

Analysis of Soybean Demand in Klaten Regency

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ABSTRACT

The aims are to analyze and identify the factors that affect demand for soybeans and the level of sensitivity (elasticity) demand of soybean in Klaten Regency. The basic method used descriptive analysis. Intake of study sites in purposive in Klaten Regency. The data is analyzed secondary data (time series) during 16 years (1993-2008). Data analysis using OLS (Ordinary Least Square) with a double logarithmic function, to obtain the coefficient of elasticity that is in use in static and dynamic analysis model. Elasticity of demand for the static model based on price elasticity, demand for soybeans is inelastic. Based on the income elasticity, soy is a normal good. Whereas for a dynamic analysis model, the elasticity of demand for short-term and long term for soybean prices is inelastic with a value of -0,134 and -0,1595. This means a change of 1% soybean prices will reduce demand for soybeans -0,134% in the short term and -0,1595% in the long term. The elasticity of demand for shortterm and long-term residents for revenue is inelastic with a value of 0,094 and 0,1119. This means that changes in population income by 1% would raise soybean demand for 0.094% in the short term and 0,1119% in the long term. The elasticity of demand for short-term and long term for the total population is elastic with a value of 2,150 and 2,5595. This means that changes in population income by 1% would raise soybean demand for 2,150% in the short term and 2,5595% in the long term.

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1. INTRODUCTION

The success of development in the agricultural sector in a country must be reflected in the country's ability to be self-sufficient in food, or at least achieve food security. Food security at the national level is the ability of a nation to guarantee that all of its inhabitants obtain food in sufficient quantity, of proper quality, safe and also halal, which is based on optimizing utilization and based on diversity of domestic resources. One indicator to measure food security is the dependence of national food availability on imports (Puslitbangtan, 1995).

The development of food security in Indonesia has been emphasized in Law no. 7 of 1996 article I concerning food which was formulated as an effort to realize food availability for all households, in sufficient quantity, quality and proper nutrition, safe for consumption, evenly distributed and affordable for every individual (Tambunan, 2008:1).

The main problem in realizing food security in Indonesia today is related to the fact that the growth in demand for food commodities is faster than the growth in supply. Therefore, increasing the productivity of food commodities must be maintained. One of the commodities whose

productivity must be increased is soybeans. Soybean plants are a source of vegetable food, with a protein content of 39%, which plays an important role in various aspects of the economy in Indonesia. Besides that, processed soybeans, as needed by many people, are relatively cheaper and easy to reach. The increased international demand for soybeans, which was not followed by an increase in productivity, resulted in an increase in international soybean prices, so that the price of imported soybeans also increased. According to FAO (2009:838) Soybean will become increasingly important for biofuel production as well as for other industrial purposes. The potential demand for soybeans from the energy market is enormous and has the potential to change the basics of the agricultural market system. This has started to happen in 2007/2008, the total use of soybean seeds for biofuel production was 11 million tonnes or 10% of the total utilization of soybean seeds. Global biofuel production is expected to increase by almost 90% over the next 10 years, reaching 192 billion liters in 2018. This has started to happen in 2007/2008, the total use of soybean seeds for biofuel production was 11 million tonnes or 10% of the total utilization of soybean seeds. Global biofuel production is expected to increase by almost 90% over the next 10 years, reaching 192 billion liters in 2018.

When domestic soybean production is insufficient to meet the demand for soybeans, the government establishes a policy to import soybeans. The entry of imported soybeans into the national soybean market affects the behavior of market consumers to choose imported soybeans, because the price is much lower than the price of local soybeans. However, at present, the situation is reversed, where the supply of soybeans, both domestic and imported, has greatly decreased. As a result, the supply of domestic soybeans was unable to meet the demand on the market, thus making the government adopt a new policy of reducing import duties which were previously 5-10% to 0% at present, with the hope that domestic supply will be able to meet the level of demand for soybeans (Oktiningtyas, 2009) .

In Indonesia, the demand for soybeans from year to year shows a considerable increase, and it is estimated that in 2010 it will reach 2.79 million tonnes (Nasution, 1990). Meanwhile, the World Bank (1992) projects that in 2010 the demand for soybeans will reach 4.90 million tons. The increased demand for soybeans was not only caused by the still high population growth (1.9% per year), but also due to increased people's incomes, as well as the development of the food and animal feed industry that uses soybean raw materials, especially for the broiler livestock industry (Puslitbangtan, 1991) .

According to Amang and Sawit in Sudaryanto (1996), soybean consumption per capita per year increased by around 160 percent in a 13-year period from 1970 to 1993. Consumption of tofu and tempeh per capita per year alone increased successively from 3.4 kg and 3.9 kg in 1984 to 3.9 kg and 4.2 kg in 1990. Considering that domestic production capacity is still low, while the demand for soybeans will increase by around 2.92 percent per year, soybean imports will increase from 1.04 million tonnes in 2000 to 1.22 million tonnes in 2010.

The decline in national soybean production has caused the national demand for soybeans to be increasingly unable to be met. When observed, the increase in volume and value of imports has increased from year to year. This means, domestic production has not been able to meet the demand for soybeans. So imports are made to cover the deficit.

Soybean is needed as a food source of vegetable protein for humans and is increasingly needed in various food processing industries made from soybeans. In general, the demand for soybeans in Klaten Regency increases every year accompanied by an increase in population. Therefore, researchers are interested in studying the problem of soybean demand in Klaten Regency related to the influencing factors and the level of elasticity.

2. METHOD

2.1 Basic Research Methods

The basic method used in this research is descriptive analytical method, which is a combination of descriptive and analytical methods. The descriptive method aims to obtain a reliable and useful description while the analytical method aims to test the truth of the hypothesis. Good

descriptive research is an indispensable ingredient for analytical research. Analytical research is certainly ultimately to create a new, more perfect description (Soeratno and Arsyad, 1995:41).

2.2 Research sites

Determination of the research location was chosen purposively or deliberately, namely the method of taking the research location area with certain considerations in accordance with the research objectives. The research location chosen was Klaten Regency with consideration of the growth in soybean demand which always increases every year followed by an increase in population income and population when compared to production which is always decreasing. Researchers are interested in observing and identifying the factors that influence the demand for soybeans in Klaten Regency. Seeing the potential of soybeans as a source of protein that can be purchased at affordable prices, apart from that soybeans can also be used as animal feed, and other factors that cause the demand for soybeans in Klaten Regency to increase every year.

2.3 Data Types and Sources

The type of data used is secondary data (time series) library.uns.ac.id digilib.uns.ac.id xlii for 16 years from 1993 to 2008. Secondary data is data obtained from related government agencies or institutions with this research. In accordance with the estimates used to predict several factors that influence the demand for soybeans in Klaten Regency, the secondary data used includes data on soybean demand, data on soybean price developments, data on rice price developments, corn price developments, population data, population income data and other supporting data.

The data used in this study were obtained from agencies or institutions related to this research. The data in this study were obtained from government agencies or institutions related to the research, namely from the Klaten Regency Agriculture Service, Klaten Regency BPS, the Klaten Regency Food Security Service, and the Klaten Regency Trade and Industry Office.

2.4 Data collection technique

Research data was collected in several ways including: Observation (Observation was carried out by making direct observations of Klaten Regency government agencies and industries that use soybeans as raw material for their production), interviews (interviews with officers from the Klaten Regency Agriculture Office, the Regency Resilience Service Klaten, BPS Klaten Regency, and the Office of Industry and Klaten Regency), Recording (recording of existing data at government agencies or institutions related to research).

2.5 Data analysis method

The data analysis method used in this study is the least squares method or OLS, which is a mathematical process for determining the most appropriate intercept and slope of the line that produces the minimum number of squared deviations or deviations. With this method, the best linear unbiased estimator (BLUE) will be produced (Arsyad, 2008: 180).

Demand Function Estimation aims to determine the elasticity of soybean demand for soybean prices, rice prices, corn prices, population income, population, and soybean demand in the previous year. The Demand Analysis Model used in research library.uns.ac.id digilib.uns.ac There are two types of .id xlili, namely the static demand analysis model and the dynamic demand analysis model.

To test the calculation results so as not to produce biased equations, statistical tests and classical assumption tests were carried out. The statistical test library.uns.ac.id digilib.uns.ac.id xlv includes test 2, F test and t test. While the classical assumption test includes multicollinearity test, heteroscedasticity test and autocorrelation test.

To test the level of sensitivity of the quantity demanded to changes that occur in the variables studied, price elasticity, income elasticity and cross elasticity are used.

3. RESULTS AND DISCUSSION

3.1 Research result

3.1.1 Demand for Soybeans in Klaten Regency

The level of demand for soybeans in Klaten Regency in question is the amount of soybeans requested for consumption and the amount of soybeans requested for animal feed needs, by the people in Klaten Regency, expressed in units of kg/year. The amount of demand for soybeans in Klaten Regency can be seen in Table 1.

Table 1. Soybean Demand in Klaten Regency 1993 – 2008

Year	Soybean	Development	Animal feed	Development	Soybean	Development
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	Consumption Kg/year	(%)	requirement (kg/year)	(%)	Demand (Kg)	of Soybean Demand (%)
1993	9,086,260.00	-	2,878,750	-	11,965,010.00	-
1994	9,069,220.00	-0.19	2,958,200	2.76	12,027,420.00	0.52
1995	9,197,690.00	1.42	2,962,400	0.14	12,160,090.00	1,1
1996	9,346,849.75	1.62	3,193,400	7,8	12,540,249.75	3,13
1997	7,719,460.00	-17.41	3,338,300	4.54	11,057,760.00	-11.82
1998	10,064,895.25	30,38	1,350,650	-59.54	11,415,545.25	3,24
1999	8,600,576.75	-14.55	2,894,500	114.3	11,495,076.75	0.7
2000	9,863,258.50	14.68	1,770,300	-38.84	11,633,558.50	1,2
2001	10,928,150.00	10,8	1,724,800	-2.57	12,652,950.00	8.76
2002	11,553,218.00	5,72	1,925,000	11.61	13,478,218.00	6,52
2003	11,256,998.20	-2.56	2,282,350	18.56	13,539,348.20	0.45
2004	11,324,181.60	0.6	2,262,750	-0.86	13,586,931.60	0.35
2005	11,659,614.80	2.96	1,972,600	-12.82	13,632,214.80	0.33
2006	10,985,365.20	-5.78	2,723,000	38.04	13,708,365.20	0.56
2007	12,322,162.20	12,17	1,425,900	-47.63	13,748,062.20	0.29
2008	12,025,086.40	-2.41	1,760,150	23,44	13,785,236.40	0.27
Average	10,312,686.67	2.51	2,338,940.63	3.74	12,651,627.29	0.98

Source: Food Security Office of Klaten Regency

Table 1 states that the average demand for soybeans in Klaten Regency from 1993-2008 was 12,651,627.29 kg/year. Meanwhile, the average development of soybean demand in Klaten Regency has increased by 123,985.95 kg/year or 0.98%. In 1997 there was a decrease in soybean demand of -11.82 or 1,495,422.35 kg/year. This is because in 1997-1998 Indonesia's economic condition was not stable. This year there was an economic crisis which caused the prices of goods and services including food prices to increase while the level of people's incomes tended to remain the same. Apart from that, other causes were due to the decrease in domestic soybean production and the decrease in soybean imports in that year.

However, along with the increase in population and public awareness about the importance of health and nutrition as well as the need for animal feed which continues to increase, it affects the increase in demand for soybeans in Klaten Regency. This is because soybeans are a good source of vegetable protein to meet the nutritional needs of the community and processed soybeans such as tempeh, tofu, soy milk and so on, are familiar foods and the prices are also affordable for all people.

3.1.2 Soybean Prices

The price of soybeans in this study is the amount of money paid to get one kilogram of soybeans. Data on the development of soybean prices from 1994-2008 before and after deflation can be seen in Table 2.

Table 2. Development of Soybean Prices in Klaten Regency in 1994-2008

Year	Price Before Deflation (Rp/kg)	Consumer Price Index (2002 = 100)	Price After Deflation (Rp/kg)	Price Development After Deflation (%)
1994	892.85	29,46	3030.30	-
1995	1040.25	33,29	3125.00	3,13
1996	900.05	36	2500.00	-20
1997	1698.65	39,09	4,345.38	73,82
1998	3078.38	77,34	3980.32	-8,4
1999	3370.33	92,64	3638,21	-8,6
2000	2,636.18	83,62	3,152.61	-13.35
2001	3.109,17	91	3,416.67	8,38
2002	2,731.23	100	2,731.23	-20.06
2003	3200.00	103,48	3092.44	13,23
2004	3,798.73	105,9	3,586.96	15.99
2005	4,234.13	116,91	3,621.79	0.97
2006	4,264.58	135,05	3,157.89	-12.81
2007	4049.20	138,36	2926.59	-7.32
2008	7,264.79	163,99	4,430.08	51,37
Average	3084.57		3,382.36	5.09%

Source: Agriculture Office of Klaten Regency

Table 2 states that the average development of soybean prices from 1994-2008 experienced an increase of 5.09% with an average price of IDR 3,382.36 per Kg. In 1997 soybean prices increased by 73.82% this was due to the monetary crisis which caused prices to soar. The increase in prices also has an impact on soybean farming because input prices have increased so that the

price of the soybean itself has also increased. In 2008 the price of soybeans also experienced a very sharp increase, this was due to the influence of the price of imported soybeans which had increased as a result of world demand for soybeans also increasing while production tended to be constant. Indonesia is one of the countries that imports soybeans, so it is also affected by the increase in world soybean prices.

3.1.3 Rice Prices

The price of rice in this study is the amount of money paid by residents to get one kilogram of rice. The price of rice studied in this study was rice of the IR 64 variety. Data regarding the development of rice prices before and after deflation can be seen in Table 3.

Table 3. Development of Rice Prices in Klaten Regency in 1994-2008

Year	Price Before Deflation (Rp/kg)	Consumer Price Index (2002 = 100)	Price After Deflation (Rp/kg)	Price Development After Deflation (%)
1994	710.42	29,46	2,411.15	-
1995	875	33,29	2,628.57	9.02
1996	859	36	2,385.98	-9.23
1997	997.5	39,09	2551.74	6.95
1998	1970.83	77,34	2548,27	-0.14
1999	2,389.58	92.64	2,579.51	1.23
2000	2085.42	83,62	2,493.95	-3.32
2001	2,368.75	91	2594.21	4.02
2002	2,704.17	100	2,704.17	4,24
2003	2,543.75	103,48	2,458.25	-9.09
2004	2,472.92	105.9	2335.06	-5.01
2005	3,129,17	116.91	2,676.63	14.63
2006	4125.00	135.05	3054.54	14,12
2007	4,791.67	138,36	3,463.21	13.38
2008	4950.00	163.99	3018.51	-12.84
Average	2,464.88		2,660.25	1.86

Source: Agriculture Office of Klaten Regency

The price of rice analyzed in this study is the price after being deflated. Based on Table 19, it can be seen that the price of rice after being deflated during 1994-2008 experienced an increasing development with an average increase of 1.86% per year, while the average price was IDR 2,660.25 per kg. The price of rice experienced the highest increase in 2005, namely an increase of 14.63%. This is due to the fact that in 2005 rice production in Indonesia was unable to meet domestic demand, because the demand for rice increased while the availability of rice decreased, resulting in an increase in prices. The steps taken by the government at that time were to import rice and promote agricultural intensification and extensification to achieve self-sufficiency in rice.

3.1.4 Corn Prices

The price of corn in this study is the amount of money paid to get one kilogram of corn. Data on the development of corn prices from 1994-2008 before and after deflation can be seen in Table 4.

Table 4. Development of Corn Prices in Klaten Regency in 1994-2008

Year	Price Before Deflation (Rp/kg)	Consumer Price Index (2002 = 100)	Price After Deflation (Rp/kg)	Price Development After Deflation (%)
1994	335,42	29,46	1138,40	-
1995	361.25	33,29	1085.23	-4.67
1996	445.83	36	1238.35	14,11
1997	480,21	39,09	1228,44	-0.8
1998	1020.83	77,34	1,319.93	7.45
1999	1075.00	92.64	1160.44	-12.08
2000	1066.67	83,62	1275.63	9.93
2001	1266,67	91	1387,23	8.75
2002	1316,67	100	1316,67	-5.09
2003	1206.25	103,48	1165.71	-11.47
2004	1402.08	105.9	1,323.92	13.57
2005	1477.08	116.91	1263,47	-4.57
2006	1833,33	135.05	1357.57	7.45
2007	2,283.33	138,36	1650.30	21.56
2008	2650.00	163.99	1615.97	-2.08
Average	1214.71		1301.82	2.80%

Source: Agriculture Office of Klaten Regency

The price of corn analyzed in this study is the price after being deflated. Based on Table 20, it can be seen that the price of corn after being deflated during 1994-2008 experienced growth which showed an increase of an average of 2.80% per year, while the average price was IDR 1,301.82 per kg. In addition, the fluctuating price of corn is due to changes in demand, changes in corn production and supply from other areas outside Klaten district, as well as price changes at the distributor level.

3.1.5 Egg Prices

The price of eggs in this study is the amount of money paid by residents to get one kilogram of eggs. Data regarding the development of egg prices from 1994-2008 before and after deflation can be seen in the following table:

Table 5. Development of Egg Prices in Klaten Regency in 1994-2008

Year	Price Before Deflation (Rp/kg)	Consumer Price Index (2002 = 100)	Price After Deflation (Rp/kg)	Price Development After Deflation (%)
1994	2015	29,46	5757.14	-
1995	2019	33,29	6118,18	6,27
1996	2022	36	5616,67	-8,2
1997	2040	39.09	5230.77	-6.87
1998	5,710	77,34	7,824.68	49,59
1999	6025	92.64	6139.78	-21.53
2000	7,642	83,62	9097.62	48,17
2001	6,515	91	7159.34	-21.31
2002	6.151	100	6151.00	-14.08
2003	6,935	103,48	6701.91	8.96
2004	6,540	105.9	6169.81	-7.94
2005	6,865	116.91	5,867.52	-4,9
2006	7,530	135.05	5,442.32	-7.25
2007	8,260	138,36	5,609.89	3.08
2008	9,233	163.99	5,629.88	0.36
Average	5,400.81		6122.66	5,71

Source: BPS Klaten Regency, 1994-2008

The price of eggs analyzed in this study is the price after being deflated. Based on Table 22, it can be seen that the price of eggs after being deflated during 1994-2008 experienced an increasing development with an average increase of 5.71% per year, while the average price was IDR 6,122.66 per kg. The price of eggs which experienced the highest increase occurred in 1998, which increased by 49.59%. This was due to the monetary crisis that hit Indonesia in 1998, which caused the price of goods and services to increase. Meanwhile, the lowest price of eggs occurred in 1999 with a decrease of -21.31%. This is because the economy has started to improve and prices have begun to stabilize so that the price of eggs has decreased.

3.1.6 Total Population of Klaten Regency

The population referred to in this study is the population living in Klaten Regency. Data on population growth from 1994 to 2008 can be seen in Table 6.

Table 6. Population Development in Klaten Regency in 1994-2008

Year	Number of Population (people)	Development (%)
1994	1,202,742	-
1995	1,216,009	1.10
1996	1,223,439	0.61
1997	1,228,640	0.43
1998	1,234,113	0.45
1999	1,242,711	0.70
2000	1,257,682	1.20
2001	1,265,295	0.61
2002	1,271,530	0.49
2003	1,277,297	0.45
2004	1,281,786	0.35
2005	1,286,053	0.33
2006	1,293,242	0.56
2007	1,296,987	0.29

2008	1,300,494	0.27
Average	1,258,535	0.52

Table 6 states that the population growth in Klaten Regency shows an increase of 0.52%, while the average population of Klaten Regency is 1,258,534.67 people. The population in Klaten Regency is always increasing. This increase in population was caused by various things such as births, improvements in public health thereby reducing mortality, an improvement in the economic situation in Klaten Regency with the aim of finding work.

3.2 Discussion

Demand is the amount of goods requested in a certain area at a certain price level and in a certain period. The law of demand says that for normal goods there is an inverse relationship between price and quantity, that is, if the price rises, the quantity that consumers want to buy will decrease. The law of demand only applies if the condition is *ceteris paribus* or it is assumed that other factors do not change.

The demand for soybeans in Klaten Regency tends to increase every year. with the development of soybean demand of 0.98% per year or 123,985.95 kg/year, the average demand for soybeans in Klaten Regency is 12,651,627.29 kg/year. This is influenced by the high consumption of the population and the demand for soybeans by the population for animal feed, because soybeans are an agricultural food crop commodity, which has a variety of processed products at relatively affordable prices. However, on the other hand, the level of consumption or demand itself is not matched by domestic production of soybeans, so that in fulfilling the demand, the government imports soybeans from abroad. This causes the price of soybeans to be very dependent on world soybean prices.

Based on the F test, the factors used as estimators that will affect the level of soybean demand in Klaten Regency for static and dynamic demand analysis include: soybean prices, rice prices, corn prices, egg prices, population income, population, and soybean demand in the year previously had a very significant effect on the demand for soybeans in Klaten Regency at the 99% confidence level. This is indicated by a significance value of 0.000 which is less than the value $\alpha = 0.01$ ($P < 0.01$).

Based on the results of the t-test, it shows that the variables that have a significant effect on the 95% confidence level are soybean prices and population income, while for the 99% confidence level the variables that have a very significant effect are the population in the static model. As for the dynamic model, the variables that have a significant effect on the 95% confidence level are soybean prices and the number of residents, while for library.uns.ac.id digilib.uns.ac.id lxxxviii the 90% confidence level the variables that have a significant effect are people's income. 95% confidence level, which is indicated by a significance value that is smaller than the value $\alpha = 0.05$ ($P < 0.05$), while the 90% confidence level, which is indicated by a significance value that is smaller than the value $\alpha = 0.1$ ($P < 0.1$). While the rice price variable, corn price variable and egg price variable have no significant effect on soybean demand in Klaten Regency, this is indicated by a significance value that is greater than the value $\alpha = 1\%$, 5%, and 10%.

4. CONCLUSION

Soybean prices, rice prices, corn prices, egg prices, population and previous year's soybean demand together have a significant effect on soybean demand in Klaten Regency on static and dynamic demand analysis models.

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Considering the increasing demand for soybeans, efforts to increase productivity are needed, including by using quality superior variety seeds, integrated weed and pest (OPT) control, improving soil fertility by fertilizing as needed (location specific), appropriate planting season/time and crop rotation.

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