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Determinant Factors of the Household Poverty Probability: Study on Household around the Taman Nasional Kerinci Sebelat (TNKS) Lebong Regency

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ABSTRACT: This research aims to determine the factors that influence the probability of occurrence of poverty of households around Taman Nasional Kerinci Seblat (Kerinci Sebelat National Park (TNKS) Lebong District. The location of this research selected purposively by categorizing the 6 villages into 3 typologies, namely, Sawah dominance, plantation Dominance, and rice fields and plantation. From each village, 20 households as respondents were selected randomly, so the total respondents were 120 households. Sayogjo poverty line was applied to determine household poverty status. In examining the factors that affect the probability of the household poverty, a logit model is applied. From the analysis, land area ownership is the main factor influencing the occurrence probability of poverty of households, while education level, number of family dependents, and household head age are not.

Keywords : Probability, Poverty, logit model

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INTRODUCTION

One of the goals of national development is to improve economic performance to create jobs and organize decent lives, which in turn will bring prosperity to the Indonesian. This goal can be achieved through poverty reduction. The problem of poverty is indeed complex and multidimensional. Therefore, efforts to reduce poverty must be carried out comprehensively, cover various aspects of community life, and be implemented in an integrated manner (Nasir *et al*, 2008).

Data published by BPS informed that Bengkulu's latest poverty rate as of September 2018 was recorded at 15.41%, a slight decrease compared to the same period the previous year at 15.59%. Although in terms of the percentage of the number of poor people in Lebong Regency is relatively small compared to districts and cities in Bengkulu Province, data published by BPS Lebong Regency shows an increase in the number of poor people in 2018 (BPS, 2018) Among these poor households, some of them live in the residents around the forest, specifically the Kerinci Seblat National Park (TNKS). Communities living around forests are one of the largest poor groups and this tends to be chronic. Various factors, such as lack of infrastructure, difficulty in communication, forest distance from markets, health facilities, and education, are often considered as the cause of their poverty. As a result, it is very difficult to eradicate the poverty experienced them. Meanwhile, the existence of forests becomes absolute for the fulfillment of food, buildings, water supply providers, and others that are fundamental to the poorest households living around the forest. From the government side, poverty alleviation

policies are mostly based on non-forest villages and ineffective programs because the information is not up to remote areas (Anonim, 2009).

Poverty is a situation of inadequacy that occurs not because the poor want it, but because it cannot be avoided with the powerthat is in it. Poverty can be interpreted broadly as moral poverty, scientific poverty, and material poverty. To simplify, poverty is indicated by the low level of income to meet the minimum living needs. Low income will result in a low reach of food so that it can result in low nutritional and health status. Low nutritional and health status results in intelligence, education, and skills which results in low work productivity which in turn results in low income (Kartasasmita, 1997). Many approaches are used in determining the poor population. Poverty is often evaluated and measured by income or expenditure and used to determine households that are poor or not. This approach has become the standard indicator to measure poverty and living standards quantitatively (Ayinde *et al*., (2002); Baiyegunhi & Fraser (2010); Achial *et al*., 2010; Akerele, *et al*, 2012). In Indonesia, one of the poverty approaches is the poverty approach as suggested by Sajogyo (1987). Sajogyo (1987), revealed that poverty is a level of life under the minimum standard of living that is determined on staple food needs that make people sufficient in working and healthy. Sajogyo in determining the poverty line uses the equivalent of per capita rice consumption. Rice consumption for urban and rural areas is determined at 360 kg and 240 kg per capita per year, respectively. This approach was also used by Wiyanto, Sukiyono, & Priyono (2014) to measure poverty among Horticultural Farmers in Rejang Lebong District.

Several studies have tried to analyze the relationship between household demographic variables and poverty. According to Amar (2002), poverty is relatively visible from the inequality of ownership of production assets, especially land as agricultural land and the unequal distribution of income between community groups. Even distribution of land tenure will greatly affect the distribution of community income because the land is the main production factor for the community in creating family income. Also, research Cahyono *et al*, (2006), for example, have tried to link the variables of household income, the number of household members, the age of the head of the household with the Poverty of Pennant Sap Farmers. While research by Sa'diyah (2012) and Suryawati (2005) examines the relationship between the number of family dependents, the level of education and asset ownership and poverty. Other researches have also examined socio-economic determinant, among others, are Baiyegunhi & Fraser (2010) in South Africa; Akarele (2011) in Nigeria; Akerele *et al*, (2012) in South-West Nigeria; and Gounder (2013) in Fiji. In general, they concluded that household socioeconomic conditions correlated with household poverty.

Departing from the discussion above, this study aims to measure poverty levels and determine the factors that influence the probability of poverty occurring in households living around TNKS.

MATERIALS AND METHODS

The location of this study was chosen purposively, i.e., Lebong Regency. In this study, the classification of villages is divided into 3 (three) typologies, namely typology of Sawah dominance (food crops), typology of plantations dominance (coffee and rubber), and typology of combined sawah and plantation. The six villages can be seen in Table 2.

Data Analysis Method

To analyze the probability factors for household poverty around the TNKS, households are grouped into two categories, namely poor and not poor. The determination of these categories is based on household income converted into rice exchange rates. Households that have income per capita less than the exchange

rate of 320 kg of rice per year or 26.67 kg of rice per month are categorized as low

Table 1. Research area and number of samples

No	District	Village	Typology	Samples
1	Embong Uram	Ujung Tanjung II	Sawah Dominance	20
2		Kota Baru		20
3	Topos	Talang Donok	Plantation Dominance	20
4		Talang Baru		20
5	Bingin Kuning	Karang Dapo Atas	Combined Sawah and	20
6		Talang Leak I	Plantation	20
Total Sample				120

From each village, 20 households were selected randomly (simple random sampling), so that a total of 120 respondents.

economic (poor) following Sayogjo (1987). The households that have income greater or equal to the exchange rate of 320 kg of rice per year or 26.67 kg of rice per month are categorized as households with high socioeconomic status (not poor).

In determining the factors that affect the probability of occurrence of household poverty around TNKS, a binary choice model, or a linear probability model (Gujarati, 1978) in logit form is applied. The logit model is a non-linear regression model that produces an equation where the dependent variable is categorical. The most basic category of the logit model has binary values 1 and 0. In this research, the response yi is binary, assuming only two values that for convenience, i.e.,

Yi = 1, means that households around the Kerinci Sebelat national park are included in the low socioeconomic status group (poor).

Yi = 0, means that households around the Kerinci Sebelat national park are classified as high socioeconomic status (not poor).

Formally, the logit model is based on the following cumulative distribution function of the logistic distribution:

$$p_i = \frac{1}{1+e^{\beta_1+\beta_2 X_1}}$$

Let $Z_i = \beta_1 + \beta_2 X_i$, then $p_i = \frac{1}{1+e^{-Z_{i1}}} = F(\beta_i + \beta_2 X_i) = F(Z_i)$, where Z_i ranges from $-\infty$ to ∞, P_i ranges between 0 and 1; and P_i is non-linearly related to Z_i.

It should be noted that

$$e^{Z_i} = \frac{p_i}{(1-p_i)}, \text{ so } \ln\left(\frac{p_i}{(1-p_i)}\right) = Z_i = \beta_i + \beta_2 X_i$$

Empirically, household poverty is assumed to be a function of the age of the head of the household (SIZE), the number of household members (SIZE), the area of land ownership (AREA), and the level of education of the head of the household (EDU). Thus, the logit model for the poverty of households living around TNKS is as follows:

$$\ln\left(\frac{p_i}{(1-p_i)}\right) = \beta_1 + \beta_2 AGE_t + \beta_2 SIZE_t + \beta_4 AREA_t + \beta_5 EDU_t + \mu_t$$

RESULTS AND DISCUSSION

Characteristics of Respondents

Respondents at the research location are characterized by diverse characteristics in terms of the level of education, and the number of family dependents. Age is an important factor in farming activities because age is related to the enthusiasm and productivity of farmers. The age of respondents based on data from the field ranged from 22 years to 70 years with an average age of respondents 45.29 years. Based on Table 2, it can be seen that the largest percentage of the age of farmers is 39 years to 55 years with 48.33%. It is, then, followed by the age range of 22 years to 38 years, i.e., 31.67% and the age range of 56 years to 70 years, i.e., 20.00%.

Table 2. Characteristics of Households

Description	Frequency (Person)	Percentage (%)	Mean
Age (year)			
▪ 22 – 38	38	31.67	45.29
▪ 39 – 55	58	48.33	
▪ 56 – 70	24	20.00	
Number of family dependents (person)			
▪ 2 – 3	53	44.67	3.88
▪ 4 – 5	58	48.33	
▪ 6 – 7	9	7.50	
Land area (Ha)			
▪ 0.25 – 1.83	90	75.00	1.33
▪ 1.84 – 3.42	27	22.50	
▪ 3.43 – 5.00	3	2.50	
Education(year)			
▪ 3 – 6	62	51.67	7.90
▪ 7 – 9	37	30.83	
▪ 10 – 12	21	17.50	
Income (IDR)			
▪ 225,000.00 – 4,258,333.33	117	97.50	1,442,934.03
▪ 4,258,333.34 – 8,741,666.67	2	1.67	
▪ 8,516,666.68 – 13,000,000.00	1	0,83	

Looking at the farmers' age, farmers in the research area are classified as productive age, where at this age a person has a better ability to think and act in planing an activity. This is in line with the opinion of Simanjuntak (1998), which states that the ages 15 to 65 years are productive. Thus, all farmers who are in the range of 39-55 years of age are productive age groups, meaning that at this productive age all abilities can be optimized and can run their businesses.

The number of dependents is a household member who is the responsibility of the head of the family and lives in the same house. To meet the family's living needs, farmers must work and try to improve farming optimally. In the study area family dependents range from 2 people to 7 people and the average farmer has a family responsibility of 3.88 or 4 people.

Table 2 shows that most households have family dependents between 4 – 5 persons with 48.33% of the total respondents. The number of family dependents is a family member whose living expenses are still borne by the family. Family members such as wives, children, parents, or other relatives who usually motivate the head of the family to work harder in the hope that they can

meet the needs of family life. The number of family dependents are very closely related to the large economic burden borne by farmers, the greater the number of family dependents, the greater the costs to meet family needs. But indirectly can motivate farmers to produce optimal production. Also, the more the number of dependents of productive-aged families, the more workers will be able to assist in farming activities to reduce the costs incurred for labor costs.

The area of land owned by farmers also affects the income earned. The greater the land area, the more production is generated in paralel with their income. All land areas are owned and managed by the farmers themselves. The land area ownership ranges from 0.25 to 5.00 ha with average land ownership of 1.33 ha. Based on research, most farmers own land between 0.25 ha – 1.83 ha with average land ownership of 1.33 ha. Only a small proportion of farmers own ranged more than 1.84 ha of land.

One important factor determines farmer success in their farming activities is education, especially formal education. Education can determine a person's ability to adopt innovations. Based on Table 2, farmer education ranges from 6 years to 12 years with an average education level of 7.90 years. This table also shows that the majority of farmers have the lowest level of formal education, which is between 3 - 6 years. The number reaches 52% of the total population. This condition is common in the agricultural sector in Indonesia and this condition often becomes an obstacle in the application of new technology, especially relating to agriculture and conservation.

Income is the sum of all revenues of both farm and non-farm revenues. Income is very important to meet the needs of household life, especially daily household needs. Income is often considered as a determinant of the level of household welfare because the size of the income will determine whether the needs of the household are met or not. The smaller the income the more difficult it is to meet every day. Table 2 shows the level of farmer acceptance ranging from IDR 225,000.00 to IDR 13,000,000.00. Farmers who have low income are 117 people or 97.50%, farmers who have medium income are 2 people or 1.67%, and farmers who have a high income are 1 person or 0.83% with an average farmer income of Rp. 1,442,934.03.

Household Poverty Status

In this study, the determination of criteria for poor and non-poor households is seen from household income which is a proxy of expenditure, as Sajogyo (1987) suggested. Households that have income per capita less than the exchange rate of 320 kg of rice per year or 26.67 kg of rice per month are categorized as low economic (poor). The households that have a greater or equal income with an exchange rate of 320 kg of rice per year or 26.67 kg of rice per month are categorized as households with high socioeconomic status (not poor). The distribution of households based on their poverty status is presented in Table 3.

Table 3 shows the status of poor households and non-poor households in each district. This table shows that 26.67% of households are categorized as poor households spread over three districts. On the other hand, the number of households classified as not poor is 73.33% of

Table 3. Household distribution based on their poverty status

Subdistrict	Poor Household		Not -Poor Household	
	Number (HH)	Persentage (%)	Number (HH)	Persentage (%)
Embong Uram	16	13.34	24	20.00
Topos	9	7.50	31	25.83
Bingin Kuning	7	5.83	33	27.50
Total	32	26.67	88	73.33

the total number of households. These results indicate that households living around TNKS belong to households that are economically sufficient to meet their daily needs. However, it should be noted that poverty studies not only improve the welfare of households that are currently poor but also prevent households from becoming poor in the future. Therefore, new future perspectives must be adopted and implemented. This is important because the households living in vulnerable condition.. For this reason, suitable forward-looking anti-poverty interventions need to be considered. This intervention must be oriented towards preventing poverty in the future rather than reducing poverty today.

Determinant Factors of Household Poverty

The results of the logit model estimation as revealed in the research method are presented in Table 4. Result analysis shows that all variables in the model, namely AGE, SIZE, AREA, and EDU, jointly affect the occurrence of household poverty. This conclusion is based on F-test results where $F_{statistic}$ (5.91) is greater than F_{table} (2.45)at a 95% confidence level. All variables are also able to explain household poverty variation of 51.72% as shown by the R^2 value of 0.517. The remaining 48.28% is influenced by other factors not included in the model, such as infrastructure access. The effect of each of the variables in the model on household poverty will be explained as follows:

Table 4. Estimated Results of the Logit model

Independent Variable	Regression Coefficient (β_i)	Standard Error	$t_{statistic}$
Household Head Age (AGE)	-0.30123	0.19118	- 0.15757
Number of Family Dependents (SIZE)	0.16764	0.20284	0.82649
Land area ownership (AREA)	-0.68817	0.32881	- 2.0929*
Household Head Education (EDU)	-0.36532	0.90562	- 0.40339
Constant	-0.36509		
R^2	0.51727		
t_{table}	1.980		
F_{table}	2.45		
$F_{statistic}$	0.59108		
Note (*) = significant at 95%			

Household Head Age (AGE)

Estimation results show that age does not significantly affect the probability of occurrence of household poverty. Using a statistical t-test on the AGE coefficient, it shows that its $t_{statistic}$ (-0.15757) is smaller than t_{table} (1,980). This result concludes that the nil hypothesis is accepted and informs that age does not affect the probability of occurrence of household poverty. The results of this study contradict the research conducted by Cahyono (2006), showing that households classified as poor are at a relatively old age so that it is relatively more difficult to increase their incomes. In addition, with age, the burden on household dependents is greater. This condition results in higher probabilities to be poor for the aged.

Number of family dependents (SIZE)

The estimation results show that the number of family dependents has also an insignificant effect on the probability of occurrence of household poverty, as indicated by the results of the t-test. Although contrary in theory, the finding is consistent with research conducted by Sa'diyah (2012) and Noor (2005). They concluded that the relationship between the number of family members and household poverty is insignificant and has a negative sign. The number of family members should be a significant factor to influence household

poverty because the larger number of members will be a burden on a household and affect the productivity of the household head. Furthermore, Noor explained that the more the number of family members, the smaller the income per capita and the poorer the family. The number of family members in the community studied tends to be large because it is related to the strength of the family kinship system, especially in the village. The house is big and spacious so that all of his children, who are married even though they live together. However, Wiyanto, Sukiyono & Priyono (2014) research found the opposite results. They found that the number of dependents of the farmer's family had a significant effect on the probability of poverty occurring of vegetable farmers. This finding is also similar to research in Nigeria as conducted by Akerele (2011) and Akerele, *et al* (2012) where the number of dependents becomes a determinant of household poverty.

Land Ownership Area (AREA)

A statistical t-test on the AREA variable shows that the value of $t_{statistic}$ (-2.0929) is greater than the t_{-table} (1,980). This Estimation results show that the area of land ownership has a significant and negative effect on the probability of occurrence of household poverty. The results of this study are consistent with research conducted by Sa'diyah (2012); Akerele, *et al* (2012) and Wiyanto, Sukiyono, & Priyono (2014), showing that capital ownership (assets) has a negative effect on poverty. This means that the smaller the capital owned by the community, the smaller the per capita income of the people studied, means that the quality of life is getting poorer. According to Amar (2002), poverty is relatively visible from the inequality of ownership of production assets, especially land as agricultural land and the unequal distribution of income between community groups. Distribution of land tenure will greatly affects the distribution of community income. The main reason is that land is the main production factor for the household to generate family income.

Education (EDU)

Estimation results show that formal education does not significantly affect the probability of occurrence of household poverty as indicated by t-test results on the EDU variable. As presented in Table 4, the $t_{statistic}$ value of EDU is smaller than the value of t_{table}, i.e., -0.40339 < 1,980 at a 95% confidence level. This finding is similar to Amar (2002). He found that education at various levels does not show a significant effect on poverty. The insignificance of levels of education on poverty provides a piece of evidence that the level of education in rural areas does not determine household income as well as the household elimination from poverty. However, this finding differs from Sa'diyah (2012); Akerele, *et al* (2012); and Gounder (2013) finding. They found that that there was a positive relationship between the household head education level household heads and household poverty. A household with a lower head of education level, it tends to be poor than the household head with a higher level of education.

Marjinal Effect

The interpretation of the logit regression model can be accomplished based on marginal effects. Marginal effects in this study to examine changes in AGE, SIZE, AREA, and EDU on the possibility of poverty in households living around TNKS. Table 5 presents the results of the estimated marginal effects of independent variables on the occurrence of poverty on households.

Tabel 7. Marginal Effects of Independent Variables on the Probability of Poverty on Households

No	Independent Variable	Marginal effect
1	Household Head Age (AGE)	- 0.57739
2	Number of Family Dependents (SIZE)	0.32133
3	Land area ownership (AREA)	- 0.13191
4	Household Head Education (EDU)	- 0.70023

From Table 7 it can be seen that the four variables have a contribution that can reduce the occurrence of household poverty. From the estimated results of the marginal effect of the land area variable also has the effect of reducing the chances of households experiencing poverty. Households that have a large area of land will have a probability of (-0.13191) not to experience poverty compared to households that have narrow land. The greater the area of land, the more production is produced which will automatically increase income which can reduce the chances of poverty in the household.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the study, it can be concluded that; the factors that influence the occurrence of the household poverty probability around the Kerinci National Park in Lebong Regency are the area of land ownership, while the age, number of family dependents and education have no significant effect on the occurrence of the household poverty probability.

Based on the research results obtained, it is suggested to the Government to provide access to the community through programs of improvement and coaching as well as access for the poor through counseling activities, skills training, and human resource improvement which are expected to help households around the Park area National Kerinci Sebelat (TNKS) Lebong Regency in terms of the application of innovations/technologies to increase farm productivity and reduce household poverty.

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