Analysis of Rural and Urban Household Food Security in Kendal District

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Abstract: Food security will determine economic, social, and political stability to fulfill people's welfare in a country. According to National Socio-Economic Survey (SUSENAS) in March 2018, the number of households that hold food in Kendal Regency in 2017 is only around 47.3 percent with the details that 45.3 percent of households are in rural areas and the remaining 54.7 percent of households are in the area urban area. This work is examining the profile of food security of rural and urban households in Kendal Regency and the effect of socio-economic variables on the food security of rural and urban households in Kendal Regency. This research used logit regression analysis and secondary data from SUSENAS in March 2018 conducted by the Kendal Regency Central Statistics Agency. The results showed that the types of regions (rural and urban) did not significantly influence the status of Kendal Regency household food security. The status of food security for rural households in Kendal Regency is influenced by the expenditure of food share, household per capita expenditure, working status of the head of the household, and the number of household members. In contrast, the status of food security for urban households in Kendal Regency is influenced by household per capita expenditure, expenditure on food share, and age of household head.

Keywords: food security; households; socio-economic

1 Introduction

Food security is a critical issue in fulfilling people's welfare because it will determine economic, social, and political stability in a country. Fulfilling food needs is a challenge for Indonesia, which has different geographical conditions between regions. The Central Java Province in the 2014 Regional Development Planning Handbook entitled "Strengthening the National Economy for Improved People's Welfare" issued by the Ministry of National Development Planning/National Development Planning Agency in 2013 (Bappenas, 2014), placed the first strategic development issue on stabilizing food production for the sustainability of food security and development priorities in (1) reducing poverty and (2) strengthening food security.

According to von Braun (2014), a lack of calories and nutrition and weight loss are medium-term indicators in measuring food and nutrition security. Indonesia uses the Nutrition Adequacy Rate (RDA) as Nutritional status standards measurement based on the average energy consumption of calories and protein per capita per day according to the nutrition adequacy table by the Minister of Health Regulation, Republic of Indonesia No. 75 of 2013 as determined by the National Food and Nutrition Widyakarya in 2010. The average community calorie consumption in both urban and rural areas is still below the adequacy standard set by the Government in Article 4 of the Regulation of the Minister of Health of the Republic of Indonesia No 75 of 2013, which amounts to 2,150 kcal. Wardani (2018), in his research based on data from the National Socio-Economic Survey (SUSENAS), showed that 52.52 percent of the population did not meet the international threshold for nutrition, which was 2,000 kcal per day in 2013.

The Central Java Food Security Agency has calculated food insecurity areas according to the district based on the Nutrition Adequacy Rate (Angka Kecukupan Gizi (AKG)). Central Java Province's Nutrition Adequacy Rate (AKG) trend, which is consists of more than 80 percent, shows that from 2014 to 2016, the number of food-resistant households in Central Java Province tended to increase. However, it is different from the number of food-resistant households in Kendal Regency, which experienced a tendency to decline from 2014 to 2016. According to the data from the National Socio-Economic Survey (*Survei Sosial Ekonomi Nasional*/Susenas) in March 2018, the number of food-security households in Kendal District in 2017 was only around 47.3 percent, and the rest fall into the category of food insecurity, less food, and susceptible food. Meanwhile, according to the status of the region, the 47.3 percent of households that are food-security, as many as 45.3 percents of households are in rural areas and the remaining of 54.7 percent of households are in urban areas. This condition shows that there are still inequalities between rural and urban areas in Kendal Regency even though the difference is slightly different. This fact emphasizes the need for strengthening food security, especially for

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residents with categories of food insecurity and lack of food in Kendal Regency by knowing the factors which can affect the food security of the community in the rural and urban areas of Kendal Regency.

A study of food analysis in rural and urban areas of Kendal Regency is urgently required. The works are to determine the profile of the resilience of households and housing in Kendal Regency and to understand the effect of socio-economic variables on the resilience of households and housing in Kendal Regency

2 Literature Reviews

Food security is a reflection of the availability of sufficient, nutritious, and evenly distributed food that can be accessed by every individual. Thus, the absorption can be carried out maximally for the achievement of a healthy and productive life. Tirtosudiro in Logistics Business Entity (*Badan Usaha Logistik*/Bulog) defines national food security as the ability of the state to produce adequate quantities of food for all consumers at affordable prices (Dawe, 1997). (Arifin, 2005) said that aspects of food distribution ranging from production centers in rural areas to consumers in urban and rural areas were equally important to strengthen food security strategies. Kahar (2010) defines food security as a situation where everyone has physical and economic access to sufficient food to live a healthy and productive. These various concepts of food security explain that achieving food security is not only conducted by paying attention to food availability but also affected by other factors such as affordable food prices and equitable food distribution, as a way to obtain the food commodities.

Sayogyo (2002) mentions in his research that rural areas experience limited infrastructure development (physical and institutional), besides that development policies are biased in urban areas, especially for the industrial, trade and service sectors. As a result, cities experience faster growth, while rural areas are relatively lagging. The lag in the progress of rural areas is also caused by the low productivity and quality of farmers and agriculture, the limited access of farmers to capital resources, and the low quality and quantity of agricultural and rural infrastructure. As a result, the welfare of the people in rural areas, which cover around 60 percent of Indonesia's population, especially farmers, is still very low. This is reflected in the number of unemployed and the number of poor people in rural areas that are greater than in urban areas. Of the 36 million poor people in 2004, around 68 percent were in rural areas and generally in the agricultural or agriculture-based sector (Dewan Ketahanan Pangan, 2006).

3 Previous Research

Sukandar et al. (2006) examined the study of food security in poor and non-poor households. The results of the study stated that the factors that significantly affected household food security were the number of household members, the age of the husband, and the family category, the smaller the number of household members, the older the husband's age, the higher the level of protein sufficiency (Sukandar, Khomsan, Hadi, Anwar, & Eddy, 2006). Low-income families have lower levels of protein adequacy than non-poor families. The results of the study of Rural Household Food Resilience Studies in Efforts to Improve Community Nutrition Status in South Lampung District indicate that variables that have the potential to affect household food security are household size, household income, household food expenditure, staple food availability rice from own production, as well as variables from Trimomukti Village (Rusyantia, Anggun, D. Haryono, 2017). The more number of household members in a household with low income and high expenditure on food, and to obtain basic food sources of rice from buying or assistance and subsidies and from the Kelawi Village community will have a greater chance of being vulnerable to food insecurity.

Halimah, Lubis, & Ginting (2017) analyzed the number of nutritional adequacy and the factors that influenced it in Medan Deli District. The results obtained showed that income and age factors had a significant effect on the number of nutritional adequacies in the study area. In contrast, the factors of education level and the number of family members did not significantly affect the nutrition adequacy rate in the study area. Heryanah (2016) examines household food security in West Java. The results of the study show that the regional category variables (urban and rural), the sex of the household head, the marriage status of the household head, the age of the household head, the number of household members, the average length of school life, household per capita expenditure, household sanitation conditions and conditions " slum "households together (simultaneously) or partially significantly affect household food security.

4 Methods

This study uses Susenas data in March 2018 collected by the Central Bureau of Statistics (BPS). The area that is the analysis of this study is Kendal Regency. The Susenas data used consists of Susenas Kor data and Susenas Module. After data and variables were found, filtering was carried out by removing all data except the following variables: per capita daily calorie intake, household food expenditure, household expenditure, per capita expenditure, regional classification, age of household head, education of the head of household, the sex of the head of the household, the number of household members, and the employment status of the head of the household.

Table 1. Classification of Degrees of Household Food Security

Figures for Adequacy of Energy Consumption (*Angka Kecukupan Konsumsi Energi* /AKE) per unit of adult equivalent	Food Expenditure Share (*Pangsa Pengeluaran Pangan* (PPP))	
	Low (<60% of total expenditure)	High (≥ 60% of total expenditure)
Enough (> 80% energy adequacy requirements)	Food Security	Vulnerable to Food
Less (≤80% energy adequacy requirements)	Food shortages	Food Insecurity

Source: Johnsson and Toole adopted by Maxwell et al. (2000)

The concept of households in this study refers to the BPS household concept, namely a person or group of people who inhabit part or all of the physical building/census and usually eat together from one kitchen. What is meant by eating from one kitchen is taking care of the daily needs together into one. Although many experts define household food security by using a variety of indicators, in this study, household food security was identified with two indicators, namely the adequacy of calories consumed with the large share of food expenditure. This is based on cross-classification used by Johnsson and Toole (1991) in Maxwell et al. (2000). The degree of household food security based on nutritional adequacy and the share of food expenditure are shown in Table 1.

Energy Consumption Adequacy Rate (AKE) refers to the daily per capita caloric intake recommended based on Article 4 of the Republic of Indonesia Minister of Health Regulation No. 75 of 2013 that nutritional status (RDA) is measured by the standard adequacy of calorie consumption of 2,150 kcal. In this study, what is meant by the share of food expenditure is the ratio of expenditure on food expenditure to the total household expenditure for a month. To find out the share of household expenditure, the equation (1) is used:

$$PPP = \frac{FE}{TE} \times 100\% \quad \text{.....(1)}$$

Notes:
PPP : Food Expenditure Share (%)
FE : Expenditures for food expenditure (IDR/month)
TE : Total expenditure on household needs (IDR/month)

In this study, using inferential statistical approaches carried out through logit regression methods. The logit regression model is used for qualitative response regression models, namely the model where the dependent variable is a dummy. Logit regression is used to find the probability of an event; in this case, the status of the household has the opportunity to hold and not hold food and nutrition (Gujarati, 2012). The models used in this study are as equation (2) as follows:

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 tipe + \beta_2 PPP + \beta_3 status\_menikah + \beta_4 jk\_krt + \beta_5 usia\_krt + \beta_6 status\_\text{ker}\, ja + \beta_7 jml\_art + \beta_8 pendidikan + \beta_9 kapita + \varepsilon \quad \text{.....(2)}$$

Information:
Li : Status of Food and Nutrition Resilience
D = 1, farm households in rural areas are food resistant
D = 0, rural farmer households are not food resistant
Type : Village / kelurahan classification
PPP : Food expenditure share (%)
Status_menikah : Marital status of the head of the household
jk_krt : Sex of the head of the household
usia_krt : Age of household head
status_kerja : Status of working head of household
jml_art : Number of household head members
pendidikan : The highest education of the head of the household
kapita : Household expenditure per capita

5 Results and Discussion

5.1 Estimated Logistic Regression Results of Rural and Urban Household Food Security in Kendal Regency

Based on the analysis techniques that have been carried out, the following in Table 2 results in estimating the food security of urban and rural households in Kendal Regency using logistic regression. The following are displayed logistic coefficient values, odds ratios, the goodness of fit test, number of observations, significance level of independent variables and standard errors with independent regional type variables, expenditure on food

share, marital status of head of household, household head gender, age of household head, the working status of the head of the household, the number of household members, the highest education of the head of the household, and per capita expenditure. The logit model regression equation obtained from the regression results conducted in this study can be seen in Table 2.

According to the logit regression results, the results of the omnibus test have a significance value of 0.00 with a confidence level of 95 percent (p <0.05) which means that the type of region, expenditure of food share, marital status of head of household, sex of head of household, age of head household, working status of head of household, number of household members, highest education of the head of household, and per capita expenditure simultaneously (together) affect the status of food security for urban and rural households in Kendal Regency. The Hosmer and Lemeshow Test results have a significance value of 0.981 (> 0.05) so that they accept H0, which indicates that the model can be accepted, and hypothesis testing can be done because there is no significant difference between the model and the value of its observations. Meanwhile, if viewed by each variable, only the expenditure variable for food share, number of household members, and per capita expenditure with a confidence level of 95 percent has a significance value of <0.05, which means that the variable partially also affects the household food security status rural and urban areas in Kendal Regency. The logit regression estimation results show that the model accuracy test shows that 93.2 percent of the independent variables can explain the dependent variables, in this case, the food security of rural and urban households in Kendal Regency. It turned out that the types of regions, namely rural and urban, did not significantly influence household food security in Kendal Regency.

$$L_i = \ln\left(\frac{p_i}{1-p_i}\right) = 3{,}35 + 0{,}54 tipe - 0{,}082 PPP + 0{,}01 status\_menikah + 0{,}05 jk\_krt + 0{,}02 usia\_krt$$
$$+ 0{,}48 status\_kerja - 0{,}38 jml\_art - 0{,}36 pendidikan + 0{,}00 kapita + \varepsilon \quad \text{.....(3)}$$

Table 2: Results of Estimates of the Coefficient of Logit Regression Model of Rural and Urban Household Food Security in Kendal Regency

Variable	Notation	Regression Results		
		Coefficient	Sig.	Odds Ratio
Village / kelurahan classification	*tipe*	0.539	0.122	1.714
Food expenditure share	*PPP*	-0.082	0.000	0.921
Marital status of the head of the household	*status_menikah*	0.009	0.989	1.009
The sex of the head of the household	*jk_krt*	0.050	0.946	1.051
The age of the head of the household	*usia_krt*	0.020	0.160	1.020
Status of working head of household	*status_kerja*	0.483	0.308	1.621
Number of household head members	*jml_art*	-0.380	0.003	0.684
The highest education of the head of the household	*pendidikan*	-0.360	0.099	0.698
Household per capita expenditure	*kapita*	0.000	0.000	1.000
N = 791				
P-value Omnibus Test	0.000			
P-value Hosmer and Lemeshow Test	0.981			
Overall Percentage	93.2			

5.2 Estimated Logistic Regression Results of Food Security for Rural Households in Kendal District

Based on the analysis techniques that have been carried out, the following in Table 3 results in estimating the food security of rural households in Kendal Regency using logistic regression. The following are displayed logistic coefficient values, odds ratios, the goodness of fit test, number of observations, a significance level of independent variables and standard errors with independent variables of food share expenditure, per capita expenditure, marital status of head of household, household head gender, age of house head stairs, working status of head of household, number of household members, and highest education of the head of the household. The logit model regression equation obtained from the regression results conducted in this study can be seen in Table 3.

According to the logit regression results, the results of the omnibus test have a significance value of 0.00 with a confidence level of 95 percent (p <0.05) which means that expenditure on food share, marital status of head of household, sex of household head, age of household head, the working status of the head of the household, the number of household members, the highest education of the head of the household, and the per capita expenditure simultaneously (together) affect the status of food security in rural households in Kendal Regency. The Hosmer and Lemeshow Test results have a significance value of 0.427 (> 0.05) so that they accept H0, which indicates that the model can be accepted, and hypothesis testing can be done because there is no significant difference between the model and the value of its observations. Meanwhile, if viewed by each variable, only the variable share of food expenditure, expenditure per capita, working status of the head of the household, and the number of household members with a confidence level of 95 percent has a significance value of <0.05, which means that the variable partially influences on the status of food security for rural households in Kendal Regency. The logit regression estimation results show that the model accuracy test shows that 93.3 percent of the independent variables can explain the dependent variables. In this case, the food security of rural households in Kendal Regency.

$$L_i = \ln(\frac{p_i}{1-p_i}) = 4{,}57 - 0{,}074\,PPP + 0{,}00\,kapita + 0{,}23\,status\_menikah - 0{,}44\,jk\_krt$$
$$- 0{,}01\,usia\_krt - 0{,}57\,pendidikan + 1{,}43\,status\_\ker ja - 0{,}48\,jml\_art + \varepsilon \quad \text{.....(4)}$$

Table 3: Results of Estimates of the Coefficient of Logit Regression Model of Rural and Urban Household Food Security in Kendal Regency

Variable	Notation	Regression Results		
		Coefficient	Sig.	Odds Ratio
Food expenditure share	PPP	-0.074	0.004	0.929
Household per capita expenditure	kapita	0.000	0.000	1.000
Marital status of the head of the household	status_menikah	0.229	0.801	1.257
The sex of the head of the household	jk_krt	-0.441	0.655	0.643
The age of the head of the household	usia_krt	-0.007	0.721	0.993
The highest education of the head of the household	pendidikan	-0.569	0.113	0.566
Status of working head of household	status_kerja	1.426	0.040	4.162
Number of household head members	jml_art	-0.480	0.008	0.619
N = 356				
P-value Omnibus Test	0.000			
P-value Hosmer and Lemeshow Test	0.427			
Overall Percentage	93.3			

5.3 Estimated Logistic Regression Results of Urban Household Food Security in Kendal Regency

Based on the analysis techniques that have been carried out, the following are in Table 4, the results of the estimation of urban household food security in Kendal Regency using logistic regression. The following are displayed logistic coefficient values, odds ratios, the goodness of fit test, number of observations, significance level of independent variables and standard errors with independent variables of food share expenditure, per capita expenditure, marital status of head of household, household head gender, age of house head stairs, working status of head of household, number of household members, and highest education of the head of the household. The logit model regression equation obtained from the regression results conducted in this study can be seen in Table 4.

According to the logit regression results, the results of the omnibus test have a significance value of 0.00 with a confidence level of 95 percent (p <0.05) which means that expenditure on food share, marital status of head of household, sex of household head, age of household head, the working status of the head of the household, the number of household members, the highest education of the head of the household, and the per capita expenditure simultaneously (together) affect the food security status of urban households in Kendal Regency. The Hosmer and Lemeshow Test results have a significance value of 0.999 (> 0.05) so that they accept H0, which indicates that the model can be accepted, and hypothesis testing can be done because there is no significant difference between the model and the value of its observations. Meanwhile, if viewed by each variable, only the variable share of food expenditure, expenditure per capita, and age of the head of the household with a confidence level of 95 percent have a significance value of <0.05, which means that the variable partially also affects the status of household food security urban areas in Kendal Regency. The logit regression estimation results show that the model accuracy test shows that 94 percent of the independent variables can explain the dependent variables, in this case, the urban household food security in Kendal Regency.

$$L_i = \ln(\frac{p_i}{1-p_i}) = 2{,}28 + 0{,}00\,kapita - 1{,}00\,PPP + 0{,}01\,status\_menikah + 0{,}01\,jk\_krt + 0{,}07\,usia\_krt$$
$$- 0{,}08\,pendidikan - 0{,}48\,status\_\ker ja - 0{,}37\,jml\_art + \varepsilon \quad \text{.....(5)}$$

Table 4: Results of Estimates of the Coefficient of Logit Regression Model of Rural and Urban Household Food Security in Kendal Regency

Variable	Notation	Regression Results		
		Coefficient	Sig.	Odds Ratio
Household per capita expenditure	kapita	0.000	0.000	1.000
Food expenditure share	PPP	-0.100	0.001	0.905
Marital status of the head of the household	status_menikah	0.008	0.995	1.008
The sex of the head of the household	jk_krt	0.006	0.996	1.006
The age of the head of the household	usia_krt	0.072	0.009	1.075
The highest education of the head of the	pendidikan	-0.077	0.798	0.926

Variable	Notation	Regression Results		
		Coefficient	Sig.	Odds Ratio
household				
Status of working head of household	status_kerja	-0.480	0.558	0.619
Number of household head members	jml_art	-0.369	0.073	0.691
N = 435				
P-value Omnibus Test	0.000			
P-value Hosmer and Lemeshow Test	0.999			
Overall Percentage	94.0			

6 Conclusion

The type of region (rural and urban) did not significantly influence the status of Kendal District household food security. The status of food security for rural households in Kendal Regency is influenced by the expenditure of food share, household per capita expenditure, working status of the head of the household, and the number of household members, while the status of food security for urban households in Kendal Regency is influenced by household per capita expenditure, expenditure on food share, and age of household head.

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