THE INFLUENCE OF INFRASTRUCTURE, POVERTY AND INCOME ON FOOD SECURITY IN SOUTH SUMATRA PROVINCE

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Abstract

This study aims to determine the influence of infrastructure, poverty and income per capita on food security in districts / cities in South Sumatra Province. The data that has been used in this study are primary and secondary data in the form of data panels in the period 2010 to 2016 with 15 district/city. The method used in the study is a quantitative method with multiple linear regression analysis. The results show that infrastructure, poverty and income per capita significantly influence food security. Meanwhile, per capita income has a large influence on food security compared to poverty and infrastructure in the district / city in South Sumatra Province.
JEL Classdification: *I30, I31, I38*
Keywords: *Food Security, Income, Infrastructure, Poverty*

1. INTRODUCTION

Improving food security is a top priority for development, because food is the most basic need for humans. The increasing population growth requires sufficient food availability from agricultural products to strengthen food security in an area. This is because food security has a central position in increasing productivity and improving the quality of life of citizens. Food security can be interpreted as the availability of food in sufficient quantity and quality, distributed at affordable prices and safe for consumption by the public in order to carry out daily activities. Food security is also interpreted as the presence of rice price stability, the availability of abundant world rice supply, food self-sufficiency, and the availability of foreign exchange as a requirement to fulfill rice imports (Damanik, 2016).

Based on the data, the number of poor people in the province of South Sumatra in 2006-2015 amounted to more than one million people but the level of poverty showed a decline from 2006-2013 except in 2014 and 2015 which experienced an increase in the number of poor people at 1,085.8 million in 2014 and 1,145.6 million in 2015 with a percentage of 13.62 percent in 2014 and 14.25 percent in 2015 when compared with the previous year of 1,043.6 million people with a percentage of 13.48 percent in 2013 (BPS, 2015). At present the percentage of poor people in South Sumatra Province is still quite high, reaching 14.80 percent in 2010. This figure is far from the national target in 2015 of 7 , 5 percent. For details can be seen in Figure 1.

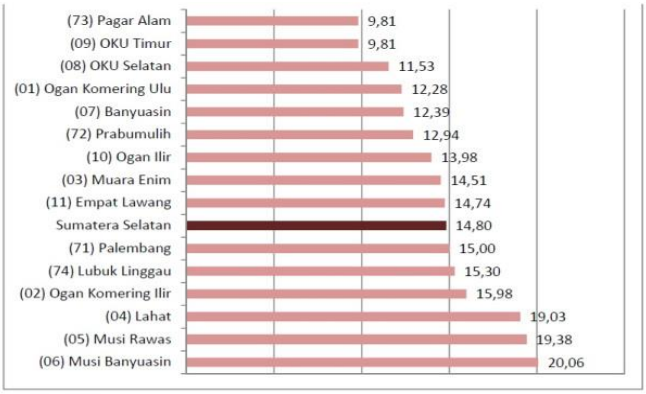

Figure 1 Percentage of Poor Population by Regency / City
Source: Badan Pusat Statistika (BPS)

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In this figure 1, there is considerable inequality between districts / cities in South Sumatra Province. The high percentage of poor people is found in Musi Banyuasin Regency (20.06 percent), Musi Rawas (19.38 percent) and Lahat (19.03 percent). While the lowest was found in Pagaralam City (9.81 percent) and East OKU District (9.81 percent). Palembang City as the Capital City still has a high percentage of poor people (15.00 percent) and even exceeds the provincial level nationally (BPS, 2016).

One characteristic of the poor in particular is that most of them live in rural areas with dominant livelihoods in their own efforts in the agricultural sector (Pasaribu, 2006) and the development of the agricultural sector becomes very important in efforts to reduce poverty (Yudhoyono, 2004, Datt and Ravallion, 1996, and Matsuyama, 1992) Agriculture is a sector that is expected to reduce poverty, but the budget allocation for the agricultural sector is still very small. The high level of poverty in rural areas is caused by urban bias development policies and the industrial sector, while the agricultural sector budget allocation drops dramatically (Sajogyo, 2002). According to Mubyarto (1991) the agricultural sector is the dominant sector in the national economy because of its substantial contribution to national income, foreign exchange income through the export of agricultural products. The agricultural sector is the provision of food and is a provider of industrial raw materials. In addition, the agricultural sector is also able to provide jobs to residents who are always growing rapidly.

Likewise, South Sumatera Province promotes development in the agricultural sector because of the abundant potential of agricultural resources in the region. This potential needs to be utilized and developed for the food security of the people of South Sumatra. Local food sources in South Sumatra Province include food crops and horticulture, livestock, plantations and fisheries. Rice production in South Sumatra Province in 2015 experienced an increase of 588.67 thousand tons (16.04 percent) from the previous year, and reached 4,259,104 tons. The increase in production was due to an increase in harvested area of 60.92 thousand ha (7.51 percent) and productivity increased by 3.59 qu / ha (7.93 percent). On Sumatra Island, out of the 10 provinces, South Sumatra is one of the second highest rice producing provinces after North Sumatra. The contribution of rice production in the province of South Sumatra in 2015 amounted to 5.43 percent of national rice production (BPS, 2015). One effort to encourage food production and productivity is the availability of adequate agricultural infrastructure. Infrastructure development that is currently needed is among others in the form of repair and construction of irrigation infrastructure, such as reservoirs and irrigation channels, as well as the construction of roads that connect production centers to end consumers. The inconsistency in the distribution process will result in expensive marketing costs and damage to agricultural commodities. Problems that occur in the distribution process due to limited transportation facilities and infrastructure, erratic climate that can interfere with food transportation. Technical problems in this distribution process result in soaring freight costs. The travel time for transporting fresh food material in the event of a good disturbance due to inadequate road infrastructure conditions, as well as erratic weather will cause more food to be damaged so that food prices will tend to rise which results in a soaring inflation rate (BKP, 2015).

In terms of increasing the fulfillment of consumption needs and realizing the availability of infrastructure, support and coordination between agencies in charge of physical development and local government through policy support that facilitates the implementation of development, is absolutely necessary. In addition to infrastructure development, increasing production and agricultural productivity also requires the support of technology provision, and must be in line with efforts to reduce poverty and food security. Based on this background, this study aims to analyze the influence of infrastructure, poverty and income on food security in South Sumatra Province.

2. LITERATURE REVIEW

Food security in terms of food affordability is also closely related to efforts to improve the quality of Indonesia's human resources. Without the support of sufficient and quality food, quality human resources cannot be produced. Therefore, building a

robust food security system is an absolute requirement for national development. The problem of food security is not just the fulfillment of the food availability aspect for the community, but also the more important aspect is the accessibility (affordability) of the community (household) of food. The purchasing power of households is a factor that greatly influences food affordability. Meanwhile, people's purchasing power is strongly influenced by the amount of income and prices of food commodities (Rosyadi & Purnomo, 2012). This is supported by (World Food Summit, 1996) which states that food security exists when everyone, at all times, has sufficient physical and economic access, safe and nutritious food that meets their dietary needs and food preferences for active and healthy living.

Infrastructure is a major support of social and economic system functions in people's daily lives. Infrastructure systems can be defined as basic facilities or structures, equipment, installations built and needed for the functioning of social systems and systems. economic community (Prasetyo, 2008) and Salepe (2014). In addition Salape (2014) stated that the existence of poor infrastructure and inadequate support from related organizations; roads are not in good condition which limits access to market facilities and other destinations and the lack of an efficient and effective transportation system paralyzes the performance of farmers which will affect food security. This is clarified by Baldwin and Dixon (2008) which mentions several characteristics of infrastructure, namely: (1) Assets have a physical form with a long service life. Asset creation requires sufficient development preparation period; (2) Assets have few substitutes in the short term; (3) The asset structure is able to facilitate the flow of goods and services and without assets there will be disruption in the flow of goods and services; (4) Assets are important especially because assets function as complementary or complementary goods to goods and services in the production factor; and (5) Having positive externalities, namely the benefits that can be enjoyed by parties outside the infrastructure maker.

Poverty according to Sharp et.al in Kuncoro (2000) tries to identify the causes of poverty that occur in society, which is divided into three perspectives. First, poverty occurs because of differences in ownership patterns of resources that cause inequality of income distribution. Poor people only have very limited resources with low quality. Second, poverty arises as a result of differences in the quality of human resources. The low quality of human resources will result in low productivity so that it will result in low wage levels received. The low quality of human resources is caused by, among others, low education, unfortunate fate, discrimination and heredity. Third, poverty arises as a result of differences in access to capital. In some countries poverty is largely due to food availability factors as the opinion of Rhoe (2008) and Salepe (2014).

Poverty is basically a condition which per capita income tends to be low. The low per capita income causes low levels of consumption and food security of the people according to Maharjan (2009) and Sukirno (2004). Per capita income according to Sukirno (2004) is the amount of the average income of residents in a country. Per capita income is obtained from the distribution of a country's national income in a given year with the country's population in that year.

3. METHODOLOGY

Quantitative analysis to analyze infrastructure dynamics, poverty, and food security in South Sumatra by using panel data regression. As a cross section data analysis unit, there are 15 (fifteen) districts / cities in South Sumatra Province and time series data for the period 2010-2016. The reason for using cross section data is to better understand the behavior of rice food security from each district / city, so that appropriate policies can be taken for each region. Meanwhile, the use of time series data from 2010-2016 is based on data availability

a. Regression Model of Panel

In general, this research model was developed from research conducted by Gani and Prasad (2007); Timmer (2004a); Malik (2011); Rodriguez et al., (2013). The

relationship between variables in this study can be expressed in mathematical equations as follows:

$$FS = f(\ Infrastructure, Poverty, Income) \quad (1)$$

$$FS_{it} = \alpha_0 + \alpha_1\ Infra_{it} + \alpha_2 Pov_{it} + \alpha_3\ Income_{it} + e_{it} \quad (2)$$

4. RESULT AND DISCUSSION

4.1 Production of Rice in South Sumatra Province

Food security is useful to monitor important aspects of individuals in the household, to design, implement, and to evaluate policies, programs or projects. The link between household access to food (food security); household needs for food; and allocation behavior means that household food security has limited value as an indicator of the individual's lack of interest (Andersen, 2009).

Rice is one of the most dominant food commodities for most Indonesian people where rice is a food ingredient that is easily converted into energy, in addition to containing enough nutrients and boosters for the body. The number of regencies / municipal rice production in South Sumatra Province can be seen in Figure 2.

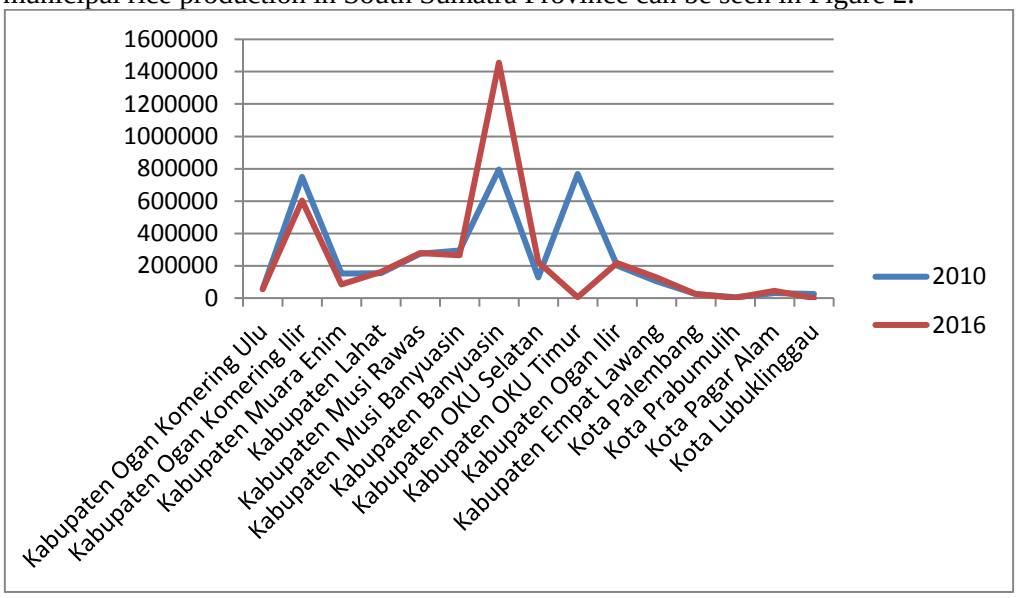

Figure 2 Number of rice production in regencies / cities in South Sumatra

Figure 2 shows the amount of rice production in 2010 and 2016 in the Regency / City of South Sumatra. From the figure it can be seen that there is a significant increase and decrease in each Regency / City of South Sumatra Province. In 2010, East OKU District was the Regency that had the most number of paddy and field rice production, while Prabumulih City was the city that had the least amount of rice production. In 2016 the Banyuasin Regency was the district that produced the highest number of rice plants and the City of Lubuklinggau did not produce rice plants.

4.2 Infrastructure

Based on the South Sumatra APBD General Policy, Government Expenditures in the infrastructure sector are directed to the construction and maintenance of roads and bridges in South Sumatra Province. Total government expenditure on infrastructure in South Sumatra can be seen in Table 2.1. Based on Table 2.1, the infrastructure budget in South Sumatra tends to increase from previous years. In 2011, it increased by 31.4% from 2010. In 2012 it increased by 16.4%, in 2013 it increased by 26.6%, in 2014 it increased by 19.8%, but in 2015 it experienced a decline the infrastructure budget was 8.4% from 2014, and in 2016 the infrastructure budget experienced a return of 16.6% from the previous year.

Table 1 Infrastructure of South Sumatra Province 2010-2016 (Million Rupiahs)

No	Kabupaten/Kota	2010	2011	2012	2013	2014	2015	2016
1	Ogan Komering Ulu	152.209	159.097	198.122	273.303	269.298	217.358	269.524
2	OKU Timur	76.133	121.095	128.658	195.781	199.770	219.884	224.282
3	OKU Selatan	72.620	217.828	178.369	224.766	256.912	306.001	364.141
4	Ogan Komering Ilir	134.204	305.675	308.238	368.886	348.114	352.661	356.188
5	Ogan Ilir	219.942	189.004	272.997	338.689	402.243	295.737	348.970
6	Musi Banyuasin	323.815	634.365	695.240	800.360	1.007.589	845.268	1.014.322
7	Banyuasin	145.533	149.144	154.450	228.181	307.327	251.446	336.938
8	Muara Enim	203.343	215.202	199.530	330.966	448.568	375.959	394.757
9	Lahat	109.267	133.989	138.137	147.748	107.048	189.974	336.254
10	Musi Rawas	270.634	237.432	414.242	490.251	392.968	398.031	402.011
11	Empat Lawang	64.165	80.203	149.976	208.132	199.977	214.140	229.130
12	Palembang	170.278	178.630	145.176	288.699	498.318	409.051	425.413
13	Lubuk Linggau	99.858	121.160	153.789	110.262	301.996	212.580	257.222
14	Pagar Alam	31.677	38.624	90.210	85.864	133.329	137.498	213.122
15	Prabumulih	115.562	95.485	122.659	147.395	203.819	227.166	252.154
	Sumatera Selatan	2.189.240	2.876.933	3.349.793	4.239.283	5.077.276	4.652.754	5.424.427

Source : Direktorat Jenderal Perimbangan Keuangan, 2017.

4.3 Poor People of South Sumatra

Poor people are a problem in the province of South Sumatra. The largest number of poor people in the province of South Sumatra in the last seven years, namely in 2015 amounting to 1.085 million people or 13.62% of the total population in that year.

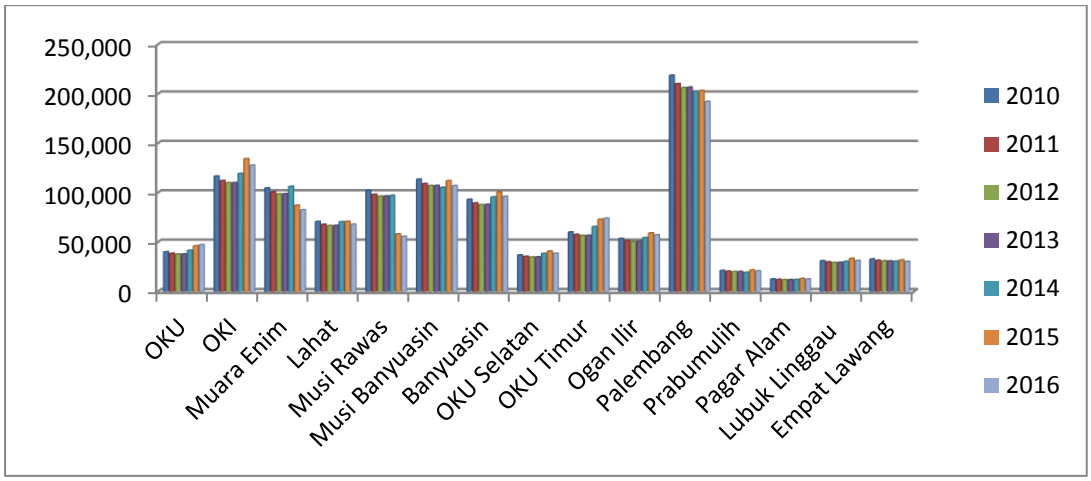

Figure 3 Poor Population in South Sumatra 2010-2016
Source: Badan Pusat Statistik, 2016

In terms of increasing the fulfillment of consumption needs and realizing the availability of infrastructure, support and coordination between agencies in charge of physical development and local government through policy support that facilitates the implementation of development, is absolutely necessary. In addition to infrastructure development, increasing production and agricultural productivity also requires the support of technology provision, and must be in line with efforts to reduce poverty and food security.

4.4 Per capita income

District / city per capita income can be used to measure the level of economic prosperity of a region by dividing the GRDP by the middle-year population in the region. This indicator describes the average value added created by each population in an area due to the production process. The increase in GRDP per capita illustrates that in nominal terms the income of the general public has increased. The high and low

magnitude of this indicator is influenced by the magnitude of the GRDP value generated by an area and the population of the region

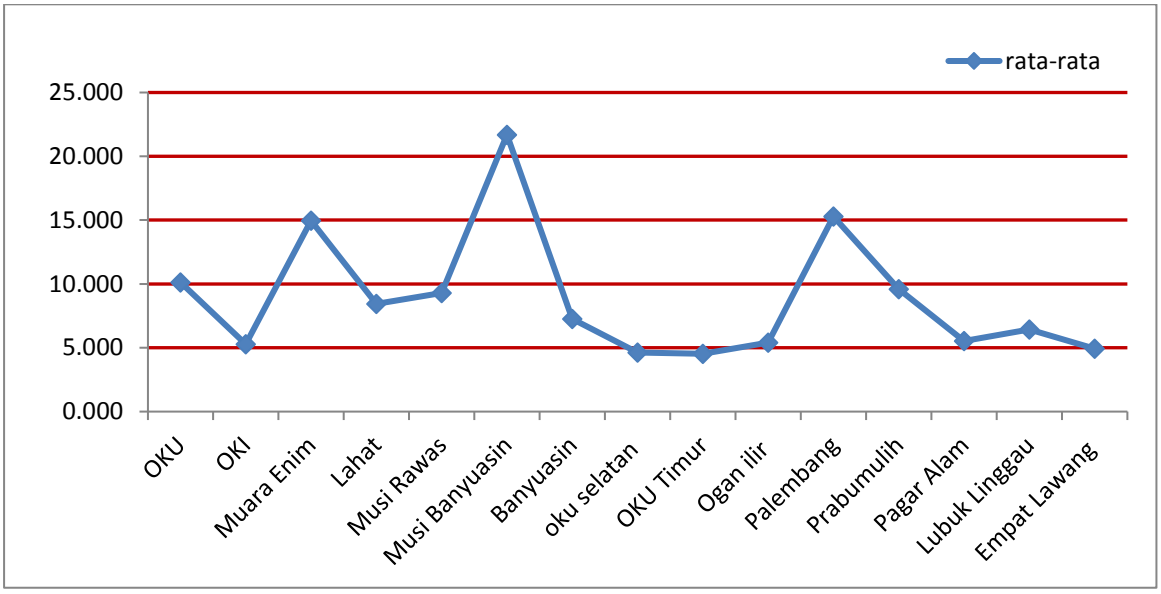

Figure 4 Average Revenue in South Sumatra Province (in million rupiah)
Source: Badan Pusat Statistik, 2016

In terms of per capita income, Musi Banyuasin district occupies the first position with the highest average income per capita value of 21.69 million rupiah where with per capita income of 23.30 million rupiah in 2016 and always increases every year, the income per capita increases caused by the movement of production of goods / services produced in all sectors in Musi Banyuasin Regency and the relatively large contribution of the oil and gas sector to the regional GDP. Compared with the city of Palembang in the next position with a per capita income of 18.41 million rupiah in 2016, and continued to increase from previous years with the average amount of income per capita 2010-2016 amounted to 14.07 million rupiah. The movement of the per capita income value in Palembang City in the past seven years illustrates the acceleration of development which tends to be massive. While the regions that have the lowest income perkaita in 2016 are occupied by East OKU amounting to 5.25 million rupiah with an average income per capita of 4.52 million rupiahs. The large population of an area affects the value of per capita income given that Palembang has the largest population South Sumatra is 1.49 million people.

4.5. Result of Estimation Model

This study uses a fixed effect model to see the effect of infrastructure, poverty and income on food security. Based on the equation of the regression results show that without the influence of infrastructure (Infra), poverty level (Pov) and income per capita (Income), food security in South Sumatra averaged 10.31%. However, the overall impact of infrastructure variables, and per capita income shows a significant influence with the coefficient of determination (R2) reaching 0.56, while for the poverty level variable shows an insignificant influence on food security in South Sumatra. This shows the influence of these variables as independent variables on the dependent variable reached 56% and significant at 95% confidence level. Means, the variables in the model have a large influence and the influence of variables outside this model only reaches 44% of household food security in South Sumatra. The panel data estimation results using the Fixed Effect model can be simplified in the following Table 2:

Table 2 Results of the Regression Model Panel

Variable	Coefficient	t-Statistic	Prob.
C	-103102.6	-1.120054	0.2658
INFRA?	0.267100	3.403637	0.0010
POV?	1.235525	1.400145	0.1650
INCOME?	33.03282	3.774666	0.0003
R^2	0.568323		
N	105		
F	0,00000		

Table 2 shows that the F test is 0.000000 which means it is smaller than the error level of 0.05 (5%), this shows that overall the independent variables are infrastructure (Infra), poverty level (Pov) and income per capita (Income) together have a significant influence on the dependent variable, namely food security.

This test is conducted to see whether each independent variable influences the dependent variable or knows the level of significance of the independent variable. This test is done by comparing the probability value t-count to the significance level α (5% or 0.05), with the test criteria if the probability t count> α (0.05) then the effect of the independent variable is insignificant. This means that the independent variable does not affect individually the dependent variable, on the contrary if the probability of t count <α (0.05) then the effect is significant, meaning that the independent variables can affect individually the dependent variable. The estimation result of t test shows on probability t count the level α = 5% (0.05). Probability t calculate infrastructure expenditure (Infra) is 0.0010 <0.05 which means that infrastructure expenditure (Infra) can affect individually household food consumption expenditure. Whereas, the probability of calculating the poverty level (Pov) is 0.1650> 0.05, which means that the level of poverty does not affect individually the consumption of household food. Probability of calculating income per capita is 0.0003 <0.05 which means that per capita income can affect individually food security.

Infrastructure has a significant effect and has a positive relationship to food security at a significant level of 5 percent. The estimated parameter value of the infrastructure is 0.267100, meaning that if the infrastructure increases by one percent it will increase food security by 0.0267100 percent. Poverty has a positive relationship with food security but is not significantly affected. The estimated parameter value (regression coefficient) of the poverty variable is 1.235525 which means that every increase of one percent of the poverty variable will increase food security by 0.1235 percent. The pattern of poor household expenditure is more likely to be spent on food consumption than basic non-food needs, this indicates that the pattern of expenditure of poor households in South Sumatra is still on primary consumption because most of the income is used for food consumption, indicating a low level of food security. Income has a significant effect and has a positive relationship to food security at a significant level of 5 percent. Estimated value is 3.303282, meaning that if income increases by one percent, it will increase food security by 0.330328 percent.

Each district / city has its own value to see the influence of infrastructure, poverty and income on food security. The highest intercept value is Lubuk Linggau Regency which is 120,146 followed by OKU Timur, Empat Lawang, Pagar Alam, South OKU, Prabumulih. This means that food security in Lubuk Linggau is 120,146 and subsequently for East OKU Regency is 108,007, Empat Lawang is 62,933, Pagar Alam is 51,236, South OKU is 26,190 and Prabumulih is 19,568 when infrastructure spending, poverty level and income per capita are equal with or considered zero (constant).

Furthermore, in Ogan Ilir Regency of -4,197, Lahat amounted to -72,445, OKI of -79,786, OKU of -100,177, Musi Rawas of -127,249, Banyuasin of -166,843, and Muara Enim of -339,849. This can provide the fact that when infrastructure expenditure, poverty level and per capita income are in constant condition, the Regency / City consumption expenditure will decrease by the intercept value of each district. While the lowest intercept is found in Musi Banyuasin Regency which is -708,796 and followed by Palembang City -462,754 which means that infrastructure, poverty level and per capita income are in constant condition, the resistance of Musi Banyuasin Regency will decrease by 708,796, and Palembang City will decrease by 462,754.

Infrastructure development can increase consumption of food, infrastructure development in the form of transportation facilities and infrastructure, such as roads and bridges, can expedite and accelerate distribution, so that food can be more easily accessed. Aspects of availability and accessibility can increase which has implications for increasing food security. This condition is in line with the research of Rhoe (2008) and Salepe (2014) that roads are not in good condition which is an indication of poor basic infrastructure that creates limited access to market facilities or any destination. There is a bad road network and one major gravel road that connects to the area to the nearest city (Empangeni) which creates transportation constraints such as expensive and time-consuming transportation costs for travel, and that has a negative impact on attracting markets and maintaining food security. During the summer there is sometimes rain most of the muddy gravel roads which make it difficult for vehicles to have access to the area thereby reducing food security. Poverty has a positive relationship with food security but is not significantly affected. The estimated parameter value (regression coefficient) of the poverty variable is 1.235525 which means that every increase of one percent of the poverty variable will increase food consumption expenditure by 0.1235 percent. The pattern of poor household expenditure is more likely to be spent on food consumption than basic non-food needs, this indicates that the pattern of expenditure of poor households in South Sumatra is still on primary consumption because most of the income is used for food consumption, indicating a low level of food security.

Per capita income has a significant effect and has a positive relationship to food security at a significant level of 5 percent. The estimated parameter value of the infrastructure expenditure variable is 3.303282, meaning that if infrastructure spending increases by one percent it will increase food consumption expenditure by 0.330328 percent. According to Keynes (Prathama 2008) states that income factors have a direct effect on consumption, where the higher the income, the higher the consumption, and vice versa. The higher the income per capita of the household, the higher the allocation of their expenditure for food consumption where the addition is also quite significant. Increasing income means increasing opportunities to buy food with better quantity and quality. Conversely a decrease in income will cause a decrease in the quality and quantity of food purchased.

5. CONCLUSION

Food security is very important to maintain the sustainability of life and fight food insecurity in the District / City in South Sumatra Province. In the presence of food security many factors influence it, including infrastructure, poverty and income.

Based on partial model estimates that infrastructure has a positive and significant impact on food security. Good and smooth infrastructure strongly supports food security in meeting the needs of the community Furthermore poverty has a positive and insignificant effect. There is a tendency for the missile community to consume more food items than non-food items. Furthermore, per capita income has a positive and significant effect on food security. The higher the income per capita in the district / city the more potential in meeting the needs of life and the better food security in the region. But in general it can be said that infrastructure, poverty and income influence food security. Therefore, a policy is needed for local governments or authorities to improve

infrastructure, create jobs to reduce poverty and increase income. So that it can support good food security in districts / cities in South Sumatra Province.

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