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Assessing the Impact of Inflation and CPI on the Agricultural Economy: A Case Study of Lampung Province's Farmer Exchange Rate

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ABSTRACT
This study investigates the effect of inflation and the Consumer Price Index (CPI) on the performance of the agricultural sector in Lampung Province, Indonesia. Given the agricultural sector's critical role in regional economic development and rural livelihoods, understanding macroeconomic influences is essential. Using secondary time-series data from relevant agencies, the research employs multiple linear regression analysis to assess the relationship between inflation, CPI, and agricultural output performance. The findings indicate that both inflation and CPI significantly affect agricultural productivity. Higher inflation rates are associated with increased production costs and reduced farm income, whereas CPI fluctuations complicate financial planning and price stability for farmers. These results highlight the need for targeted economic policies to stabilize macroeconomic variables and mitigate their adverse effects on the agricultural sector, ensuring long-term sustainability and productivity in rural economies.

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Introduction

In recent years, the escalating influence of inflation and the Consumer Price Index (CPI) on the agricultural sector in Lampung Province has emerged as a critical challenge for farmers and relevant stakeholders. Price uncertainty complicates production planning and financial management, disrupts operational efficiency, and threatens the viability of agricultural businesses. As crop incomes struggle to keep pace with rising living costs, farmers experience a decline in their purchasing power, which in turn affects their quality of life and undermines the region's overall economic resilience. Recognizing these challenges highlights the need to examine the dynamics between inflation, CPI, and agricultural sustainability in Lampung Province. Bridging the gap between these broader economic challenges and the agricultural realities of Lampung is essential. Macroeconomic volatility reflected in erratic inflation and CPI trends directly shapes farmer's cost structures and revenue streams. This interconnectedness underscores the urgency of examining how shifts in inflation and CPI affect input costs, market demand, and ultimately, the financial stability and productivity of Lampung's agricultural sector. Agriculture is a very important sector in Lampung Province, not only as the backbone of the regional economy, but also as the main source of livelihood for most people.

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The performance of this sector is strongly influenced by various economic factors, one of which is inflation and the Consumer Price Index (CPI). Inflation, which is a general increase in the prices of goods and services, can affect farmers' purchasing power and production costs. Meanwhile, the CPI reflects price changes over time for certain goods and services, which can have a direct impact on farmers' operational costs and profits. In the context of Lampung Province, fluctuations in inflation and CPI can have a significant impact on the stability and sustainability of the agricultural sector. An increase in inflation can lead to higher prices of agricultural inputs such as seeds, fertilisers, and farming tools, which in turn can reduce farmers' profit margins. Conversely, (Saputra, et al 2013) stated that a decrease in inflation can help lower production costs, but may also be accompanied by economic uncertainty that affects market demand.

The significant influence of inflation and the Consumer Price Index (CPI) on the agricultural sector in Lampung Province poses various challenges that farmers and stakeholders must face. Price uncertainty can cause difficulties in production planning and financial management, as well as reduce operational efficiency and threaten the viability of agricultural businesses. Unpredictable price fluctuations reduce farmers' ability to budget and invest. High inflation can also have a negative impact on farmers' welfare, as crop income may not keep pace with the rising cost of living. This results in a decline in farmers' purchasing power and affects their quality of life as well as the region's economic resilience. Therefore, it is important to understand the dynamics of inflation and CPI and find solutions that can help reduce their negative impact on the agricultural sector.

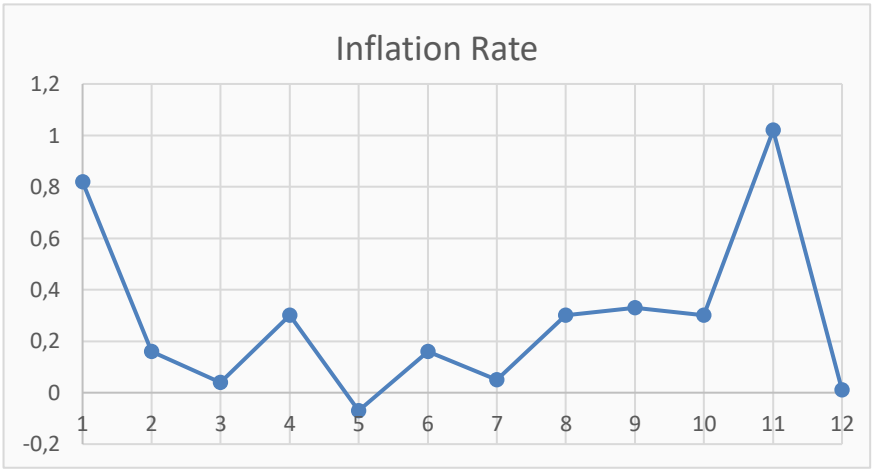

Figure 1. Inflation Rate by 2023 on Lampung Province. BPS Lampung

Inflation data in Lampung Province in 2023 showed significant variations from January to December. The highest inflation was recorded in November at 1.02%, while the lowest inflation occurred in May at -0.07% (deflation). Peak inflation was seen in January (0.82%), with several other months showing relative stability, such as April, August, and October (0.3% each). This increase in inflation may have been caused by rising prices of key commodities, disruptions in the supply chain, and increased production and distribution costs. Conversely, a decline in inflation or deflation may be triggered by a fall in market demand, the success of government policies in stabilising prices, or an increase in production that outpaces demand.

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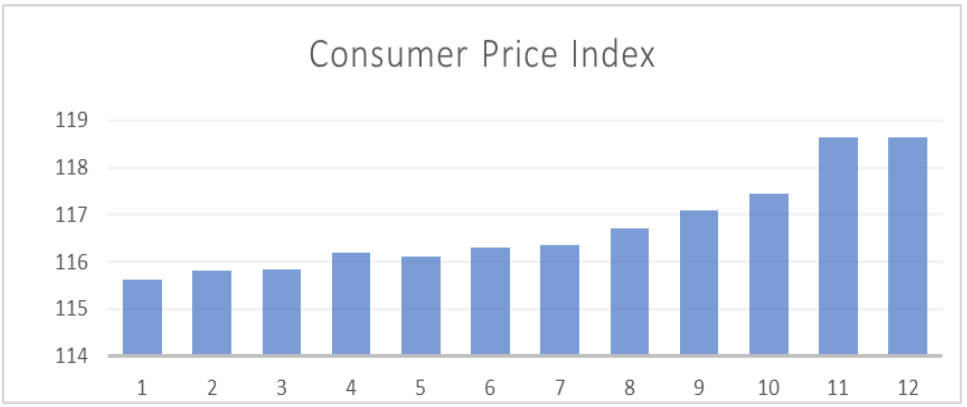

Figure 2. Consumer Price Index Rate 2023, BPS Lampung

Lampung Province's Consumer Price Index (CPI) data for 2023 showed a consistent increase from 115.62 in January to 118.65 in December, with the largest spike occurring between October and November. This increase in the CPI reflects an increase in the prices of goods and services, which is caused by several factors, such as rising commodity prices, disruptions in the supply chain, and high production costs. In addition, external conditions such as fluctuations in fuel prices and weather factors also contributed. A decline in inflation or slower growth in certain months may be due to effective government policies, increased production, or decreased market demand. This is in line with previous research stating that the reduction in high inflation levels is due to central banks that have successfully adopted inflation-targeting frameworks, which have led to the implementation of more robust monetary policies and the stabilization of inflation expectations (Ha et al., 2023). Understanding these dynamics is crucial to maintaining economic stability in Lampung Province.

This study aims to examine the effect of inflation and CPI on the agricultural sector in Lampung Province. By understanding their relationship, effective strategies can be developed to mitigate the negative impacts of inflation and price fluctuations on agriculture. The findings are expected to offer valuable insights for policymakers in designing measures that support sustainability and boost agricultural productivity in Lampung. Additionally, the research will reveal how inflation and CPI influence production costs and farmers' decision-making, guiding more targeted policy interventions.

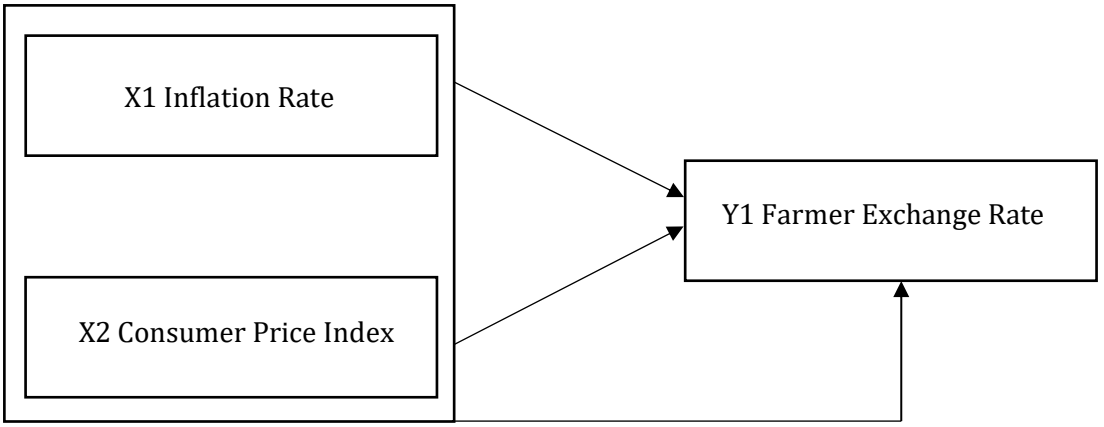

Figure 3. Research Analysis Framework

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Method

This type of research is quantitative descriptive research, which involves the calculation of data collected and interpreted to observe the characteristics of individuals or groups. This research evaluates the nature of the conditions seen. All data used in this research is secondary data, which is information obtained through intermediary media or indirectly from archives and article publications. Descriptive quantitative research aims to systematically and objectively depict conditions or phenomena through the computation and analysis of numerical data.

The information that are applied here in this research has already been collected, recorded, and published by third parties such as archives, reports, or scientific publications. Utilizing secondary data allows researchers to save time and resources while providing a robust foundation for gaining a comprehensive overview of the existing conditions. Although this data was not gathered specifically to address the current research questions, proper analysis of it still yields valuable insights into the phenomena under investigation. This approach proves highly effective in identifying trends and patterns within society or specific groups, making the research findings a useful reference for policymaking or further studies. In this study, researchers utilised data from Lampung's Central Bureau of Statistics (BPS), including the inflation rate, consumer price index, and farmer exchange rate.

In this study, the OLS (ordinary least squares) or multiple regression method was used. This OLS method is equipped with a diagnostic tool, namely the classical assumption test which includes normality which examines the normal distribution of dependent and independent variables in the regression model, heteroscedasticity which identifies the relationship between independent variables by looking at the VIF value, and multicollinearity which tests the equality of residual variances; if the variance is fixed, it is called homoscedasticity. In the Classical Assumption Test, there are several tests that aim to ascertain whether the regression model that has been analysed is suitable for use in research (Mardiatmoko, 2020). Analyses were conducted with the help of IBM SPSS Statistics 26 software.

Findings

Table 1. Normality Test

		X1	X2	Y1
N		12	12	12
Normal Parameters[a,b]	Mean	.2400	116.7275	109.3167
	Std. Deviation	.42166	1.03811	4.99686
Most Extreme Differences	Absolute	.249	.225	.175
	Positive	.249	.225	.175
	Negative	-.234	-.143	-.129
Test Statistic		.249	.225	.175
Asymp. Sig. (2-tailed)		.039[c]	.094[c]	.200[c,d]

Source: Data analysis 2025

Based on the results of the Kolmogorov-Smirnov (K-S) normality test presented in Table 1, the Asymp. Sig. (2-tailed) values for variables X1, X2, and Y1 are 0.039, 0.094, and 0.200, respectively. Although the significance value for X1 is slightly below the conventional threshold of 0.05, while those for X2 and Y1 exceed it, the deviation observed in X1 is relatively minor. Given the small sample size (N = 12), slight deviations from normality are not uncommon and may still be considered acceptable depending on the robustness

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required for the subsequent analyses. Additionally, the descriptive statistics indicate that the standard deviations are within an acceptable range, and the most extreme differences are not substantially large, suggesting no critical violation of the normality assumption.

Considering both the statistical outcomes and contextual interpretation, it can be inferred that the distributions of X1, X2, and Y1 exhibit an acceptable degree of normality. This finding suggests that the normality assumption is sufficiently met, thereby justifying the use of parametric statistical techniques in further analyses. Consequently, the data are deemed appropriate for subsequent inferential procedures, such as regression or correlation analysis, which rely on the assumption of normally distributed variables.

Table 2. Multicollinearity Test X1 X2 on Y1

Collinearity Statistics	
Tolerance	VIF
.895	1.117
.895	1.117

a. Dependent Variable: Y1

Source: Data analysis 2025

Based on the results presented in Table 2, the multicollinearity test was conducted to examine the relationship between the independent variables—Inflation (X1) and Consumer Price Index (X2)—on the dependent variable, Farmer Exchange Rate (Y1). The Variance Inflation Factor (VIF) values for both X1 and X2 are 1.117, which is well below the commonly accepted threshold of 10. In addition, the Tolerance values for both variables are 0.895, which is significantly above the minimum acceptable level of 0.1. These results suggest that there is no indication of high intercorrelation or redundancy among the independent variables.

From these findings, it can be concluded that multicollinearity does not pose a problem in the regression model involving X1 and X2. The absence of multicollinearity ensures that the regression coefficients can be estimated reliably and that the individual effect of each independent variable on the dependent variable can be accurately interpreted. Therefore, the model meets one of the essential classical assumptions required for multiple linear regression analysis.

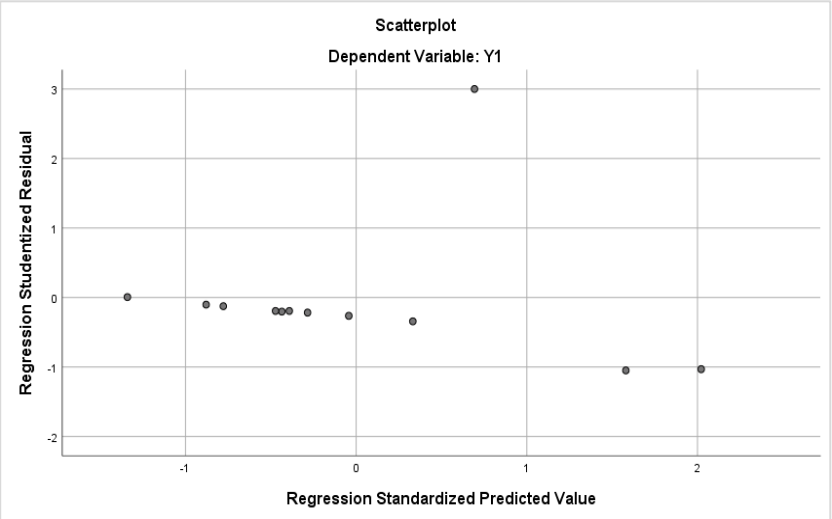

Figure 5. Heteroscedasticity Test Y1

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Based on the results presented in the scatterplot, it is evident that the data points are evenly distributed around the horizontal axis without forming any discernible pattern. The points are not concentrated solely above or below the line but are instead randomly dispersed throughout the plot. This random distribution indicates that the variance of the residuals does not systematically change with the predicted values, which aligns with the assumption of homoscedasticity. Therefore, it can be concluded that there is no indication of heteroscedasticity in the regression model under analysis. The absence of specific patterns, such as a funnel shape that widens or narrows, supports the notion that the residuals have a constant variance across the range of observed values. This finding confirms that the regression model satisfies the classical assumption of homoscedasticity, which is essential for ensuring the efficiency and unbiasedness of the parameter estimates.

Table 3. T-test

Coefficients[a]					
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
1(Constant)	-448.323	54.463		-8.232	.000
X1	-3.445	1.266	-.264	-2.721	.024
X2	4.785	.467	.994	10.241	.000

a. Dependent Variable: Y1
Source: Data analysis 2025

Based on the results of the T-test presented in Table 3, both independent variables Inflation (X1) and Consumer Price Index (X2) have a statistically significant effect on the dependent variable, the Farmer Exchange Rate (Y1), as indicated by their significance values of 0.024 and 0.000, respectively, both of which are below the 0.05 threshold. The negative coefficient for X1 (-3.445) suggests an inverse relationship, indicating that an increase in inflation tends to reduce the farmer exchange rate. Conversely, the positive coefficient for X2 (4.785) and its high standardized Beta value (0.994) indicate a strong positive relationship, implying that an increase in the consumer price index significantly enhances the farmer exchange rate. These findings demonstrate that while both variables are influential, the consumer price index exerts a stronger and more direct impact on the farmer exchange rate.

Table 4. F-test

ANOVA[a]					
Model	Sum of Squares	df	Mean Square	F	Sig.
1Regression	236.952	2	118.476	28.282	.000[b]
Residual	37.702	9	4.189		
Total	274.654	11			

a. Dependent Variable: Y1
b. Predictors: (Constant), X2, X1
Source: Data analysis 2025

Based on Table 4, it can be concluded that H0 is rejected and H1 is accepted. This can be seen from the calculated F value which reaches 28,282. In addition, the significance value obtained is 0.000, which is smaller than 0.05. Thus, it can be concluded that this multiple regression model is feasible to use, and the independent variables which include the inflation rate and consumer price index simultaneously have an influence on the dependent variable of farmers' exchange rate. This finding highlights the substantial role of inflation-related indicators in shaping economic conditions, particularly within the agricultural sector.

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Discussion

Inflation and CPI: Definition, Functions, and Evolution

Inflation affects economic activities in various ways, depending on its intensity. Low inflation boosts national income and encourages investment, whereas high inflation increases production costs, reduces investment, and erodes purchasing power, ultimately undermining economic stability (Hasibuan, 2023). Inflation is the process of increasing prices of goods and services that can occur at any time in a given period. An increase in the price of one good or service cannot be considered inflation if it is not accompanied by a general price increase in other goods and services (Sahiba et al., 2023). It disrupts the economy by reducing investment, raising interest rates, creating uncertainty, weakening national product competitiveness, lowering living standards, increasing unemployment, and worsening overall societal welfare (Muqsit, 2019). The inflation rate is closely related to the Consumer Price Index (CPI), this is supported by the opinion which says that the CPI is the measure of inflation that is most closely watched by economic policy makers when choosing monetary policy. The CPI itself has the meaning of an index number that shows changes in the prices of goods and services consumed by the general public in a certain period according to a predetermined time (Karlina, 2017).

When the Consumer Price Index (CPI) rises, it means that the prices of goods and services in the CPI basket are also increasing, indicating inflation. Conversely, a decrease in the CPI indicates that the prices of goods and services in the basket are decreasing, indicating deflation or a decrease in inflation. Thus, the CPI serves as a measuring tool to monitor and calculate the rate of inflation. Therefore, changes in the CPI provide a clear picture of the inflation rate in the economy. Consumer Price Index (CPI) are designed to capture shifts in the overall price levels of the goods and services that households purchase for daily consumption. Initially, many countries developed this index as a way to gauge changes in the cost of living experienced by workers, thereby ensuring that wage adjustments could appropriately reflect fluctuations in prices. Over time, the role of CPI has grown considerably.

Today, this index is not only essential for measuring inflation on a macroeconomic scale but also serve as a cornerstone for governments and central banks in setting monetary policies, monitoring price stability, and acting as deflators within national accounting systems. As trade and production become increasingly globalized and markets become more open, the reliability and precision of national Consumer Price Index (CPI) have gained significant attention from governments, central banks, and international organizations. These entities prioritize ensuring that CPI maintain high standards of accuracy and can be effectively compared across countries to support economic analysis and policymaking. (Graf, 2020).

Impact of Rising CPI on Agricultural Production and Farmer Welfare

When the Consumer Price Index (CPI) rises, it means that the prices of goods and services in the CPI basket are also increasing, signalling inflation. Conversely, a decrease in the CPI indicates that the prices of goods and services in the basket are decreasing, which indicates deflation or a decrease in inflation. Thus, the CPI serves as a measuring tool to monitor and calculate the rate of inflation. Therefore, changes in the CPI provide a clear picture of the inflation rate in the economy. One indicator that can be used to assess farmer welfare is the farmer exchange rate (Nilai Tukar Petani). The Farmer Exchange Rate (NTP) is a key indicator of farmers' welfare, reflecting their income and its balance with expenses. It is calculated by comparing the price index received by farmers with the one they pay. NTP also illustrates the relationship between what farmers sell and the goods and services they

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purchase, serving as a measure of their ability to exchange agricultural products for household consumption and production necessity (Jepri et al., 2024). (Mazwan & Masyhuri, 2019) stated on (Indah et al., 2023) research stated that the factors contributing to a growth or decline in the farmer exchange rate (NTP) include farmers' experience, seed prices, organic fertilizer costs, and labor wages. This growth or decrease in NTP significantly impacts the welfare of farmers in Lampung Province.

An increase in the inflation rate also results in an increase in the overall price of goods and services. Inflation can benefit producers if their revenue exceeds their incurred expenses. However, if production costs rise sharply, it may lead to a reduction in their labor force. This is also felt by the agricultural sector. Farmers feel the increase in production costs such as the price of fertiliser, seeds, and agricultural equipment. According to (Abdullah et al., 2019) the biggest obstacles faced by farmers are low productivity and high production costs, which affect the welfare of farmers. It should be noted that if production costs increase faster than the selling price of agricultural products, this will have a negative impact on farmers, which can lead to a decrease in the farmer exchange rate (NTP). This means that when the cost of production inputs such as fertilizer, seeds, and agricultural equipment rises faster than the selling prices of agricultural products, farmers' net trade position (NTP) deteriorates. In this scenario, the revenue they receive from selling their products fails to cover the increasingly high costs they incur, thereby shrinking profit margins and reducing their capacity to invest in future production or meet household needs. Such an imbalance not only affects individual farmers' welfare but also has broader implications for the sustainability of the agricultural sector.

Policy Strategies for Enhancing Agricultural Sector Resilience

Inflation raises prices, increasing regional revenue through higher tax collection. However, it can also reduce consumption, As the cost of goods and services increases, some segments of society may reduce their consumption, particularly for essential needs, and even more so for secondary and luxury goods (Muslim et al., 2019). In light of these challenges, it is imperative for policymakers to adopt targeted strategies that stabilize the NTP and bolster farmers' incomes. This could involve providing subsidies for critical inputs such as fertilizers, seeds, and modern equipment and improving access to affordable credit through local banks and microfinance institutions. Additionally, promoting innovative production techniques like precision agriculture and smart technologies can help farmers optimize resource use, reduce waste, and boost yields. These measures work together to bridge the gap between rising production costs and selling prices, fostering a more predictable agricultural market and enhancing rural economic resilience. A coordinated effort among policymakers, financial institutions, and agricultural stakeholders is essential for ensuring the long-term stability and growth of the agricultural sector.

The Consumer Price Index (CPI) serves to express changes in the prices of goods and services purchased by consumers. If the CPI rises, the prices of goods and services that farmers need will rise. Then, if the CPI is higher than the increase in the price of agricultural products sold by farmers, this will have a negative impact because it can reduce the income from agricultural products because farmers cannot cover the increase in costs. This is in line with the opinion of (Mahendra, 2016) which states that the needs of farmers are diverse and different from the inflation that occurs causing the cost of living index to increase, so that the costs to be paid also increase. The higher the costs to be paid, the lower the farmer's exchange rate.

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Conversely, if inflation and CPI decrease, the production costs incurred by farmers will decrease. This results in lower production costs and can maximise profits. If the price of agricultural products remains stable or does not decrease as much as the cost, then the NTP will increase because the income of farmers is higher than the production costs that must be incurred. This is in line with previous research that stated controlled inflation improves economic efficiency and reduces business uncertainty, encouraging long-term investments and sustained production growth. Stable prices boost business confidence, fostering expansion and a favorable environment for society. Thus, policies that keep inflation in check are key to sustainable economic growth (Maimunah et al., 2024).

This means that a favorable NTP indicates a balanced and efficient exchange system where the income from agricultural sales exceeds the expenditure on goods and services needed for both household consumption and ongoing production. When farmers achieve this balance, they are better positioned to reinvest in their agricultural activities, contributing to the sustainability and growth of the agricultural sector. Moreover, this positive trade position reinforces the overall economic resilience of rural communities, as it demonstrates the farmers' ability to effectively convert their produce into the resources required for daily living and further production. In essence, a robust NTP serves as a key indicator of the financial health and operational efficiency within the agricultural landscape.

The results of research related to the effect of the inflation rate and consumer price index on the exchange rate of farmers in Lampung province are as follows:

a. Based on the analysis and multiple linear regression test results, the regression coefficient for the inflation variable is negative at -3.445, which means that every 1% increase in inflation will result in a decrease in the level of farmer exchange rate (NTP) by -3.445. The negative regression coefficient indicates a negative relationship between inflation and farmers' exchange rate. Therefore, the higher the inflation in Lampung province, the lower the farmer exchange rate. Conversely, if inflation in Lampung province decreases, the farmer exchange rate will increase.

   Meanwhile, the regression coefficient for the consumer price index (CPI) variable shows a positive value of 4,785. This means that every 1% increase in the consumer price index will cause the farmer exchange rate to increase by 4.785. This result indicates a positive relationship between the consumer price index and the farmer exchange rate. In other words, the higher the consumer price index in Lampung province, the higher the farmer exchange rate. Conversely, if the consumer price index decreases, the level of farmer exchange rate in Lampung province will also decrease. Based on the multiple linear regression test results, the regression equation is Y = -448,323 - 31.084 X1 + 4.785 X2.

b. The results of the simultaneous significance test (F test) above show that the significance value is 0.000 <0.05, which means Ho is rejected and Ha is accepted. Testing can also be done in another way, namely by determining F table based on 5% significance, where N1 = 2 and N2 = 9. From this test, F count is 28.282 and F table is 19.38. Because F count is greater than F table (28.282 > 19.38), Ha is accepted and Ho is rejected. Thus, it can be concluded that simultaneously there is a significant influence between the inflation rate and the consumer price index on the exchange rate of farmers.

   The calculations show that inflation and the CPI significantly affect the farmer exchange rate (NTP) in Lampung Province. A 1% rise in inflation decreases NTP by 3.445 points, while a 1% increase in the CPI raises it by 4.785 points. This is in line with previous research which states that a 1 percent increase in inflation will reduce the farmers' exchange rate by 0.043. The negative relationship between inflation and the farmers'

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exchange rate explains that an increase in inflation is inversely related to the welfare of nilam farmers (Sinaga et al., 2022). These statistically significant results highlight that macroeconomic conditions directly impact farmers' financial well-being, underscoring the need for policies targeted at stabilizing input costs and protecting farmers' incomes.

c. Based on the two-sided test on the individual parametric significant test (t test), for the inflation variable, the t-count value obtained is -2.721, which indicates that t count is greater than t table (-2.721 > -1.812) and the sig value. 0,024 < 0,05. These results indicate that Ha is accepted and Ho is rejected, so inflation has a significant positive influence on the level of farmers' exchange rate in Lampung province. Meanwhile, the consumer price index variable shows a t-value of 10.241. This means that t count is greater than t table (10.241 > 1.812) and sig value. 0,000 < 0,05. Thus, Ha is accepted, indicating that the consumer price index has a positive and significant influence on the level of farmer exchange rate in Lampung province.

   This means that even modest changes in inflation are strongly associated with noticeable shifts in the relationship between farmers' incomes and their expenditures on essential goods and inputs. Similarly, the tests reveal a robust, positive link between the CPI and the farmer exchange rate as consumer prices adjust, the economic outcomes for farmers reflect these changes in a way that affects their ability to sustain their livelihoods. Collectively, these findings underscore that macroeconomic factors like inflation and CPI play a critical role in shaping the financial well-being and operational stability of the agricultural sector in Lampung Province.

Conclusion

Inflation, as a general increase in the prices of goods and services, and its measurement through the Consumer Price Index (CPI) play critical roles in shaping the economic landscape of the agricultural sector. An increase in the CPI indicates rising production costs such as higher prices for fertilizers, seeds, and supporting equipment which in turn reduces farmers' income and diminishes the farmer exchange rate (NTP), a key indicator of their welfare. Conversely, a decrease in inflation lowers production costs, potentially enhancing the NTP provided that the prices of agricultural products remain stable.

These dynamics underscore the necessity for targeted policy interventions aimed at stabilizing production costs and safeguarding farmer income. By addressing the challenges posed by inflation and CPI fluctuations through measures such as strategic subsidies, improved credit access, and the adoption of efficient production technologies, policymakers can enhance the sustainability and resilience of the agricultural sector. Ultimately, understanding and managing these economic indicators are vital for maintaining the balance between production expenses and income, thereby ensuring the long-term welfare of farmers and the stability of rural economies.

Based on the multiple linear regression analysis, it was found that the regression coefficient for inflation is -3.445, indicating that a 1% increase in inflation will decrease farmers' exchange rate (NTP) by 3.445, indicating a negative relationship between high inflation and low NTP. Meanwhile, the coefficient for the consumer price index (CPI) is positive at 4.785, indicating that a 1% increase in CPI will increase NTP by 4.785, reflecting a positive relationship between high CPI and high NTP. The regression equation obtained is Y = -448.323 - 31.084 X1 + 4.785 X2, and the results of the simultaneous significance test (F test) show a significant influence between inflation and CPI on NTP with $p < 0.05$. In addition, the t-test for inflation (t count -2.721, p 0.024) and CPI (t count 10.241, p 0.000) also showed a

significant influence on NTP in Lampung.

In conclusion, the findings reveal that the economic environment in Lampung has a clear impact on farmers' financial conditions. When inflation rises, it tends to erode the farmers' exchange rate, implying that higher inflation pressure can diminish their overall income and purchasing power. Conversely, increasing consumer prices appear to strengthen the exchange rate for farmers, suggesting that higher market prices may offer some economic advantages despite the inflationary context. Overall, these insights underscore the delicate interplay between inflation and consumer price levels in shaping the economic stability of the agricultural sector, emphasizing the importance of policies that maintain both price stability and fair income for farmers.

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