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Analysis of Demand and Supply of Tomato (*Solanum lycopersicum* L.) in North Sumatra Province

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ABSTRACT

The purpose of this research is to analyze demand and supply of tomato (Solanum lycopersicum L.) in North Sumatra Province. The determination of the research area is carried out purposively. The research is conducted in North Sumatra Province. The data used in this study is secondary data in the form of a time series starting from 1990 to 2021. Secondary data is collected from the Central Bureau of Statistics for North Sumatra Province, the Agriculture Office for North Sumatra Province, the Ministry of Trade and the Food Security Agency for North Sumatra Province as well as other relevant agencies as well as other publications or publications, namely journals and research results. Data analysis in this study used a partial test (t). The results show that workers have a positive and insignificant effect on supply of tomato. Subsidized fertilizer prices have a negative and insignificant effect on supply of tomato. Tomato area has a positive and significant effect on supply of tomato. Domestic price of tomato has a positive and insignificant effect on demand of tomato. Total population has a positive and significant effect on demand of tomato. Price of complementary good has a negative and insignificant effect on demand of tomato. Income per capita has a negative and insignificant effect on demand of tomato.

Keywords: Demand, Supply, Tomato

INTRODUCTION

Tomato is a vegetable plant that belongs to the Solanaceae family (Dewi and Jumini, 2012). Tomato with the latin name Lycopersicum esculentum is a type of vegetable plant that has been well known by the public since the last century. The word tomato comes from the aztec language, one of the Indian tribes, namely xitomate or xitotomate (Fitriani, 2012). Tomatoes are a form of agricultural crops with high economic value that can be used for various industries such as jams, chili sauce, tomato sauce, tomato dates, drinks, herbs, and cosmetics (Luntungan, 2012). The tomato plant is a plant that belongs to the vegetable group. The market demand for tomatoes continues to increase, this cannot be separated from the role of tomatoes as one of the most important horticultural commodities, especially as a vegetable crop. In fact, currently tomatoes are not just for vegetables but have become a fruit commodity, not only for the domestic market but also for the export market (Kusuma and Zuhro, 2015).

Research on the demand and supply of tomatoes in North Sumatra Province is still very small, so that the determining factors for prices are still unknown. Research related to supply and demand issues is very important to do because the results of the study can be used to estimate the magnitude of demand and supply parameters and their behavior which are very necessary for policy makers to predict population food needs, amount of availability and real price levels that are appropriate in an area.

Tomato is one of the important horticultural commodities in North Sumatra. Based on data from the Central Bureau of Statistics, tomatoes are one of the 2 horticultural commodities with the largest harvested area in North Sumatra.

The tomato harvest area from 2011 to 2021 continues to increase. In 2011 the tomato harvested area was 4,142 hectares, increasing to 5,837 hectares in 2021. In 2021, the tomato commodity is the fifth horticultural commodity with the largest harvested area after chili, potatoes, cabbage, and mustard greens with a harvest area of 17,066 hectares for commodities chilies, 7,975 hectares of area for potatoes, 7,671 hectares of cabbage, 6,172 hectares of mustard greens and 5,837 hectares of tomatoes.

Price fluctuations that occur in the market, apart from being caused by factors affecting the demand side, are also caused by factors affecting the supply side. From the supply side, it shows that the process of supply (production and distribution) of tomatoes has not been fully controlled by farmers. The main causative factor is that tomato farmers are small farmers whose production decision-making process is allegedly not handled and supported by a good production forecast and price.

Tomatoes are perishable food crops and farmers do not have the technology to overcome this. Farmers are forced to accept the selling price prevailing in the market so that sometimes the price of tomatoes in the 6 markets is high when tomato production is low, but conversely if production is abundant then the price will fall. Price fluctuations like this can affect farmers' income conditions from tomato farming, because when carrying out production activities farmers incur quite large costs. Farming activities include the use of production factors which can also affect farm income. One of the causes of sub-optimal production levels is due to the excessive use of pesticides and fertilizers without regard to the recommended doses, causing financial losses and sub-optimal production. In addition, natural constraints, pest and disease attacks and the use of technology that is still low cause one of the obstacles in tomato farming. Fluctuations in the price of tomatoes will of course affect the income of tomato farmers.

The purpose of this research is to analyze demand and supply of tomato (Solanum lycopersicum L.) in North Sumatra Province.

RESEARCH METHODS

The determination of the research area is carried out purposively, namely the method of selecting the research area by considering the reasons known from the research area (Sugiarto, 2000). Purposively refers to a group of non-probability sampling techniques in which units are selected because they have characteristics that you need in your sample. In other words, units are selected on purpose in purposive sampling (Disman et al., 2010). The research area is conducted in North Sumatra Province. The reason for choosing North Sumatra Province as the research area is because North Sumatra Province is one of the largest tomato producing provinces in Indonesia.

The data used in this study is secondary data in the form of a time series starting from 1990 to 2021. Secondary data is data collected from pre-existing data (Chow, 1983). At first, secondary data is primary data that had been collected by other people before, either used for research purposes or to be stored in the database only (Supranto, 1984). Secondary data is collected from the Central Bureau of Statistics for North Sumatra Province, the Agriculture Office for North Sumatra Province, the Ministry of Trade and the Food Security Agency for North Sumatra Province as well as other relevant agencies as well as other publications or publications, namely journals and research results.

Data analysis in this study used a partial test (t). t test is a partial test that aims to find out whether each regression coefficient is significant or not for the dependent variable

by assuming the other variables are constant (Koutsoyiannis, 1977; Gujarati, 2003). This means that the independent variable being tested has a real or significant effect on the dependent variable, and if the probability is higher than the error rate then ho is accepted, this means that the independent variable being tested has a real or significant effect on the independent variable (Makridakis et al., 1998).

RESULT

General Description

Administratively, North Sumatra Province is located at 0° South Latitude – 4° 40' South Latitude and 96° 40' – 100° 50' Longitude, which is Medan City and has 25 regencies and 8 municipalities. North Sumatra Province has a northern border on Aceh Province and the Malacca Straits, south borders on Riau Province, West Sumatra Province and Indonesian Ocean, west borders on Aceh Province and Indonesian Ocean, east borders on the Malacca Strait. The area of North Sumatra Province is approximately 72,981.23 square kilometers.

The topography of the area in North Sumatra Province consists of coastal areas, lowlands and highlands as well as the Bukit Barisan Mountains which stretch in the middle from north to south. The slope of the land is between 0 and 12 percent covering an area of 65.51 percent covering an area of 8.64 percent and above 40 percent covering an area of 24.28 percent, while the area of Lake Toba is 112,920 hectares or 1.57 percent area. Based on the regional topography, North Sumatra Province is divided into 3 parts, namely the eastern part with relatively flat conditions, the middle part is undulating to hilly and the western part is undulating plains.

The east coast region, which is a lowland area of 24,921.99 square kilometers or 34.77 percent of the area in North Sumatra Province, is a fertile area, with high humidity and relatively high rainfall. This area has high economic potential, so it tends to get 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 supply due to the critical condition of the forest. The highlands and the west coast region covering 46,758.69 square kilometers or 65.23 percent of the area in North Sumatra Province, which are mostly mountainous, have variations in 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 region and parts of the area are recorded as areas of tectonic and volcanic earthquakes.

The climate in North Sumatra Province includes a tropical climate which is influenced by the passat winds and the Monsoon winds. The average air humidity is 78 to 91 percent, rainfall (800 to 4000) milli meters per year and 43 percent sunshine. The population in North Sumatra Province consists of various tribes, namely Malay, Batak, Nias, Acehnese, Minangkabau, Javanese, and have religions. Even though they have different religions and customs, life together goes on in harmony and peace with Pancasila as a guide for life.

The total population of 14,562,549 people in North Sumatra is the province with the most population outside Java. Around 56.75 percent of the population lives in rural areas and 43.25 percent lives 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 179 people per square kilometers.

Development of Demand and Supply of Tomato (Solanum Lycopersicum L.) in North Sumatra Province from 1990 to 2021

The demand for and supply of tomatoes is the amount of tomatoes demanded or offered for consumption by the people of North Sumatra Province at a certain price level and amount, expressed in units of

kilograms per year. The development of demand and supply of tomatoes in North Sumatra in the last 32 years has experienced fluctuations, especially for supply that fluctuates greatly, for the highest demand for tomatoes occurred in 2016 with a total of 62,475,896 kilograms and an average demand of 25,270. 460 kilograms per year, while the highest bidding milai occurred in 1999 with a total of 268,587,836 kilograms and an average supply of 118,152,869 kilograms per year. The demand for tomatoes in the province of North Sumatra in the past 32 years has continued to increase and in several years there have been fluctuations. The demand for tomatoes which has continued to increase is in line with tomato consumption and population growth which has also increased. Meanwhile, the supply of tomatoes in North Sumatra experienced very high fluctuations and was always above the total demand for tomatoes. This was in line with the development of the tomato harvested area in North Sumatra Province which also experienced quite high fluctuations.

Analysis of Demand and Supply of Tomato (Solanum Lycopersicum L.) in North Sumatra Province

Table 1. Factors Affecting the Quantity of Tomato Production in North Sumatra Province

Variable	Coefficient	t-Statistic	Prob
Constant	1.448.581	0.167099	0.8685
Workers	0.500310	0.645748	0.5237
Subsidized Fertilizer Prices	-0.051276	-0,197148	0.8451
Tomato Area	1.021.143	5.807.554	0.0000
R-Squared	0.644839		
Adjusted R-Squared	0.606786		
F-Statistic	1.694.580		
Prob(F-statistics)	0.0000002		

Source: Processing Results

The results show that workers have a positive and insignificant effect on supply of tomato. Subsidized fertilizer prices have a negative and insignificant effect on supply of tomato. Tomato area has a positive and significant effect on supply of tomato.

Table 2. Factors Affecting the Quantity of Tomato Demand in North Sumatra Province

Variable	Coefficient	t-Statistic	Prob
Constant	-62.82053	-2.147874	0.0409
Domestic Price of Tomato	0.080414	0.570404	0.5731
Total Population	4.572.803	2.373523	0.0250
Price of Complementary Good	-0.133671	-0.808246	0.4260
Income per Capita	-0.084170	0.615601	0.5433
R-Squared	0.735412		
Adjusted R-Squared	0.696214		
F-Statistic	18.76135		
Prob(F-statistics)	0.000000		

Domestic price of tomato has a positive and insignificant effect on demand of tomato. Total population has a positive and significant effect on demand of tomato. Price of complementary good has a negative and insignificant effect on demand of tomato. Income per capita has a negative and insignificant effect on demand of tomato.

CONCLUSION AND SUGGESTION

The results show that workers have a positive and insignificant effect on supply of tomato. Subsidized fertilizer prices have a negative and insignificant effect on supply of tomato. Tomato area has a positive and significant effect on supply of tomato. Domestic price of tomato has a positive and insignificant effect on demand of tomato. Total population has a positive and significant effect on demand of tomato. Price of complementary good has a negative

and insignificant effect on demand of tomato. Income per capita has a negative and insignificant effect on demand of tomato.

Based on the results of the analysis in this study, the following suggestions are proposed:

1. The research results show that the supply of tomatoes in North Sumatra Province is very high compared to demand, so it is hoped that the government will develop good distribution throughout Indonesia so that the price of tomatoes in North Sumatra Province remains stable.
2. The government also needs to increase the quantity of tomato exports from North Sumatra Province to other countries.
3. When the selling price of tomatoes is low, the government needs to set a minimum selling price limit for tomatoes so that tomato farmers don't lose money.
4. It is suggested to further researchers to further investigate the formation and transmission of tomato prices in North Sumatra Province.

Declaration by Authors

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REFERENCES

1. Chow, G. C. (1983). *Econometrics*. International Edition. Singapore: McGraw-Hill Book Company.
2. Dewi, P., & Jumini. (2012). Pertumbuhan dan Hasil Dua Varietas Tomat Akibat Perlakuan Jenis Pupuk. *Jurnal Floratek, 7*, 76-84.
3. Disman, H., et al. (2010). *Ekonometrika*. Jakarta: Universitas Pendidikan Indonesia.
4. Fitriani, E. (2012). *Untung Berlipat Budidaya Tomat di Berbagai Media Tanam*. Yogyakarta: Pustaka Baru Press.
5. Gujarati, D. (2003). *Basic Econometrics*. Four Edition. Singapore: McGraw-Hill Book Company.
6. Koutsoyiannis, A. (1977). *Theory of Econometrics*. Second Edition. New York: Harper & Row Publishers, Inc. Barnes & Nobles Import Division.
7. Kusuma, A. H. & M. U. Zuhro. (2015). Pengaruh Varietas dan Ketebalan Mulsa Jerami Padi pada Pertumbuhan dan Hasil Tanaman Tomat (Lycopersicum esculentum Mill). *Agrotechbiz, 2*, 1-20.
8. Luntungan, Antonius Y. (2012). Analisis Tingkat Pendapatan Usaha Tani Tomat Apel di Kecamatan Tompso, Kabupaten Minahasa. *Jurnal Ekonomi dan Keuangan Daerah (PEKD), 7*(3).
9. Makridakis, Spyros G., Steven C. Wheelwright, & Rob J. Hyndman. (1998). *Forecastong: Methods and Applications*. New York: John Wiley & Sons.
10. Sugiarto. (2000). *Metode Statistika untuk Ekonomi dan Bisnis*. Jakarta: Gramedia.
11. Supranto, J. (1984). *Ekonometrik*. Buku Dua. Jakarta: Universitas Indonesia.

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