tests were carried out and then analyzed to draw conclusions. This test is used to determine whether there are differences in price levels between contract and non-contract farmers [6]. The coefficient of variation from commodity price data in a time series is used to determine the price stability that occurs in a commodity in a region. In this case the smaller the coefficient of variation in price data in an area can be interpreted that prices are relatively stable or have low fluctuations. Price stability is one indicator that can be used to give a signal to producers of price risk factors that producers may face from exploiting a commodity [7]. The coefficient of variation formula used is [8]:

$$KV = \frac{S}{\bar{X}} \times 100\%$$

KV = Coefficient of Variation
S = Standard Deviation
\(\bar{X}\) = Mean (Price)

3. Results and Discussion
3.1. Comparison of contract and non-contract farmers

| Variable                  | Non-Contract Farmers | Contract Farmers | t test of difference |
|---------------------------|----------------------|------------------|----------------------|
| Age of head (years)       | 42.80                | 41.00            | 37,708               |
| Education of head (years) | 8.38                 | 10.20            | 26,502               |
| Education of Spouse(years)| 8.42                 | 10.23            | 25,690               |
| Land cultivated (m2)      | 2206.67              | 1830.00          | -24,427              |

**t-stat** (Sig 2-tailed) ***.000
Note: *** Significant at 5% level

Table 1 shows that the results of the t test statistics are 000 where the results are smaller than 0.05. This proves that there are significant differences between contract farmers and non-contract farmers in terms of age, education, land area, land status, land type, land management, reasons for participation, and production. In addition, it can also be seen that for the average area of non-contracted farmers has a wider land area than contract farmers, this means that contracted farmers are not farmers who have large tracts of land.

Factors affecting contract agriculture are the age of the farmer, farmer education, wife education, land area, land status, land type, land management, reasons for participation, and production in accordance with research from Miyata and Minot [9] and farmers motivation [10]. For reasons of participation, the reason for farmers who do not contract is the lack of information about the contract, while the reason farmers follow the contract is the ease of marketing [11].

3.2. Impact of Agricultural Contracts on prices

3.2.1. The average price of red chillies are contract farmers and non-contract farmers

Table 2. Prices of Red Chillies for Contracted Farmers and Non-contracted Farmers

| Month    | Indofood Price (Contract Farmers) IDR | Produsen Price (Non-Contract Farmers) IDR |
|----------|--------------------------------------|------------------------------------------|
| January  | 9,250                                | 16,900                                   |
| February | 9,485                                | 17,158                                   |
| March    | 9,860                                | 15,850                                   |
| April    | 12,754                               | 23,450                                   |
| May      | 14,129                               | 20,690                                   |
| June     | 17,453                               | 32,214                                   |
| July     | 27,833                               | 43,740                                   |
| August   | 22,500                               | 43,958                                   |
| Average  | 15,408                               | 26,745                                   |

From table 2 the average price of red chilli above is obtained by the highest price of red chilli for the average price of contract farmers of IDR 27,833, - in July and the lowest average price of red chillies for contract farmers was IDR 9,250, in January. While the highest average non-contract farmer prices were in August of IDR 43,958, - and the lowest average price in March was IDR 15,850.

In July it was known to coincide with the month of Ramadan and Eid al-Fitr, the need for red chillies in that month was known to be very large resulting in a significant increase in prices. Based on the
table above shows that January is the harvest season for red chillies, so that the production of red chillies is abundant [12,13].

3.2.2. Analysis of the Impact of Contract Agriculture on Average Prices on Contract Farmers and Non contract Farmers with the T Test

| Table 3. T-Test Results for Contracted Farmers and Non-Contract Farmers |
|-------------------------------------------------------------|
| **Average of red chillies price** | **T** | **Df** | **Sig. (2-tailed)** |
|-----------------------------------|-------|--------|---------------------|
| Contract farmer                   | -5.801| 7      | 0.001               |

Table 3 shows that the results of the T statistical test of the average price of red chillies farmers who contract farming with farmers who do not contract is 0.001 where the T test results are smaller than 0.05 which means that there are significant differences in the average the price of red chillies to the contracting farmers [14]. Therefore contract farming has a real impact or influence on the average price of red chillies.

3.2.3. Calculation of Variation Coordination for Price Stability

| Table 4. Results of Calculation of Variation Coefficient of Red Chili Price |
|---------------------------------------------------------------|
| **Month** | **Variation Coefficient** |
|           | **Contract** | **Non contract** |
| January   | 0.73 | % | 0.70 | % |
| February  | 0.71 | % | 0.69 | % |
| March     | 0.69 | % | 0.74 | % |
| April     | 0.53 | % | 0.50 | % |
| May       | 0.48 | % | 0.57 | % |
| June      | 0.39 | % | 0.37 | % |
| July      | 0.24 | % | 0.27 | % |
| August    | 0.30 | % | 0.27 | % |
| **KV total** | 4.08 | % | 4.10 | % |

In table 4 above we can see the calculation of the coefficient of variation between prices for contract farmers is 4.08% compared to prices for non-contact farmers which is 4.10%. This shows that the price of red chilli commodities in contract farmers is more stable than in non-contact farmers [15,16].

4. Conclusions
From the results of this study it was found that:

a) The factors that influence contract farming are the age of the farmer, farmer education, wife's education, land area, land status, land type, land management, reasons for participation, and production.
b) The reason for farmers' participation in contract farming is for reasons that farmers do not contract, namely the lack of information about the contract, while the reason farmers follow the contract is the ease of marketing.

c) Contract farming affects the average price of red chili compared to the price on non-contracted farmers.

d) Contract farming also influences the stability of prices compared to prices for non-contract farmers. This is seen from the coefficient of variation in the average price of contract farmers is smaller than in non-contract farmers

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