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Price Fluctuations and Risks of Red Chili and Curly Red Chili Commodities in Traditional Markets in Makassar City

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A B S T R A C T

Price fluctuations in horticultural commodities, particularly large red chilies and curly red chilies, are a significant issue that directly impacts traders' income and consumers' purchasing power. This study aims to analyze the price risk of red chilies based on quality in traditional markets in Makassar City, focusing on Daya Market and Pabaeng-baeng Market. The data used are weekly price data for large red chilies and curly red chilies during a specific observation period. The analysis method used is the coefficient of variation (CV) to measure the level of risk and price stability relative to the average value. The results show that the price of large red chilies in both markets tends to be stable with a coefficient of variation of 0%, indicating no price fluctuations during the observation period. In contrast, curly red chilies show different price variations between markets, with a coefficient of variation of 10.16% in Daya Market and 3.67% in Pabaeng-baeng Market. These findings indicate that the price risk of curly red chilies is relatively higher, especially in Daya Market. This study is expected to be a consideration for traders, consumers, and local governments in formulating strategies to stabilize chili commodity prices in traditional markets.

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INTRODUCTION

Red chilies (large red chilies and curly red chilies) are considered strategic horticultural commodities due to their high demand, significant role in household consumption, and frequent triggers of food price fluctuations. In many regions, chili prices can fluctuate rapidly within a short period of time, creating uncertainty for traders and consumers. This phenomenon is also relevant for Makassar City, given that the price dynamics of strategic food commodities in traditional markets are linked to regional inflation. Studies of traditional markets in Makassar indicate that price fluctuations in strategic food commodities are linked to inflation, making price stabilization a critical issue for both the local government and market players.

Theoretically, fluctuations and risks in horticultural commodity prices are influenced by the seasonal nature of production, which is sensitive to weather and vulnerable to supply disruptions. During peak harvests, supply increases and prices tend to fall; conversely, during lean times or when production declines (for example, due to extreme weather), prices can spike. This seasonal pattern is common in chilies and explains why chilies are often more volatile than other commodities. In addition to production factors, distribution and marketing structure also play a role: the producer-consumer price differential and distribution costs can exacerbate price volatility at the consumer level, particularly when supply flows are unstable or market information is asymmetric.

Several previous studies have confirmed that curly red chilies tend to experience significant seasonal fluctuations, with significant price fluctuations within specific periods. These findings demonstrate that the chili issue is not simply a matter of "price fluctuations," but also involves varying levels of uncertainty (risk) across time and market locations. At the farmer and regional levels, risk is often measured using the coefficient of variation (CV) to indicate how much price deviates relative to the average. Studies in various regions use the CV to categorize chili price risk (low–high) and indicate that risk can vary between chili varieties and regions.

The local context of South Sulawesi and Makassar also demonstrates the dynamics of chili prices in traditional markets. Research in Makassar's buffer zone (e.g., Maros) found a pattern of fluctuations in the price of large red chilies over time, indicating that the market in this region is vulnerable to changes in supply and demand. In Makassar itself, studies of chili fluctuations (even for specific types of cayenne pepper and market locations) confirm that demand factors, consumption habits, and market trading mechanisms can influence price changes. This means that the need for more specific analyses—based on chili types, market locations, and transaction characteristics—remains highly relevant.

Based on this description, the study of price fluctuations and risks for red chilies and curly red chilies in traditional markets in Makassar City is important to provide an empirical picture of the level of price risk in the city's reference markets. Specifically, price data from Daya Market and Pabaeng-baeng Market, along with measuring risk using the coefficient of variation, can be used to

compare price stability between chili varieties and between markets. Large red chilies tend to be stable, while curly red chilies fluctuate more in one market, indicating differences in risk between commodities and locations.

Chili Price Risk Based on these findings and analysis, it is hoped that it will be useful as input for traders, consumers, and policy makers in designing risk mitigation strategies and steps to stabilize chili supply/prices in Makassar's traditional markets.

THEORETICAL REVIEW

Price fluctuations for horticultural commodities, particularly red chilies, are common in traditional Indonesian markets. Red chili prices often experience instability, influenced by various factors, both in production and distribution. Furthermore, red chili prices are also affected by changes in demand, which can be highly volatile. Therefore, it is important to understand the dynamics of red chili prices and the factors that influence these fluctuations. This literature review will discuss several aspects related to red chili price fluctuations, focusing on large red chilies and curly red chilies in traditional markets in Makassar City, as well as their relationship to relevant economic theories.

1. Price Fluctuations and Their Causes

Price fluctuations in agricultural commodities, including red chilies, are a common phenomenon observed in various countries, especially developing nations like Indonesia. These price fluctuations are generally caused by seasonal factors, weather, and government policies. According to Darmawan and Kuntadi (2018), chili prices are often influenced by seasonal supply conditions. During harvest season, chilies are abundant and prices tend to fall. Conversely, during the lean season, chili prices can spike dramatically due to limited supply.

Weather also plays a crucial role in determining chili prices. Bad weather, such as drought or heavy rain, can disrupt chili production, which in turn affects prices. Research by Saptana and Ashari (2013) shows that dependence on weather factors and the instability of chili harvests significantly influence market price fluctuations.

Besides weather factors, government policies regarding trade and food distribution also have a significant impact on chili prices. According to Ilham and Saliem (2016), government policies regulating chili distribution and price controls can minimize sharp price fluctuations. However, the imbalance between chili demand and supply remains a major challenge in maintaining price stability.

2. Price Risk and Coefficient of Variation

In analyzing price fluctuations, one frequently used tool is the coefficient of variation (CV), which measures the level of price volatility relative to its average. The concept of the coefficient of variation was first introduced by Karl Pearson in 1896 to measure the spread of data in statistics. According to Rahim and Hastuti (2008), the CV is used to determine the extent of price variation in a commodity. The higher the CV value, the greater the price fluctuation.

For red chilies, both large and curly, CV measurements provide an overview of the level of risk faced by consumers and traders. Research by Nuraeni and Setiawan (2019) shows that the price of curly chilies varies more than that of large chilies, indicating a greater price risk for curly chilies. This is consistent with the findings of this study, where the price of curly chilies at Daya Market showed a higher CV (10.16%) compared to Pabaeng-baeng Market (3.67%).

3. Traditional Markets and Price Dynamics

Traditional markets in Indonesia, such as those found in Makassar, have distinct characteristics from modern markets. Traditional markets generally have shorter distribution systems and rely more heavily on direct interaction between traders and consumers. Furthermore, prices in traditional markets tend to be more influenced by local factors, such as weather and local consumer demand. Research by Salim and Munadi (2017) revealed that price fluctuations are more frequent in traditional markets than in modern markets, which have more transparent and organized pricing mechanisms.

At Daya Market and Pabaeng-baeng Market, two major traditional markets in Makassar City, the price of large red chilies tended to be stable, with a very low coefficient of variation (0%). This indicates that the price of large red chilies in these markets did not experience significant fluctuations throughout the analyzed period. In contrast, the price of curly red chilies showed higher fluctuations, particularly at Daya Market, which had a coefficient of variation of 10.16%, compared to Pabaeng-baeng Market, which had a CV of 3.67%.

According to Wibowo et al. (2023), price stability in traditional markets can be influenced by simpler distribution networks, which make prices easier to control in the short term. However, on the other hand, dependence on local supply and sudden seasonal changes can cause prices to become more volatile, especially for commodities that are highly dependent on weather factors like chilies.

4. Policy Implications for Stabilizing Chili Prices

Fluctuating red chili prices, particularly those related to curly red chilies, represent a significant risk for traders and consumers in traditional markets. Therefore, policies that stabilize prices are crucial to safeguard the well-being of market participants. One policy that can be implemented is increasing storage and distribution capacity to ensure a stable chili supply despite production declines due to adverse weather conditions.

Furthermore, government price subsidy or price control programs can also help maintain stable red chili prices in traditional markets. Research by Pindyck and Rubinfeld (2018) shows that price control policies can reduce market uncertainty, but must be implemented carefully to avoid disrupting existing market mechanisms.

METHODOLOGY

The basic method in this research is quantitative descriptive. Quantitative descriptive method is used to describe systematically, factually, and accurately the phenomena that occur, with data in the form of numbers generated from

actual situations. This research covers the Makassar City area, specifically traditional markets, namely Pabaeng-baeng Market and Daya Market. The type of data used is secondary data weekly time series for the period January 7 - January 13, 2026. The main data source was obtained from PIHPS (Strategic Food Price Information Center).

Data analysis in this study uses coefficient of variation (CV) analysis. To analyze price fluctuations of large red chilies and curly red chilies in Daya Market and Pabaeng-baeng Market, the coefficient of variation (CV) formula is used as follows:

The steps that need to be taken to calculate the coefficient of variation are as follows:

1. Calculating the Average (Mean) Price

The average price is calculated by adding up all the prices in a given time period and then dividing it by the number of time periods.
Formula:

$$\text{Rata-rata} = \frac{\sum X}{n}$$

Where:

- $X$is the price in each period,
- $n$is the number of time periods (in this case 5 periods).

2. Calculating Standard Deviation

The standard deviation measures how far prices spread from the average price. The higher the standard deviation, the greater the variation.
Formula:

$$\sigma = \sqrt{\frac{\sum(X_i - \bar{X})^2}{n}}$$

Where:

- $X_i$is the price in period i,
- $\bar{X}$is the average price,
- n is the number of time periods.

3. Calculating the Coefficient of Variation (CV)

The coefficient of variation is the ratio between the standard deviation and the mean, expressed as a percentage. The formula for calculating the coefficient of variation is:

$$CV = \frac{\sigma}{\bar{X}} \times 100\%$$

Where:

- $\sigma$is the standard deviation,
- $\bar{X}$is the average price.

Thus, the coefficient of variation will show how much price varies in relation to the average price.

RESULTS

Price Fluctuations and Price Risks of Red Chilies and Curly Red Chilies

Price fluctuations are changes in the price of a commodity that occur over time due to an imbalance between supply and demand. For horticultural commodities such as large red chilies and curly red chilies, price fluctuations often occur due to their seasonal production characteristics, perishability, and significant impact on weather and distribution conditions. Small changes in supply or demand can immediately impact price changes in traditional markets.

1. Red Chili Price Fluctuations

Based on weekly price data for the period January 7–13, 2026, at Daya Market and Pabaeng-baeng Market in Makassar City, fluctuations in the price of large red chilies showed a relatively stable pattern. The price of large red chilies in both markets remained unchanged during the observation period, thus preventing price fluctuations. This condition indicates that the supply of large red chilies is relatively sufficient and market demand is in a balanced condition. This price stability is reflected in the standard deviation value equal to zero, which then produces a coefficient of variation (CV) of 0%. Thus, large red chilies are categorized as having very low price risk during the study period.

Figure 1. Fluctuations in Red Chili Prices at Daya &b Pabaeng-baeng Market, Makassar City

Based on the data in Figure 1, the price of large red chilies did not change throughout the period, so the standard deviation () is 0. In such a case, the coefficient of variation (CV) will also be 0%, because there is no price variation.σ

- Power Market: Coefficient of Variation (CV) = 0.0%
- Pabaeng-baeng Market: Coefficient of Variation (CV) = 0.0%

This results in a coefficient of variation of 0%, indicating that there is no price fluctuation at all.

Risk Analysis Red chili pepper

The price risk analysis in this study aims to measure the level of price uncertainty for large red chilies and curly red chilies in traditional markets in Makassar City, specifically Daya Market and Pabaeng-baeng Market. Price risk is analyzed using the coefficient of variation (CV), which is the ratio of the standard deviation of prices to the average price. This indicator is widely used to describe the relative magnitude of price fluctuations.

Based on weekly price data, large red chilies at Daya Market and Pabaeng-baeng Market showed constant prices throughout the observation period. The price of large red chilies at Daya Market remained at Rp 20,000 per kilogram, while at Pabaeng-baeng Market it remained at Rp 15,000 per kilogram. This condition results in a standard deviation of zero.

With a standard deviation of zero, the coefficient of variation (CV) for large red chilies in both markets was also 0%. This CV value indicates no price risk for large red chilies during the study period. This price stability indicates a relatively balanced supply and demand for large red chilies, and a well-functioning distribution mechanism. From the perspective of market participants, this condition provides price certainty for both traders and consumers.

Price Stability: The price of large red chilies at Daya Market and Pabaeng-baeng Market was stable throughout the observation period, with minimal price fluctuations (no price changes). This indicates that the price of large red chilies during this period did not exhibit significant volatility.

Factors Affecting Stability:

1. Maintained Supply: A stable supply of large red chilies in the market can contribute to stable prices. When supply is stable, prices are less likely to experience sharp fluctuations.
2. Market Demand Tends to be Consistent: The demand for large red chilies in traditional markets may be relatively stable, without any external factors causing price spikes.

2. Fluctuations in the Price of Curly Red Chilies

Based on the weekly price of curly red chilies at Pabaeng-baeng Market in Makassar City for the period January 7 – January 13, 2026, curly red chilies showed price fluctuations, especially at Daya Market. The price of curly red chilies in the market increased from IDR 20,000 to IDR 25,000 per kilogram at the end of the observation period. This price change reflects a disruption in the

balance between supply and demand, which can be caused by a decrease in supply, an increase in demand, or distribution constraints. This price fluctuation resulted in a coefficient of variation of 10.16%, which indicates that curly red chilies at Daya Market have a relatively higher price risk.

Meanwhile, at Pabaeng-baeng Market, price fluctuations in curly red chilies tended to be smaller. The price of curly red chilies only experienced limited fluctuations in the range of IDR 15,000–IDR 16,500 per kilogram. The coefficient of variation of 3.67% indicates that despite price fluctuations, the risk level remains relatively low compared to Daya Market. This indicates that the supply and distribution mechanisms for curly red chilies at Pabaeng-baeng Market are relatively stable.

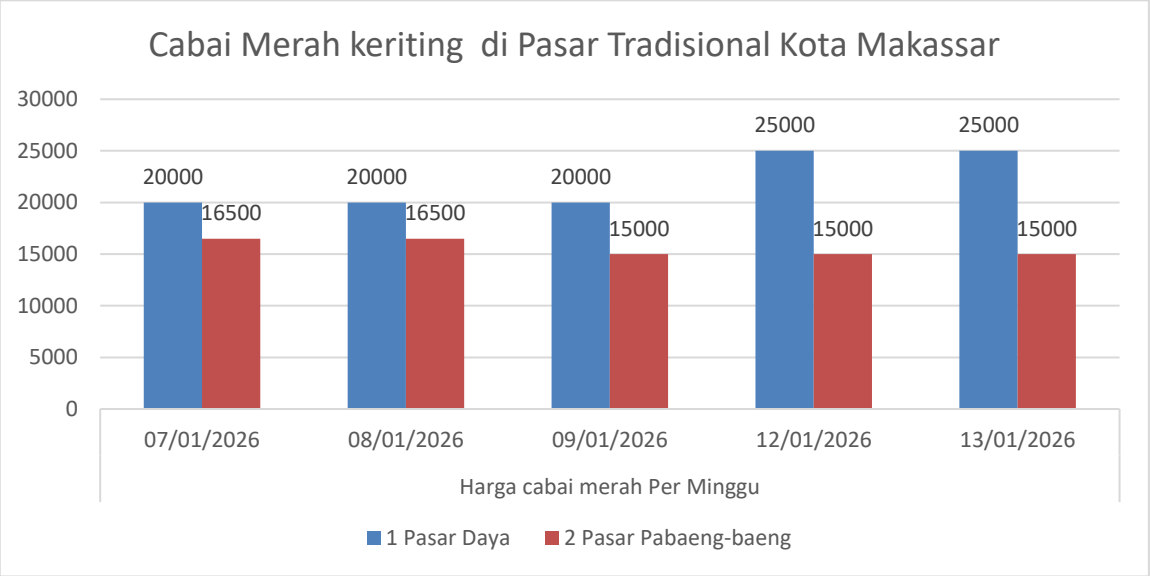

Figure 2. Fluctuations in the Price of Curly Red Chilies at Daya &b Pabaeng-baeng Market, Makassar City

Based on the data in Figure 2, for the price of curly red chilies, we can calculate the average and standard deviation of prices in both markets.

Power Market:

- Price: [20,000, 20,000, 20,000, 25,000, 25,000]
  - Average ():μ

$$\mu = \frac{(20{,}000 + 20{,}000 + 20{,}000 + 25{,}000 + 25{,}000)}{5} = 22{,}000$$

  - Standard deviation ():σ

$$\sigma = \sqrt{\frac{(20{,}000 - 22{,}000)^2 + (20{,}000 - 22{,}000)^2 + (20{,}000 - 22{,}000)^2 + (25{,}000 - 22{,}000)^2 + (25{,}000 - 22{,}000)^2}{5}}$$

$$= 2{,}236.07$$

- Coefficient of variation (CV):

$$CV = \frac{2{,}236.07}{22{,}000} \times 100 \approx \mathbf{10.16}\%$$

Pabaeng-baeng Market:

- Price: [16,500, 16,500, 15,000, 15,000, 15,000]
  - Average ():μ

$$\mu = \frac{(16{,}500 + 16{,}500 + 15{,}000 + 15{,}000 + 15{,}000)}{5} = 15{,}600$$

  - Standard deviation ():σ

$$\sigma = \sqrt{\frac{(16{,}500 - 15{,}600)^2 + (16{,}500 - 15{,}600)^2 + (15{,}000 - 15{,}600)^2 + (15{,}000 - 15{,}600)^2 + (15{,}000 - 15{,}600)^2}{5}}$$
$$= 573.55$$

  - Coefficient of variation (CV):

$$CV = \frac{573.55}{15{,}600} \times 100 \approx \mathbf{3.67}\%$$

From these results, it can be concluded that the price of curly red chili peppers varies significantly more at Daya Market than at Pabaeng-baeng Market. Meanwhile, the price of curly red chili peppers shows no price variation at all.

Price of Curly Red Chilies

- Power Market: Coefficient of Variation (CV) = 10.16%
- Pabaeng-baeng Market: Coefficient of Variation (CV) = 3.67%

Based on Daya Market conditions: The price of curly red chilies varies from 20,000 to 25,000 rupiah. Although prices have increased in the past two days, the fluctuations have not been significant, resulting in a coefficient of variation of 10.16%. This indicates significant price variation in Daya Market.

Meanwhile, Pabaeng-baeng Market: The price of curly red chilies at Pabaeng-baeng Market is more stable, with prices ranging between 15,000 and 16,500. The coefficient of variation is lower, at 3.67%, indicating that the price of curly chilies at this market is relatively more stable compared to Daya Market.

The Risk of Curly Red Chili Prices

The price of curly red chilies shows variation across time and markets. At Daya Market, the price of curly red chilies was recorded at Rp20,000 per kilogram at the beginning of the period and increased to Rp25,000 per kilogram in the last two days of observation. This price change resulted in a larger standard deviation and a coefficient of variation of 10.16%.

The CV value indicates that curly red chilies at Daya Market are subject to relatively higher price risk, reflecting significant short-term price fluctuations. This could be caused by changes in supply, differences in chili quality, or the dynamics of consumer demand in the market.

Meanwhile, at Pabaeng-baeng Market, the price of curly red chilies fluctuated within a narrower range, between Rp 15,000 and Rp 16,500 per kilogram. The calculation results showed a coefficient of variation of 3.67%, indicating that the price risk of curly red chilies in this market is relatively low and prices tend to be more stable than at Daya Market.

Factors Affecting Price Fluctuations:

1. Increased Demand: The increase in the price of curly red chilies at Daya Market could be caused by a surge in demand, due to seasonal factors or certain increased needs at that time.
2. Supply Constraints: Price increases may also be caused by supply disruptions that reduce the availability of curly red chilies in the market, although this data does not indicate an explicit supply problem.

DISCUSSION

Fluctuations in the price of red chilies, both large and curly, are a significant issue in traditional markets in Makassar City, particularly in Daya Market and Pabaeng-baeng Market. This study aims to analyze price risk based on the quality of chilies traded in these two markets using the coefficient of variation (CV). The analysis shows that the price of large red chilies is relatively stable, while the price of curly red chilies exhibits more significant price fluctuations. In this discussion, the researcher will delve deeper into the factors influencing price fluctuations and their implications for traditional markets.

Price of Large Red Chilies

The results obtained from the analysis of large red chili prices indicate that the price of red chilies at Daya Market and Pabaeng-baeng Market remained stable throughout the observation period. At Daya Market, the price of large red chilies remained constant at IDR 20,000 per kilogram, and at Pabaeng-baeng Market, the price of large red chilies remained stable at IDR 15,000 per kilogram. With a coefficient of variation (CV) of 0% for both markets, it can be concluded that there was no price fluctuation at all for large red chilies in either market. This indicates that the supply of large red chilies was relatively stable, and external factors such as weather changes or distribution disruptions did not significantly affect prices during the period.

The price stability of large red chilies may be influenced by certain factors, such as the stable supply from farmers, who may have carefully planned to maintain price stability. Furthermore, the presence of markets with a steady supply, such as Pabaeng-baeng Market, which maintains fixed prices, may also play a role in maintaining price stability for large red chilies.

Price of Curly Red Chilies

In contrast, the price of curly red chili peppers shows greater variation. At Daya Market, the price of curly red chili peppers ranges from IDR 20,000 to IDR 25,000 per kilogram, with a coefficient of variation of 10.16%, indicating significant price fluctuations. On the other hand, Pabaeng-baeng Market shows lower price variation, with prices ranging from IDR 15,000 to IDR 16,500 per kilogram, resulting in a coefficient of variation of 3.67%. The greater price fluctuation at Daya Market may be due to supply instability, for example due to reliance on curly red chili peppers from areas vulnerable to supply disruptions due to weather changes or distribution constraints.

Although the price of curly red chilies at Pabaeng-baeng Market tends to be more stable, the difference in the coefficient of variation between Daya Market and Pabaeng-baeng Market suggests local factors influence price stability. At Daya Market, differences in distribution mechanisms or high demand for curly red chilies may have led to sharper price fluctuations. This may also reflect a supply shortage leading to price increases.

Factors Causing Price Fluctuations

The higher price fluctuations of curly red chilies at Daya Market compared to Pabaeng-baeng Market may be influenced by various factors. One of these is external factors such as climate change and weather, which affect harvest yields. Extreme weather can lead to reduced chili yields, resulting in limited supply and rising prices. Furthermore, internal factors such as distribution and trader behavior also play a role in determining prices. The difference in coefficient of variation between Daya Market and Pabaeng-baeng Market may also be due to differences in supply and demand management in each market.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the analysis of fluctuations and risks in the prices of large red chilies and curly red chilies in traditional markets in Makassar City, especially in Daya Market and Pabaeng-baeng Market, several main conclusions can be drawn as follows:

1. Large Red Chili Price Stability The price of large red chilies in both markets during the observation period showed very stable conditions. There were no price changes in either Daya Market or Pabaeng-baeng Market. The price of large red chilies remained at IDR 20,000/kg in Daya Market and IDR 15,000/kg in Pabaeng-baeng Market. This condition resulted in a standard deviation value of zero and a coefficient of variation (CV) of 0%. Thus, large red chilies can be categorized as a commodity with very low, if not no, price risk.
2. The price fluctuations of curly red chili peppers indicate price fluctuations, although at varying levels across markets. At Daya Market, the price of curly red chili peppers increased from IDR 20,000/kg to IDR 25,000/kg in the last two days of observation. This resulted in a coefficient of variation of 10.16%, indicating a relatively higher level of price risk. Meanwhile, at Pabaeng-baeng Market, the price of curly red chili peppers was relatively

stable, ranging from IDR 15,000–IDR 16,500/kg and a coefficient of variation of 3.67%, indicating a lower price risk compared to Daya Market.

3. Differences in Risk Between Chili Types and Market Locations: The study's findings confirm that price risk is influenced not only by commodity type but also by market location. Curly red chilies have a higher price risk than large red chilies, and Daya Market exhibits a higher level of risk than Pabaeng-baeng Market. These differences indicate variations in supply and demand conditions, as well as trading mechanisms, in each market.

RECOMMENDATIONS:

1. The government and related institutions need to improve the system for collecting and distributing more accurate and up-to-date price data in traditional markets.
2. To reduce price volatility caused by dependence on one or two supply sources, the government and market players are advised to seek alternative chili suppliers from various regions.

FURTHER STUDY

Recommendations for Further Research: Further research could deepen the analysis by:

1. Analysis of the Influence of Government Policy on Prices
2. Chili Price Prediction Model Using the Approach
3. The Effect of Chili Quality and Type on Price

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REFERENCES

Anindita, R., & Baladina, N. (2017). Marketing of Agricultural Products. Yogyakarta: Andi Offset.

Asmarantaka, RW (2014). Agribusiness Marketing (Agrimarketing). Bogor: IPB Press.

Bank Indonesia. (2021). Study of Strategic Food Price Stability in Indonesia. Jakarta: BI.

Central Statistics Agency. (2022). Producer and Consumer Price Statistics for Horticultural Commodities. Jakarta: BPS.

Darmawan, D., & Kuntadi, EB (2018). Analysis of red chili price volatility in Indonesia. Indonesian Agribusiness Journal, 6(2), 101–112.

Firdaus, M. (2011). Econometric Applications for Panel and Time Series Data. Bogor: IPB Press.

Hanafie, R. (2010). Introduction to Agricultural Economics. Yogyakarta: Andi.

Ilham, N., & Saliem, HP (2016). Price dynamics and supply stabilization of red chilies. Agricultural Policy Analysis, 14(2), 89–104.

Makassar City Central Statistics Agency. (2023). Makassar City in Figures. Makassar: BPS Makassar City.

Mankiw, N.G. (2016). Principles of Economics (7th ed.). Boston: Cengage Learning.

Mayrowani, H. (2014). Fluctuations in horticultural commodity prices and their implications for farmers' income. Agro-Economic Research Forum, 32(1), 45–58.

Ministry of Agriculture of the Republic of Indonesia. (2022). National Red Chili Outlook. Jakarta: Center for Agricultural Data and Information Systems.

Nuraeni, D., & Setiawan, B. (2019). Price risk of curly red chilies in traditional markets. Journal of Agricultural Socioeconomics, 13(3), 167–178.

Pindyck, R. S., & Rubinfeld, D. L. (2018). Microeconomics (9th ed.). New Jersey: Pearson Education.

Prastowo, NJ, Yanuarti, T., & Depari, Y. (2008). The influence of distribution on the formation of strategic commodity prices. Bulletin of Monetary Economics and Banking, 11(1), 3–28.

Rahim, A., & Hastuti, DRD (2008). Agricultural Economics. Jakarta: Penebar Swadaya.

Rasmikayati, E., Saefudin, BR, & Karyani, T. (2017). Red chili price behavior in traditional markets. Integrated Agribusiness Journal, 10(2), 125–136.

Salim, Z., & Munadi, E. (2017). Chili Commodity Information. Jakarta: Trade Assessment and Development Agency.

Saptana, & Ashari. (2013). Price behavior and market integration of red chili peppers. Journal of Agroeconomics, 31(1), 1–20.

Siregar, S. (2015). Applied Statistics for Higher Education. Jakarta: Kencana.

Supriyadi, A., & Darwanto, DH (2016). Analysis of red chili price risk at the consumer level. Journal of Agricultural Economics and Agribusiness, 1(2), 85–94.

Todaro, M. P., & Smith, S. C. (2020). Economic Development (13th ed.). Boston: Pearson.