

ANALYSIS OF THE SUPPLY AND NEEDS OF RED CHILI IN NORTH SUMATRA PROVINCE

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ABSTRACT

The purpose of this study was to find out and analyze the availability and demand for red chili in North Sumatra Province. The research area was carried out in North Sumatra Province. The reason for choosing North Sumatra is with the consideration that red chili plants spread throughout the Province of North Sumatra and the research is planned to last for 6 months, this research uses a quantitative approach, in this study the data to be examined is in the form of secondary data in the form of, the price of red chilies in North Sumatra, chili production, rainfall and the price of substitute goods, the data analysis technique used in this study is multiple linear regression analysis, while the results of this study are, in this study partially prices correlate positively and significantly to chili consumption in North Sumatra, p. this is because t count > t table. In this study partially, production correlated not positively and significantly correlated with chili consumption in North Sumatra. In this study partially Rainfall correlated positively and significantly to Chili Consumption in North Sumatra, this is because t count > t table. In this study partially substitutes correlated positively and significantly to chili consumption in North Sumatra, this is because t count > t table. Chili in North Sumatra because f count > f table (28.322>2.57) and sig 0.000 <0.05

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1. INTRODUCTION

North Sumatra Province is one of the largest contributors to red chili yields in Indonesia, based on the data the author obtained that for 2020 the area of red chili farming land in North Sumatra was 18,509 ha. In 2020, red chili production in North Sumatra reached 193,827 tons with a productivity of 104.83 quintals per hectare based on a harvested area of 18,492 hectares. Based on this land area (sumut.bps.go.id), the red chili production centers are Karo, Simalungun, Dairi, Langkat, where the attractiveness of chili development for farmers lies in its high economic value. The chili commodity plays a very large role in supporting the government's efforts to increase farmers' income and standard of living, expand employment opportunities, support agribusiness development and preserve natural resources (Angreini et al., 2021). The increase in chili prices was significant enough to correlate with the inflation rate. These price fluctuations occur almost every year and worry residents, but there is no concrete solution to control these price spikes. If this is allowed, it can disrupt economic stability. everyone, especially the poor, is getting poorer, then unstable inflation will create uncertainty for economic actors in making good decisions in consumption, investment and production (www.bi.go.id). Inflation arises due to pressure Based on the supply side (cost) push inflation), Based on the demand side (demand pull inflation), and Based on inflation expectations.

2. METHODS

The research area was conducted in North Sumatra Province. The reason for choosing North Sumatra was on the consideration that red chili plants spread throughout the province of North Sumatra, this research is a quantitative study, the research data is sourced. the data analysis technique used in this study is multiple linear regression analysis. The linear statistical model for multiple linear regression analysis is generally like an equation (1).

$$y_i = \theta_0 + \theta_1 x_{i1} + \theta_2 x_{i2} + \dots + \theta_n x_{in} + \varepsilon_i \dots \dots \dots (1)$$

Where y_i is the I response component, $\theta_0, \theta_1, \theta_2, \dots, \theta_n$ is the regression parameter and ϵ_i is the error component (Pramesti, 2013). The demand function is defined as a function based on the price of red chili, population, and income. Mathematically, the demand for red chili is formulated as follows

$$Qd_{T1} = a + b_1P_t + b_2Y_t + b_3Y_t + c$$

Explanation :

Qd_t	= Red Chili Needs (Ton)
a	= Coefficients <i>intersep</i>
b_1, b_2, b_3	= Coefficients Regression
P_t	= Current years chili price (Rp/Kg)
h_t	= Current years chili substitution price (Rp/Kg)
Y_t	= jumlah Rainfall (mm/tahun)
c	= Konstanta regression

For the second purpose, namely to analyze the correlation between the red chili price component, the red chili harvest area and the red chili supply using a dynamic model. Analyzed using multiple linear regression analysis with SPSS tools.

3. RESULTS AND DISCUSSION

Multiple Linear Regression Analysis

Regression analysis is used to estimate the value of Component Y based on the value of Component X, as well as to estimate the change in Component Y for each unit change in Component X. The linear regression equation model in this study is as follows

Table 1 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	1.112	.704			2.329	.024
Price	-.396	.214	.353		4.849	.000
Production	.105	.104	.134		1.894	.076
Rainfall	.493	.210	.378		2.346	.023
Substitution	-.118	.176	.122		3.018	.004

a. Dependent Variable: Konsumsi cabai

$$Y = 3.069 + -(0.396) + 0.105 + 0.493 + -(0.118) + \epsilon$$

Based on the above equation, it can be concluded:

- Constant Value (β_0) = 1.112, this indicates a constant level, where if the Price (X_1), Production (X_2), Rainfall (X_3) and Substitution (X_4) Components are 0, then the value of the Needs and Substitution Components the availability of chili (Y) will remain at 1,112 assuming other components remain the same.
- The Price Component (X_1) $-(0.396)$ shows that the relationship between the Price Component and the need and availability of chili is negative, meaning that if the Price Component increases by 1% it will reduce the demand and availability of chili by 3.96%.
- Production Component (X_2) 0.105 indicates that the relationship between the Production Component and the Need and Availability of Chili is positive, meaning that if the Production Component increases by 1%, it will increase the Demand and Availability of Chili by 1.05%.
- Rainfall Component (X_3) 0.493 meaning that if the Rainfall Component increases by 1% it will increase the availability of chili by 4.93%.
- The Substitution Component (X_4) $-(0.118)$ indicates that the relationship between the Substitution Component is negative, meaning that if the demand and availability of chilies increases by 1%, it will reduce the demand for Substitution chilies by 1.18%

Hypotesys

Partial Test (T Test)

Partial Testing of the significance of linear regression coefficients partially is very important to conclude whether there is a correlation between changes in each independent component to the dependent component. By comparing tcount with ttable. How to compare is as follows:

- If tcount > ttable then Ho is rejected, meaning that the independent component is partially positively and significantly correlated with the dependent component.
- If tcount < ttable then Ho is accepted, meaning that the independent component is partially not positively and significantly correlated with the dependent component.

With a sample size of 55, freedom $df = n - k$ (55-4) so that in this study the df value was 51 and the significance level was 5% (0.05) and the t table value was 2.01.

Table 2 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	1.112	.704			2.329	.024
Price	-.396	.214	.353		4.849	.000
Production	.105	.104	.134		1.894	.076
Rainfall	.493	.210	.378		2.346	.023
Substitution	-.118	.176	.122		3.018	.004

Hasil Berdasarkan *testing* dugaan sementara adalah :

- The Price component has a t count of 4,849 and a significant level of 0,000. In this study, partially, Price correlates positively and significantly to the need and availability of chili. In North Sumatra, this is because t count > t table (4,849 > 2.01) and a significant level of 0,000 < 0.05.
- The Production component has a t count of 1,894 and a significant level of 0,076. In this study, partially Production is not positively and significantly correlated with the need and availability of chillies. In North Sumatra, this is because t count < t table (1,894 > 2.01) and a significant level 0.076 < 0.05.
- The Rainfall component has a t count of 2.346 and a significance level of 0.023. In this study, partially Rainfall correlates positively and significantly to the demand and availability of chili. In North Sumatra, this is because t count > t table (2.346 > 2.01) and a significant level of 0.023 < 0.05.
- The Substitution component has a t count of 3.018 and a significant level of 0.004. In this study, partially Substitution correlates positively and significantly to the demand and availability of chili in North Sumatra, this is because t count > t table (3.018 > 2.01) and a significant level of 0.004 < 0.05.

F Test

For simultaneous correlation testing, a provisional conjecture formula is used and the steps are as follows: Comparing the tcount with the ttable on the following testing criteria: a. If fcount < ftable The independent components together do not correlate positively and significantly with the dependent component then Ho is accepted and Ha is rejected b. If fcount > ftable and Sig > the independent component is positively and significantly correlated with the dependent component, then Ho is rejected and Ha is accepted as freedom $df = n - k - 1$ ((55-4)-1) so that in this study the value of df as large as the obtained f table value of 2.57, the results based on the provisional suspected testing will be described in the table below.

Table 3 ANOVA^b

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	277.104	4	69.276	28.322	.000 ^a
Residual	416.241	50	8.325		
Total	693.345	54			

- Predictors: (Constant), Substitution, Price, Production, Rainfall
- Dependent Variable: Need and chillies supplies

Based on table 3, it can be concluded that f count is 28,322 and a significant level is 0,000. In this study, the independent component consisting of Substitution, Price, Production, Rainfall simultaneously correlates Need and chillies supplies in North Sumatra because f count > f table (28,322> 2.57) and sig 0.000 < 0.05.

Coefficients Determination

Coefficients Determination (R²) basically measures the proportion or percentage of contribution of the independent component to the variation of the ups and downs of the dependent component, namely Employee Performance (Y) simultaneously, where $0 \leq R^2 \leq 1$.

Table 4 Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.732 ^a	.535	.452	2.88528

b. Dependent Variable: Need and chillies supplies

Based on Table 4. it is known that the value of R Square is 0.535 or 53.5% percent. This shows that the Need and chillies supplies component can be explained by the Substitution, Price, Production, Rainfall Component of 53.5 percent in this study, while the remaining 46.5 percent is explained by other factors not included in the study.

DISCUSSION

The correlation between price and chillies needs

Half of the residents make the price level a symbol based on the quality of the product offered. The higher the price of the product offered to consumers, in general, the quality based on the product offered will also be high, and the lower the price of the product offered to consumers, in general, the lower the quality of the product. The price of chillies that fluctuates is usually caused by the amount of harvest production that does not match the target market, poor yields and rainfall, which means the more abundant the stock of chillies, the lower the price, this can happen because it is better for farmers to sell cheaply based on what they have to loss because many chillies are rotten In this study the Price component has a t count of 4,849 and a significant level of 0,000 in this study partially Price correlates positively and significantly to Need and chillies supplies In North Sumatra, this is because t count > t table (4.849> 2.01) and a significant level of 0.000 <0.05. This means that if the price of chili falls, the consumption pattern of citizens for chili will increase, and vice versa. An increase in population and per capita income will also increase the demand for chillies. Population growth is usually followed by developments in the need for a commodity because in these conditions more people will need this commodity. Likewise with income. The results of this study are in line with the results of research conducted by Ismi Mahardini, Nenek Woyanti (2012) states that price correlates with the demand for a commodity. The relationship between price and the quantity of goods demanded is negative. If a commodity has abundant stock, the price will be lowered to prevent oversupply

The correlation between Production to chillies needs

Market demand (consumers) for chili products tends to continue to increase from time to time in line with the increase in average consumption. The chili market potential can also be seen. The quantity will decrease when the price increases and the quantity demanded increases when the price decreases, it can be said that the quantity demanded is negatively related to the price. In this study, the production component has a t count of 1,894 and a significant level of 0,076. Partially, production is not positively and significantly correlated with need and chillies supplies in North Sumatra, this is because t count < t table (1,894> 2.01) and a significant level of 0.076 <0.05. meaning that in this study, no matter how much the increase in chili production will not make the demand for chili increase. Abundant chili production is the result of a successful farmer's harvest in a certain period of time, a sufficient amount of chili production will definitely guarantee the availability of chili on the market so that it will stabilize the demand for these chillies, if the chili product decreases it will impact the chili stock there is a market that can make the price of chili increase rapidly. research conducted by (Fajri et al., 2017) states that Red Chili Needs is correlated with red chili production in an area.

The correlation between Rainfall to Chillies needs

The height of the land surface of North Sumatra Province is classified as an area with tropical rainfall. The height of the land surface of North Sumatra Province varies greatly, half of the area is flat, only a few meters above sea level, with hot enough rainfall that can reach 30.1°C, half of the area is hilly with a gentle slope, moderate rainfall and the other half are in areas of high temperature. at least it can reach 21.4°C In this study the Rainfall component has a t count of 2,346 and a significant level of 0,023 in this study partially Rainfall correlates positively and significantly to Need and chillies supplies In North Sumatra, this is because t count > t table (2.346>2.01) and a significant level of 0.023 <0.05. meaning that in this study if the weather conditions are conducive it will increase the availability of chillies, and vice versa. and Rainfall. One of the agricultural sectors affected by the change in Rainfall is the horticulture sub-sector in red chili (*Capsicum annum L*).

The correlation between substitution goods to Chillies needs

Red Chili Needs is correlated with red chili prices, red chili production results, Rainfall conditions and prices based on Substitution. These components will be examined how much the Components correlate with Red Chili Needs, meaning that if there is stability in the demand and supply of chillies, the demand for Substitution chillies will decrease. In this study the Substitution Component has a t count of 3.018 and a significant level of 0.004 in this study partially Substitution correlates positively and significantly to Need and chillies supplies in North Sumatra, this is because t count > t table (3.018> 2.01) and the level significant 0.004 < 0.05. This means that in this study it shows that when the availability of chillies experiences scarcity and the price of chillies increases, pepper consumption will increase. Availability is the amount of goods and or services that producers want and can offer on the market at various price levels. When the price of an item rises, producers tend to increase the amount of goods produced. The increase in the amount of availability made by producers is related to the increasing consumer demand for these goods. The results of the research conducted (Angreini et al., 2021) state that the availability of substitute products correlates with the level of need and demand for chili because if the price of chili is too high, residents will look for substitute products to meet their needs.

Availability analysis and chillies needs in North Sumatra

Some of the things that cause the high and low levels of Need and chillies supplies are price, price can be interpreted as the amount of money (monetary unit) and/or other aspects (non-monetary) that contain certain utilities/uses needed to get a product that the higher the price of the product offered to consumers in general, the quality based on the product offered will also be high, and the lower the price of the product offered to consumers, in general, the lower the quality of the product (Tjiptono, 2014). In addition, according to Nugroho, fluctuations in the price of red chillies that occur can be caused by production factors, namely the harvested area and the amount of production. Chili price fluctuations occur because chili production is seasonal, also correlated with production costs and the length of the distribution channel. On a macro level, fluctuations in the price of red chili are also caused by consumption factors, namely the amount of consumption expenditure and the population (Sutrisno, 2018). Rainfall conditions also affect air humidity for chili plants, the humidity needed by chili plants ranges from 60-80%. High humidity will cause plants to be susceptible to disease so that it also correlates with the availability of chillies. According to Maulidah et al., (2012), an increase in Rainfall have a negative impact on cayenne pepper plants. A high increase in rainfall can cause the chili flowers to fall. According to its relationship with other goods, it can be divided into two parts, namely the price of substitute goods and complementary goods. According to Pappas, substitute goods are goods that can replace the function of other goods, so the price of substitute goods can be a factor that can correlate the number of requests for a product. While complementary goods are goods that can complement the function of other goods. The price of complementary goods can be a factor that can correlate the amount of demand (Taufiq et al., 2021). In this study the independent components consisting of Substitution, Price, Production, Rainfall together correlate the Need and chillies supplies in North Sumatra because f count > f table (28.322> 2.57) and sig 0.000 <0.05.

4. CONCLUSION

In this study, there is a correlation between the price of chillies and the need and chillies supplies with a negative relationship, meaning that if the price component increases by 1%, the need and chillies supplies will decrease by 3.96%. In this study, there is a correlation between production and need and chillies supplies with a positive relationship, meaning that if the production component increases by 1%,

the need and chillies supplies will increase by 1.05%. in this study, there is a correlation between Rainfall and Need and chillies supplies with a positive relationship, meaning that if the Rainfall component increases by 1%, the availability of chillies will increase by 4.93%. In this study there is a correlation of Substitution Need and chillies supplies with a negative relationship meaning that if the Need and chillies supplies increase by 1% it will decrease the demand for Substitution chillies by 1.18%.

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