INCOME DISTRIBUTION AND FOOD SECURITY OF FARM HOUSEHOLD IN SLEMAN DISTRICT, YOGYAKARTA

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Abstract

The objectives of the study are to 1) identify the income distribution among farm households, 2) identify food security of farm household level, and 3) analyze the determinants of farm household food security in Sleman district. The study was conducted in Depok and Godean sub districts, Sleman district. The location was chosen purposively by considering its characteristic. Depok subdistrict represents sub urban area, while Godean subdistrict represents rural area. Sixty five farm households was interviewed at random. The Gini ratio was applied to measure the equality of income distribution among households. The Jonsson and Toole clasification of food security was used to identify the farm household food security. An ordinal logistic regression model was employed to analyze the determinants of farm household food security. The study shows 1) the onfarm income is high unequally distributed among farm households, 2) farm household are less secure 46.2 percent, secure 33.8 percent, vulnerable 12.3 percent and insecure 7.7 percent, 3) the determinants of farm household food security are the price of rice, price of sugar, family size, off farm income and asset.

Keywords: *farm household income, income distribution, household food security.*

Introduction

As a basic needs for every human being, food will always be one of the main issue at the present and in the future. Thus, the importance of food has raised many concepts of food, one of the most noted concept is the food security, in particular at the household level.

Food security has a strategic role in the development of a nation. In the macro level, it takes role as one of the main pillars supporting sustainable economics and national security. Meanwhile, in the micro level, food security shows its importance due to the facts that access to suffficient food and nutrition forms the basic human right. Moreover, food holds an important rolein the creation of the quality human resources (Hermanto, 2005 *cit*. Rusastra, *et.al*., 2008).

Achieving food security at the micro level-household level- is not simple matter at all. It was recognized that quiet hard to cope with the distortion sources to access to food, which has led to insufficient consumption of energy and protein. It need to be overcomed in order to develop the quality of human resources (Sukirman, 2002 *cit*. Hardono, 2003). The

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past experience revealed that high food availability in the market/macro level did not guarantee the high food security at the household/micro level, at the same time. There was a paradox hunger, when household lost their capability to access to food because of the decreasing of their purchasing power (Simatupang, 1999).

The study of National Food Security Council (DKP) and the World Food Programme on 2005 showed that household food security in Indonesia has not been achieved evenly. Among 265 districts in Indonesia, there was 100 districts which was insecure and lack of nutrient adequacy. Thus condition was caused by the lack of land ownership, limited natural resources, limited knowledge and skills of the human resources, lack of access to capital, and inadequate facilities and infrastructure (Ariani *et.al.,* 2006).

Jamhari (2011) analyzed household food security in Central Java province. Susenas data comprises 7.109 rural and urban households was used in the research. Household food security is measured by Jonsson and Toole cross classification between share of household food expenditure and the consumption energy. The result showed 53 percent household are secure, while the vulnerable, less secure and insecure households are 24 percent, 17 percent and 5 percent, respectively. The study also revealed that urban household food security was better than rural household. The determinants of household food security are price of fruits, price of instant noodles, price of food and beverages, and number of family member which was negatively significant. Meanwhile, income and age of head household was positively significant.

The study of Troesch (2003) *cit*. Linguist, *et.al*. (2007) revealed that the level of farm household food self sufficiency was found to be directly correlated with size of paddy land endowment. Household with a larger endowment were found to have fewer food shortages than those with smaller endowment of paddy land.

Food security is not directly determined by changes in income, but by the effect of a change in income has on peoples access to food. In summary, the income inequality compounds the problem of food insecurity and poverty in low income countries (Peters and Saphouri, 1997).

Considering all mentioned above, this study will emphasize on farm household income distribution, farm household food security and the determinants of farm household food security.

Research Method

The study was conducted in Sleman district. Depok and Godean subdistricts was chosen purposively by considering the characteristics, which representing urban and rural area, respectively. The sixty five farm households was interviewed at random.

To understand the income distribution, Gini ratio was applied. According to Oshima (1976) *cit* Supriyati *et.al.* (2004), income are unequally distributed in low rate if Gini<0,4, unequally distributed in medium rate if 0,4<Gini<0,5 and unequally distributed in high rate if Gini>0,5.

The Gini ratio can be calculated as (Riemenschneider, 1976),

$$GR = 1 - \sum_{i=1}^{k}(f_{i+1} - f_i)(y_i + y_{i+1}) \qquad (1)$$

Where,

k : number of class/group
f_i : proportion of cumulative household number of class of-i
y_i : proportion of cumulative income amount of class of-i

Farm household food security was measured by applying the Jonsson and Toole classification,

Table 1. Jonsson and Toole's Classification of household food security

Consumption of Energy by Adult	Share of Food Expenditure	
	Low (≤60% of expenditure)	High (>60% of expenditure)
Sufficient (>80% of requirement)	Secure	Vulnerable
Not sufficient (≤80% of requirement)	Less secure	Insecure

Source: Maxwell, et.al. (2000)

To analyse the determinants of farm household food security, an ordinal logistic regression model was employed.

$$FSS_i = Ln\left(\frac{P_i}{1-P_i}\right) \qquad (2)$$

$$FSS_i = Ln\beta_0 + Ln\beta_1 \text{PRi} + Ln\beta_2 \text{PSu} + Ln\beta_3 \text{PChi} + Ln\beta_4 \text{PEgg} + Ln\beta_5 \text{POil} + Ln\beta_6 \text{POut} + Ln\beta_7 \text{Age} + Ln\beta_8 \text{Fam} + Ln\beta_9 \text{IOn} + Ln\beta_{10} \text{IOff} + Ln\beta_{11} \text{Asset} + \delta_1 \text{DNs} + \delta_2 \text{DLoc} \quad (3)$$

FSS_i	:	Farm household food security (1-insecure, 2-less secure, 3-vulnerable, 4-secure)
Pri	:	Price of rice (Rp)
Psu	:	Price of sugar (Rp)
Pchi	:	Price of chicken meat (Rp)
Pegg	:	Price of egg (Rp)
Poil	:	Price of frying oil (Rp)
Pout	:	Price of output/paddy (Rp)
Age	:	Age of head household (years)
Fam	:	Family size (persons)
Ion	:	Onfarm income (Rp/year)
Ioff	:	Off farm income (Rp/year)
Asset	:	Value of assets owned (Rp)
Ns	:	Dummy of education (1-no schoolling, 0-other)
Loc	:	Dummy of location (1-Depok, 0-Godean)
β_0	:	Constant
$\beta_1 \ldots \beta_{11}$	:	Regression parameter
$\delta_1 \ldots \delta_2$	:	Dummy regression parameter

Result and Discussion

Income distribution

In the macro level, income distribution among households describes how people get benefit of 'the development pie'. In ideal condition, the income should be equally distributed among people. Once it achieved, it means that people has the same opportunity to access economics sources. Table 2 shows household income and its distribution.

Table 2. Household Income and Its Distribution

Item	Household Income		
	Onfarm	Off-farm	Total
Income Average (Rp/yr)	2,973,249 (0.14)	17,917,154 (0.86)	20,890,403
GR	0.67	0.45	0.40

Source: Primary data (analyzed, 2012)

As shown in the Table 2, the contribution of onfarm income to the household income is less than off farm income. It is likely caused by pest attack (rat attack) that bring consequences to the farmers. Most of paddy field was fail to harvest, that means a big loss suffered by farmers. Meanwhile, off farm income was distributed more equal than onfarm income, an indication that farm household access to off farm income sources tends to increase and there are more opportunity to work in off farm sector. It gives benefit to farm household to get another source of income, which could support household when facing off-season or pest attack.

Lorenz curves shows visualization of income distribution. As shown in Fig.1, it is clearly shown that onfarm income is the one that most unequally distributed. It curve drawn farthest from the perfect equal distribution line (diagonal line). Household total income is be more equally distributed than both onfarm and off farm income. It can be said that off farm income has repaired the household income distribution.

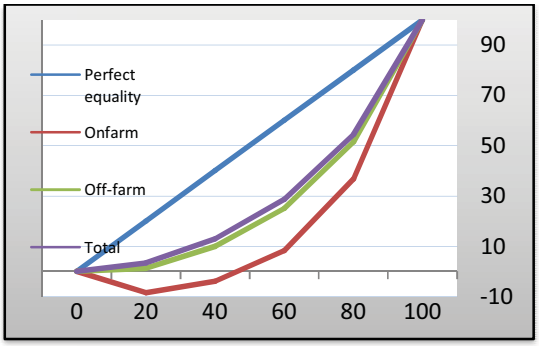

Figure 1. Lorenz curve of the household income distribution
Source: Primary data (analyzed, 2012)

Household Food Security

Household food security is considered better to explain food security than in the higher level, regional or nation. The main problem of food security is the lack of access to food other than aggregate shortage of food supplies. Household purchasing power closely linked with access to food and nutrient adequacy.

According to household food security classification (Jonsson and Toole method), households in Sleman district can be categorized into four groups of food security; that are 33.8 percent secure, 12.3 percent vulnerable, 46.2 percent less secure and 7.7 percent insecure. Most of the household are categorized as less secure and secure, that means most of household spent no more than 60 percent of their income for food. The difference between those two group is the consumption of energy. Farm households indicate starting to

change and attempting to adapting to a change in life style and livelihood. Non food expenditure tend to increase at the present such as telecommunication, vehicle (private transportation), education, house and clothing. In the otherside, they often ignore the need of nutrious food. For example, there are only few households serve fruits as a part of their daily meal.

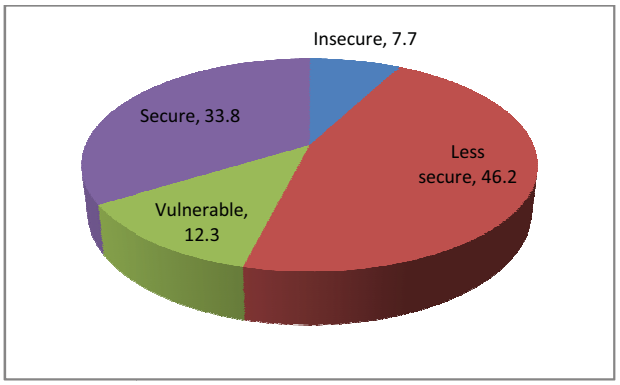

Figure 2. Household Food Security in Sleman District
Source: Primary data (analyzed, 2012)

Determinants Of Household Food Security

Determinants of farm household food security are presented in Table 4 as follow,

Table 4. Determinants of Household Food Security

Variable	Expected sign	Coefficient		Sig.
Pri	-	14.129	*	.060
Psu	-	4.297	**	.039
Pchi	-	10.712		.194
Pegg	-	-1.307		.383
Poil	-	.958		.624
Pout	+	-.602		.441
Age	+	-1.580		.274
Fam	-	-2.788	***	.001
Ion	+	.125		.715
Ioff	+	.497	*	.060
Asset	+	.147	**	.036
Ns	-	1.075		.651
Loc	+/-	.311		.138
Log likelihood		126.884		
LR stat		26.343		
Prob LR stat		0.015***		
Pseudo R^2 (Mc Fadden)		0.172		

Source: Primary data (analyzed, 2012)

As shown in the Table 4, the ordinal logistic regression model explains 17.2 percent of the total variations in the household food security. All of the parameters include in regression are significantly different from zero at 1 percent level. The determinants of farm household food security are price of rice, price of sugar, family size, off farm income and value of asset owned.

The price of rice and price of sugar are significantly determine household food security. The positive sign is different from the expected sign, indicates that both rice and sugar are staple food, household will remain to buy in spite of the increase of the price. Family size has negative sign and statistically significant. The bigger family size will lead to the decrease of probability of household food security. In the future, *Keluarga Berencana* (family planning program) need to be promoted and adopted by household.

Off farm income and assets owned are also statistically significant and have positive sign. Income could be an indicator which describes capability of the household to access to food. The higher income obtained, the higher access to food that households have. Based on the result, off farm income has important role in increasing probability of farm household food security. Because of its importance, off farm income need to be increased by promoting entrepreneurship culture and creating new employment in the off farm sector.

Asset is also statistically significant and has positive sign. The probability of household food security will be higher when household own the higher value of assets. Household income should be wisely managed. The surplus income, after deducted food and non food expenditure, will be better if it kept as saving or transformed into high productive asset such as jewelry (gold for instance) or livestock which has opportunity to gain an extra income. The analysis also shows that onfarm income is not statistically significant.

Conclusion and Recommendations

Onfarm income has small contribution to farm household income. It also high unequally distributed. Meanwhile, off farm income more equally distributed and it has bigger contribution to farm household income. Off farm income is also statistically significant and has positive effect to farm household food security.

Farm household in Sleman district are mostly categorized into less secure and secure, each by 46.2 percent and 33.8 percent, respectively. The determinants of farm household food security, other than off farm income are price of rice, price of sugar, family size, and assets owned.

Considering the fact, that off farm income has positive effect on household food security and statistically significant, farm households should be assisted to diversify their sources of income so that household be able to face off season, when onfarm income couldnt be expected due to pest attack for instance. Promoting entrepreneurship culture and creating new employment will open opportunity for farm household to obtain new sources of income.

In view of the negative impact of family size on the farm household food security, farm household could adopting modern family planning by joining family plan program (*Keluarga Berencana*).

Farm household should be educated on the need to manage income surplus by saving or purchasing assets which have high opportunity to gain an extra income. Investment on jewelry (gold for instance) or livestock will help household to improving their economics.

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