

The Farmer's Willingness to Preserve Rice Farming in Suburban Areas in Sleman Regency Yogyakarta, Indonesia

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Abstract- *This research aims to know the level of knowledge of farmers about government regulations on the protection of agricultural land sustainable food and identifying the factors that influence the farmer's willingness to preserve rice farming. The location was determined by a purposive method in six villages which belong to suburban area of Sleman regency. Sixty farmers were chosen as respondents using simple random sampling technique. This research used the logistic regression to analyze the factors that influence the farmer's willingness to preserve rice farming. The result showed that knowledge of farmers about government regulations on the protection of agricultural land sustainable food was still shallow. Logistic regression analysis showed that age, farming experience, farming income, availability of credit and land status significantly influenced the farmer's willingness to preserve rice farming. On the average, the probability of the WTPs farmer in suburban area of Sleman regency was low and it was about 53.33%.*

Keywords: *willingness to preserve, rice farming, suburban, agriculture land sustainable food*

Introduction

The concept of sustainable agriculture is a process that utilizes agricultural resources optimally to meet the needs and welfare of today's society without having to sacrifice the needs and well-being of future generations (Karwan, 2003). The Special Region of Yogyakarta in 2013 has an area of 56,539 Ha which is spread in several regions with the broadest paddy fields in Sleman Regency, which is 22,835 Ha. During 2009-2013 there was a shrinkage of rice fields in Sleman Regency from 22,914 ha to 22,835 Ha or 0.34% (Special Region of Yogyakarta in Figures, 2014). Along with the rate of conversion of agricultural land, agricultural resources that need priority attention are agricultural land for national food production.

Conversion of agricultural land causes a reduction in land tenure by farmers, resulting in a decline in farmer income. The Indonesian government has established Law No. 41 of 2009 concerning the Protection of Sustainable Food Agriculture Land to control the rate of conversion of agricultural land to improve the welfare of farmers and the community. The Government of the Special Region of Yogyakarta has also stipulated Regional Regulation No. 10 of 2011 as regulation at the regional level.

At present, even though the government has carried out various efforts to protect sustainable agricultural food land, the rate of land conversion continues to occur every year. Whether farmers as land managers already know the regulations for lasting food agriculture protection and the

extent to which farmers' willingness to preserve rice farming in peri-urban areas of Sleman Regency is an interesting study. This study aims to determine farmers' knowledge of government regulations on sustainable food agricultural land protection and find out the factors that influence farmers' willingness to preserve rice farming in the peri-urban area of Sleman Regency with a choice experiment approach (Hanley et al., 2003).

Literature Review

Environmental, economic assessments using contingency valuation methods has been carried out. One valuation technique is to calculate the value of willingness to pay (WTP) of the community towards environmental benefits that can be enjoyed. Research on the assessment of green open space with WTP analysis was carried out by Dahal et al. (2018) and Cook et al. (2018), whereas Song et al. (2015) examined the relationship between motivation and willingness to conserve urban green space.

An assessment of willingness to pay (WTP) of visitors for forest area conservation was carried out by Iranah et al. (2018) and Bravo-Varga et al. (2019), whereas Platania & Rizzo (2018) examined WTP entrance tickets for Etna Park, the protected area of Sicily, the park of the Etna Volcano. WTP for tourism area development was reviewed by Ramdas & Mohamed (2014) and Lankia et al. (2014). Tseng, Hsu, & Chen (2015) examined the preferences of tourists for alternative natural resource management options.

The preservation of natural resources in coastal areas is a concern of researchers in the fields of natural resource and environmental economics. WTPs Communities for coastal damage control were examined by Kontogianni et al. (2014), Dribek & Voltaire (2017) and Enriquez-Acevedo et al. (2018). Seroa da Motta & Ortiz (2018) and Feng et al. (2018) examined the willingness of the community to accept payments for ecosystem services, while Obeng & Aguilar (2018) calculated WTP for payments for ecosystem services (PES).

Preservation of water resources and water quality has also been a concern of researchers. Halkos & Matsiori (2016) examined the willingness to pay WTP to protect artificial lakes. Larue et al. (2017) examined the economic assessment of rural residents living in the province of Quebec to improve water quality. Boyer et al. (2016) examined the willingness to pay additional costs for reclaimed or recycled water.

Marine Resources are one of the concerns for researchers. Grilli & Notaro (2019) estimated the loss of welfare associated with potential damage to coral reefs, while Aanesen et al. (2015) calculated WTP to increase the protection of marine resources in the form of cold water corals (CWC).

In addition to natural resources, the attention of researchers also focused on the issue of pollution and climate change. Gupta (2016) examined the willingness to pay WTP for road transport carbon taxes, while Combes et al. (2018) analysed WTP to prevent environmental pollution. Kragt et al. (2016) estimated community values to mitigate climate change and the benefits of carbon farming / reduce greenhouse gas emissions. Cook et al. (2018) estimated willingness to pay for environmental preservation associated with a power plant project.

Non-market assessments were also used by researchers to analyze the willingness to pay for environmentally friendly products. Shint et al. (2017) calculated the willingness to pay more for organic menus introduced in society. Roosen et al. (2015) examined the willingness to pay WTP for food products with nanotechnology. Kamaruddin et al. (2012) examined the willingness of customers to pay WTP for the logistics of halal products. Another study about WTP for environmental public goods was carried out by Baumgartner et al. (2016).

Methodology

The primary method used in this research was a descriptive method. The purpose of this descriptive research was to make a systematic, factual and accurate description of the facts, characteristics, and relationships between phenomena investigated (Nazir, 2011). The location of the study was determined by purposive sampling technique with the consideration that the peri-urban areas with rice fields in Sleman Regency were in three sub-districts. Those were Gamping District, Godean District, and Mlati District.

In general, the villages in Gamping Subdistrict have rice fields. We took four villages that were included in suburban areas, namely Ambarketawang and Balecatu Villages because the main road to Yogyakarta City crossed them and both villages were close to economic growth and services. Banyuraden and Trihanggo villages were chosen because they were near Yogyakarta city. As for Mlati sub-district, which only has rice fields, was included in suburban areas and Sinduadi Village was also included because it was adjacent to the city of Yogyakarta. Godean Subdistrict generally has rice fields, but villages which were included in peri-urban areas namely Sidoarum Village, were bypassed by the main route to the city of Yogyakarta from the central part of the west and directly adjacent to the city of Yogyakarta. Farmer the samples were taken from 10 respondents from each village in a non-proportional random sampling so that the total samples taken in this study were 60 respondents.

Descriptive analysis was used to describe farmers' knowledge about Farmers' knowledge of government regulations in the form of Law No. 41 of 2009 and the Special Region of Yogyakarta regulation No. 10 of 2011 concerning the Protection of Sustainable Food Agriculture

Land. Descriptive analysis was chosen because it is expected to be able to describe the entire data and facts encountered in the field so that the accuracy of the research data is objective.

The sustainability of farming is not only thought to be based on market benefits. There are considerations of non-market benefits that determine the attitude of farmers to survive or leave their farming. Assessment of non-market benefits can often be revealed by a choice experiment approach (Hanley et al., 2003). The choice experiment (CE) approach is carried out to reveal one's preferences towards the specific context of the different attribute choices. The CE application has been carried out by Hanley (2006) by estimating the economic value of improving river ecology in England and Central Scotland.

CE is a development of contingent valuation theoretical framework with choices that are dichotomous in Random Utility Model as the basis of empirical analysis in econometric limited dependent variables (Hanley et al., 2001, 2006; Greene, 1997). According to the theory, the indirect utility function of each respondent *i* (*U*) can be described in two parts: a determinant element that is precisely as a linear index attribute (*X*) of the alternative choice *j* and a stochastic component (*e*) which represents the effect that is not observed in individual choices. It can be shown in the equation:

$$U_{ij} = V_{ij} (X_{ij}) + e_{ij} = bX_{ij} + e_{ij} \dots\dots\dots (1)$$

Thus the probability that some respondents prefer *g* choices rather than *h* choices, in a set of choices can be described as the probability in which the utility associated with the choice *g* outside all other options can be expressed as a logit model.

Logit model or logistic regression is a modeling approach that can be used to describe the relationship between independent variables and variable responses that are binary or dichotomous. The logistic regression model is part of the striking linear model (Generalized Linear Models) which is composed of three components (Kleinbaum, 1994), namely:

1. A random element that describes the distribution of opportunities for the response variable.
2. Systematic components are linear functions of independent variables.
3. Connection function describes the relationship between systematic random components with random component expectation values.

According to Hosmer & Lemeshow (1989), there are three critical things in logistic regression analysis, namely:

1. The variable expectation value, $E(Y | X)$ ranges from 0 and 1, $0 \leq E(Y | X) \leq 1$, where the logistics distribution function can meet this constraint.
2. The rest follows the binomial distribution .
3. The principle of analysis in linear regression can be applied to logistic regression analysis.

If the observed data has an independent variable that is indicated by vector $x = (x_1, x_2, x_3, \dots, x_p)$ and the *Y* response variable, where *y* has two possibilities namely 0

and 1, where $y = 1$ states that the response has a survival criterion to preserve farming (Willing to Preserve = WTPs) and vice versa $y = 0$ states the response does not have criteria (leaving farming), with $P(Y = 1) = \pi(x_1)$ and $P(Y = 0) = 1 - \pi(x_1)$ then the Y (Willing to Preserve = WTPs) response variable will follow the Bernoulli distribution with the opportunity function:

$$f(Y = y) = \pi^y (1 - \pi)^{1-y} \quad (2)$$

The free variable group which is the socioeconomic factor of farmers is mapped to the opportunity of a response that has a region between zero and one by using the logistical distribution function with the equation (by Hosmer and Lemeshow (1989):

$$\pi(x) = \frac{e^{g(x)}}{1 + e^{g(x)}} \quad (3)$$

Whereas the linear relationship between the probability of response $\pi(x)$ and the free variable groups can be achieved by using the logit function which is a connection function in logistic regression (McCullagh and Nelder, 1989), namely:

$$g(x) = \ln \left(\frac{\pi(x)}{1 - \pi(x)} \right) \quad (4)$$

with ;

$$g(x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p \quad (5)$$

In this case, the function of the opportunity for the farmer's willingness to preserve rice farming can be formulated as follows:

$$\text{Logit} [(P=WTPs)] = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + d_1 D_1 + d_2 D_2 + d_3 D_3 \dots \quad (6)$$

where :

$WTPs$ = Willingness to Preserve with scale: 1 = preserve; 0 = leave

$\beta_0, \beta_1, \beta_2, \dots, \beta_7$ = Parameter coefficient

$d_1 - d_3 \dots$ = Dummy parameter coefficient.

X_1 : Farmer's knowledge (score of 5 items of knowledge)

X_2 : Age of farmer (year)

X_3 : Family members (people)

X_4 : Education level (no school = 0; elementary school = 1; junior high school = 2; senior high school = 3; Diploma = 4; bachelor = 5).

X_5 : Farming experience (years)

X_6 : Farm income (Rp. / Season)

X_7 : Outside farm income (Rp./ Month)

D_1 : Participation of farmer groups ($D = 1$, if active or $D = 0$, if it is not active).

D_2 : Availability of credit. ($D = 1$, if available or $D = 0$, if not)

D_3 : Land ownership status. ($D = 1$, if it's own or $D = 0$, if it's non-owned)

Furthermore, to conduct parameter testing simultaneously a likelihood test or G-test is carried out. Theoretically,

manual calculation can be seen by the formula:

$$G = -2 \ln \left[\frac{\text{(maximum likelihood for model)}}{\text{(maximum likelihood for saturated model)}} \right] \quad (7)$$

$$G = -2 \ln \left[\frac{\left(\frac{n_0}{n}\right)^{n_1} \left(\frac{n_1}{n}\right)^{n_0}}{\sum_{ni} Y_i^{Y_i} (1 - \pi_1)^{(1 - Y_i)}} \right] \quad (8)$$

where:

n_1 = number of samples included in the P category ($Y = 1$)

n_0 = number of samples included in the P category ($Y = 0$)

n = total number of samples

The G value of the statistics spreads according to the distribution of Chi-square (X^2). If the G value is greater than the Chi-square (X^2) table or the P-value is greater than α , then H_0 (the null hypothesis) was accepted or fail to reject H_0 at that level. The hypothesis built on this overall test is:

$$H_0 : \beta_1 = \beta_2 = \beta_3 = \dots = \beta_p = 0$$

$$H_1 : \text{At least there is one } \beta_i \neq 0 \text{ with } i = 1, 2, 3, \dots, p.$$

If $G \geq X^2(p, \alpha)$ means H_0 is accepted and if $G < X^2(p, \alpha)$ means H_0 is rejected.

Testing the effect of each independent variable on individual independent variables used the Wald test. Theoretically, manual calculation can be seen by the formula:

$$W_i = \left[\frac{\beta_i}{SE(\beta_i)} \right]$$

where:

β_i = Regression Coefficient

$SE(\beta_i)$ = Error X_i

The Wald test value spreads according to the normal distribution (Z). If Z count is greater than Z table or the P-value (sig) of the Wald Test is greater than α , then accept H_0 (the null hypothesis) or fail to reject H_0 at that level. The hypothesis in the partial test is:

$$H_0 : \beta_i = 0$$

$$H_1 : \beta_i \neq 0$$

If $W \geq Z_{\alpha/2}$ or sig value more than α 10% means H_0 is accepted and If $W < Z_{\alpha/2}$ or sig value is less than α 10% means H_0 is rejected.

Results and Analysis

Farmers Knowledge About Agricultural Land Protection Regulations

Farmers' knowledge of Law No. 41 of 2009 and regional regulation No. 10 of 2011 is the foundation of farmers' knowledge of government regulations regarding sustainable food agriculture land protection. The Knowledge of Law No. 41 of 2009 and Regional Regulation No. 10 of 2011 had a minimal score. It is probably due to the lack of intensive publication of laws and regulations by the government so that farmers who are the main target of the government policy do not know much.

Knowledge of announcements or counseling is closely related to farmer activity in farmer group activities. The Knowledge of farmers regarding (to) the publication or extension of Law No. 41 of 2009 and regional regulation No. 10 of 2011 is(was) still minimal, but on the other hand farmers' knowledge of the area of sustainable agricultural land (green lines) and the knowledge of the prohibition on draining rice fields or land conversion was quite high. It may be because the government in conducting extension more emphasizes farmers to know the area of food agriculture land protected by the government (green line) and the prohibition on draining paddy fields to reduce the high rate of land conversion in suburban areas.

Table 1. Farmers' knowledge of government regulations regarding the protection of sustainable food agricultural land in peri-urban areas

No	Indicator	See		Not see	
		person	percent	person	percent
1	Law No. 41 of 2009	5	16.67	25	83.33
2	Regional Regulation No. 10 of 2011	8	26.67	22	73.33
3	Extension of Regulations	11	36.67	19	63.33
4	Green area	18	60.00	12	40.00
5	Prohibition of drying rice fields	10	33.33	20	66.67

Factors Affecting Rice Farming WTPs in the Suburban Areas

Analysis of factors that influence rice farming WTPs used logistic regression. Logistic regression analysis in this study used a sample of 60 with seven independent variables and one dependent variable was the willingness of farmers to preserve rice farming. We can see the descriptive statistics of the independent variables in table 2.

Table 2. Descriptive statistics of independent variables that influence farmers' willingness to preserve rice farming in suburban areas

	N	Minimum	Maximum	Mean	Std. Deviation
Knowledge (score)	60	0.00	4.00	1.70	1.31
Age (years)	60	20.00	73.00	54.43	10.45
Family members (people)	60	1.00	9.00	4.33	2.24
Education (score)	60	1.00	5.00	2.20	1.23
Farming experience (years)	60	3.00	60.00	26.20	17.2
Farming Income (Rp. / Season)	60	395000.00	9061800.00	2461891.03	1790235.49
on Farm Income (Rp./Month)	60	0.00	3500000.00	1632933.33	955986.24
Valid N (listwise)	60				

Feasibility testing of logistic regression models that is used to see if empirical data matches the model or not can be done by looking at the Hosmer and Lemeshow Goodness of Fit Test values measured by Chi-square values. The Chi-square value of the table for free degree 7 at the significance

level of 0.05 was 14.07. From the results of the above analysis it can be seen that Chi-square count is smaller than Chi-square table (3.168 <14.07) at the significance level 0.05. From the results, analysis can also be seen that the significance value of 0.869 (> 0.05) indicated that the model fit or was accepted and hypothesis testing can be done.

The accuracy of the model after the independent variables entered into the logistic regression model form can be seen in table 3. The table provided information that the overall value was (20 + 24) / 60 = 73.3 percent, which means the accuracy of this model was 73.3 percent.

Table 3. The accuracy of the logistic regression model

Observed	Predicted			Correct Percentage
	Willingness to Preserve		Percentage	
	Leave	Preserve		
Step	Willingness to Preserve	Leave Preserve	20 8	71,4
	Overall Percentage		8 24	75,0
				73,3

The overall model test or parameter test simultaneously determine the effect of independent variables on dependent variables. To test parameters simultaneously, the G test or Maximum likelihood test was used.

Table 4. Simultaneous likelihood test results

		Chi-square	Df	Sig.
Step 1	Step	25,862	10	0,004
	Block	25,862	10	0,004
	Model	25,862	10	0,004

H0: There are no independent variables that affect non-independent variables
 H1: At least one independent variable affects non-independent variables
 Reject H0 if the sig value is more than 0.05

The significance test of simultaneous variables or maximum likelihood tests in logistic regression used the Chi-square value of the difference between the initial Log likelihood value -2 (before the independent variable is entered into the model) and the final Log likelihood value - 2 (after the independent variable is entered into the model).

From the results above, it can be seen that the difference between the initial Log likelihood value of -2 and the final Log likelihood value -2 (82,911 - 57,049) is was 25,862. The value of P (sig) is 0.004 (<0.05) so that H0 was rejected. So it can be concluded that the knowledge of farmers, farmer's age, family members, education level, farming experience, farmer group participation, credit availability, land ownership status, farming income, and non-farm income significantly influenced farmers' willingness to conserve rice farming in the region suburban in Sleman Regency because the P-value of Chi-square was

0.04 where $\alpha < 0.05$ or in other words that the model was declared fit and can be used for further analysis.

The testing coefficient of determination was used to see the ability of independent variables in explaining the dependent variable. In the logistic regression test, Nagelkerke R Square was used to determine the coefficient. These values are also called Pseudo R-square. The results of the analysis obtained by Nagelkerke R Square value was 0.468, which is higher than Cox and Snell R Square. The ability of independent variables to explain the dependent variable (WTPs) was 46.8% and there were 53.2% of other factors outside the model defining the dependent variable.

Partial parameter tests are conducted to determine the effect of each independent variable on dependent variables. To test the parameters individually, a Wald test was used. Table 5 presents the results of estimating models of factors that influence WTPs

Table 5. Results of Estimating the Binary Logistic Regression Model Factors Affecting Rice Farming WTPs

Predictor	B	S.E.	Wald	Df	Sig.	Odds ratio
Constant	13.502	4.701	8.250	1	0.004	730.648.792
Knowledge	-0.512	0.314	2.653	1	0.103	0.599
Age	-0.244	0.085	8.230	1	0.004*	0.784
Family members	-0.178	0.190	0.879	1	0.348	0.837
Education	-0.581	0.413	1.986	1	0.159	0.559
Experience	0.059	0.035	2.813	1	0.094**	1.061
Farming Income	0.708	0.415	2.908	1	0.088**	0.493
Non-Farm Income	0.363	0.335	1.173	1	0.279	1.437
Dummy Group Participation	1.187	0.928	1.635	1	0.201	3.277
Dummy Credit Availability	1.941	0.965	4.043	1	0.044*	6.966
Dummy Land Status	1.810	0.958	3.571	1	0.059**	6.112

Description: * significant at $\alpha = 5\%$, ** significant at $\alpha = 10\%$

The model estimation results shown in the table above stated that the age factor and credit availability had a significant effect on WTPs in the suburban region at the alpha level of 5 percent. The age of respondents significantly affected rice farming WTPs. This means that the older the age of the farmers the higher the chance for WTPs to decline. The survey results showed that most respondents age were more than 50 years. This finding is similar to the study of Dahal et al. (2018) and Iranah, et al. (2018) which stated that population age had a negative effect, i.e. residents over 50 years tended to be lower in their role in preserving natural and environmental resources.

Experience, farming income, and land status significantly influenced rice farming WTPs in the suburban region at the alpha level of 10 percent. It means that the longer the experience and the higher the income, the higher the chance of WTPs. This finding is contrary to Enriquez-Acevedo et al. (2018) which stated that willingness to pay for coastal conservation did not depend on economic factors (income and employment). The probability of WTPs for

farmers with their land status was six times greater than other farmers' WTPs.

The significance testing of the variables showed that knowledge factors, family members, education, outside farm income, dummy farmer group participation did not affect rice farming WTPs in the suburban area of Sleman Regency. This result is different from the findings of Bravo-Vargas et al. (2019) which stated that education, although brief, would increase awareness of controlling natural resources and the environment. Even Larue et al. (2017) stated that highly educated residents were very willing to pay for pollution control. In line with the findings above, Gupta, M (2016) has found that education, income, and age played an important role in asking the community for environmental sustainability.

Probability of Willingness to Preserve (WTPs) of Rice Farming in Suburban Areas

The estimation results of logistic regression coefficients of the factors that affect rice farmers' WTPs in the peri-urban areas of Sleman Regency can be estimated from the probability value of the farmer's willingness to conserve rice farming (willingness to preserve) with the formula $P(WTPs) = \ln(\pi / (1 - \pi))$, where $P(WTPs) = P(Y = 1 / x)$ is an event opportunity $Y = 1$. The results of the estimation analysis of probability for paddy farmers' WTPs are presented in the form of descriptive statistics in table 6.

Table 6. Probability Value of Willingness to preserve rice farming in Suburban areas

P(WTPs)	Category	Person	Average	Percent (%)
0.0172 – 0.3448	Low	21	0.1899	3.00
0.3448 – 0.6724	Middle	19	0.5585	3.67
0.6724 - .,0000	High	20	0.8701	3.33
Minimum	: 0.017			
Maximum	: 1.000			
Mean	: 0.533			
Std. Deviation	: 0.300			

Table 6 shows that the minimum probability value of willingness to preserve rice farming in the peri-urban area of Sleman Regency was 0.0172 and the maximum amount was 1.0000 with an average of 0.5333 and a standard deviation of 0.3008. Zero was a code of farmer's desire that abandon rice farming activities, and 1 was is a code of farmer's willingness to preserve rice farming activities. The results of the analysis of the opportunities for farmers' desire to continue farming are divided into three categories. Based on the table, it can be seen that the largest percentage of farmers' wishes were in a low category, which was 35.00%. It is probably because farming activities for people in peri-urban areas are only hobbies that become regular routines of farmers who are challenging to abandon because the primary purpose of farmers in doing rice farming is to meet their own food needs rather than to get maximum profit

The results of interviews in the field about farmers' expectations of their children in rice farming activities provide an overview of farmers' expectations of the sustainability of rice farming. Based on table 7, it was known that most farmers expected their children to continue to cultivate rice. Field data showed that most of the reasons farmers hope that their children will continue to grow rice were to safeguard inherited land, to provide for their own food needs, for the side and so that farming activities can be continued. The farmers did not expect their children to continue farming mostly because they did not know the wishes of their children, whereas at present children are rarely involved in farming activities. Another reason was that they did not owe the land and the economy was not stable.

Table 7. Farmers' Expectations of Their Children in Rice Farming Activities

No	Farmers' Expectations	person	Percent (%)
1	Leaving rice farming	20	33.33
2	Preserve rice farming	40	66.67
	Total	60	100.00

Conclusion and Recommendations

Overall knowledge of farmers on government regulations in the form of Law No. 41 of 2009 and Regional Regulation No. 10 of 2011 concerning the protection of sustainable food agriculture in suburban areas is still minimal, but farmers' knowledge of sustainable food agriculture (green line) is quite high, or more than 50 percent of farmers know.

Willingness to preserve paddy farming by farmers in the peri-urban areas of Sleman Regency is significantly influenced by factors of age, farming experience, farming income, dummy credit availability, and dummy land status at a real level of $\alpha = 10$ percent. Based on the results of the analysis of the prediction of the average probability of farmer's willingness to preserve rice farming in peri-urban region is 53.33%.

For the sustainability of rice farming in the suburban area, it is necessary to increase socialization and implementation of Law No. 41 of 2009 and Regional Regulation No. 10 of 2011 concerning the protection of sustainable food agricultural land as a foundation for farmers' knowledge in continuing rice farming. Besides, it is necessary to train farmers' children in the management of rice farming intensively and with an agribusiness perspective to attract their interest in the field of rice farming. These efforts need to be supported by the provision of credit that is easily accessible for farmers.

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