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THE DETERMINANT OF FOOD SECURITY AMONG HOUSEHOLD WITH DISABILITY IN INDONESIA: SUSTAINABLE LIVELIHOOD PERSPECTIVE

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Abstract

This study aims to examine the determinant of food security in a disabled household in Indonesia. This research is analyzed with a sustainable livelihood perspective and modified with household characteristics in a disabled household. The research data used cross section data covering IFLS wave 5 data taken in 2014-2015 using sample of 2,407 households with disabilities based on their chronic conditions. This study uses a binary logistic regression method with the dependent variable being food security status, while the independent variable is a sustainable livelihood perspective (covering maternal education, income, disaster risk, access to information, arisan participation) and household characteristics (covering the number of household members). The results showed that all independent variables, both mother's education, income, natural disaster risk, access to information, arisan participation, and a number of family members had a statistically significant effect on the food security of disabled households. It is concluded from the study that empirical research results are useful to consider in formulating policies related to food security for disabled households.

Keywords: disability, food security, sustainable livelihood, household characteristic

1. Introduction

Since the 1974 world food conference, the term food security has continued to develop and diversify by several researchers (Bedeke, 2012). Previous research on food security has been carried out by Jonathan et al. (2020) in Nigeria; Sabogu et al. (2020) in Northern Ghana; Abdullah et al. (2019) in Pakistan; Manlosa et al. (2019) in Ethiopia; Twongyirwe et al. (2019) in Uganda; Niragira et al. (2018) in Burundi; Widada et al. (2017) and Yuniarti & Purwaningsih (2017) in Indonesia; Ali et al. (2016) in Bangladesh; Sultana & Kiani (2011) in Pakistan. Previous studies on food security were examined from several multidimensional aspects such as economic, social, natural, physical, financial, and cultural. Discussions on household food security are the main focus of the world to tackle the problem of global hunger. Food insecure households tend to experience hunger because access to food is very low, thus affecting food availability (Damayanti, 2018). Disability households face much greater food insecurity than non-disabled households (Heflin et al., 2019; Sonik et al ., 2016; Coleman-Jensen & Nord, 2013). Limited mobility, limited vision, limited thinking, limited hearing, limited vision, functional limitations, and limited financial management make disabled households experience

Vol. 5, No.08; 2021

ISSN: 2456-7760

food insecurity (Heflin et al ., 2019). In addition, discrimination, stigma, and shocks in various aspects such as economic, environmental, and social also cause households with disabilities to become food insecure (Coleman-Jensen & Nord, 2013).

Research on food security is often correlated with Sustainable Livelihood in several developing countries such as Uganda, Malaysia, and Ethiopia to address food problems (Ibrahim et al., 2018; Jessup-varnum, 2018; Manlosa et al., 2019). Jessup-varnum (2018) explains that food security in Uganda is an important aspect in the household livelihood perspective. Households that face economic, environmental, social, and physical problems, the household's food needs experience food insecurity. Sustainable Livelihood (SL) is a perspective based on how households manage and solve food problems (Singh & Hiremath, 2010). The essence of the Sustainable Livelihood perspective is connecting aspects of vulnerability to alleviating household poverty which focuses on several aspects including human capital, natural capital, physical capital, financial capital, and social capital. These aspects derive meaning and value from institutions, organizations, and social environments that are part of the transformation of structures and processes to increase incomes, welfare, and sustainable natural resource management (Kollmair & St. Gamper, 2002). It is suspected that human capital, natural capital, physical capital, financial capital, and social capital affect the food security of disabled households. This paper aims to analyze determinant food security of disability households in Indonesia with a sustainable livelihood perspective, namely human capital (education of mother), financial capital (income), physical capital (access of information), natural capital (natural disaster), and social capital (participation of *arisan)*. The selection of Indonesian households with disabilities as research areas was based on the consideration that households with disabilities in Indonesia have low per capita expenditures, in addition to stigma and discrimination received by persons with disabilities resulting in low access to mobilization (Badan Penelitian dan Pengembangan Kesehatan, 2018). This research is expected to be useful as a consideration in formulating policies related to food security for disabled households based on empirical research results.

2. Data and Method

2.1 Research Data

This research uses secondary data were obtained from the Indonesia Family Live Survey (IFLS) wave 5 which was carried out in 2014-2015 (Strauss et al., 2016). In this study, not all households were analyzed, but limited to households that have household members with disabilities in IFLS wave 5. The criteria for persons with disabilities are determined based on the type of disability in IFLS 5 book 3B section CD related to chronic conditions which include someone with a physical disability, brain damage, imperfect vision, imperfect speech, mental retardation, autism in a household so that the number of households with disabilities analyzed was 2,407 households.

2.2 Research Variables

The dependent variable of this study is the scale of food security as measured by cross classification between the proportion of food expenditure and energy adequacy conducted by Jonsson and Toole (1991) in Maxwell et al. (2000). The proportion of food expenditure is calculated by dividing food expenditure by total expenditure (which is obtained by adding up

Vol. 5, No.08; 2021

ISSN: 2456-7760

food expenditure and non-food expenditure). Food expenditure data is obtained from IFLS data book 1 section KS1TYPE (KS02), namely "During the last one week, how much was the total expenditure for this type of food". Non-food expenditure data was obtained from IFLS data book 1 section KS2TYPE and KS3TYPE, namely "Approximately the total value of non-food materials consumed by this household which came from their own business or received from other sources during the past month". The formula for calculating the proportion of food expenditure is as follows:

(1)

$$PFE = \frac{FE}{TFE} x\ 100\%$$

Information:

PFE: proportion of food expenditure (%)

FE: food expenditure (rupiah)

TFE: total household expenditure (rupiah)

Meanwhile, energy adequacy is the ratio between the total energy consumed and the energy adequacy rate (%). The determined AKE is 2,150 kcal/cap/day (Food Security Agency of the Ministry of Agriculture, 2019). The determination of the total energy consumed is done by converting the type of food consumed in the IFLS book 1 section KS data (KS4TYPE) with the calorie level determined by the Indonesian Ministry of Health through the *Nutrisurvey2007* software (Kemenkes, 2016). The formula for calculating energy adequacy is as follows:

(2)

$$TEC = \frac{EC}{AKE} x\ 100\%$$

Information:

TEC: total energy adequacy (%)

EC: sufficient energy (calories)

AKE: energy adequacy rate (kcal/cap/day)

The criteria for measuring food security using the method of expenditure and energy adequacy are as follows:

Table 1. Measuring Indicator Household Food Security

Vol. 5, No.08; 2021

ISSN: 2456-7760

Calorie Intake	Proportion of Food Expenditure (PFE)	
	Low (<60% of total expenditure)	**High (≥60% of total expenditure)**
Sufficient (>80% from AKE *)	Food Secure (FoodSecure)	Food Vulnerable (Food Insecure)
Less (≤80% from AKE*)	Food Less Secure (Food Insecure)	Food Insecure (Food Insecure)

Source: Jonsson and Toole (1991) modified from Maxwell et al. (2000)
*AKE is Standard Indonesian Energy Sufficiency from food consumption equal to 2,150 kcal/capital/days (Widyakarya National Food and Nutrition, 2019).

In summary, the division of research variable categories is as follows:

Table 2. Definition of Operational Variables

Variable	Description
$ln\left[\frac{\pi_i}{(1-\pi_i)}\right]$	Food Security Index 1: Food Secure 0: Food Insecure (food vulnerable, food less secure, food insecure)
Mom_educ_d	Dummy for the education of the mother 1: high school more 0: high school down
Log_income	Natural logarithm of monthly income
Natural_disaster_d	Dummy for the risk of natural disaster 1: Yes 0: No
Access_info_d	Dummy for the access of information 1: Yes 0: No
*Arisan*_d	Dummy for the participation of *arisan* 1: Participate 0: Not Participate
Member	Number of family members

2.3 Analysis Method
The analytical method used in this research is the binary logistic regression model with the STATA tool. Model of binary logistic regression became one of the logistic regression models, the simplest of which is used to analyze is the relationship between the dependent variable (dichotomous) with independent variables (character polychotomous), whereas variable independent binary logistic regression using the data ber ordinal scale and ratio scale, while the

Vol. 5, No.08; 2021

ISSN: 2456-7760

dependent variable uses noun scale data l (Hosmer & Lemeshow, 1989). The probability function of each observation is as follows:

$$f(Y) = p^{Y}(1-P)^{1-Y} \quad (3)$$

The exponential conditions in the binary logistic regression equation are

$$Y(Y;\theta) = a(\theta)b(Y)\exp(\theta)\,d(Y) \quad (4)$$

X_1,X_2…, X_k is a random variable that is thought to affect on, while it is the number of independent variables so that the equation becomes as follows:

$$c(\pi) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k \quad (5)$$

Then the binary logistic regression equation model becomes:

$$ln\left(\frac{\pi}{1-\pi}\right) = X^T\beta \text{ or written with } ln\left(\frac{\pi\,(X)}{1-\pi\,(X)}\right) = X^T\beta \quad (6)$$

Furthermore, the dependent variable model in logistic regression is$Y = \pi\,(X) + \varepsilon$. ε is the probability of one of two values, namely the first, and the probability of Y=1. Second, and the probability if Y = 0 and follows the binomial distribution (1,) with a mean value of zero and variance.

The regression equation model for the determinants of factors affecting household food security for persons with disabilities is divided into two models as follows:

Model 1: Analyze the determinants of household food security with disabilities with a pure sustainable livelihood perspective.

$$ln\left[\frac{\pi_i}{(1-\pi_i)}\right] = \beta_{0i} + \beta_{1i} mom\_educ\_d + \beta_{2i}\log\_income - \beta_{3i} natural\_disaster\_d + \beta_{4i} acces\_info + \beta_{5i} arisan\_d + \varepsilon_i \quad (7)$$

Model 2: Analyze the determinants of household food security with disabilities with a pure sustainable livelihood perspective combined with household characteristics.

$$ln\left[\frac{\pi_{ij}}{(1-\pi_{ij})}\right] = \beta_{0i} + \beta_{1i} mom_{educ_d} + \beta_{2i}\log_{income} - \beta_{3i} natural_{disaster_d} + \beta_{4i} acces_{info} + \beta_{5i} arisan_d + \beta_{6i} member + \varepsilon_i \quad (8)$$

Note:

fsi: food security index, 1 is food secure and 0 is food insecure

mom_educ_d: dummy for the education of the mother

log_income: natural logarithm of monthly income

natural_disaster_d: dummy for the risk of natural disaster

access_info_d: dummy for the access of information

*arisan*_d: dummy for the participation of *arisan*

Vol. 5, No.08; 2021

ISSN: 2456-7760

member: number of family members
β: regression coefficient
i: household-i
ε: error

2.4 Testing Models and Hypotheses
2.4.1 Simultaneous model test
Simultaneous model test performed to examine the role of the independent variable on the dependent variable simultaneously or simultaneously. Simultaneous model testing is also called the *chi square* model test, with the following hypotheses:
H 0: β 1 = β 2 = ⋯ = βi = 0
H 1: at least one parameter βi ≠ 0

Likelihood Ratio Test:

$$G = -2ln\left[\frac{\left(\frac{n_1}{n}\right)^{n_1}\left(\frac{n_0}{n}\right)^{n_0}}{\prod_{i=1}^{n}\hat{\pi}_i^{y_i}(y-\hat{\pi}_i)^{1-y_i}}\right] \quad (9)$$

where:
n_1 = number of observations category 1
n_0 = number of observations category 0
G test statistic follows the chi-square distribution, to obtain a decision made a comparison with the value of χ 2 table, with degrees of freedom (db) = k-1, k is the number of predictor variables. Criteria for rejection (reject H_0) if the value G > χ 2 (, α) or if the P-value <α.

2.4.2 Partial hypothesis test
Testing partially used to test the effect of each βi individually in the model are obtained. Partial/individual test results will show whether a predictor variable is eligible to be included in the model or not. The hypothesis used for each variable is as follows:
H 0: βi = 0
H 1: βi ≠ 0

Wald's test statistics (W):

$$W = \frac{\hat{\beta}_i}{Se(\hat{\hat{\beta}}_i)} \quad (10)$$

and

$$SE(\hat{\beta}_i) = \sqrt{\left(\sigma^2(\hat{\beta}_i)\right)} \quad (11)$$

where:
SE (ß i) = standard error for the coefficient alleged βi

Vol. 5, No.08; 2021

ISSN: 2456-7760

ß i = the estimated value for the parameter (βi).
The resulting ratio dar i test statistic under the hypothesis H_0 will follow the standard normal distribution, to obtain a decision made a comparison with the standard normal distribution (Z). Criteria for rejection (reject H_0) if the value $W > Z\alpha/2$ or p - $value < \alpha$.

2.4.3 Coefficient of Determination
The value of R Square is used as the basis for interpreting the coefficient of determination. The coefficient of determination is a modification of Cox & Sneel R Square which produces a value between 0 and 1.

2.4.4 Interpretation of Results
In general, the odds ratio is a set of opportunities divided by other opportunities. The odds ratio value is defined as follows:

$$\Psi = \frac{\frac{\pi(1)}{[1-\pi(1)]}}{\frac{\pi(0)}{[1-\pi(0)]}} = \frac{e^{\beta_0+\beta_1}}{e^{\beta_0}} = e^{\beta_1} \quad (12)$$

If the value of = 1, then there is no relationship between the two variables. If the value of ψ <1, then there is a relationship between two variables negatively to change the category of the value of x and vice versa when ψ > 1.

3. Results and Discussion

3.1 Descriptive Statistical Analysis

Table 3 is a general descriptive description of the data used in the study which shows that the average food expenditure of disabled households in Indonesia differs between households with male and female household heads. The average household food expenditure disabilities with the head of the male household per month is approximately Rp 469,642, whereas average household food expenditure disabilities with female heads of household per month is approximately Rp 542,490.

Vol. 5, No.08; 2021

ISSN: 2456-7760

Table 3. Descriptive Statistics

Variable	Mean		Standard Deviation		Minimum		Maximum	
	M ale	Female	Female	Female	M ale	Female	M ale	Female
food expenditure (Rupiah)	469,642	542,490	371,808	459,311	15,000	22,000	3,452,000	3,198,000
Non-food expenditure (Rupiah)	256,411	347,608	784,308	815,038	3.854	3,471	2,070,000	7,300,000
AKE (Kcal/capital/days)	2,492	2.176	4.108	2.105	3	3	90.145	13,986
Education of Mother (Year)	10	9	4.5	4.9	0	0	16	16
Monthly Income (Rupiah)	2,212,614	1,947,134	2,145,935	2,091,288	62,500	62,500	12,100,000	12,100,000
Risk of natural disaster	0.21	0.27	0.4	0.44	0	0	1	1
Access information	0.77	0.67	0.41	0.46	0	0	1	1
Lottery club	0.36	0.37	0.48	0.48	0	0	1	1
Member (person)	4.38	3.79	1.78	2.11	1	1	15	15

Source: data processing (2021)

Average expenditure of non-food household disabilities with the head of the male household per month is approximately Rp 256,441, whereas average expenditure non-food household disabilities with female heads of household per month is approximately Rp 347,608. In terms of calorie and nutritional needs, both male and female household heads have an AKE above the calorie intake figure of 2,150 kcal/capital/days. Disability households with male heads of household have a higher average nutritional adequacy of 2,492 kcal/capital/days, when compared to disabled households with female heads of household, which is 2,176 kcal/capital/days. The results of the analysis show that both food and non-food expenditures in disabled households with a male household head are lower than those with a female household head. This shows that the role of a mother as a dual role greatly affects access to food and non-food needs in a household. The average education of a disabled household with a male head of household is 10 years, while the average education of a disabled household with a female head of household is 9 years. This shows that women's educational participation is lower than that of men. The average monthly income of disabled households with a male head of household is Rp. 2,212,614 when compared to the average monthly income of disabled households with a female head of household, which is Rp 1,947,134. The average natural disaster risk for disabled households with a male household head is 0.21, while the average natural disaster risk for a disabled household with a female household head is 0.27. This shows that disabled households with a female household head are more vulnerable to natural disasters when compared to disabled households

Vol. 5, No.08; 2021

ISSN: 2456-7760

with a male household head. The average access to information for disabled households with a male household head is 0.77, while the average access to information for disabled households with a female household head is 0.67. Disability households with a male household head have higher access to information when compared to disabled households with a female household head. Disability households with a female household head are more participatory in the *arisan* program when compared to disabled households with a male household head. The average participation of disabled households with male household heads is 0.36, while the average participation of disabled households with female household heads is 0.37. The average number of disabled household members with a male household head is 4 people, while the average number of disabled household members with a female household head is 2 people.

3.2 Determinants of food security of disabled households in Indonesia

In the research method, it is stated that to find out the factors that affect the food security of households with disabilities, binary logit regression analysis is carried out with food security status as the dependent variable and several independent variables that are thought to affect the food security of disabled households. This research is divided into two model equations, namely the pure sustainable livelihood model and the sustainable livelihood model which is combined with household characteristics. The following are the results of the test and model analysis using the STATA tool:

Table 4. Model Test Results and Hypotheses

Variable	Models	
	Model 1	Model 2
Goodness of Fit Pearson	0.090	0.152
LR chi ^{2}	228.05	264.59
Probability chi ^{2}	0.000	0.000
Pseudo R ^{2}	0.738	0, 856

Source: data processing (2021)

Table 4 shows that Pearson's goodness of fit value in model 1 is 0.090 and model 2 is 0.152. Pearson's goodness of fit value in model 1 and model 2 is greater than a significant value of 0.05 which means that the specified model is appropriate and can be used for further analysis. The LR chi-square value of model 1 is 228.05 (probability < 0.05) and model 2 is 264.59 (probability < 0.05) with a significant level of 5%. This suggests that either model 1 and model 2, in a simultaneous test rejects H_0 and accept H_1 which means that there is at least one independent variable statistically significant effect on household food security disability. Value pseudo R ^{2} model 1 worth 0.738 which means that the variable mother's education, income, disaster risks, access to information and participation can explain the variable data gathering food security 73.8%, while the rest is explained variables outside the model. In model 2, Rated pseudo R ^{2} of 0.856 which means that the variable mother's education, income, disaster risks, access to information, participation of social gathering, and the number of family members were able to explain the variable data amounted to 85.6% of food security, while the rest is explained variables beyond model.

Vol. 5, No.08; 2021

ISSN: 2456-7760

Table 5 shows the partial test of each variable in each model. Following are the results of the partial test of model 1 and model 2:

Table 5. Partial Test Results

Variable	Partial Test			
	Model 1	Description	Model 2	Description
Constanta	0.000*	Significant	0.000*	Significant
Human capital				
mom_educ_d	0.013*	Significant	0.066**	Significant
Financial_capital				
log_income	0.000*	Significant	0.000*	Significant
Natural capital				
natural_disaster_d	0.007*	Significant	0.004*	Significant
Physical capital				
access_info_d	0.081**	Significant	0.038*	Significant
Social capital				
*arisan*_d	0.057**	Significant	0.028*	Significant
Household characteristics				
Member	-	-	0.000*	Significant

Source: data processing (2021)

Note: * significant on α=5%, ** significant on α=10%

Table 5 shows that all variables in model 1 and model 2 have a significant effect on the food security of disabled households. In model 1, the mother's education variable has p-value of 0.013 which means that p-value < α so rejects H_0. So it can be concluded that the mother's education variable has a statistically significant effect on the food security of disabled households. The income variable has p-value of 0.000 which means that p-value < α so rejects H_0. So it can be concluded that the income variable has a statistically significant effect on the food security of disabled households. The natural disaster risk variable has p-value of 0.007 which means that p-value < α so rejects H_0. So it can be concluded that the natural disaster risk variable has a statistically significant effect on the food security of disabled households. The information access variable has p-value of 0.081 which means that p-value < α so rejects H_0. So it can be concluded that the variable of access to information has a statistically significant effect on the food security of disabled households. The *arisan* participation variable has p-value of 0.057 which means that p-value < α so rejects H_0. So it can be concluded that the *arisan* participation variable has a statistically significant effect on the food security of disabled households. In model 2, the mother's education variable has p-value of 0.066 which means that p-value < α so rejects H_0. So it can be concluded that the mother's education variable has a

Vol. 5, No.08; 2021

ISSN: 2456-7760

statistically significant effect on the food security of disabled households. The income variable has p-value of 0.000 which means that p-value < α so rejects H_0. So it can be concluded that the income variable has a statistically significant effect on the food security of disabled households. The natural disaster risk variable has p-value of 0.004 which means that p-value < α so rejects H_0. So it can be concluded that the natural disaster risk variable has a statistically significant effect on the food security of disabled households. Information access variable has p-value of 0.038 which means that p-value < α so rejects H_0. So it can be concluded that the variable of access to information has a statistically significant effect on the food security of disabled households. The *arisan* participation variable has p-value of 0.028 which means that p-value < α so rejects H_0. So it can be concluded that the *arisan* participation variable has a statistically significant effect on the food security of disabled households. The variable number of family members has p-value of 0.000 which means that p-value < α so rejects H_0. So it can be concluded that the variable number of family members has a statistically significant effect on the food security of disabled households.

Table 6. Oods Ratio Results

Variable	Coeficient Oods Ratio	
	Model 1	Model 2
Constanta	-9.562	-10.508
Human capital		
mom_educ_d	0.257	0.193
Financial_capital		
log_income	0.600	0.620
Natural capital		
natural_disaster_d	-0.306	-0.332
Physical capital		
access_info_d	0.217	0.261
Social capital		
*arisan*_d	0.177	0.207
Household characteristics		
Member	-	0.149

Source: data processing (2021)

Thus, the estimation of the binary logistic regression model obtained in the form of a transformation from logit (x) is as follows:

Model 1:

$$ln\left[\frac{\pi_i}{(1-\pi_i)}\right] = -9.562 + 0.257 mom\_educ\_d + 0.600 \log\_income - 0.306 natural\_disaster\_d + 0.217 acces\_info + 0.177 arisan\_d \quad (13)$$

Model 2:

Vol. 5, No.08; 2021

ISSN: 2456-7760

$$ln\left[\frac{\pi_{ij}}{(1-\pi_{ij})}\right] = -10.508 + 0.193mom\_educ\_d + 0.620\log\_income - 0.332natural\_disaster\_d + 0.261acces\_info + 0.207arisan\_d + 0.149member \quad (14)$$

Table 6 shows the ratio of values, which are interpreted as trends in food security of households with disabilities based on influencing factors. In model 1, the oods ratio value in the mother's education variable is 0.257, indicating that households with disabilities with a mother's education from high school and above will have a food security opportunity of 0.257 times when compared to households with disabilities with a mother's lower secondary education. The income variable has an income ratio of 0.600, which means that an increase of one percent of income will increase the food security of households with disabilities by 0.600 times when compared to households with disabilities that experience a decrease of one percent of income. The natural disaster risk variable has an odds ratio of -0.306, which means that disabled households affected by natural disasters will reduce household food security by 0.306 times when compared to households that are not affected by natural disasters. The information access variable has an oods ratio value of 0.217 which means that households with disabilities that have access to information will tend to be more food insecure by 0.217 times when compared to houses of persons with disabilities who do not have access to information. The *arisan* participation variable has an oods ratio value of 0.177, which means that households with disabilities who participate in *arisan* will tend to be more food insecure by 0.117 times when compared to households with disabilities that do not participate in *arisan*.

In model 2, the oods ratio value on the mother's education variable is 0.193, indicating that households with disabilities with a mother's education from high school and above will have a food security opportunity of 0.193 times when compared to households with disabilities with a mother's education from middle school and lower. The income variable has an income ratio value of 0.620, which means that an increase of one percent of income will increase the food security of disabled households by 0.620 times when compared to disabled households which experience a decrease of one percent of income. The natural disaster risk variable has an oods ratio value of -0.332 which means that disabled households affected by natural disasters will reduce household food security by 0.332 times when compared to households that are not affected by natural disasters. The variable of access to information has an oods ratio value of 0.261 which means that households with disabilities that have access to information will tend to be 0.261 times more food insecure compared to households with disabilities that do not have access to information. The *arisan* participation variable has an oods ratio value of 0.207 which means that households with disabilities who participate in *arisan* will tend to be more food resistant by 0.207 times when compared to households with disabilities that do not participate in *arisan*. The variable number of family members has an oods ratio of 0.149 which means that an increase in 1 member of the household tends to increase the food security of households with disabilities by 0.149 times compared to households with disabilities that do not experience an increase in the number of family members.

The mother's education variable has a significant positive effect on the food security of disabled households, this shows that high maternal education has an impact on the mother's ability to

Vol. 5, No.08; 2021

ISSN: 2456-7760

manage food purchases and effective food processing to improve household food security (Iram & Butt, 2004; Martin et al., 2004; Yuniarti & Purwaningsih, 2017). The income variable has a significant positive effect on the food security of disabled households, this shows that income into the flow of funds that enter the household consisting of agricultural and non-agricultural income will increase the ability of households to buy food to increase food security (Akinoade et al., 2016; Coleman-Jensen & Nord, 2013; Martin et al., 2004; Niragira et al., 2018; Purwaningsih et al., 2015; Twongyirwe et al., 2019). The natural disaster variable has a significant negative effect on the food security of disabled households, this shows that natural disasters that cause food availability and food management from upstream to downstream experience shocks and the distribution process becomes hampered (Ramakrishna et al., 2014). In addition, natural disasters make agricultural land more vulnerable to crop failure which has an impact on decreasing farmer productivity, causing a decrease in household food security (Jonathan et al., 2020). The variable of access to information has a significant positive effect on the food security of disabled households, indicating that technology makes it easier for households to exchange information related to food from post-harvest to food distribution as well as informal knowledge between individuals, individuals between groups and groups (Manlosa et al., 2019). The *arisan* participation variable has a significant positive effect on the food security of disabled households, this shows that the existence of the *arisan* group is a forum for the relationship of a group's interests in aspects of economic management and household food security (Yuniarti & Purwaningsih, 2017). The variable number of family members has a significant positive effect on the food security of disabled households, this indicates that the number of family members will increase household food security if the proportion of family members who work is greater than the number of family members who do not work, otherwise the number of family members will decrease household food security if the proportion of family members who do not work is greater than the number of working family members (Fekede et al., 2016).

4. Conclusion and Recommendation

Conclusions

This study aims to examine the determinant of food security in a disabled household in Indonesia. This research is analyzed with a sustainable livelihood perspective and modified with household characteristics in a disabled household. The research data used cross section data covering IFLS wave 5 data taken in 2014-2015 using sample of 2,407 households with disabilities based on their chronic conditions. This study uses a binary logistic regression method with the dependent variable being food security status, while the independent variable is a sustainable livelihood perspective (covering maternal education, income, disaster risk, access to information, arisan participation) and household characteristics (covering the number of household members). The results showed that all independent variables, both mother's education, income, natural disaster risk, access to information, arisan participation, and a number of family members had a statistically significant effect on the food security of disabled households. It is concluded from the study that empirical research results are useful to consider in formulating policies related to food security for disabled households.

Based on the results of the calculation analysis, it can be concluded that model 2, namely the sustainable livelihoods perspective combined with household characteristics, is better used to

Vol. 5, No.08; 2021

ISSN: 2456-7760

analyze the influence of independent variables on food security variables, which is indicated by the magnitude of the coefficient of determination which is greater than model 1 which only analyzes from pure a sustainable livelihoods perspective. Therefore, it can be concluded that the factors that influence the food security of disabled households in Indonesia are maternal education, income, natural disaster risk, access to information, *arisan* participation, and number of family members.

In this study, it can be concluded that household assets such as human capital, financial capital, physical capital, natural capital, and social capital greatly affect the resilience of households with disabilities. In addition to household assets, household characteristics also affect the food security of households with disabilities. Based on the five assets in a sustainable livelihood perspective, financial assets which are interpreted by the amount of income are the variables that have the most influence on the food security of disabled households. Therefore, persons with disabilities need to be empowered and obtain special facilities to be able to participate in the labor market in Indonesia. In addition to income, disaster risk is also a very influential factor on the resilience of households with disabilities, because natural disasters cause food availability and food management from upstream to downstream to experience shocks and the distribution process becomes hampered. The risk of natural disasters can be minimized with disaster mitigation programs and sustainable natural management. The access of information also affects the food security of families with disabilities because the technology makes it easier for households to exchange information related to food from post-harvest to food distribution as well as informal knowledge between individuals, individuals between groups and groups. The participation of arisan also affects the food security of families with disabilities because the arisan group is a forum for the relationship of a group's interests in aspects of economic management and household food security. Mother's education also affects the food security of families with disabilities. High maternal education has an impact on the mother's ability to manage food purchases and effective food processing to improve household food security. The variable number of family members also affects the food security of families with disabilities because that the number of family members will increase household food security if the proportion of family members who work is greater than the number of family members who do not work, otherwise, the number of family members will decrease household food security if the proportion of family members who do not work is greater than the number of working family members.

Recommendations

This research can be used as a recommendation by the government to be considered in formulating policies related to food security for disabled households. In addition, the government needs to provide space for persons with disabilities to participate in the labor market and provide training for persons with disabilities to remain productive despite their limitations. Non-formal education is also needed by persons with disabilities to be productive through their training programs so that they can generate income in the non-formal sector

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Vol. 5, No.08; 2021

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