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Analysis of the Factors Influencing Soybean Demand in North Sumatra Province

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A B S T R A C T

The goal of the food diversification program is to encourage Indonesians to expand their dietary choices beyond rice. This initiative is not meant to replace rice but to shift consumption patterns, promoting the inclusion of a broader range of foods. Indonesia has a wealth of agricultural products, such as soybeans, corn, and potatoes, that can serve as staple foods and support the diversification effort. Given the limited purchasing power of many Indonesians, the program emphasizes food products that are both highly nutritious and relatively affordable for the general population. Legumes, including soybeans, peanuts, winged bean seeds, and koro beans, are commonly used to meet dietary needs. Among these, soybeans are particularly important as a rich source of vegetable protein. The public has increasingly turned to soybean-based products such as tofu, tempeh, soy sauce, and soy milk to boost their intake of plant-based protein. Additionally, soybeans are versatile, serving not only as food for direct consumption but also as ingredients in animal feed for poultry and fish.

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INTRODUCTION

Food is one of the most fundamental human needs, and its fulfillment is recognized as a human right protected by the 1945 Constitution of the Republic of Indonesia. According to the Ministry of Health (2005), meeting food needs is closely linked to efforts to enhance public health, which in turn contributes to developing high-quality human resources with strong and competitive capabilities as a nation. High-quality human resources are characterized by being healthy, intelligent, productive, and self-reliant. Consequently, the demand for food consumption is expected to grow annually in line with population increases.

Several other factors driving the growing demand for food include rising incomes, increased purchasing power, and greater awareness of the nutritional value of food, such as carbohydrates, proteins, and vitamins. To address these needs, the government has promoted food and nutrition diversification. This initiative has been a priority since the early 1960s when the government recognized its significance. Food diversification is one of the four key programs in agricultural development, aiming to provide a balanced intake of carbohydrates, proteins, fats, vitamins, and minerals through a variety of sources, including crops, livestock, and fish (Aminatadisastro, 1997).

The demand for soybeans in Indonesia has been rising steadily each year, driven by population growth and shifts in dietary patterns accompanying economic development. In North Sumatra Province, population growth has directly contributed to an increased need for food, including soybeans. This growing demand is further fueled by the expansion of small-scale food industries that use soybeans as a primary raw material (Waspada, 2012).

THEORETICAL REVIEW

Soybeans, known scientifically as *Glycine max* (yellow soybean) and *Glycine soja* (black soybean), are one of the primary food commodities alongside rice and corn. This versatile plant has roots with nitrogen-fixing nodules, which contribute to soil fertility. Soybeans are notable for their high protein content, making them valuable not only as green manure but also as animal feed. The primary use of soybeans lies in their seeds, which are rich in protein and fat and contain essential nutrients such as vitamins (phytic acid) and lecithin.

METHODOLOGY

Research Area Determination Method

The study was carried out in North Sumatra Province, selected as the research site due to its status as one of the provinces with the highest soybean demand in Indonesia, despite being among the lowest soybean producers (BPS, 2019). Additionally, the location was deemed ideal for its accessibility and the opportunities it provided to gather the data needed for the research.

Data Determination Method

This study utilized secondary data in the form of annual time series data spanning from 1990 to 2019, resulting in a total of 30 observations. According to Umar (2008), secondary data refers to primary data that has been processed and

presented in tables or other formats. The secondary data for this research were sourced from the Central Bureau of Statistics of North Sumatra, the North Sumatra Agriculture Office, the North Sumatra Livestock Service Office, the Food Security and Horticulture Agency, as well as research findings, journals, literature, and other relevant institutions.

Data Collection Method

The Central Bureau of Statistics (BPS) of North Sumatra Province, the Food Crops and Horticulture Office of North Sumatra Province, and other pertinent organizations acquired and disseminated the data used in this study. The data were also extracted from literature about the demand for soybeans.

Data Analysis Method

The statistical package for social science, or SPSS, was utilized to analyze the data used in this study. After the data has been gathered, it is tabulated, a hypothesis is formed, and an analysis method that supports the hypothesis is chosen. Multiple linear regression models are the analytical tool used to examine the variables influencing the demand for soybeans in North Sumatra Province. This model was selected to ascertain the partial and joint influence of the independent factors on the dependent variable. Prior to testing the hypothesis with the regression model, the following is done:

1. Classical assumption testing

In this study, the classical assumption tests carried out were:

- Normality test

2. Hypothesis Testing

The next stage is to ascertain whether the hypothesis put forth in this study is accepted if all requirements for the study of a regression model have been satisfied. Data analysis is done using:

- F test
- T test

To test the identification of the problem will be tested using regression, with the equation:

$$\mathbf{Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + a_6X_6 + \mu}$$

Description:

Y = Soybean Demand (Tons)
a0 = Constant Intercept
X1 = Production (Ton)
X2 = Soybean Price (Rp / Ton)
X3 = Consumption (Tons)
X4 = Per Capita Income (Rp/capita)
X5 = Total Population (Soul)
X6 = Maize Price (IDR/Ton)
μ = Standard Error
a1-a6 = Coefficient of Regression Variables

Simultaneously the hypothesis used is:

H0 = Production, soybean prices, consumption, per capita income, population and corn prices together have no effect on the demand for soybeans in North Sumatra Province.

H1 = Production, soybean prices, consumption, per capita income, population and corn prices together affect the demand for soybeans in North Sumatra Province.

If t ≤ t table, reject H1; accept H0.

If t ≥ t table, reject H0; accept H1.

Normality Test

The purpose of the normality test is to determine whether or not the residual value follows a normal distribution. The residual value of a decent regression model should be regularly distributed. Therefore, the residual value is subjected to the normality test rather than every variable. Many people believe that every variable is subjected to the normalcy test. Although it is not forbidden, the regression model demands that the residual value, not every research variable, be normal.

Coefficient of Determination R2 (R Square)

In linear regression, both simple and multiple, the coefficient of determination (R2) is used to measure the ability of the linear regression model to match or adjust (fits) the data. If the coefficient of determination of the linear regression model is 1, then the model adjusts or matches the data perfectly. If the coefficient of determination of the linear regression model is close to 0, then the model is not good at adjusting or matching the data.

Statistical Test t

In multiple linear regression, the t test is used to determine the significance of each independent variable in influencing the independent variable. In this test, a coefficient is called statistically significant if the t-stat is in the critical area bounded by the t-table value according to a certain level of significance. The steps taken in the t test are as follows:

1) Determine H0 and Ha.

If the hypothesis is positive, then: Ho: $\beta 1 \leq 0$ H1: $\beta 1 > 0$

If the hypothesis is negative, then: Ho: $\beta 1 \geq 0$ H1: $\beta 1 < 0$

2) Determine the confidence level and critical region (Df = n - k - 1).

3) Determine the t table value and then compare the t table value and the t-statistic value.

The criteria in the t test are:

Ho is accepted, if t-count < t-table; t-count> t-table means that the independent variable partially has no significant effect on the dependent variable.

F test

The F test is a test used to determine whether the independent variables as a whole have a significant or insignificant effect on the dependent variable,

with the degree of confidence used being 5%. If the calculated F value is greater than the F value according to the table, the alternative hypothesis, which states that all independent variables as a whole have a significant effect on the dependent variable. The test is carried out using the F distribution by comparing the F-count value obtained from the regression results with the F-table.

For this test, the following hypotheses are used:

1. Ho: β1, β2, β3 = 0 Ho is accepted (Prob F-statistic is significant at α = 5% or F-statistic < F table), meaning that the independent variables together have no real effect on the dependent variable.
2. Ha: β1, β2, β3 ≠ 0 Ha is rejected (Prob F-statistic is not significant at α = 5% or F-statistic < F table), meaning that the independent variables together have a real effect on the dependent variable.

Ho is rejected, if t-count ≥ t-table; t-count ≤ t-table. This means that the independent variable partially has a significant effect on the dependent variable.

Operational Definitions and Limitations

Definition

To avoid misunderstanding in this study, the following definitions are made:

1. Soybean demand is the amount of soybeans demanded by consumers at a certain time and price or in other words is the need for soybeans offered to consumers in North Sumatra Province in tons.
2. Production is the amount of soybeans produced by farmers in North Sumatra Province in a certain period in tons per year.
3. Soybean price is the consumer purchase price of soybeans prevailing in North Sumatra Province in units of Rupiah per Ton.

For this test, the following hypothesis is used:

1. Ho: β1, β2, β3 = 0 Ho is accepted (Prob F-statistically significant at α = 5% or Physistic < F table), meaning that the independent variables together have no real effect on the dependent variables.
2. Ha : β1, β2, β3 ≠ 0 Ha are rejected (Prob F-statistically insignificant at α = 5% or F satistic < F table), meaning that independent variables together have a real effect on the dependent variables.

Ho is rejected, if the t-count ≥ t-table; t-count ≤ t-table. This means that the free variable partially has a real effect on the bound variable.

1. Consumption is the total consumption of the people of North Sumatra Province of soybeans in tons per year.
2. Per capita income is the average annual income of the population of North Sumatra Province in units of Rupiah per capita.
3. Population is the total number of all residents in North Sumatra Province in units of Souls.

4. Maize Price is the prevailing consumer purchase price of maize in North Sumatra Province in IDR per ton.

Operational Limitation

1. The research area is North Sumatra Province.
2. The sample used is a sample of data on everything that affects soybean demand during 1990-2019 (30 years) sequentially. The data taken are soybean demand, soybean production, soybean price, soybean consumption, per capita income, population and corn price in North Sumatra Province.
3. The research time is 2020.

RESEARCH RESULTS

Overview of the Research Area

North Sumatra Province, with Medan as its capital, is located at 0° S - 4° 40' N and 96° 40' - 100° 50' E. It comprises 25 regencies and 8 municipalities. It shares borders with Aceh Province and the Strait of Malacca to the north, Riau Province, West Sumatra, and the Indian Ocean to the south, Aceh Province and the Indian Ocean to the west, and the Strait of Malacca to the east. The province spans approximately 72,981.23 km² (BPS, 2019).

The region features diverse topography, including coastal areas, lowlands, highlands, and the Bukit Barisan mountain range, which runs north to south. The land slope ranges from 0-12% (65.51%), 13-40% (8.64%), to above 40% (24.28%), while Lake Toba occupies 112,920 hectares or 1.57% of the area. North Sumatra can be divided into three topographical zones: the flat eastern region, the undulating and hilly central region, and the undulating western plains. The East Coast, covering 24,921.99 km² or 34.77% of the province, is fertile with high humidity and significant rainfall, making it an economically vital area. However, deforestation and erosion have led to frequent flooding, while the dry season causes water shortages.

The highlands and West Coast cover 46,758.69 km² or 65.23% of the province, consisting mostly of mountainous terrain with varying soil fertility and climate. This region includes lakes, rivers, waterfalls, and volcanoes and is prone to tectonic and volcanic activity. The province has a tropical climate influenced by the Monsoon and Trade Winds, with average humidity of 78-91%, annual rainfall between 800-4,000 mm, and 43% solar radiation.

The population of North Sumatra is diverse, with ethnic groups such as Malay, Batak, Nias, Aceh, Minangkabau, and Javanese coexisting harmoniously under the principles of Pancasila. The total population in 2019 was 14,562,549, making it the most populous province outside Java. About 56.75% live in rural areas, and 43.25% reside in urban areas. Population growth has varied over time, with a rate of 1.20% annually between 1990-2000 and increasing to 1.35% annually from 2000-2005. Tapanuli Tengah recorded the highest growth (2.96% per year), likely due to its role as a transit area, while Toba Samosir experienced a negative growth rate of -0.96% per year. The age distribution shows 33.68% under 15 years, 42.06% women of childbearing age, and 18.17% aged over 45 years, including 3.3% over 64 years.

North Sumatra is rich in natural resources, with significant potential in agriculture, horticulture, plantations, fisheries, and tourism. The plantation sector covers 1,634,772 hectares (22.73% of the province) and produces approximately 3,738,516 tons annually of commodities such as palm oil, rubber, coffee, cocoa, tobacco, and coconut. Plantation area growth averages 0.72% annually, while production increases by 2.74% per year (BPS, 2019). The province has 647,223 hectares of arable land, primarily allocated to horticultural crops (66.4%), annual crops (21.9%), and rice fields (11.7%). Despite its agricultural richness, North Sumatra is transitioning toward a service- and industry-based economy, with agriculture's contribution to GRDP gradually declining.

Description of Research Data

Development of Soybean Production in North Sumatra Province

Indonesian soybean production during the period 1990 to 2019 tends to experience upward fluctuations, although not too much. The development of soybean production in North Sumatra Province from 1990 to 2019 can be seen in Figure 3.1 below:

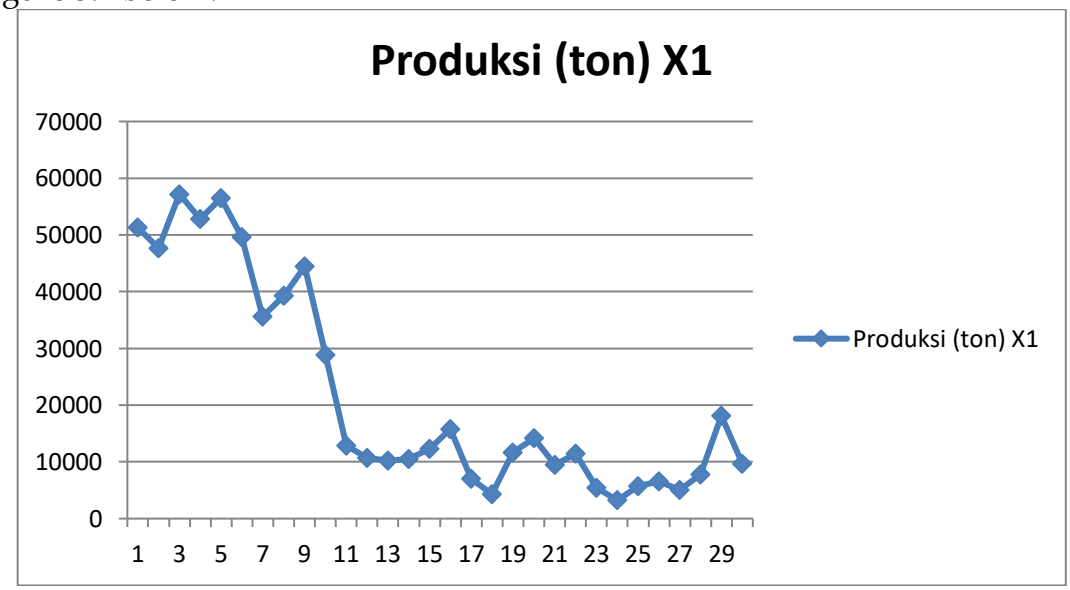

Figure 3.1. Development of soybean production in North Sumatra Province 1990-2019

Based on Figure 3.1, it can be seen that the development of Indonesian soybean production during the period 1990 to 2019 tends to decline. Based on Figure 4.1, in 1990 Indonesia's soybean production was 51,322 tons. The highest soybean production in this study occurred in 1992 at 57,198 tons and the lowest occurred in 2017 at 4,345 tons. This is due to the reduced interest of farmers in growing soybeans locally, due to the large number of imported soybeans with cheaper prices and better quality.

Development of Soybean Prices in North Sumatra Province

The price of soybeans is the price at the consumer level to traders in rupiah per kilogram. The development of soybean prices in North Sumatra Province from 1990-2019 can be seen in Figure 4.2 below:

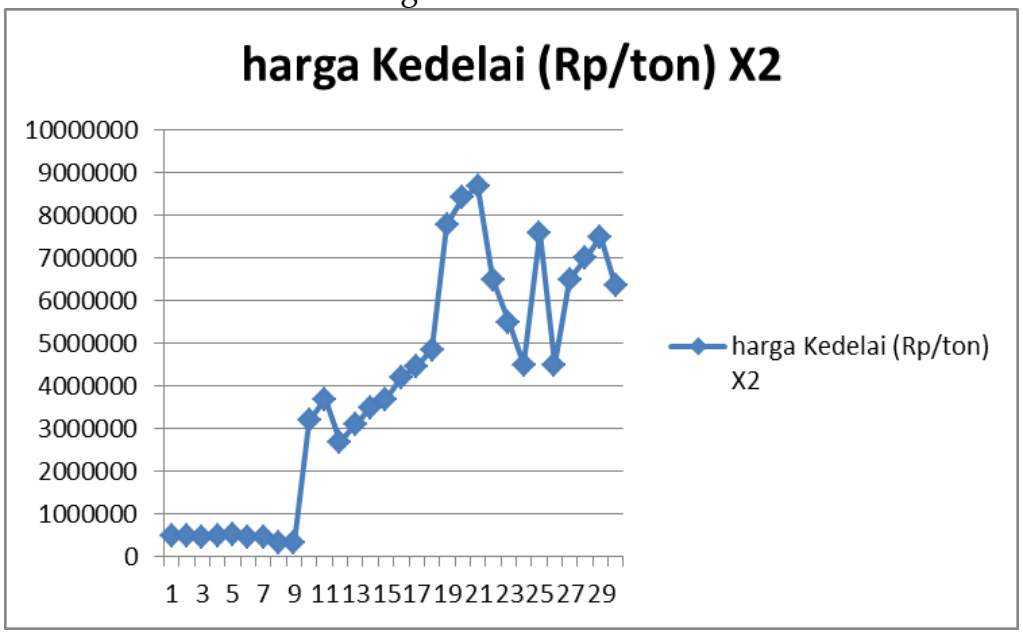

Figure 3.2. Development of soybean prices in North Sumatra Province 1990-2019

Figure 3.2 illustrates that soybean prices in North Sumatra Province have shown an upward trend over the past 30 years. This increase is attributed to factors such as currency value changes and inflation.

Development of Consumption in North Sumatra Province

The total domestic demand for soybeans increases every year and is directly proportional to population growth. The increasing need for soybeans is due to consumption continuing to increase following population growth.

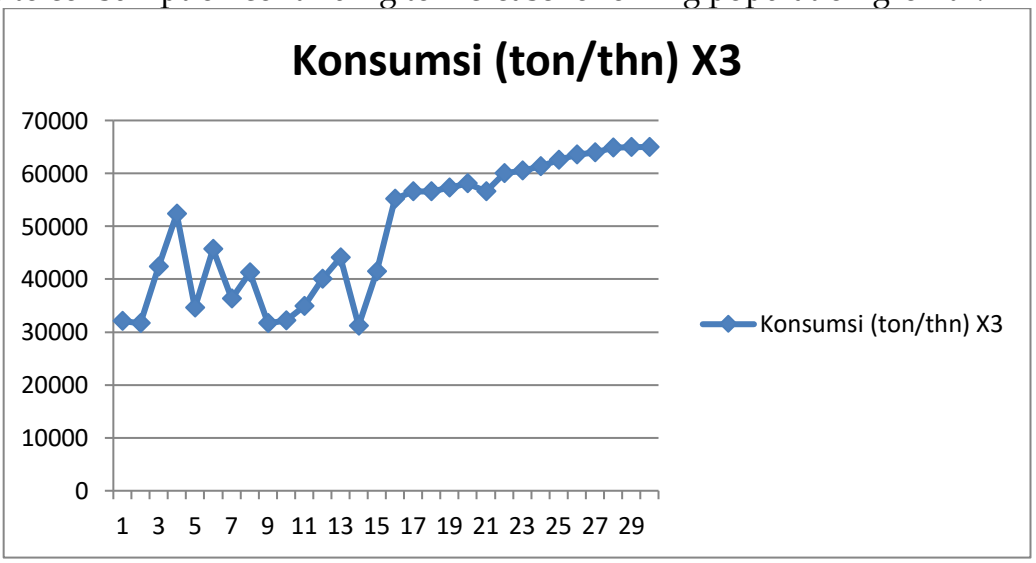

Figure 3.3. Development of Consumption in North Sumatra Province 1990 – 2019

Figure 4.3 shows that Indonesian soybean consumption fluctuated from 1990 to 2005 but tended to increase from 2006 to 2019.

Development of Per Capita Income in North Sumatra Province

Per capita income in North Sumatra Province is the average income of the population in North Sumatra Province. Per capita income in North Sumatra Province over the last 30 years (1990-2019) has increased. Conditions show that the level of GRDP per capita population in North Sumatra Province is relatively good, but the quality of distribution still needs to be improved so that income is more evenly distributed and reduces poverty rates in North Sumatra Province. The development of per capita income in North Sumatra Province in 1990-2019 can be seen in Figure 4.4. the following:

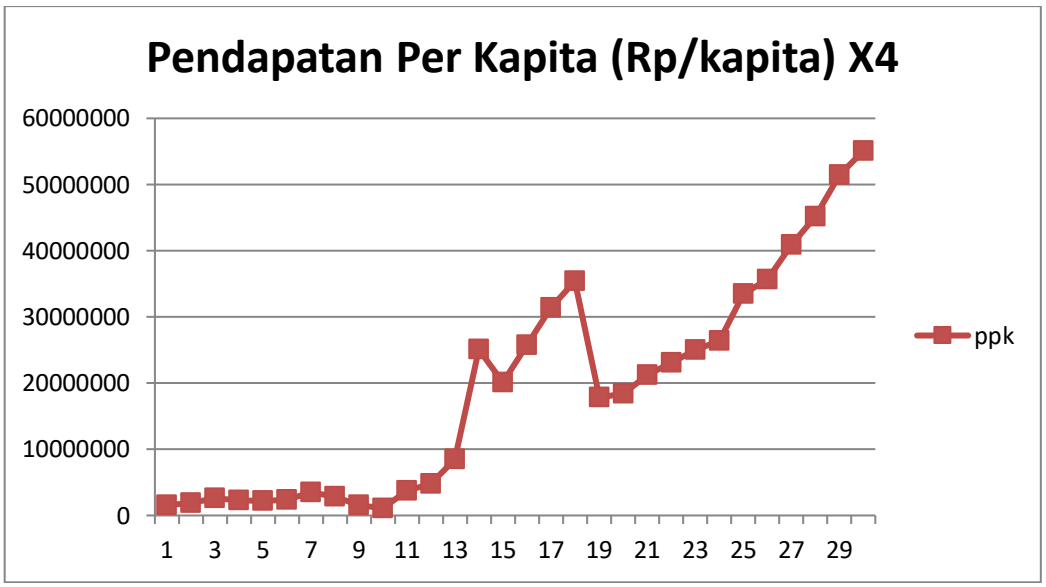

Figure 3.4. Development of Per Capita Income in North Sumatra Province 1990-2019

The increase in income is also caused by increasing development in North Sumatra Province, which will ultimately increase employment opportunities which will have an impact on increasing population income. The improvement and increase in the number of facilities and infrastructure built by the government will also facilitate economic activities so that it can encourage people to open businesses and entrepreneurs to enlarge their businesses so that they can open up new job opportunities for the community.

Development of the Population of North Sumatra Province

The population in North Sumatra Province is the total population of North Sumatra Province. The development of population in North Sumatra Province from 1990-2019 can be seen in Figure 4.5 below:

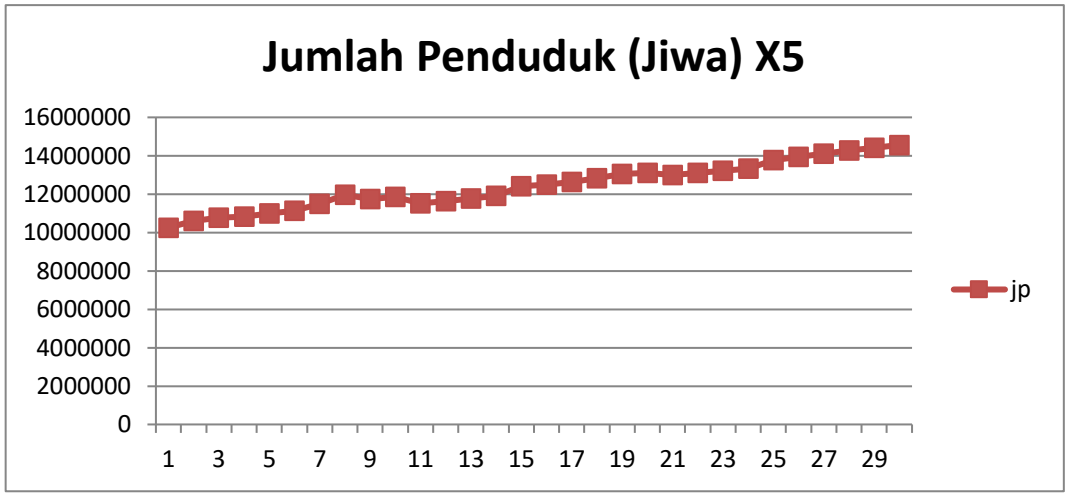

Figure 4.5. Development of the Population of North Sumatra Province 1990-2019

Based on Figure 3.5. It can be seen that the population in North Sumatra Province over the last 30 years (1990-2019) has increased, this is due to the large number of births that occur each year plus the number of immigrants from outside North Sumatra.

Development of Corn Prices in North Sumatra Province

The development of corn prices in North Sumatra Province from 1990-2019 can be seen in Figure 4.6 below:

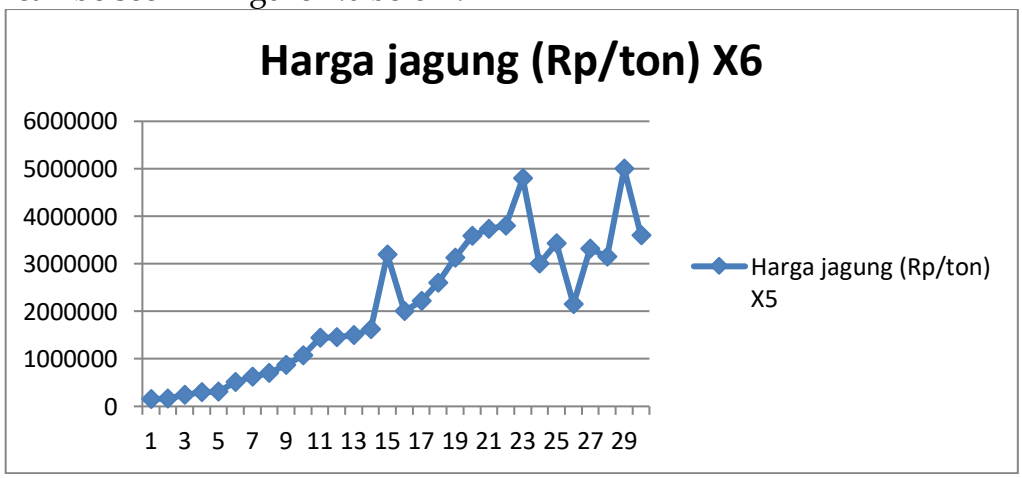

Figure 3.6. Development of Corn Prices in North Sumatra Province 1990-2019

Figure 3.6 shows that the nominal price of corn in North Sumatra Province over the past 30 years (1990-2019) has exhibited a consistent upward trend, similar to the price movement of soybeans.

Development of Soybean Demand in North Sumatra Province

The demand for soybeans refers to the quantity of soybeans that consumers in North Sumatra Province are willing to purchase at a specific time and price, measured in tons. The trend in soybean demand in North Sumatra from 1990 to 2019 is shown in Figure 4.7 below:

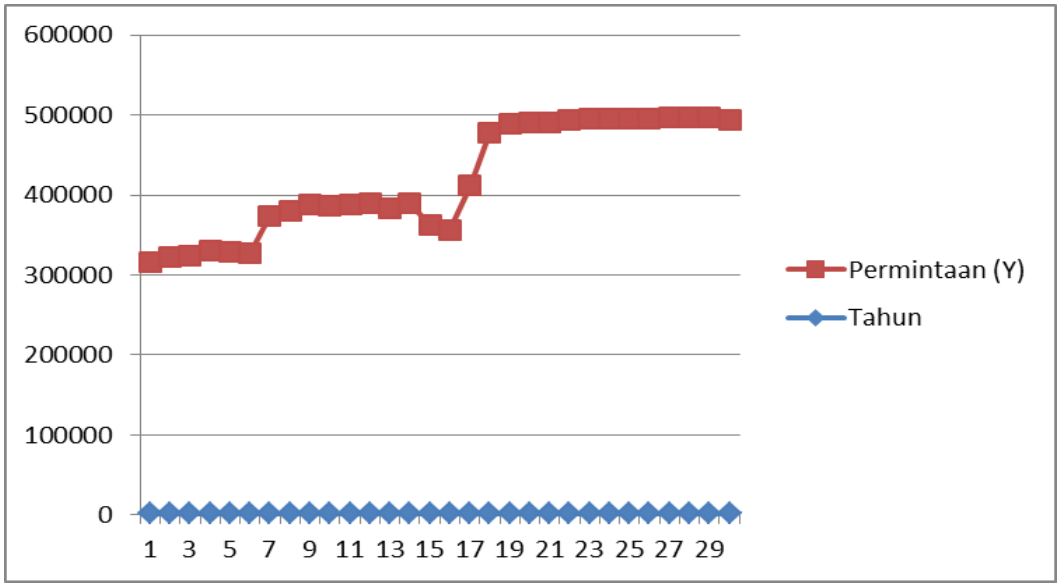

Figure 3.7. Development of Soybean Demand in North Sumatra Province 1990-2019

Based on Figure 3.7. It can be seen that the development of demand for soybeans in North Sumatra Province over the last 30 years (1990-2019) has increased, this is in line with population growth and consumption of soybeans and processed foods made from soybeans.

DISCUSSION

Factors Affecting Demand for Soybeans in North Sumatra Province

From the data analysis method, it is known that the variables that can influence the demand for soybeans in North Sumatra Province are Production (X1), Soybean Price (X2), Consumption (X3), Per Capita Income (X4), Population (X5) and Corn Price (X6). From these independent variables we will see how much influence they have on demand for soybeans as the dependent variable (Y). However, before carrying out regression analysis, the classical assumptions must first be tested, namely:

Normality Test

The normality test can be seen from the scatterplot graph processed using SPSS as follows

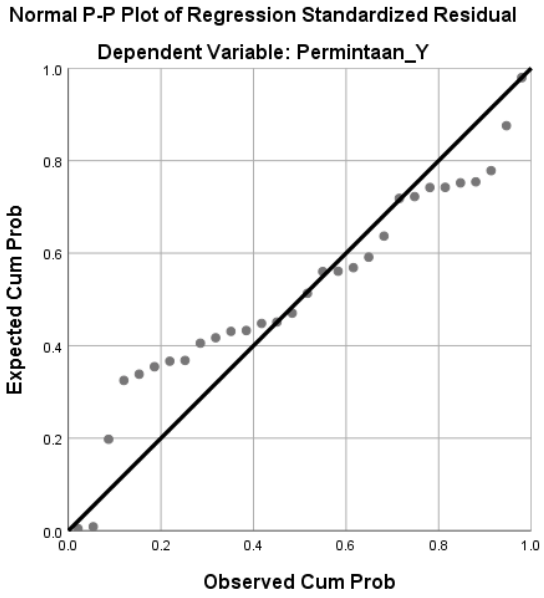

Figure 4.1. Normal Graph Plot Demand for Soybeans

Figure 4.1 demonstrates that the normal probability plot exhibits a typical graphical pattern. This is evident from the points scattered around the normal curve, with the distribution closely following the diagonal line.

Multiple Linear Regression Analysis

Soybean demand is influenced by variables including Production (X1), Soybean Price (X2), Consumption (X3), Per Capita Income (X4), Population (X5) and Corn Price (X6). From these independent variables we will see how much influence they have on demand for soybeans as the dependent variable (Y). The results of multiple linear regression can be seen in table 5.1. the following.`

Table 4.1. Soybean Demand Analysis Results

Variabel	Koefisien Regresi	T Hitung	Signifikan
(Constant)	- 210.958,614	- 1.637	0.115
Produksi (X1)	- 0,013	- 0.812	0.425
Harga Kedelai (X2)	0.006	1.485	0.151
Konsumsi (X3)	0.491	0.689	0.498
Pendapatan per kapita (X4)	- 0.001	- 1.973	0.061
Jumlah Penduduk (X5)	0.048	3.896	0.001
Harga Jagung (X6)	0.006	0.732	0.471
R^2	0.907		
Uji F			
F Hitung	37.497		0,000
F Tabel	6,511		
T Tabel	3,896		

Source: Secondary data analysis from appendix 2

From table 4.1. Above the regression equation is obtained as follows:
Y=-210.958,614–0,013X1+0,006X2+0,491X3-0,001X4+0,048X5+0,006X6+π
Information:
Y = Soybean Demand (Tons)
a_0 = Intercept Constant
X_1 = Production (Tons)
X_2 = Soybean Price (Rp/Ton)
X_3 = Consumption (Tons)
X_4 = Income Per Capita (Rp/capita)
X_5 = Total Population (Soul)
X_6 = Corn Price (Rp/Ton)
μ = Error Standards
a_1-a_6 = Regression Variable Coefficient

Coefficient of Determination (R2)

From table 4.1. The R2 value obtained is 0.907, which means that 90.7% of the variation in the dependent variable, namely the demand for soybeans, can be explained by variations in the independent variables, namely production, price of soybeans, consumption, income per capita, population and price of corn, while the remaining 9.3% is explained. by other variables not included in the model.

F Test (Simultaneous Test)

From the results of multiple linear regression analysis, it was found that the calculated F value was 37.497 with a significance level of 0.000, while the F table value was 6.51 at a significance level of 0.05%. Thus F count ≥ F table and sig. F (0.000) ≤ 0.05, then H0 is rejected and H1 is accepted, which means that production, soybean prices, consumption, per capita income, population and corn prices together have a significant effect on soybean demand in North Sumatra.

T Test (Partial Test)

From table 5.1. It can be interpreted that the influence variables are Production, Soybean Prices, Consumption, Per Capita Income, Population and Corn Prices on soybean demand in North Sumatra as follows

Effect of Soybean Production on Soybean Demand

The soybean production regression coefficient of -0.013 means that there is an inverse (negative) relationship between soybean production and soybean demand. If production increases by 1 ton, then demand will decrease by 1 ton. The calculated T value of the soybean price variable obtained is -1.637 and the T table value is 3.896, so T calculated < T table and the significance level of T calculated is 0.115, so sig. T (0.115) > 0.05, so it can be concluded that H0 is rejected and H1 is accepted, which means that the partial production variable has no real effect on soybean demand.

The Influence of Soybean Prices on Soybean Demand

The soybean price regression coefficient of 0.006 means that there is a directly proportional (positive) relationship between soybean prices and soybean demand. If the price increases by IDR 1, then the demand for soybeans will increase by 0.006 tonnes. The calculated T value of the variable amount of income obtained is 1,485 and the T table value is 3.896, so T calculated < T table and the significance level of T calculated is 0.151, so sig. T (0.151) > 0.05, so it can be concluded that H0 is rejected and H1 is accepted, which means that the soybean price variable partially has no real effect on soybean demand.

Effect of Consumption on Soybean Demand

The consumption regression coefficient of 0.491 means that there is a directly proportional (positive) relationship between consumption and demand for soybeans. If consumption increases by 1 ton, then demand for soybeans will increase by 0.491 tons. The calculated T value of the consumption variable obtained is 0.689 and the T table value is 3.896, so T calculated < T table and the significance level of T calculated is 0.498, so sig. T (0.498) > 0.05, so it can be concluded that H0 is rejected and H1 is accepted, which means that the partial consumption variable has no real effect on soybean demand.

The Effect of Per Capita Income on Soybean Demand

The regression coefficient for per capita income for soybeans is -0.001 which means that there is an inverse (negative) relationship between income and demand for soybeans. If income increases by Rp. 1, then demand will decrease by 1 ton. The calculated T value of the income variable obtained is -1.973 and the T table value is 3.896, so T calculated < T table and the significance level of T calculated is 0.061, so sig. T (0.061) > 0.05, so it can be concluded that H0 is rejected and H1 is accepted, which means that the partial income variable has no real effect on demand for soybeans.

The Influence of Population on Soybean Demand

The population regression coefficient of 0.048 means that there is a directly proportional (positive) relationship between population and demand for soybeans. If the population increases by 1 person/person, then the demand for soybeans will increase by 0.048 tonnes. The calculated T value of the population variable obtained is 3.896 and the T table value is 3.896, so T calculated = T table and the significance level of T calculated is 0.001, so sig. T (0.001) < 0.05, so it can be concluded that H0 is accepted and H1 is rejected, which means that the population variable partially has a real effect on soybean demand.

Effect of Corn Prices on Soybean Demand

The corn price regression coefficient of 0.006 means that there is a directly proportional (positive) relationship between the price of corn and the demand for soybeans. If the price of corn rises by IDR 1, then the demand for soybeans will increase by 0.006 tonnes. The calculated T value of the corn price variable obtained is 0.732 and the T table value is 3.896, so T calculated < T table and the

significance level of T calculated is 0.471, so sig. T (0.471) > 0.05, so it can be concluded that H0 is accepted and H1 is rejected, which means that the partial corn price variable has no real effect on soybean demand.

CONCLUSIONS

Based on the results of the analysis in this research, the following conclusions can be obtained:

1. Factors influencing demand for soybeans in North Sumatra Province are as follows:
2. The population variable (X5) simultaneously has a significant effect on the demand for soybeans (Y) in North Sumatra Province, meanwhile
3. The variables production (X1), soybean price (X2), consumption (X3), per capita income (X4) and corn price (X6) simultaneously have no real effect on the demand for soybeans (Y) in North Sumatra Province.

RECOMMENDATIONS

The recommendations proposed in this study are as follows:

1. The government should focus on boosting local soybean production to address the growing gap between demand and the increasing population each year.
2. Farmers are expected to be able to increase the productivity of their soybean farming to meet the demand for soybeans in North Sumatra Province, one of which is by using superior seeds or seeds even though this does not increase the land area.

FURTHER STUDY

Future researchers are advised to conduct further research on other variables such as those that influence the demand for soybeans in North Sumatra Province.

REFERENCES

Adang Agustian, Supena Priyatno. 2014. *Analisis Permintaan dan Penawaran komoditas Kedelai Di Indonesia*. Jurnal. Prosiding Seminar Nasional Pengembangan Teknologi Pertanian Politeknik Negeri Lampung. Lampung

Alamanda, Almira Prima Clarissa, (2018). *Analisis Faktor-Faktor Yang Mempengaruhi Impor Kedelai di Indonesia Tahun 2001-201.* Fakultas Ekonomi Universitas Islam Indonesia, Yogyakarta.

Aldillah, R. 2014. *Analisis Produksi Dan Konsumsi Kedelai Nasional*. Tesis Institut Pertanian Bogor. Bogor.

Anggasari, Popy, (2008). *Analisis Faktor-Faktor Yang Mempengaruhi Volume Impor Kedelai Indonesia*. Fakultas Ekonomi dan Manajemen Institut Pertanian Bogor, Bogor.

Anjani, Dkk. 2015. *Analisis Permintaan Kedelai Di Indonesia.*Jurnal. Ekonomi Pertanian. Fakultas Pertanian. Universitas Gadjah Mada.

Badan Pusat Stastik Sumatera utara. 2020. *Data Jumlah Penduduk*. Sumatera Utara. Medan

Badan Pusat Statistik Sumatera Utara. 2020. *Data Luas panen, produksi, dan rata-rata produksi kacang kedelai 2003 -2019.*

Febianti, Y. 2014. *Permintaan Dalam Ekonomi Mikro.* Dosen Pendidik Ekonomi FKIP Unswagati. Jawa Barat.

Fitria Dina Riana, Ikbal Hardiyanto. 2011. *Analisis Peramalan Konsumsi Kedelai (Glicyne max L Di Indonesia 2010 – 2019).* Jurnal. Universitas Brawijaya. Malang

Ginting, R. 2015. *Faktor – Faktor Yang Mempengaruhi Permintaan Kedelai Di Provinsi Sumatera Utara.* Jurnal. Universitas Sumatera Utara

Harahap, Muhammad Abdu, (2018). *Analisis Faktor-Faktor Yang Mempengaruhi Impor Kedelai di Provinsi Sumatera Utara*. Fakultas Pertanian Universitas Sumatera Utara, Medan.

Ilham Prastia, Dkk. 2019. *Analisis Impor Komoditi Kedelai Indonesia.*Fakultas Pertania. Universitas Wijaya Kusuma.Surabaya.

Iswandari, Diah Ayu, (2018). *Analisis Faktor-Faktor Yang Mempengaruhi Impor Kedelai di Indonesia Tahun 1977-2015.* Fakultas Ekonomi dan Bisnis Universitas Muhammadiah Surakarta, Surakarta.

Karosekali, S. 2015. *Analisis Faktor – Faktor Yang Mempengaruhi Permintaan Dan Penawaran Kedelai Di Sumatera Utara*. Universitas Sumatera Utara.

Kementrian Perdagangan. 2014. *Outlook Pangan Kedelai 2015 - 2019*. Pusat Kebijakan Perdagangan Dalam Negeri Badan Pengkajian dan Pengembangan Kebijakan Perdagangan.

Party, M. 2019. *Analisis Permintaan Dan Penawaran Beras Di Provinsi Sumatera Utara.* Tesis. Universitas Sumatera Utara.

Rifai, M.2010. *analisis Dinamis Permintaan Dan Penawaran Komoditas Kedelai Di Jawa Timur.* Jurnal. Dosen Fakultas Ekonomi Universitas Tribhuana Tungga Dewi. Malang.

Surwono, Willy Pratama. 2014. *Analisis Daya Saing Kedelai Indonesia.* Jurnal. Badan Pusat Statistik Indonesia.