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ANALYSIS OF FACTORS AFFECTING THE DECREASING INTEREST OF RAINFED RICE FARMERS IN RICE FARMING BUSINESS INSURANCE (AUTP) PROGRAM IN BANJARBARU CITY

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ABSTRACT
One of the most worrisome threats today is the threat of global warming, the ever-changing climate in the world, changes in ecosystems and disruption of the ecological balance. Therefore, there is a need for serious efforts from the government to minimize the risk of losses due to threats to the agricultural sector. Agricultural insurance is an alternative risk management instrument that is considered by the government. The purpose of this study is to describe the characteristics of lowland rice farmers' households and analyze the factors that influence the declining interest of rainfed lowland rice farmers in the Rice Farming Business Insurance (AUTP) program. The city of Banjarbaru is one of the implementing areas of the AUTP program in South Kalimantan so it needs to be used as a research site, which will be carried out from January 2021 to March 2022. The sampling method used is *purposive sampling* for two sub-districts, namely Cempaka District, and North Banjarbaru Sub-district, and then the sampling of the research was carried out in Bangkal Village and North Banjarbaru Village. The analysis used is descriptive analysis and binary logistic regression analysis. The average age of rice farmers at the time of the study was 52.42 years who participated in the AUTP program. On average, farmers who participate in the AUTP program have 4 household members. The distribution of rice farmers who participated in the AUTP program based on education level was mostly at the high school and junior high school education levels, which were 54% and 40% respectively. The average area of rice farming land for farmers participating in the AUTP program is 1.12 hectares. Farmers who participate in the AUTP program at most have experience of less than 5 years, which is 90%. For farmers who participate in the AUTP program, the highest percentage of land ownership is ownership of leased land, which is 90%. The productivity of rice farming by farmers who participate in the AUTP program is 2,475 kg/ha. The farmers' side jobs consist *on-farm* of 6% *off-farm*, and *non-farm*, while 49% do not have side jobs. Three of the five independent variables analyzed using logistic regression analysis showed a significant effect, while the other two variables had no significant effect on the participation of farmers in the AUTP program. The three influential variables are land area, land status, and ownership of side jobs.

KEY WORDS
Rice farming insurance, binary logistic regression, rainfed.

The agricultural sector is one sector that is directly related to nature so it will always be faced with a high risk of *uncertainty*. Indonesia as an agricultural country is very vulnerable to natural disasters such as earthquakes, tsunamis, floods and droughts and attacks by Plant Pest Organisms (OPT), this often occurs in Indonesia (Septian and Anugrah, 2014). One that is directly affected is food crop farming activities, especially rice plants which are vulnerable to climate change (Estiningtyas, 2015).

Referring to the nine priority agenda programs by the government known as Nawa Cita, as a step towards change towards an Indonesia that is politically sovereign and independent in the economic field and has a personality in culture. One of the priority agendas is realizing economic independence by moving other strategic sectors. With a program launched to support the achievement of self-sufficiency through the Special Efforts

to Increase Production of Rice, Corn and Soybeans (UPSUS PAJALE) which was launched in early 2015.

One of the most worrying threats today is the threat of global warming impact, making the world's climate always changing, ecosystem changes and disruption of the ecological balance. In aggregate it is estimated that the total costs and risks due to global climate change are equivalent to a loss of at least 5% of world GDP per year (Stern 2006 in Sumaryanto and Nurmanaf 2007).

Therefore, there needs to be serious efforts from the government to minimize the risk of losses due to threats that occur in the agricultural sector. Agricultural insurance is one of the alternative risk management instruments that should be considered by the government, especially to cope with losses due to global climate change. Agricultural insurance relates to farming financing with third parties (institutions/private companies/government agencies) with a certain amount of premium financing (World Bank 2008 in Pasaribu 2010).

The implementation has been carried out by the Ministry of Agriculture of the Republic of Indonesia in 2012 to 2013, involving Jasindo (Indonesian insurance service), Rice Farmers Insurance (AUTP) involving several parties including: (1) Fertilizer BUMN, farmers or a combination of farmer groups, insurance company (PT. Jasindo) and the Ministry of Agriculture. The aim is to provide protection in the form of working capital compensation to farmers in the event of crop failure due to floods, droughts and attacks by Plant Pest Organisms (OPT). Areas that are pilot areas for the implementation of Rice Farming Business Insurance are areas with a high enough risk level for uncontrollable conditions such as drought and flooding, so that the implementation can run effectively and involve farmers in every process of their activities.

In 2019 the realization of each district/city in South Kalimantan looks low, this is due to the increase in the target area of AUTP from the province each year and the budget in 2019 in each district is low for socializing the program, reduced pest attacks and other technical matters. In Banjarbaru City there is a decrease in land area of 11.62 ha; one of the reasons is the budget for AUTP socialization is reduced. The AUTP program is one of the programs organized by the government in order to see the extent to which this program can effectively protect farmers from the threat of crop failure and introduces to farmers how the mechanism of the agricultural insurance system works as a first step to developing an agricultural insurance system in Indonesia on a national scale. As a first step towards developing a sustainable agricultural insurance system, the total area of paddy fields in each sub-district compared to the actual area of paddy fields participating in the Rice Farming Business Insurance (AUTP) program is 89.62 ha or 6.12% of the 1,464 land area, 13 ha. This is because the 2019 budget was reduced for AUTP socialization, reports of pests and plant diseases were reduced. From this data, the question arises why with an area of 1,464.13 ha of agricultural land registered only 89.62 ha (6.12%), so from this data it is necessary to analyze what factors influence farmers to participate in the Rice Farming Business Insurance program (AUTP).

This study aims to analyze:

- Describe the characteristics of Paddy Farmers' Households of Participants in the Rice Farming Business Insurance (AUTP) program in Banjarbaru City;
- Analyzing the factors that influence the declining interest of rainfed rice farmers in the Rice Farming Business Insurance (AUTP) program.

METHODS OF RESEARCH

Data used in this study were of two types, namely primary data and secondary data. Banjarbaru City is one of the implementing areas for the Rice Farmer Business Insurance (AUTP) program in South Kalimantan so it needs to be used as a research location, which will be carried out from January 2021 to March 2022.

The sampling method used is *purposive sampling*) to two sub-districts, namely Cempaka District and North Banjarbaru District, then the research sampling was carried out

in Bangkal Village and North Banjarbaru Village. The sampling process was carried out through the following stages:

- The first stage: selecting Cempaka District and North Banjarbaru District which were the locations for the AUTP implementation;
- The second stage: selecting the kelurahan in the sub-district based on the most farmer groups participating in the AUTP;
- The third stage selecting a sample of farmer households as a sample unit in each selected kelurahan using a deliberate sampling technique with a total sample of 100 farmers.

The analytical methods used are:

- Descriptive analysis to answer the first objective and the second objective, namely the descriptive method. Descriptive research aims to make a hostage/painting/description of the facts and characteristics of a particular population or area in a systematic, factual and thorough manner;
- Logistics Regression Analysis to answer the second goal is to analyze the factors that affect the decline in interest Rainfed rice farmers in the AUTP program used Logistic Regression analysis. Logistics Regression is a regression analysis used to describe the relationship between a response variable and one or more explanatory variables (Agresti, 1990).

The general form of the logistic regression probability model with k variables is formulated as follows:

$$\pi(x)\frac{expexp\,(\beta_{0+}\,\beta_1\,x_{1\,+\cdots+}\,\beta_k\,x_k\,)}{1+\,expexp\,(\beta_{0+}\,\beta_1\,x_{1\,+\cdots+}\,\beta_k\,x_k\,)}\ (1)$$

Where: $\pi(x)$ is the probability of success or the probability of the event/case specified by y=1, β_j is the parameter value.

This function is a nonlinear model, so it needs to be transformed into logit form so that the relationship between the dependent variable and the independent variable can be seen. By performing the logit transformation of $\pi(x)$, we get a simpler equation which is a linear function, namely:

$$g(x) = \text{ln}\{\frac{\pi(x)}{(1-\pi(x))}\} = \beta_{0+}\,\beta_1\,x_{1\,+\cdots+}\,\beta_k\,x_k\ \ (2)$$

Where: $\frac{\pi(x)}{(1-\pi(x))}$ is the risk y = 1 for a given x.

The above formula is a linear function in its parameters. If from several independent variables there are discrete and nominal scales, then these variables will not be included if they are included in the model. This is because the numbers used to express the level are only for identification and do not have a numerical value. In a situation like this a variable is needed; dummy as much as k-1. Suppose the variable to j that is xj has kj levels, then the dummy variable is kj-1. For example, the j-th dependent variable xj has kj levels, then the dummy variable kj-1 is denoted D_{ju} with coefficient β_{ju}, u = 1,2,3,…kj-1. Then the logit transformation model becomes:

$$g(x) = \beta_{0+}\,\beta_1\,x_{1\,+\cdots+}\,\beta_k\,x_k\ +\ \sum_{u=1}^{k_{ji}}\ \ \beta_{ju}D_{ju}\ (3)$$

The principle in logistic regression is to compare the observed values of the response variables to predict the values constructed from models with or without variables in the equation. To find out the role of all independent variables in the model together, the significance test of the model can be used, using the hypothesis:

- H_0: $\beta_1 = \beta_2 = \beta_3 = \cdots = 0$ (there is no effect between the independent variable simultaneously with the dependent variable);

- H_1: There is at least one βj 0, with test statistic G = $-2\ ln\frac{L_0}{L_k}$, where L_0 = Likelihood without independent variables, L_K = Likelihood with all independent variables.

To estimate parameters on This logistic regression uses the maximum likelihood method to estimate the parameters (Hosmer and Lemeshow, 2000) namely the weighted least squares method with several iteration processes. This maximum likelihood method estimates the parameter with a value that maximizes the likelihood function. Likelihood without independent variables (L_0) is the maximum likelihood of the reduction (Reduced Model) or a model consisting of constants only, while the likelihood with all independent variables (L_k) is the maximum likelihood with the full model or with all independent variables.

This G statistic follows a Chi-Square distribution with degrees of freedom p so that the hypothesis is rejected if G>$X^2_{(0,1,db(r-1)(k-1))}$ or p-value < 0.1.

Generally, the purpose of analysis is to find a suitable model with a strong correlation between the model and the existing data. According to Hosmer and Lemeshow (2000), testing the significance of the parameter (coefficient β) partially by using the Wald test using the following hypothesis:

- H0: βj = 0 (independent variable to j has no significant effect on the independent variable);
- H1: βj ≠ 0 (independent variable to j has a significant effect on the dependent variable), with statistical tests, namely: $W = [\frac{\widehat{\beta}_J}{Se(\widehat{\beta}_J)}]^2$.

The hypothesis is rejected if W >$X^2_{(0,1,db(r-1)(k-1))}$ or p-value <0.1

Logistic regression produces odds ratio (Odds Ratio/OR) associated with the value of each independent variable. The odds of an event are defined as the probability of an event occurring divided by the probability of an event not occurring. Through the regression model, it can be seen clearly that the difference in response opportunities is due to the value of the Odds Ratio (Ana, 2000).

RESULTS AND DISCUSSION

Respondents in this study were rice farmers in Banjarbaru City. As a fairly heterogeneous area, of course, farmers in Banjarbaru City have different characteristics from one another. The characteristics of the respondents that are discussed in this study include age, formal education, length of business, number of dependents in the family, area of farmland, status of farming land ownership, farm production, and side jobs.

Based on the data presented in Figure 1, it shows that rice farmers who participate in the AUTP program in the research area are mostly in the age group of 51-60 years, which is 40%. Meanwhile, farmers who did not participate in the AUTP program were mostly in the 41-50 year age group, which was 36%. The average age of rice farmers who participate in the AUTP program is in the range of 52.42 years. Meanwhile, the average age of rice farmers who did not participate in the AUTP program was 48.82 years. Overall, the dominant farmers who participate or do not participate in the AUTP program are in the productive age.

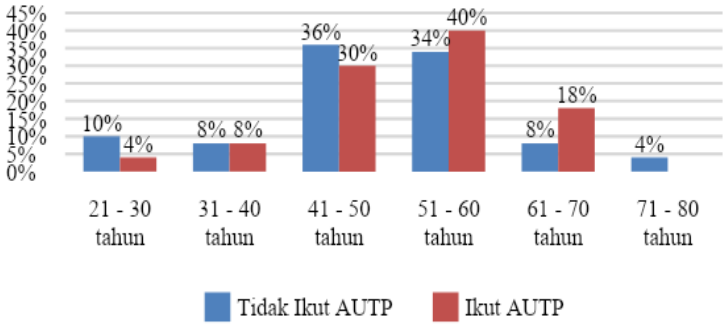

Figure 1 – Distribution of rice farmer respondents by age

Based on the data presented in Figure 2, it shows that the most rice farmers who follow the AUTP program are farmers who have 4 household members, which is 30% of respondents. Meanwhile, the most rice farmers who did not participate in the AUTP program were farmers who had 2 household members, which was 34%. On average, farmers who participate in the AUTP program have 4 household members, and farmers who do not participate in the AUTP program have 2 - 3 household members.

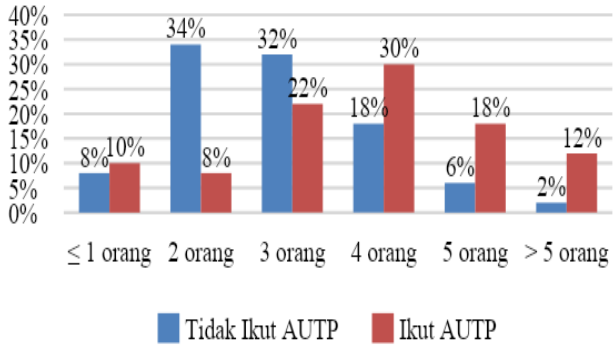

Figure 2 – Distribution of rice farmer respondents based on the number of household members

Based on the data presented in Figure 3, the distribution of rice farmers who participated in the AUTP program based on education level was mostly at the SMA and SMP education levels, which were 54% and 40%. Meanwhile, farmers who did not take part in the AUTP program were mostly dominated by farmers with an elementary education level/equivalent (78%), and there were even farmers who did not complete elementary school/equivalent namely by 8%.

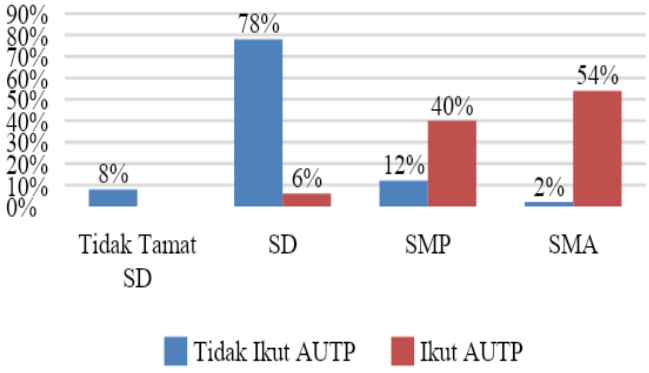

Figure 3 – Distribution of rice farmer respondents based on formal education level

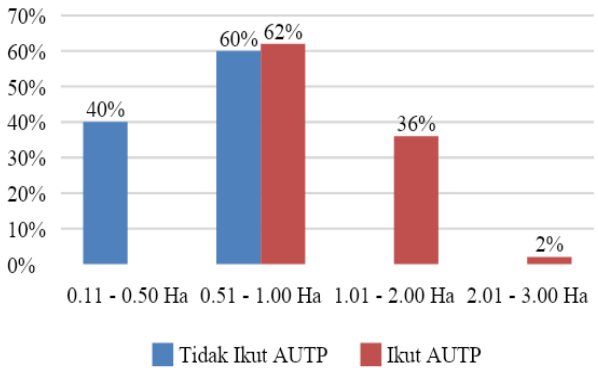

Figure 4 – Distribution of respondents

The average area of rice farming land for farmers who participate in the AUTP program is 1.12 hectares, while the average area of rice farming land for farmers who do not participate in the AUTP program is 1.12 hectares. Based on the data presented in Figure 4, it shows that the highest number of rice farmers in the AUTP program are in the farming land ownership group of 0.51 - 1.00 ha, which is 62%, and also quite a lot in farming land of 1, 01 – 2.00 ha which is as much as 36%, and farming land from 2.01 – 3.00 ha is only 2% of farmers. Meanwhile, rice farmers who did not participate in the AUTP program also had the most farming land area of 0.51 – 1.01 ha, which was 60%, while the rest of the farmers only had a farm area of 0.11 – 0.50 ha.

Based on land area of paddy farming program at most had less than 5 years of experience, which was 90%. Meanwhile, farmers who do not participate in the AUTP program tend to have more than 5 years of experience. This is because, for farmers who already have long experience feel they already have solutions for risks in their rice farming activities.

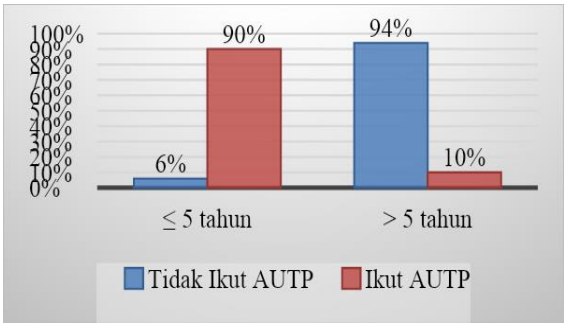

Figure 5 – Distribution of respondents from rice farmers based on length of cultivation

For farmers who participate in the AUTP program, the highest percentage of land ownership is ownership of leased land, which is 90%. Meanwhile, for farmers who do not participate in the AUTP program, the highest percentage of land ownership is ownership of their own land, which is 94%. This land ownership status will affect the cost operations for rice cultivation. Indirectly will affect the yield of lowland rice farming in both areas the. Freehold land usually does not take into account operational costs incurred because it does not incur land rental costs, but pay taxes on land. It's different again for land rented by farmers for rice cultivation. Farmers who rent arable land are more motivated to optimize land management in order to obtain better results higher.

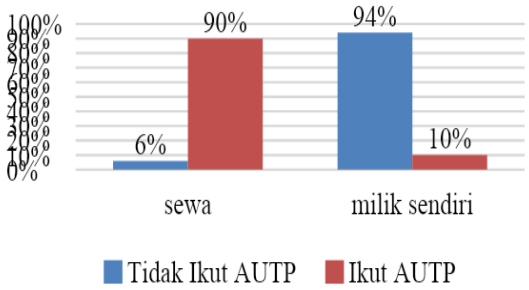

Figure 6 – Distribution of respondents based on land ownership status for rice

The productivity of rice farming farmers who participate in the AUTP program is 2,475 kg/ha. This is slightly higher than the productivity of farmers who do not participate in the AUTP program which is only 2,443 kg/ha. As for the production per farm from farmers who participated in the AUTP program of 2,750 kg/farm, while farmers who did not participate in the program produced 1,197 kg of rice/farm. When viewed from the price, it is not too much different, namely farmers who participate in AUTP sell dry milled unhulled rice with a price

range of Rp 6,590,-/kg, while farmers who do not participate in the AUTP program have a selling value of dry milled unhulled rice of Rp 6,588/kg.

If the OLS (*Ordinary Least* Square) model to test the simultaneous significance using the F-test, while the logistic regression model uses the *Chi-Square* of the difference between *-2 log likelihood* before the independent variables enter the model and *-2 log likelihood* after the independent variable entered into the model. This test is also known as the *Maximum likelihood*. Meanwhile, based on the results of the analysis using the *Omnibus Tests of Model Coefficients,* it shows that the resulting model is fit after the variables of activity in farmer groups, farming experience, registration grace period and rice plant maintenance are eliminated. This is based on the *smaller sig.* with a confidence level of = 5% (0.05), with a Chi-square value of 113.707, which can be seen in Table 1.

Table 1 – Omnibus tests of model coefficients

		Chi-square	df	Sig.
Step 1	Step	113.707	5	0.000
	Block	113.707	5	0.000
	Model	113.707	5	0.000

Source: Primary Data Processing, 2022.

Cox & Snell R Square and *Nagelkerke R Square* are used to assess the ability of independent variables to explain the dependent variable. These values are also known as *Pseudo R-Square* model *Ordinary Least* is better known as *R-Square*. Based on the test results show that the value of *Nagelkerke R Square* is 0.906 or 90.6%, which means that the ability of the independent variable variation in explaining the variation of dependent variables (farmers not participating in the AUTP program) is 90.6%, while the remaining 9.4% is explained by other factors outside the model, this can be seen in Table 2.

Table 2 – Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	24,922[a]	0,679	0,906

Source: Primary Data Processing, 2022.

Goodness of fit (GOF) to find the *Chi-Square Hosmer and Lemeshow* are tests carried out in order to determine whether the model formed is correct or not. It is said to be appropriate if the model with the observed value does not have a significant difference. The *Chi-Square Hosmer and Lemeshow* values show at 0.868 with a *sig value* is 0.997. Thus, the value of *sig.* greater (>) when compared to the value of the confidence level of = 5% (0.05). So the decision was taken that the model in this study can be accepted because there is no significant difference between the model and the observed values, and further hypothesis testing can be carried out (see Table 3).

Table 3 – Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	0.868	7	0.997

Source: Primary Data Processing, 2022.

The number of respondents who did not participate in the AUTP program was 50 rice farmers. Meanwhile, the number of farmers who actually did not participate in the AUTP program based on the model's predictions was 48 people and 2 people who should have participated in the AUTP program from the farmers who did not participate in the AUTP.

The number of respondents of rice farmers who participated in the AUTP program was 50 people. Meanwhile, the number of farmers who actually participated in the AUTP program based on the model's predictions was 47 people and 3 people who should not have participated in the AUTP program from the farmers who participated in the AUTP. Based on

the results of the analysis, the *overall percentage* is 95.0%. This gives an understanding that the accuracy of the model in this study to predict the dependent variable is 95.0%.

Table 4 – Wald test results on logistic regression analysis

Independent Variable	Coefficient	Wald	Sig.	Exp(B)
Constant	13,443	4,740	0.029*	689216,202
Land Area (X_2)	-0.455	4,435	0.035*	Land
Status (X_4)	-3,107	6,779	0.009*	0.045
Side Work (X_5)	-2,126	2,941	0.635	0,08
Socialization Jasindo(X_8)	0.885	0.578	0.447	2,423
Officer Activeness (X_9)	0.249	0.046	1.283	0.830
Real test level (α) = 10% T table (α=10%) = 1.6611				

Source: Primary Data Processing, 2017.

Regression model equation binary logistics obtained are as follows:

$$logit\ [P] = ln\ ln\ \left[\frac{P1}{-P}\right] = 13.443 - 0.455\ X_2 - 3.107\ X_4 - 2.126\ X_5 + 0.885X_8 + 0.249X_9$$

Based on the data presented in Table 14, that three of the five independent variables analyzed using logistic regression analysis showed a significant effect, while the two variables others have no significant effect.

The area of rice farming land which is calculated in hectare units shows a significant influence on the non-participation of farmers in the AUTP program. This can be seen from the value of *sig.* -it is 0.035 which means it is smaller than the confidence level (α) of 10%, or it can also be seen in the wald value (T count) = 4.35, which is greater than T table = 1.6611. In addition, the value of the *Odds Ratio* in the variable area of rice farming land is 0.635. This means that for every 1 hectare increase in land area, the rice farmer's chances of not participating in the AUTP program will be 0.635 times.

Land ownership status which is calculated in the form of a *dummy* (1=rent and 0=own ownership), shows that there is a significant effect on the non-participation of farmers in the AUTP program. This can be seen from the value of *sig.* -it is 0.009 which means it is smaller than the confidence level (α) of 10%, or it can also be seen in the wald value (T count) = 6.779, which is greater than T table = 1.6611. In addition, the value of the *Odds Ratio* on the variable of land ownership status of rice farming is 0.045. This means that any change in land status to lease, will reduce the opportunity for the rice farmer not to participate in the AUTP program by 0.045 times.

Ownership of a side job which is calculated in the form of a *dummy* (1=no side job and 0=has a side job), shows that there is a significant effect on farmers' not participating in the AUTP program. This can be seen from the value of *sig.* -it is 0.086, which means it is smaller than the confidence level (α) of 10%, or it can also be seen in the wald value (T count) = 2.941, which is greater than T table = 1.6611. In addition, the value of the *Odds Ratio* on the variable ownership of side jobs is 0.119. This means that any change from having a side job to having no side job will reduce the chances of the rice farmer not participating in the AUTP program by 0.119 times.

The frequency of socialization carried out by Jasindo which is calculated in the form of a *dummy* (1=rarely and 0=often), shows that there is no significant effect on the participation of farmers in the AUTP program. This can be seen from the value of *sig.* -it is 0.447, which means it is greater than the confidence level (α) of 10%, or it can also be seen in the wald value (T count) = 0.578, which is smaller than T table = 1.6611. If we look at the value of the *Odds Ratio* on the frequency of socialization carried out by Jasindo, it is 2,423. This means that any change in the frequency of socialization from frequent to infrequent, will increase the chances of the rice farmer not participating in the AUTP program by 2,423 times.

The activeness of field officers, which is calculated in the form of a *dummy* (1=less active and 0=active), shows that there is no significant effect on the participation of farmers in

the AUTP program. This can be seen from the value of *sig.* -it is 0.830, which means it is greater than the confidence level (α) of 10%, or it can also be seen in the value (T count) = 0.046, which is smaller than T table = 1.6611. When viewed from the *Odds Ratio* on the activity of field officers, it is 1.283. This means that every change in the activity of field officers from active to inactive, will increase the opportunity for the rice farmer not to participate in the AUTP program by 1,283 times.

CONCLUSION

The conclusions based on the results and discussions in this study are as follows:

1. Characteristics of farmer households participating in the AUTP program in Banjarbaru City, namely:
   - The average age of rice farmers at the time of the study was 52.42 years old;
   - On average, the farmers who participated in the AUTP program had 4 household members;
   - Distribution of rice farmers who participated in the AUTP program based on the level of education, mostly at the SMA and SMP education levels, which were 54% and 40% respectively;
   - The area of rice farming land for farmers who participate in the AUTP program is 1.12 hectares;
   - Farmers who participate in the AUTP program have the most experience of less than 5 years, which is 90%;
   - For farmers who participate in the AUTP program, the highest percentage of land ownership is ownership of leased land, which is 90%;
   - The productivity of rice farming of farmers who participate in the AUTP program is 2,475 kg/ha;
   - These farmers' side jobs consist of on-farm as much as 6%, off-farm as much as 2%, and non-farm as much as 43%, while those who don't have side jobs are as much as 6%. 49%.
2. Three of the five independent variables analyzed using logistic regression analysis showed a significant effect, while the other two variables had no significant effect on the participation of farmers in the AUTP program. The three influential variables are land area, land status, and ownership of side jobs.

Suggestions that can be given by researchers based on the results of research conducted are the need for improvements in the service process starting from submitting as insurance participants to insurance claims for eligible farmers. As well as increasing socialization and understanding to farmers regarding the AUTP program, both carried out by the company (Jasindo) and field officers (POPT).

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