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Analysis of Soybean Demand in North Sumatra Province

Surtan Hasibuan[1], Rulianda P. Wibowo[2], Rahmanta[2]

[1]Postgraduate Students, Department of Agribusiness, Faculty of Agriculture at Universitas Sumatera Utara, Indonesia
[2]Postgraduate Lecturer, Department of Agribusiness, Faculty of Agriculture at Universitas Sumatera Utara, Indonesia

Corresponding Author: Surtan Hasibuan

ABSTRACT

The purpose of this study is to analyse soybean demand in North Sumatra Province. The variables used are soybean price, previous year soybean price (t-1), maize price, population and soybean demand. North Sumatra Province was chosen as the research location because this area is one of the provinces with the highest soybean demand rate in Indonesia but one of the provinces that produces the lowest soybean in Indonesia. The data used in this study is secondary data, in the form of time series annual data from 2000-2019, so that 20 observations were obtained. In this study, the equation uses a distributed lag finate model. The results showed that population was the most significant effect on soybean demand, while soybean price, previous year soybean price (t-1) and maize price did not significantly effect on soybean demand.

Keywords: Soybean Price, Previous Year Soybean Price (t-1), Maize Price, Population, Soybean Demand

INTRODUCTION

The most important basic human need and its fulfillment is part of the human rights guaranteed in the 1945 Constitution of the Republic of Indonesia is food. The fulfillment of food needs is also related to efforts to improve the quality of public health in order to obtain the quality of Indonesian resources that have strong and superior competitiveness as a nation. Quality human resources are described as healthy people who are intelligent, productive and independent. Therefore, the need for food consumption will continue to increase from year to year in line with population growth.

Other factors that cause the need for food to continue to increase, namely increased income, increased purchasing power and awareness of the importance of nutritional values (carbohydrates, protein, vitamins) from the food consumed. One of the government's efforts is through food and nutrition diversification. The food diversification program has actually been initiated since the early 1960s, where the government has realized the importance of such diversification. This program is one of the four main programs for agricultural development, namely through diversifying food from plants, livestock and fish to meet the needs of carbohydrates, protein, fat, vitamins and minerals (Aminatadisastro, 1997).

Due to the people's weak purchasing power, the food diversification program emphasizes food products that have high nutritional content at prices that are relatively affordable to the general public. One of the commodities that people often use to fulfill their food needs are nuts such as soybeans, peanuts, bean sprouts, koro, and others. Soybeans are a very important vegetable food as a source of protein.

Soybean is a plant originating from Manchuria and parts of China, and there are wild types of soybeans belonging to the species Glycine ussuriensis. The genetic

source of soybean plants grows in the mountainous areas of central and western China, as well as the surrounding lowlands. In the heyday of soybeans, this plant was known as "Cow From China" or cattle from China because soybean seeds were used as a substitute for milk in that country (Rukmana, 1996). Then it spreads to the tropics and subtropics and breeding is carried out so that various types of superior soybeans are cultivated (Koswara, 2001). In general, soybean plants require conditions with high temperatures and low rainfall. Meanwhile, if the air temperature is low with excessive rainfall, it will decrease the quality of the soybeans produced (Karosekali, 2015). Purwandari (2010) states that the need for protein for humans is 55 grams per day. This protein requirement can be met by consuming 157.14 grams of soybeans.

People started consuming processed soy foods such as tofu, tempeh, soy sauce, and soy milk with the aim of increasing consumption of vegetable protein. In addition, soybeans also have a wide range of uses for direct consumption and as an ingredient for animal feed (poultry and fish).

The demand for someone or something in society for an item is determined by many factors. Among these factors, the most important are (Sukirno, 1995):

1. The price of the item itself.
2. Prices of other goods which are closely related to the goods.
3. Household income and average income of the community.
4. Taste of society.
5. Total population
6. Predict the situation in the future.

Demand for soybeans in North Sumatra continues to increase due to the growing population, the development of soybean processing industries such as tofu and tempeh, and animal feed for the poultry industry. However, this was not able to be balanced by local soybean production, so to meet the demand, imports had to be carried out in large quantities.

The range regarding the amount of increased demand for crop production whether it is a large amount or a limited amount (small), this is important to determine the pattern of intensive agricultural management or extensive agriculture, which means adjusting the increase in production with an increase in demand, with the intention of not reducing production and also do not let excess in the effort to fulfill the demand (Kartasapoetra, 1985).

Demand for Indonesian soybeans continues to increase from year to year, this is due to population growth and changes in food patterns that are in line with economic growth. The increase in population in North Sumatra Province directly affects food demand growth. The need for soybeans in North Sumatra Province continues to increase, triggered by the growing number of small food industries made from these commodities.

According to data in 2019, the soybean harvested area has increased very sharply compared to the previous 2 years. The average soybean productivity in 2019 is 17.02 quintals per hectare of harvested land. Even though the amount of productivity in 2018 was less than in 2019 and 2017, Indonesia's soybean production in 2018 was still higher than the previous year at 982,598 tons.

The purpose of this study to determine is an analysis of soybean demand in North Sumatra Province.

RESEARCH METHODS

The variables used are soybean price, previous year soybean price (t-1), maize price, population and soybean demand.

The research was conducted in North Sumatra Province. North Sumatra Province was chosen as the research location because this area is one of the provinces with the highest soybean demand rate in Indonesia but one of the provinces

that produces the lowest soybean in Indonesia (Badan Pusat Statistik, 2019). In addition, these locations are also very representative in terms of access and opportunities to obtain the data desired by researchers.

The data used in this study is secondary data, in the form of time series annual data from 2000–2019, so that 20 observations were obtained. Secondary data is primary data that has been processed and presented in tables and in other forms (Umar, 2008). Secondary data were obtained from the North Sumatra Central Bureau of Statistics, the North Sumatra Agricultural Service, the North Sumatra Animal Husbandry Service, the Food Security and Horticulture Agency, research results, journals, literature, and other related agencies.

In this study, the equation uses a distributed lag finate model.

RESULT

General Description of the Research Area

Administratively, North Sumatra Province is located at 0^{o} LS-4^{o} 40 'North Latitude and 96^{o} 40'-100^{o} 50 'East Longitude, which has a capital city of Medan and has 25 districts and 8 municipalities. North Sumatra has a northern boundary, namely the province of Aceh and the Strait of Malacca, the south borders the provinces of Riau, West Sumatra and the Indonesian Ocean, the west borders the province of Aceh and the Indonesian Ocean, the east borders the Strait of Malacca. The area of North Sumatra Province is approximately 72,981.23 km^2 (Badan Pusat Statistik, 2019).

Topographical the North Sumatra region consists of coastal areas, lowlands and highlands as well as the Bukit Barisan mountains that stretch in the middle from North to South. The slope of the land is between 0-12% covering an area of 65.51% covering 8.64% and over 40% covering an area of 24.28%, while the area of Lake Toba is 112,920 Ha or 1.57%. Based on the regional topography, North Sumatra is divided into 3 (three) parts, namely the eastern part with relatively flat conditions, the middle part is wavy to hilly and the western part is a wavy plain. The East Coast region which is a lowland area of 24,921.99 km2 or 34.77 percent of the area. the area of North Sumatra is a fertile area, high humidity with relatively high rainfall as well.

This region has high economic potential, so it tends to be denser due to migration flows from the West Coast and highlands. Floods also frequently hit the area due to reduced forest conservation, erosion and silting of rivers. During the dry season there is also a shortage of water supplies due to critical forest conditions. The highlands and the West Coast area covering 46,758.69 km^2 or 65.23 percent of the total area of North Sumatra, which is mostly mountainous, has variations in the level of soil fertility, climate, topography and contours as well as areas where the soil structure is unstable. Several lakes, rivers, waterfalls and volcanoes are found in this area and some of its areas are recorded as areas of tectonic and volcanic earthquakes.

The climate in North Sumatra includes a tropical climate which is influenced by the Passat wind and the Monsoon wind. Humidity average 78%91%, Rainfall (800-4000) mm/year and 43% solar radiation. The population of North Sumatra consists of various tribes, namely Malay, Batak, Nias, Aceh, Minangkabau, Javanese and have religions. Although different religions and customs, life together takes place in harmony and peace with Pancasila as a guide for life.

The total population in North Sumatra is 14,562,549 people (Badan Pusat Statistik, 2019), is a province with the largest population outside Java Island. Approximately 56.75% of the population live in rural areas and 43.25% live in urban areas. In 2007, the population of North Sumatra Province increased to 12,834,371 people consisting of 6,405,076 male residents or 49.91 percent and 6,429,925 female residents or 50.09 percent, with an

average density of an average of 179 people/km².

The population growth rate of North Sumatra during the period 1990-2000 was 1.20 percent per year, and in 2000-2005 to 1.35 percent per year. The highest population growth rate between 2000 - 2005 was found in Central Tapanuli Regency at 2.96 percent per year, this is probably due to the location of Central Tapanuli Regency as a transit area for surrounding districts such as Nias and South Tapanuli Regencies. Meanwhile, the lowest population growth rate is in Toba Samosir Regency, which is recorded at negative 0.96 percent per year. Based on the overall age structure, 33.68 percent are under 15 years old; 42.06 percent of women of childbearing age and 18.17 percent of those over 45 years (including 3.3 percent over 64).

North Sumatra's natural resource potential is quite abundant, including food crops and horticulture, plantations, fisheries and tourism. The agricultural potential of North Sumatra Province includes vegetables and fruits, most of which have been well marketed and have been exported to other countries and provinces. Plantation area is 1,634,772 ha or 22.73% of the area of North Sumatra with a production of ±3,738,516 tons for 23 commodities including oil palm, rubber, coffee, cocoa, tobacco and coconut. The average increase in plantation area is 0.72% per year and production growth is 2.74% per year (Badan Pusat Statistik, 2019).

North Sumatra Province has 647,223 ha of expandable agricultural land. Most of the agricultural land area is allocated for seasonal crops. Nearly 66.4% of the agricultural land area is allocated for horticultural crops. The remaining 21.9% of the agricultural land area in North Sumatra is allocated for annual crops and 11.7% is directed towards the formation of lowland rice fields. North Sumatra Province is heading to become a service and industry-based province.

Soybean Demand

Soybean demand is the amount of soybeans purchased or requested at a certain price and time. Demand is expressed in tonnes. The following is a graph of soybean demand.

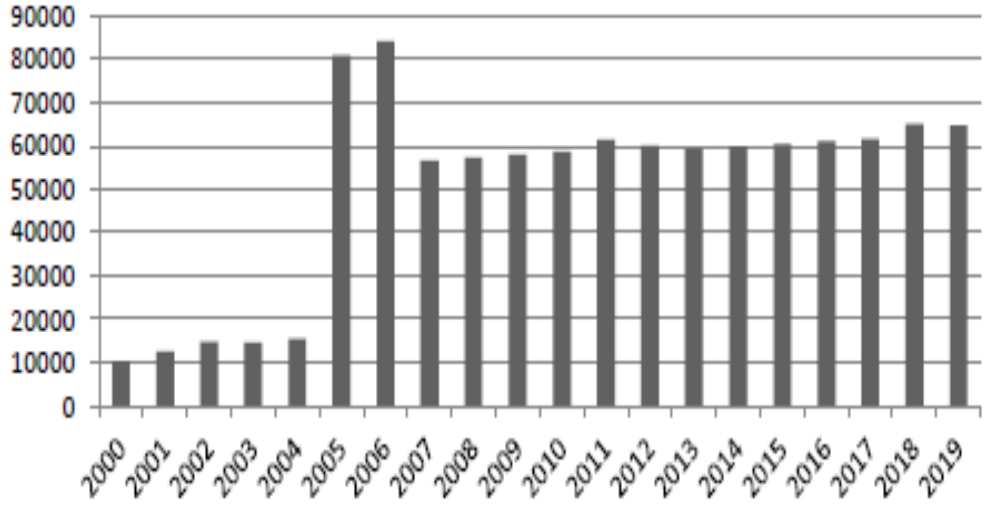

Figure 1. Soybean Demand
Source: Compiled from Various Sources

From Figure 1, it can be seen that the demand for soybeans in North Sumatra from 2000-2019 fluctuated and there was a very sharp increase from 2004 to 2005. Demand for soybeans in North Sumatra was highest in 2006, amounting to 84,056 tons while the lowest demand for soybeans occurred in 2000 which was 10,211 tonnes.

Estimation of Distributed Lag Model with OLS

In this study, an equation using a distributed lag model of the finate is used where the different lengths of time are known to be as follows:

Table 1. Distributed Lag Model with OLS

Dependent Variable: YT
Method: Least Squares
Date: 02/15/21 Time: 21:18
Sample: 2000 2019
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	1.918795	5.006453	0.383264	0.7069
X2	-2.741030	4.733476	-0.579073	0.5711
X3	-16.70920	16.73007	-0.998753	0.3338
X4	0.038791	0.017924	2.164191	0.0470
C	-412276.9	200291.3	-2.058386	0.0574

R-squared	0.516083	Mean dependent var	50817.90
Adjusted R-squared	0.387039	S.D. dependent var	23197.94
S.E. of regression	18162.09	Akaike info criterion	22.66438
Sum squared resid	4.95E+09	Schwarz criterion	22.91331
Log likelihood	-221.6438	Hannan-Quinn criter.	22.71297
F-statistic	3.999268	Durbin-Watson stat	1.069652
Prob(F-statistic)	0.021055		

Source: Data Processing Results

The results showed that population (X_4) was the most significant effect on soybean demand (YT), while soybean price (X_1), previous year soybean price (t-1) (X_2) and maize price (X_3) did not significantly effect on soybean demand (YT).

CONCLUSION AND SUGGESTION

The results showed that population was the most significant effect on soybean demand, while soybean price, previous year soybean price (t-1) and maize price did not significantly effect on soybean demand.

The suggestions put forward in this study are as follows:

1. The government needs to increase local soybean production to fill the gap between demand and increasing population every year.
2. Further researchers are advised to conduct further research on soybean supply in North Sumatra Province.
3. In the research, it is hoped that government support and assistance in the form of the latest data on soybean demand data at the Central Bureau of Statistics of North Sumatra Province, is expected for the government to more complete data input so that other researchers can easily obtain the required data.

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