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THE ANALYSIS OF TRADING SYSTEMS AND DISPARITY OF SHALLOT'S PRICE IN CENTRAL JAVA PROVINCE

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Abstract: The purpose of this research is to analyze the distribution channel patterns of shallots in Central Java, analyze the efficiency, price spread and share margin in the trading channels and disparities of shallots in Central Java, to determine the effect of prices at the consumer level, the amount of consumption, and the amount of shallot production in the short term and long term against price disparity figures. The data analysis method uses ECM (Error Correlation Model). The results of the analysis show that the red onion commodity trading channel pattern in Central Java has 5 different trading system channels. The shortest shallot commodity trade system channel is on channels III and V, while the longest shallot trade system channel is on channels I and IV. The calculation of marketing margins in Central Java is Rp. 18,800 with a trading system efficiency of 1.16, which means that the marketing is efficient, but the value of the farmer's share of shallot farmers in Central Java Province has a value of 56.16 percent, which means that the value is not efficient. The results of the ECM analysis show that the amount of shallot consumption in Central Java Province in the short and long term has a negative and significant effect on the price disparity of shallots at the farmer level in Central Java Province and is in accordance with the theory and hypothesis.

Keywords: shallots, trade system, disparity, efficiency, error correlation model

Abstrak: *Tujuan dari penelitian ini adalah untuk menganalisis pola saluran tata niaga bawang merah di Jawa Tengah, menganalisis efisiensi, price spread dan share margin pada saluran tata niaga dan disparitas bawang merah di Jawa Tengah, mengetahui pengaruh harga di tingkat konsumen, jumlah konsumsi, dan jumlah produksi bawang merah pada jangka pendek dan jangka panjang terhadap angka disparitas harga. Metode analsis data menggunakan ECM (Error Correlation Model). Hasil analisis menunjukkan pola saluran tataniaga komoditas bawang merah di Jawa Tengah memiliki 5 saluran tataniaga yang berbeda. Saluran tataniaga komoditas bawang merah yang paling pendek yaitu pada suluran III dan V, sedangkan saluran tatniaga bawang merah yang paling panjang yaitu pada saluran I dan IV. Perhitungan margin pemasaran yang ada di Jawa Tengah sebesar Rp. 18.800 dengan efisiensi tataniaga sebesar 1,16 yang berarti pemasaran tersebut sudah efisien, akan tetapi nilai farmer's share petani bawang merah yang ada di Provinsi Jawa Tengah yang memiliki nilai 56,16 persen yang berarti nilai tersebut belum efisien. Hasil analisis ECM menunjukkan bahwa jumlah konsumsi bawang merah di Provinsi Jawa Tengah dalam jangka pendek maupun jangka panjang berpengaruh negatif dan berpengaruh secara signifikan terhadap angka disparitas harga bawang merah di tingkat petani Provinsi Jawa Tengah dan sesuai dengan teori serta hipotesisnya.*

Kata kunci*: bawang merah, tataniaga, disparitas, efisiensi, error correlation model*

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INTRODUCTION

As an agricultural country, Indonesia produces various types of agricultural products that have great potential to be used as business fields, ranging from fresh agricultural products to processed products, all of which have high economic value. Many farmers cultivate various types of agricultural products, one of which is horticulture as a business activity that has quite promising prospects.

Central Java is the province with the highest shallot production center in Indonesia. There are seven districts contributing 33.7% to shallot production in Indonesia. The district with the highest production was Brebes with a contribution of 383,511 tons, followed by the Demak region with a contribution of 78,165 tons, then the other five highest districts with a contribution of under 50,000 tons namely Boyolali, Grobogan, Pati, Kendal and Tegal Regencies. Then there are other provinces with a contribution of under 10,000 tons (BPS, 2021). Shallot is one of Indonesia's leading vegetable commodities that has many benefits and high economic value and it has been long sought by farmers intensively. The role of shallot is faced with farming that has a high risk, many challenges and obstacles faced in its cultivation, including the attack of Plant Pests (OPT) and climate change that can thwart the harvest (Linda et al. 2020).

Without the marketing of agricultural products, agriculture cannot develop, as is the case with red onion which is one of the leading commodities that is widely cultivated in Central Java and is also the largest red onion production center in Indonesia. The length of the shallot trade channel that is passed causes the price comparison between farmers' and consumers' prices to be very large. The longer the red onion trading channel, the higher the selling price to the final consumer. In this case, it can be seen the comparison of the level of efficiency of each marketing channel. The research conducted by Faridah (2022) indicate that a marketing strategy can boost the economy of a specific area. It can be useful for local governments and business entities when developing effective strategies to deal with the national economy and for monitoring of farmer effectiveness.

The length of the red onion trading system in Central Java has resulted in a very large price comparison between farmers and consumers. In addition, there are price differences at the level of producers and trade actors in each province which creates a price gap for the shallot commodity. In this case, a comparison of the price levels of each channel of the shallot trade system in each district in Central Java can be seen.

The difference in the price of the shallot commodity in each district causes disparities or price gaps between farmers or producers that occur in every trading system actor. In 2022 the lowest price received by shallot farmers will be in the Grobogan area, namely 10,000 rupiah per kilogram, but this is far different from other regions such as the Kendal, Tegal and Brebes Regencies which have prices of 28,000, 25,000 and 25,000 rupiah per kilogram at the farmer level.

According to Laili, in 2016 conducting research on the marketing value chain of shallots in Brebes district, Central Java, stated that one of the causes of the low bargaining position of farmers was the result of fluctuations in the price of shallots caused by oversupply due to the harvest season, the entry of imported shallots and the role of middlemen.

The purpose of this research is to analyze the distribution channel patterns of shallots in Central Java, analyze the efficiency, price spread and share margin in the trading channels and disparities of shallots in Central Java, to determine the effect of prices at the consumer level, the amount of consumption, and the amount of shallot production in the short term and long term against price disparity figures. Therefore researchers are interested in analyzing the shallot trade system to find out how the marketing channel, disparity, and efficiency of the shallot trade channel in Central Java.

METHODS

The method used in this research is a descriptive and analytical method. The descriptive method of this research is through a questionnaire with direct field surveys located in Demak, Brebes, and Tegal Regencies. The analytical method used in this study is the measurement of share margin, trading efficiency, and analysis of price disparities in shallots in Central Java. The research was conducted by searching for primary and secondary data on 01 November 2022 to 30 May 2023.

Determination of the sample in this study was carried out using a non-probability sampling technique, with a purposive sampling technique, which did not provide an opportunity for all members of the farmer population and trade system actors to be sampled where the sample elements taken were only shallot trade system actors in Central Java Province, then after arriving in the field to conduct a survey, the researcher conducted a study using the Accidental Sampling technique. In determining the sample for the trading system institutions involved in the shallot trade system chain in the study area using the Snowball Sampling method. The researcher chose snowball sampling because in determining the sample, the researcher first only determined one or two people first, after that the researcher would get quite a lot of information about the perpetrators of the shallot trade system.

Trading System Analysis

To find out whether the red onion trading channel in the Central Java region is efficient or not, it can be calculated using the Efficiency Index Method, Add 1 with a comparison between marketing margins and marketing costs (Thamizhselvan and Paul, 2012):

$$\varepsilon=1+(\gamma-\gamma p)/(\beta+\beta p)$$

description: ε (Trading efficiency); γ (Trading institutions profit (Rp)); γp (Farmer profits (Rp)); β (Trading institutions cost (Rp)); βp (Farmer's cost (Rp)).

Terms of the trading system are called to be efficient that:

If the value of efficiency ≥ 1 then the marketing channel is said to be efficient.
If the value of efficiency < 1 then the marketing channel is said to be inefficient.

The trading system margin is the sum of all the trading system costs incurred and the profits taken by the trading system during the process of distributing one commodity from one trading system institution to another (Aji & Nur, 2017).

According to Sudiyono (2004), the formula for calculating Share Margin is Producer share (SF) in each intermediary institution using the following model:

$$Sm=Pf/Pr\times100\%$$

Notes: Sm (percentage of Share Margin calculated in percent (%)); Pf (Price received by farmers or traders (Rp/kg)); Pr (Price paid by the end consumer (Rp/kg)).

Disparity Analysis

Furthermore, researchers conducted research on price disparity calculations using the analysis method of analysis of the coefficient of variation (kV) which then looked at price disparities and the ECM (Error Correlation Model) method to see shallot price transmission.

Price disparity is measured by the coefficient of variation (kV), the magnitude of the coefficient can be calculated by the formula:

$$KV=SS/\bar{x}\times100\%$$

Notes: KV (Coefficient of Variation); SS (Standard Deviation); $\bar{x}$ (average commodity price).

Calculation of disparities in these coefficients can be categorized:

Not Critical	= kV = 0
Low	= kV < 10%
Moderate	= 10% ≤ kV < 20%
High	= 20% ≤ kV < 30%
Very high	= kV ≥ 30%

While the average deviation of prices can be calculated by the formula:

$$SS=\sqrt{(\sum_{i=1}^{n}(Xi-\bar{X}))/n}$$

Notes: X (price at district level); $\bar{x}$ (national average price).

The ECM regression model equation will be used to find out what factors influence the price disparity at the farmer level of shallots in Central Java Province, which equation:

Long Term:

$$Y= a_0+a_1X_1t + a_2 X_2t + a_3X_3t + u_t$$

Short Term:

$$Y = \beta_0 + \beta_1 \Delta X_1 t + \beta_2 \Delta X_2 t + \beta_3 \Delta X_3 t + \beta_4 RESID + u_t$$

Where: α_i (Long term coefficient); β_i (Short term coefficient); Y (Disparity price); X1 (Shallot prices at the consumer level in Central Java Province); X2 (Total consumption of shallots in Central Java Province); X3 (Shallot production in Central Java Province); Ui (Residual value).

This research has developed hypotheses. The hypotheses are:

1. There is no influence between the price of shallots at the final consumer level, the amount of consumption, and the amount of production of shallots in Central Java Province on the price disparity at the farmer level of shallots in Central Java Province.
2. There is an influence in the short and long term on the variable price of shallots at the final consumer level, the amount of consumption, and the amount of production of shallots in Central Java Province on price disparities at the level of shallot farmers in Central Java Province.

RESULTS

Trading System Analysis

The results of research on shallot trade system channels conducted in 3 shallot producing center districts in Central Java, namely Brebes, Tegal, and Demak districts, show 5 patterns of shallot trade channel channels, that is:

Pattern I:

Farmer – Collector Traders – Whole Salers – Retailers – Consumers.

In the trading system pattern 1, farmers sell their shallots to collectors who come directly to the farmers' land and then negotiate prices with the farmers. Then, after a large number of purchased shallots have been collected, the collecting traders sell their shallots to wholesalers in each market in large quantities, these markets include the Brebes Larangan Market, Tegal Morning Market, and Demak Bintoro Market. After the shallots have been purchased by the wholesalers, the shallots are purchased by retailers who will be sold in small grocery stores, so that the shallots are purchased by the end consumer. The results of the analysis can be seen in Table 1, namely the value of the farmer's share owned by farmers in the channel I of 55% with a marketing margin obtained of Rp. 18,000, - so the results of the analysis of efficiency in marketing pattern I is equal to 0.80, which means that marketing efficiency is not efficient.

Pattern II:

Farmer – Whole Salers – Retailers – Consumers

In the trading system II pattern, farmers sell their shallots directly to wholesalers in large markets, these farmers sell their shallots only when there is a large enough demand for market traders. After the shallots have been purchased by wholesalers, the shallots are purchased by retailers who will be sold in small grocery stores, so that the shallots are purchased by the end consumer. The results of the analysis can be seen in Table 1, namely the value of the farmer's share owned by farmers in channel II of 55% with a marketing margin obtained of Rp. 18,000, - so that the results of the efficiency analysis on marketing pattern II are equal to 1.23, which means that the marketing efficiency is already efficient.

Pattern III:

Farmer – Retailers – Consumers

In the trading channel pattern III, the farmers sell their shallots to retailers, the retailers sell their shallots in the form of seeds. Then the seeds are purchased by the end consumers, namely shallot farmers around the area. The results of the analysis can be seen in Table 2, namely the value of the farmer's share owned by farmers in channel III of 55% with a marketing margin obtained of Rp. 13,000, - so that the results of the efficiency analysis on marketing pattern III are equal to 1.33, which means that the marketing efficiency is already efficient.

Pattern IV:

Farmer – Distributors – Whole Salers – Retailers – Consumers

In the trading system channel pattern IV, farmers sell their shallots through cooperatives that have been

provided. The shallots are sold by the farmers at a predetermined price before planting to the cooperative, this makes it very easy for the farmers to make decisions on the amount of shallots to plant. The cooperative has a role as a distributor of shallots. From the cooperative side, they market shallots directly to wholesalers outside Central Java province, most of them are sent to Sumatra, Kalimantan and Bali. Most of the cooperatives have also exported abroad.

The results of the analysis can be seen in Table 3, namely the value of the farmer's share owned by farmers in channel III of 55% with a marketing margin obtained of Rp. 13,000, - so the results of the efficiency analysis on marketing pattern III are equal to 1.33, which means that the marketing efficiency is efficient.

Table 1. Efficiency and farmer's share of Central Java Shallot Trading System

Marketing Patterns	Farm Level Prices (Rp/ Kg)	Consumer Level Prices (Rp/Kg)	Farmer's Share (%)	Average Marketing Efficiency
I	22,000	40,000	55.00	0.80
II	22,000	40,000	55.00	1.23
III	22,000	35,000	62.86	1.33
IV	25,000	40,000	62.50	1.67
V	25,000	55,000	45.45	1.99
Average	23,200	42,000	56.16	1.40

Table 2. Shallot price disparity in Central Java Province

District	Coeficient Variation (%)			
	Farmer	Collector	Whole Seller	Retail
Brebes	11.8	5.4	6.7	1.2
Tegal	12.8	5.8	6.7	1.2
Demak	16.4	6.3	7.9	1.3
Central Java Average	13.6	5.9	7.1	1.3

Table 3. Root Test Unit

ADF Stat	Prob.		
	Unit Root Test Level	Unit Root Test 1st Difference	Unit Root Test 2nd Difference
Y	0.2045	0.0361	0.0245
X1	0.1304	0.1001	0.0009
X2	0.0080	0.0206	0.0363
X3	0.1516	0.0225	0.0103

Pattern V:

Farmer – Industrial – Consumers

In the trading channel pattern V, the farmers sell their shallots directly to the shallot processing industry. The processing industry produces various kinds of shallot processing, including fried onions, onion paste, shallot chips, and shallot oil. The processing industry sells its products to various regions, such as Jakarta, Bogor, Semarang, Bali and Sulawesi. In addition, the shallot processing industry has been able to export to the United Arab Emirates.

Based on Table 1 it can be seen that the price at the highest consumer level is in the channel V pattern, which is Rp. 55,000. There are several factors that influence it, namely (1) marketers sell their shallot products in the form of processed products which make the shallot price higher, (2) products traded by the shallot processing industry are of higher quality and hygienic so that they can enter the perpetrators. Marketing such as supermarkets and exports, this is not a problem as long as the target consumers are middle and upper economic actors.

The results of this study support research conducted by Nugraheni and Tinaprilla in 2022, which has research results that farmers prefer to sell their crops directly rather than delay selling because delaying sales is the same as incurring higher costs. Farmers who delay sales will incur additional costs for storage and depreciation. Marketing patterns I and II have the same percentage of Farmer's Share, namely 55%, with efficiency values of 0.83 and 0.97. This shows that marketing patterns I and II are still not efficient, but the farmer's share value for all shallot commodity marketing patterns is at a percentage of ≥ 40%, which is equal to 56.16%. While the average efficiency level of marketing in the shallot commodity trade system in Central Java Province has a score of 1.40. This shows that this percentage belongs to the category of marketing channels that are already efficient.

Research conducted by Faisal (2018) regarding the analysis of shallot marketing case studies, Umelah Village, Blang Pegayon District, Gayo Lues Regency, shows that there are 2 marketing channels and the share margin on channel I is 68% and marketing channel II is 80%, then the efficiency value of marketing channel I is 9.92% and marketing channel II is 8.85% indicating more efficient channel II because 8.85 < 9.92.

However, research conducted by Brigitta (2023), conducted research on the analysis of the efficiency of the shallot trading system in Wanasari District, Brebes Regency, calculating the farmer's share with a percentage of 71.6%, it has efficient marketing criteria. Meanwhile the results research that has been calculated by researchers has percentage 56.16%.

Research conducted by Maria et al. (2019) regarding the analysis of shallot marketing in Central Timor Regency has a farmer's share calculation with a percentage of 100%. In this channel, there is no difference in price because the farmer directly sells shallots to the final consumer so that the farmer's share is 100%.

Research conducted by Hardana (2017), conducted research on the price efficiency of shallots in rural areas in Indonesia. Based on price efficiency, shallot marketing in all marketing studies can be said to be efficient, this is because the proportion of marketing profits is greater than the marketing costs incurred. This is contrary to research conducted by researchers that only a few channel patterns have efficient marketing.

Research conducted by Driyanti et al. (2018), the results of the study showed that the average margin in the Gerbang Raja market was Rp. 5,800, and Rp. 4,213 at the Loa Kulu market, Kutai Kartanegara district. The two markets have a weak relationship, this is indicated by the correlation coefficient r = 0.44803, which means that the two markets do not have any relationship in the selection of sources.

The research conducted by Resky et al. (2017) regarding the pattern of distribution and marketing margins of shallots in the city of Parepare, it shows that the distribution pattern of shallots originating from Kab. Enrekang consists of 3 marketing distribution patterns while shallots originating from Kab. Bantaeng consists of 2 marketing distribution patterns. On the marketing distribution of shallots originating from Kab. Enrekang's highest marketing margin was in the marketing distribution pattern I, which was Rp. 6,250 and the lowest in the marketing distribution pattern II, which was Rp. 3,000 while the red onion marketing distribution came from Kab. Bantaeng, the highest marketing margin was in the marketing distribution pattern I, which was Rp. 7,438 and the lowest was in the marketing distribution pattern II, which was Rp. 7,000.

Research conducted by Timbul et al. in (2016) regarding the comparison of the marketing efficiency of shallots for consumption and seeds in Brebes Regency, Central Java Province, shows that the shallot supply chain for seeds is more manageable than the shallot supply chain for consumption. The shallot market for seeds is more efficient than the shallot market for consumption, which is reflected in the marketing margin and farmer's share indicators. A policy to improve shallot supply chain management is needed that is oriented towards providing quality/certified seeds at prices that farmers can afford.

The efficiency of the trade system for leaf vegetables is influenced by several factors, because the short length of the trade system chain for the three vegetables is also an indicator of the level of efficiency of the leaf vegetable trade system, because the increase in consumption of these vegetables is the more complex the trade chain for these three leaf vegetables, the price of leaf vegetables will be higher (Riadhotul et al. 2021). Research conducted by Jonni in (2019), regarding the analysis of trade systems and price disparities of shallots in the province of North Sumatra, the results of

the research show that Simalungun, Karo and Samosir Regencies each have 2 trading system channels, while North Tapanuli Regency has 3 trading system channels. The trading system functions carried out by the trading system institution are exchange functions, physical functions and facility functions. The marketing channel in Simalungun, Karo and North Tapanuli Regencies is classified as efficient because it has a value of e > 1, while Samosir Regency is classified as inefficient because it has a value of e < 1.

The Disparity of Shallot Price Analysis

Price disparities use marketing margin analysis to find out the components of marketing costs that make shallot prices rise and differ from one marketing agency to another. The results of the analysis in Table 2 show that at the shallot farmer level in Brebes, Tegal, and Demak districts it has a Coefficient of Variation (KV) of 11.8%, 12.8%, and 16.4%, which means that the three regencies have price gaps moderate (10%≤KV<20%). Meanwhile, collectors in the three regencies have low coefficients of variation, there are 5.4%, 5.8%, and 6.3% which indicates that the disparity rate in Brebes, Tegal, and Demak districts is low (kV < 10%). Furthermore, wholesalers or wholesalers in Brebes, Tegal, and Demak regencies also have relatively low disparity rates for shallot prices (kV<10%), namely 6.7%, 6.7%, and 7.9%.

Furthermore, price disparity analysis (Y) is used to see whether the price gap between the institutions involved in the marketing chain (producers, wholesalers, and consumers) of shallots is significantly affected by the independent variables used, these variables include the average price of shallots at producers and consumers in all districts in Central Java Province (X1), the amount of shallot consumption in Central Java Province (X2), and the total production of shallot commodities in Central Java Province (X3).

This section describes the methods and analytical tools used in data processing, using the ECM (Error Correction Model) method and assisted by an analysis tool, namely Eviews12. The method then carried out several stages of testing on the data, namely the data stationarity test, and the estimation results test. The ECM method is used to analyze the relationship between variables in the short and long term.

Root Test Unit

The unit root test uses the ADF (Augmented Dickey-Fuller) test with an alpha limit of α = 5%. From Table 3 it can be seen that only variable X2 has stationary data because the data has α < 5%, while the other variables (Y, X1, and X3) are not stationary at the data level because the probability of these variables is not lacking in value alpha (α = 5%) (not significant). Furthermore, from the results of data that are not stationary, it is continued with a test at a higher level, namely a test at the first difference level, so that at the first difference level test the variables Y, X2, and X3 are stationary at alpha α < 5%. Furthermore, from the non-stationary variable X2, it is continued with a test at a higher level, namely a test at the second difference level, so that in the second difference level test where the probability value of all variables is smaller than α <5%, which means that all variables are stationary at the second level difference.

Cointegration Test

The method used in the cointegration test is the Eagle Granger Method. The results of the Cointegration Test with the Eagle Granger method can be seen in Table 4. In this study, if the residual is stationary at the level, it can be said to have cointegration where the coefficient value is negative (-), and the Prob. which has a significant value of 0.0118 at a value of <5%, it can be said that the data has cointegration and between variables has a short-term relationship and a long-term relationship.

Table 4. Cointegration Test

Variable	Coefficient	Prob.
RES(-1)	-1.182	0.01
C	-0.0032	0.76

Short Term Analysis

The short-term estimation equation in Table 5, it shows that the shallot commodity price variable at the consumer level and the total production of shallot commodities in Central Java Province have a positive effect on shallot price disparities. Thus, the equation obtained from the short-term estimation is as follows:

D(LOG(Disparity)) = -0.21 + 0.00001 * D(LOG(Price)) - 0.00001*D(LOG(Consume)) + 0.0000005D(LOG(Production)) - 1.18 * RESID01

The results of the analysis in Table 5 show that the amount of shallot consumption in Central Java Province has a negative effect on the price disparity of shallots. The variable on the amount of shallot consumption in Central Java Province is significant at α = 5%, namely with a probability of 0.002 while the other two variables, namely the price of shallot commodities at the consumer level and the total production of shallot commodities in Central Java Province have a significance of 0.09 and 0.07, it shows that the number is not significant at the 5% significance level. The RESID coefficient value shows that the balance cost of shallot price disparities at the farmer level in the previous period adjusted for current changes is -2.31 where the probability of RESID is 0.02, significant to α = 5% while the RESID coefficient which is negative indicates that the regression model has a short-term relationship.

The coefficient of determination test is carried out to find out how much influence the independent variables have on the dependent variable. Based on the estimation results, the R^2 value is 0.91, which means that the independent variables, namely the price of the shallot commodity at the consumer level in Central Java Province, the amount of shallot consumption in Central Java Province, and the amount of shallot commodity production in Central Java Province affect the variable depending on the price disparity of shallots at the farmer level in Central Java Province is 91.25% while the remaining 8.75% is influenced by other factors outside the model.

From the results of processing the data that has been done, it is obtained a probability value (Fstatistic) of 0.004 where the probability value is 0.004 <0.01 (α = 1%), it can be concluded that all independent variables, namely the price of the shallot commodity at the consumer level in Central Java Province, the number of consumption shallots in Central Java Province, and the total production of shallots in Central Java Province together have a significant effect with a significance level of α = 1% on the dependent variable the number of disparities in shallot commodity prices in Central Java Province.

The research conducted by Rahmawati (2018), results of this research exhibit that there is no complete spatial market integration among shallot producer markets. There are approximately 40 co-integrated pairs of producer markets (44.944%), and the rest of 49 (55.056%) pairs of producer markets are not co-integrated. Based on the causality test, the producer markets such as Central Java, East Java, and West Nusa Tenggara are price-leading markets. Approximately 74 pairs (83,146%) of producer markets are integrated into the short run. Government policy that can be implemented to control price fluctuations at producer level is fairly floor price policy specifically made for three price-leading markets.

Long Term Analysis

From the long-term estimation equation in Table 6 it shows that the variable price of the shallot commodity at the consumer level and the amount of shallot commodity production in Central Java Province has a positive effect on the shallot price disparity, but the amount of shallot consumption in Central Java Province has a negative effect on the disparity figure onion price. Thus, the equation obtained from the long-term estimation is as follows:

LOG(Disparity) = 1.15 + 0.000002 * LOG(Price) - 0.00001* LOG(Consume) + 0.0000005* LOG(Production) + RESID01

Table 5. Short term impact analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.21	0.02	-1.06	0.33
D(Price)	0.00001	0.000005	2.09	0.09
D(Consumtion)	- 0.00001	0.000002	- 5.40	0.002
D(Production)	0.0000005	0.0000002	2.29	0.07
D(RESID(-1))	-2.31	0.67	-3.44	0.02
R-squared	0.91	Mean Dependent var		-0.005
Prob(F-statistic)	0.004			

Table 6. Long term impact analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.15	0.21	5.49	0.001
X1(Price)	0.000002	0.000001	1.35	0.22
X2(Consumtion)	- 0.00001	0.000001	- 6.70	0.0005
X3(Production)	0.0000005	0.0000002	2.36	0.05
RESID(-1)	-1.18	0.35	-3.37	0.01
R-squared	0.90	Mean Dependent var		0.218
Prob (Fstatistic)	0.002			

However, only the variable on the amount of shallot consumption in Central Java Province is significant at α = 5%, namely with a probability of 0.0005 while the other two variables, namely the price of shallot commodities at the consumer level and the total production of shallot commodities in Central Java Province have a significance of 0.22 and 0.055, it shows that these numbers are not significant at the 5% significance level. In the long term equation using the ECM method produces a RESID coefficient value. The RESID coefficient value shows that the balance cost of shallot price disparity at the farm level in the previous period adjusted for current changes is -1.18 where the probability of RESID is 0.0118, significant to α = 5% while the RESID coefficient is marked negative indicates that the regression model has a long-term relationship.

However, only the variable on the amount of shallot consumption in Central Java Province is significant at α = 5%, namely with a probability of 0.0005 while the other two variables, namely the price of shallot commodities at the consumer level and the total production of shallot commodities in Central Java Province have a significance of 0, 22 and 0.055, it shows that these numbers are not significant at the 5% significance level. In the long-term equation using the ECM method produces a RESID coefficient value. The RESID coefficient value shows that the balance cost of shallot price disparity at the farm level in the previous period adjusted for current changes is -1.18 where the probability of RESID is 0.0118, significant to α = 5% while the RESID coefficient is marked negative indicates that the regression model has a long-term relationship.

The coefficient of determination test (R2) was carried out to find out how much influence the independent variables had on the dependent variable. Based on the estimation results, the R2 value is 0.900260, which means that the independent variables, namely the consumer level shallot prices in Central Java Province, the amount of shallot consumption in Central Java Province, and the total production of shallot commodities in Central Java Province affect the variable depending on the price disparity of shallots at the farmer level in Central Java Province is 90.00% while the remaining 9.99% is influenced by other factors outside the model.

From the results of data processing that has been done, it is obtained a probability value (Fstatistic) of 0.002088 where the probability value is 0.002088 <0.01 (α = 1%), it can be concluded that all independent variables, namely the price of shallot commodity prices at the consumer level in Java Province Central Java, the amount of shallot consumption in Central Java Province, and the total production of shallot commodities in Central Java Province together have a significant effect with a significance level of α = 1% on the dependent variable the disparity figure for shallot commodity prices in Central Java Province.

The results of the study using the ECM method showed that the consumer-level shallot commodity prices in Central Java Province in the short and long term did not significantly affect the dependent variable the disparity in shallot price figures at the farm level. Province of Central Java. The results of this study support research conducted by Kholifatin Artika (2019) who conducted research on changes in shallot commodity prices in Indonesia, stating that the transmission of shallot prices proceeds unevenly where there are short-term and long-term asymmetric relationships in several channels. This means that in the short run, price increases that occur in the main market are not perfectly transmitted to producers. The opposite occurs when price increases occur at the producer level, prices are not perfectly transmitted to the main market. In the long run, price asymmetry causes prices to not return to equilibrium. This shows that there has been inefficiency in marketing institutions.

In the results of research concerning the effect of the amount of shallot production in Central Java Province, the variable amount of shallot production in Central Java Province in the short and long term does not significantly affect the dependent variable the number of shallot price disparities at the farmer level in Central Java Province. This supports research conducted by Pane and Supriana (2019), who conducted research on the effect of long-term and short-term price elasticity of shallots in North Sumatra Province, this study supports that shallot supply is positively influenced by shallot harvested area, area shallot planting, and the price of TSP fertilizer, as well as being negatively affected by the price of shallot producers and the supply of shallots in North Sumatra Province in the previous period. The elasticity of shallot supply in North Sumatra Province in the short term is -0.2274 and in the long term is -0.2018. In both the short and long term, shallot supply in North Sumatra Province is price inelastic.

The results of research conducted by Pranata (2014), show that the coefficient of determination in the results of the analysis has an R-square with a value of 0.1175. The change in shallot production was influenced by the shallot price variable by 11.76% while the remaining 88.24% was influenced by other variables outside the model. This supports this research which analyzes that the price elasticity of shallots at the consumer level does not significantly affect the price disparity figures at the shallot farmer level in Central Java Province.

The research conducted by Rachmawati (2020), showed that the price behavior of red chili, cayenne pepper, and shallot was highly volatile and unstable. This is known from the high average consumer price variations (> 9%) in five big cities in Java.

The research conducted by Susanawati (2019), the results showed that the external factors that became an opportunity for the STA were the support from the government towards the STA, the number of shallot farmers in the regency of Brebes, the large number of food processing industries made from shallots.

Shallots have been cultivated intensively by agricultural business actors in Indonesia because their demand for this commodity tends to increase along with an increase in population, there are no substitute commodities for it, either as spices or herbs. Apart from domestic demand, the demand for shallots in the international market is also high (Pratiwi, 2019).

This study from Verawati (2019) examines the impact of village funds on the price disparity in chili and shallot market at provincial level. The findings show that price disparities between provinces still occur, especially in the eastern and western regions. Papua is a province with the highest prices in both commodities.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The sales channel system for shallot commodities in Central Java has 5 different sales channels. The shortest trading channels for shallot commodities are channels III and V. Furthermore, the longest trading channels for shallots are channels I and IV. The price spread value calculation for the onion sales channel has the highest value for marketing channel V, with a value of Rp. 30,000, this is because the difference between the supply price for shallot commodities and the demand price is very high and the profit margin is the largest for processing industry players with a percentage of 157.22%. From all these calculations, the value of the farmer's share of shallot farmers in Central Java Province is 56.16%. Researchers found that the most efficient trading channel is channel V (e = 2.11), where shallot farmers sell their harvest to the shallot processing industry directly. Besides that, the overall efficiency of trading in Central Java Province is 1.16. Judging from price disparity analysis calculations, shallot farmers in Central Java Province have a disparity figure of 13.6%, which is a moderate level of disparity figure, while collectors, wholesalers and retailers have a price disparity figure of 5.9%, 7.1%, and 1.3% which means the rate is low, with an overall average of 6.9% which means low disparity. The results of the ECM analysis also concluded that the amount of shallot consumption in Central Java Province in the short and long term had a negative and significant effect on the dependent variable of shallot price disparities at the farmer level in Central Java Province and was in accordance with the theory and hypothesis.

Recommendations

A farmer must be able to maintain the quality and quantity of their shallot production, in order to increase the selling price and income of shallot farmers in Central Java Province. Price disparities are unavoidable, therefore it is necessary to have a policy

from the government to stabilize shallot prices, namely by building cooperatives to accommodate shallot harvests for farmers in Central Java Province.

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