

# THE ROLE OF WOMAN ON HOUSEHOLD FOOD SECURITY IN SLEMAN DAERAH ISTIMEWA YOGYAKARTA

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## Abstract

*The objectives of this research are (1) to know the diversification design of food material in household level, (2) to analyze the factors that influenced the role of female in food diversification for food security reason in household level and (3) to analyze the factors that influenced the diversification design of food material in household level. The method of this research is descriptive method with the case study at Sleman Regency, Yogyakarta Special Region Province. The primary data is collected from 50 respondents of female in household level using the simple random sampling and the regression analyze with Ordinary Least Square (OLS) method is applied for the data analysis. The result shows that the diversification design of food material in household level is mainly the rice paddy which is followed by potatoes, noodles, wheat and corn. The main factors that influence the role of female in food diversification for food security is the household income and the numbers of family dependent. Furthermore, the factors that determine the diversification design of food material are household income, product image and the number of family dependent.*

**Keywords:** *role of female, food diversification, food security, household level*

## INTRODUCTION

Food is most important human basic need. In this case, fulfilling of food is part of individual human right. Quality and amount of food material will have an effect on the existence and survive of every human being. The availability of sufficient food, safe, qualified, nutritious, healthy and lawful are basic principal which must be fulfilled by every household in realizing the quality of mankind. Qualified human resources is most important element in development because it is determinant of success of development which in turn increase prosperity and lessen poverty level in Indonesia. Considering the importance of food sufficiency, then every state will prioritize development of food security as foundation for development of other sectors. Thereby, this food resilience is vital and strategic.

The commitment of Indonesia Government to develop food security is affirmed in Undang-Undang Ketahanan Pangan Nomor 7 Tahun 1996 about Food and Peraturan Pemerintah Nomor 68 Tahun 2002 about Food Security( BBKP, 2003). Food security is defined as the availability of food in sufficient number and quality, distributed with affordable prices and safe to be consumed by public so that they are able to do everyday activity. Based on the definition, then focus of food resilience is not only at supply and consumption side at aggregate level but also at

household level and individual in fulfilling their nutritious requirement ( Ariani, 2005).

The concept of food security which is internationally accepted is a situation where every household has access to obtain enough, healthy and safe food for all member of its family at any time. Four components which there must be available in food security namely: availability, accessibility, security and sustainability.

Food which we consume is as source of carbohydrate as well as source of protein, vitamin and mineral. The more complete of food we consume, then the more useful of food as source of energy and development. It is also important for health, food resilience and sustainability of human life.

Based on National Social Economic Survey data or SUSENAS ( BPS, 2005), it explains that at the last five years the household consumption of energy or protein had increased. Based on this data, consumption energy rose from 1.851 kilo calorie/capita/ day in 1999 to 1.997 kilo calorie/capita/day in 2005. However, in terms of the quality shows the significant decreasing rate in consumption grain food from 346,30 gram/capita/ day in 1999 to 319 gram/capita/day in 2005 or 126,30 kg/capita/year to 116,44 kg/capita/year. Meanwhile, for the consumption of other food materials (animal food, vegetable and fruit) is presented in Tables 1.

Table 1: Consumption of Food Material 1999 and 2005

Type of Food	1999 (gram/capita/day)	2005 (gram/capita/day)
Grains	346,30	319
Animal Food	59,30	87,40
Vegetables and Fruits	162,30	223,40

Source: Statistics, 2005

Table 1 explains that there is shifting of consumption pattern of household level in Indonesia. This also indicates food diversification in Indonesia. Position of women in household has a central role in food diversification and food security. Naturally, woman as housewife are the first person selecting, managing, processing, and serving for the family members.

Based on the background, then this research is aimed at identifying the pattern food diversification at household level, analysing the factors influencing the role of woman in the food diversification to realize food security in household level, and analysing the factors influencing the pattern of food diversification.

## THEORETICAL FRAMEWORK

### The Role of Woman in Household Food Consumption Pattern

Consumption on food is requirement for food security in household. Food security includes consumption of sufficient food either in quality or quantity. In term of food quality, it is related to nutrition aspect which is based on food diversification because none of food meets all nutrition requirements. Meanwhile, in terms of quantity is related to the amount of food consumed as well as nutrient consumption contained in food material (Department of Agriculture, 1999).

Based on those explanation, it can be told that nutrient consumption is measurement of food security in household level. This clearly explains the role of a woman in maintaining food resilience. According to FAO (1998), the role of a woman is to meet nutrition requirement of their family. In this case, a woman has important role in choosing food material and processing them becomes food ready for consumption.

### Food Diversification

Food diversification is a process of selecting of food material which do not depend on only one type of food but rather to various kinds of food material. This process is including the production, process, distribution and consumption of food at household level (Tampubolon, 1998). Basically, the food

diversification is addressed to vary food consumed by household including complimentary foods, vegetables, fruits and other food. This various food is expected to have better nutrition as result from various food.

To measure the variety of food is used the Expected Food Patterns or Pola Pangan Harapan (PPH). This approach enables to value the quality of food based on food score. The higher the score the more diversified the food and its composition.

### Group Of Food Material

Daily food material can be classified into nine food clusters. Each food cluster is different for any type of household depend on the availability of food resources. Food material is grouped as follows:

1. Grain: rice, corn, sorghum and wheat.
2. Corm: cassava, parsnip, potato, talas and sago
3. Animal food: fish, meat, milk and egg
4. Oil and fat: vegetable oil, palm oil
5. Fruit/oily seed: ivory coconut
6. Legume: soy, peanut, green peanut
7. Sugar: white sugar, palm sugar
8. Vegetable and fruit: all consumable vegetables and fruits
9. Other foods: tea, copy, chocolate, syrup, kitchen flavour, food and beverage

### The Consumption Theory

Every individual has its own utility of their consumption. Based on its characteristic, consumption goods can be classified into three types (Nicholson, 2000) i.e.:

1. Normal Goods. Normal goods is consumption goods which increases as increasing of consumer income.
2. Neutral Goods. Neutral goods is consumption goods which is independent to consumer income.
3. Inferior Goods. Inferior goods is consumption goods which decrease as increasing consumer income.

Consumer faces any combination of different goods and services. This combination will have different utility level so that the consumer choose combination which has highest utility level subject to income and and

price level. Mathematically, this utility maximization can be formulated as follows:

Utility function :  $U = U ( X_1, X_2, \dots X_n )$   
 Constraint :  $I = P_1 X_1 + P_2 X_2 + \dots + P_n X_n$

Where

- U = Utility level
- I = Income
- $X_i$  = quantity of goods consumed
- Pi = price of the goods

By Lagrange method will be obtained by relation between quantity demanded and its price, the price of other goods and earnings:

$X_1 = f_1 ( P_1, P_2, \dots P_n, I )$   
 $X_2 = f_2 ( P_1, P_2, \dots P_n, I )$   
 $X_3 = f_3 ( P_1, P_2, \dots P_n, I )$

In general demand function can be formulated by

$X_i = f_i ( P_1, P_2, \dots P_n, I )$

This function shows that demand for a good is a function of its price, the price of other goods either substitution goods or complementary, and earnings of consumer. In this case, combination good X and Y which has the highest utility is depicted in Diagram 1.

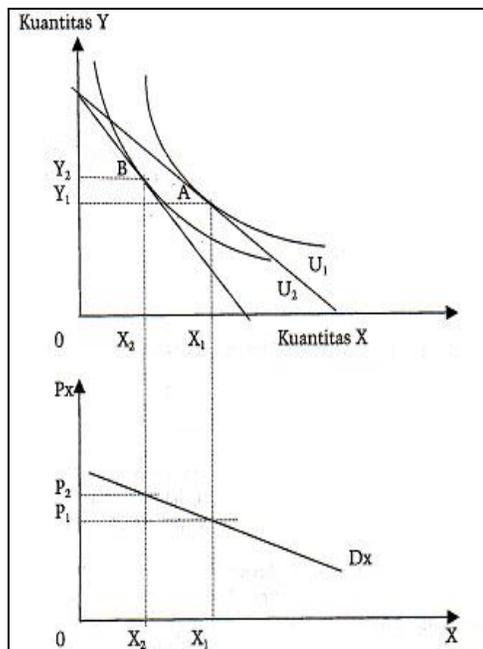


Diagram 1: Demand Curve

Diagram 1 explains that if all earnings (I) is spent so that  $0X_1$  good X will be obtained at utility level  $U_1$  in point of A ( with assumption of constant Y). If price of goods X is rising hence amount of goods bought will decrease ( $0X_2$ ) with utility level at  $U_2$  in point B. If the two points, A and B, are connected then it will be obtained the demand curve, that is curve showing by amount goods demanded

of various levels of price in order to have highest utility subject to limited budget.

Holding relative price of X and Y is constant, the increasing in earning from  $I_1$  to  $I_2$  and to  $I_3$  will raise the quantity demanded of goods X and Y, from  $X_1$  to  $X_2$ , to  $X_3$  and  $Y_1$  to  $Y_2$ , to  $Y_3$ .

**Hedonic Price Model**

This article uses the hedonic price theory and the demand theory. Ladd and Suvannunt (1976) expresses that demand function of a goods is influenced by the good characteristic because value or the price of every goods or product have the same marginal value as implicit value of the goods characteristic.

$$P = \sum_{j=1}^m X_j P_j + \mu$$

Where:

- P = The price of goods/product
- $X_j$  = Amount of characteristic j of a good/product
- $P_j$  = Value of characteristic j
- $\mu$  = error term

According to Unnevehr (1986) the price of goods estimated is useful to answer such question about whether consumer preference relates to its quality or not, whether the consumer preference is equal or not all around the world, and (c) how research result is applicable to improve the quality.

This estimated price is applicable to estimate of acquirement of higher consumer surplus. Ladd and Suvannunt (1976) have shown that this innovation will change the rice consumed ( $q_i$ ) if the amount from characteristic of rice ( $X_i$ ) and its price ( $P_j$ ) is remain constant.

The quality improvement will shift demand curve to right from D to  $D^*$ . The increase of quantity demanded is equivalent to increase of consumer utility. Consumer surplus obtained from consuming per unit of rice is:

$$G = \sum_{j=1}^m (X^*_{Rj} - X_{Rj}) P_{Rj}$$

Where:

- G = Consumer surplus from consumption of per unit of rice
- $P_{Rj}$  = The price of characteristic j
- $X^*_{Rj}$  = New value of characteristic j
- $X_{Rj}$  = Old value of characteristic j which is determined from one of unit

Brorsen, Grant and Rister ( 1984) use of Hedonic Price Model as follows:

$P_i = f ( V_{ii}, \dots, V_{ij}, U_i )$

Where:

$P_i$  = Consumer surplus per unit rice consumed  
 $V_{ij}$  = The price of characteristic  $j$   
 $j$  = 1,2, ..., n (characteristic quality)

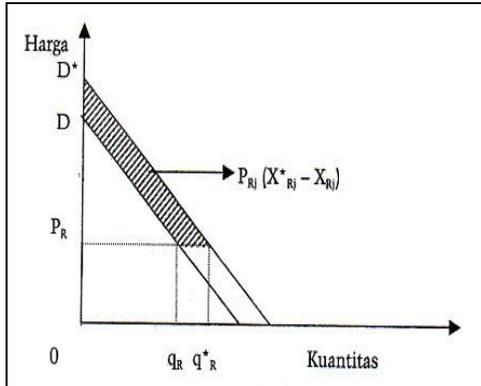


Diagram 2: Value Of Consumer Surplus of Improvement Quality

By using Hedonic Price function then the difference price of one goods because of having different characteristic will be appeared. This characteristic explains the quality of goods hence the higher the quality of goods, the higher the price of the good.

The hedonic price is used to in appraise the allocation of household spending on food materials, i.e.:

$$Y_i = P_i \cdot Q_i$$

Where:

$Y_i$  = Allocation spending on  $i$  th food material

## RESEARCH METHODOLOGY

Basic method used in this research is descriptive method. Descriptive method is a method of checking the status of a group of a human, an object, a set of condition, a thought system and or an event. The objective of this descriptive research is to make description on facts, characteristic and relationship amongst phenomenon investigated. In addition, this research is aimed at describing in detail on background, nature and characteristic of a case or status of individual which in turn becomes a general truth (Nazir, 1999). In this case, the object is the pattern of food diversification and the role of woman in realizing food security at household level in Sleman, Yogyakarta Special Region.

Respondent of this research is woman, as head or member of family, 17 year old or older, and livings in Sleman, Yogyakarta Special Region.

Data collected is both primary data and secondary data. Primary data is collected by random sampling so that each individual has same opportunity to be taken as sample. In

this case, the number of respondent is 50 from different household unit.

## RESULT

### Pattern of Food Diversification at Household Level in Sleman

Pattern of food diversification is closely related to pattern household consumption because the diversification pattern will have an effect on the volume of household consumption. Table 2 explains the pattern of food diversification at household level in Sleman, Yogyakarta Special Region.

Table 2: Pattern of Food Diversification at Household Level Sleman, DIY 2007

Type of Food	Consumption/capita/year (kg)
Rice	473,923
Noodle	108,266
Wheat	107,521
Corn	14,269
Potato	198,109

Source: Primary Data Analysis, 2007

Based on Table 2, it is known that the household in Sleman still rely on rice as their staple food. Consumption level of rice is 473,923 kg/capita/year ( 52%). Consumption on other food materials per year per capita is potato 198,109 kg/year/capita (22%), noodles 108,266 kg/capita/year (12%), wheat 107,521 kg/capita/year (12%), and corn 14,269 kg/capita/year (2%). Therefore the pattern of food diversification at household level in Sleman is rice, potato, wheat, noodles and corn.

### The Role of Woman in Food Diversification at Household Level in Sleman, Yogyakarta Special Region

Woman has important role in food diversification at household level since they plan, process and prepare food for their families. This role in food diversification is subject to the amount of its budget. Therefore, this budget should be managed in such manner to meet all food requirement of their families. If the available budget is limited, the cheaper food will be selected.

Data analysis uses OLS ( Ordinary Least Square) of multiple regression. Before performing any statistical test, this research runs test of classical assumption to obtain BLUE (Best Linear Unbiased Estimator) of regression. The test of classic assumption consists of multicollinearity, heteroskedasticity and autocorrelation. Model used as follows:

$$Y_i = f (I_h, I_f, A_f, E_f, S, DB, DI)$$

Where:

$Y_i$  = Consumption of food material of i-th household (Rp/capita/year)  
 $i = 1, 2, \dots, n$   
 $I_h$  = Household earnings (Rp/year)  
 $I_f$  = Woman earnings (Rp/year)  
 $A_f$  = Woman age (year)  
 $E_f$  = Woman education (year)  
 $S$  = Number of family (people)  
 $DB$  = Dummy of Less than 5 years old children  
 $DI$  = Dummy of information

Estimation result explains that all variables i.e. household earnings ( $I_h$ ), earnings of woman ( $I_f$ ), woman age ( $A_f$ ), education of woman ( $E_f$ ), number of family member ( $S$ ), and the dummies are jointly significant effect in influencing the dependent variable at 5 percent significant level. This is obtained from comparison of F-statistic (3,728) which is larger than its critical value (3,10).

Table 3 shows that 31,74% variation of the dependent variable can be explained by the all variables estimated i.e. household earnings ( $I_h$ ), earnings of woman ( $I_f$ ), woman age ( $A_f$ ), education of woman ( $E_f$ ), number of family member ( $S$ ), and the dummies in which these variables explain the role of woman in food diversification in Sleman. As for 0,6826 or equal to 68,26% are influenced by other factors not estimated in this model.

Two of seven variables has significant effect on dependent variable. They are earnings of household ( $I_h$ ) and number of family member ( $S$ ). Where as the other variables do not have significant influence at 10% significant level.

Table 3: Regression Analysis of The Role Of Woman in Food Diversification at Rumahtangga Level in Sleman, DIY 2007

Variables	Coefficient	t-statistic
$I_h$	0,029907	1,916*
$I_f$	-0,13870	-0,2197
$A_f$	3572,1	0,1225
$E_f$	370770	1,466
$S$	685710	2,895**
$DI$	276500	0,5484
$DB$	670270	1,151
$C$	-693600	-0,4543
$R^2$	0,4149	
$R^2$ Adjusted	0,3174	
F-statistic	3,728	
F-table	3,10	

Source: Primary Data Analysis, 2007

Notes \*\*\* = significant at 1% level  
 \*\* = significant at 5% level  
 \* = significant at 10% level

### Factors Influencing Food Diversification at Household Level in Sleman, Yogyakarta Special Region

Pattern of food diversification is form of food variety of household to meet their food requirement. Same as the previous analysis, variables are estimated using multiple regression to identify the factors influencing the pattern of food diversification at household level as follows:

$$Y_i = f(Ph, Phi, I_h, S, DT, PI)$$

Where:

$Y_i$  = Spending allocated on main food material at household level (Rp/capita/year)

$Ph$  = Hedonic price

$Phi$  = The price of i-th other food materials ( $i=1, 2, \dots, n$ ) (Rp/year)

$I_h$  = Household earnings ( Rp/year)

$S$  = Number of family member of household

$DT$  = Dummy Variable of Taste

$PI$  = Product image

Estimation result shows about 31,74% of food diversification pattern can be explained by all variables i.e. hedonic price ( $Ph$ ), the price of i-th other food materials ( $Phi$ ), earnings of household ( $I_h$ ), number of family member of household ( $S$ ), dummy variabel of taste ( $DT$ ) and product image ( $PI$ ). The remaining is explained by other factors not estimated in this model. At 5% significant level, all variables are jointly significant in influencing the dependent variable. This is inferred from the value of F-statistic which is larger than its critical value 2,315.

Table 4: Regression Analysis on Factors Influencing Food Diversification at Household Level in Sleman, DIY 2007

Variables	Coefficient	t- statistic
$Ph$	-368,76	-0,4899
$Phi$ total	-9,3999	-0,7069E-01
$I_h$	0,027573	1,824*
$S$	603020	2,704***
$DT$	500660	-0,7839
$PI$	377690	1,830*
$C$	1342200	0,3944
R-Square	0,4101	
R-Square Adj	0,3278	
F-Statistic	4,982	
F-Table	2,315	

Source: Primary Data Analysis, 2007

Notes \*\*\* = significant at 1% level  
 \*\* = significant at 5% level  
 \* = significant at 10% level

Table 4 explains that 33% variation of dependent variable can be explained by its independent variables. This is good enough as it is a social research (Schoter, 1999). However three of six variables estimated, holding other variables are constant, which show the significant influence namely earnings of household, number of family member and product image. Whereas, the other variables

which are hedonic price, price of other food materials, and taste dummy variable do not have significant effect at 10% significant level. The result shows that factors influencing the pattern of food diversification at household level are household earning, number of family member and product image.

#### CONCLUSION

1. Pattern of food diversification at household in Sleman, Yogyakarta Special Region is rice, potato, wheat, noodles and corn.

2. Factors influencing the role of woman in food diversification material at household level are its earnings and number of family member.
3. Factors influencing the pattern of food diversification at household level are its earnings, number of family member and product image.

Based on this conclusion, it is urgently developed food diversification especially non-rice food materials based on local potential such as cassava, corn, potato and other foods.

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