IOPICOsa_Factors influencing

by Kelik Sukma

Factors influencing in implementing rice farming conservation on slope land

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Abstract. Farmers in Pamekasan Regency, especially in Pakong Subdistrict, use sloping land as agricultural land. The farmers generally have implemented conservation rules at different levels. This study aims to examine the factors that influence the application level of rice farming conservation on sloping land. The method used in this study is a questionnaire that concern with the level of conservation application and the factors that influence the adoption level of conservation farming. Meanwhile variables of Conservation farming include making terraces, making infiltration channels, planting terrace reinforcement plants, making water drainage channels and utilizing or using natural mulch. Furthermore the influencing Factors include land area ($X1$), farmer's age ($X2$), formal education ($X3$), non-formal education ($X4$), land slope ($X5$), conservation farming knowledge ($X6$), knowledge of conservation methods ($X7$) , and knowledge of the importance of conservation ($X8$). The result showed that 65.38% of the sampled farmers had applied conservation with a high level category. Multiple linear analysis of the factors showed that $X4$, $X5$, $X7$ and $X8$ had a significant effect on the level of conservation farming iplementation for rice plants on sloping land.

1. Introduction

New land clearing by expanding the area of food crops for productive purposes and adding economic value causes the changes of land function. It can decrease the capacity of land and as a result, it cannot support farming activity [1]. Ministry of Agriculture [2] said that the use of a land must be in accordance with the ability of the land. Agricultural cultivation in mountainous land includes two main activities, farming and conservation activities.

Farmers in Pamekasan District, especially in Waru Sub-District, use a lot of sloping land as agricultural land. The most cultivated plants were rice. According to Sulistyono *et al.* [3], conservation farming can prevent excessive erosion on sloping agricultural land and maintain land fertility. The majority of farmers have applied conservation rules at different levels. In line with this, Suwarto and Anantanyu [4] explained that farmers have carried out land conservation in different degrees. Some farmers have made bench terraces, but without strengthening plants.

The difference in the level of innovative technology application in conservation farming based on the characteristics of each farmer. Nuraeni *et al.* [5] said the effort to implement the principles of land

resource conservation in the crop cultivation system depends on the perception and participation of farmers as actors who determine the management of their farming.

Based on this, it is necessary to examine the factors that influence farmers' decision in implementing conservation farming, so it can be used as a source of information in improving the implementation of conservation on sloping lands.

2. Materials and Methods

Farming and conservation activities integrated to be conservation farming systems (CFS) or Conservation Agriculture (CA). conservation agriculture (CA) was used as an alternative to conventional agriculture as a result of losses in soil productivity due to soil degradation. May techniques were aplicated such as zero-tillage, mulching, mixed cropping, crop rotation, and using botanical pesticide using rather than chemical [6].

CA practices have been widely adopted by farmers. Some countries that adopted CA were found in the southern cone of Latin America (Argentina, Brazil and Paraguay), North America, Australia, Eastern Europe, East Asia and Africa [7, 8].

2.1. Location of the Research

The research was carried out in Waru Subdistrict, Pamekasan Regency, with consideration that the area is mountainous land where many sloping lands are used for seasonal crops such as rice. Administratively, Pamekasan Regency is located at 6 ° 51'-7 ° 31 'south latitude and 113 ° 19'-113 ° 58' east longitude. Waru Subdistrict is a sub-district located in the northern part of Pamekasan Regency and has the potential for agricultural land because it is located in the highlands.

2.2. Level of Application of Conservation Farming

To find out the level of implementation of conservation, *scoring rubric is* carried out for each respondent which is presented in Table 1.

Table 1. Indicators of the Level of Implementation of Conservation Farming.

No.	Conservation Application Level Indicator	Score				
		1	2	3	4	5
1	Terrace treatment					
2	Making of channel infiltration					
3	Planting amplifier terrace					
4	Making water channels					
5	The use of natural mulch					

2.3. Analysis of the Factors Affecting the Level of Conservation Application

To examine the factors that influence the level of application of conservation, it was used multiple linear regression analysis. The function model of conservation farming adoption which was used in this study is:

$$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_7 X_7 + \alpha_8 X_8 + u \quad (1)$$

Where α_0 is an intercept / constant, α_1-α_7 is the adoption kefesien, Y is the adoption or application of conservation farming, X_1 is the land area (ha), X_2 is the age of the farmer (year), X_3 is formal education, X_4 is non-formal education, X_5 is the slope of the land, X_6 is the knowledge of conservation farming, X_7 is the knowledge of conservation technique, X_8 is the knowledge of the conservation importance.

3. Results and Discussion

3.1. Identification of the of Application Level in Conservation Farming

The level of implementation in conservation farming on sloping land based on the treatment of making terracing, making infiltration channels, making water channels, planting annual crops, planting terrace reinforcement plants and using natural mulch. The highest level of application of terrace making is 50-75% (Table 2) of the total area of land which is planted with rice.

Fifty percent of farmers didn't make water infiltration channels. According to farmers, making water channels is enough to replace the water catchment channel, but some farmers also argue that the manufacture of infiltration canals is very important to reduce the amount of water discharge in the land, especially in the rainy season in order not to damage rice plants. Meanwhile for water channels, the average of farmer has applied with an application rate of 50-75% (Table 2).

Table 2. Distribution of the Level of Implementation of Rice Farming Conservation.

Application Level	Number of Farmers (people)				
	Terrace	Water infiltration	Terrace amplifier	Water channel	Natural mulch
There is no	0	26	0	0	0
1-25%	1	8	5	3	15
25-50%	3	18	33	3	15
50-75%	37	0	14	32	14
> 75%	11	0	0	14	8
amount	52	52	52	52	52

The level of conservation farming implementation is classified into two groups namely low and high. Farmers who apply conservation in the high category are 65.38 % of farmers (Table 3). According to farmers, the level of conservation implementation need much money than those who do not apply conservation, especially for labor wages. However, by applying conservation, it can be easier for farmers, especially during the weeding process. Conservation also minimizes the existence of water loss due to the condition of sloping land so that it requires an accompanying treatment.

Table 3. Distribution of the Level of Application of Conservation Farming.

No.	Level of Application of Conservation Farming	Number of people)	Percentage (%)
1	Low	18	34.62
2	High	34	65.38
	amount	52	100

3.2. Factor-Factors Affecting the Level of Adoption of Conservation Farming

SDS Factors influencing the level of implementation of rice farming conservation were analyzed using multiple regression methods with the dependent variable the level of conservation adoption applied by farmers and there were eight variables included in the analysis model. .

From the regression results, it was found that the land area variable (X1) had no significant effect on the level of implementation of conservation farming with a t-table value is greater than t-count (Table 4), it means that farmers who have a narrow land area and a wide area have the same opportunities in the implementation of farming conservation level. Research conducted by Susanti [9] shows that land tenure variables do not affect farmers in the application of organic rice farming

innovations. In line with the research conducted by Bruce *et al.* [10] show that the land area does not affect the farmers' decision in applying the level of rice varieties adoption.

The value of t-count for variable of farmers' age (X2) is -0.689 , so it can be concluded that the age of the farmers does not have a significant effect statistically with margin of error 10 %, it means that young and old farmers have the same potential in applying conservation farming levels. In line with the research conducted by Jailanis *et al.* [11] explained that age has no effect on farmers in making technology adoption decisions. Research Apriliana and Mustadjab [12] showed that age did not affect farmers' decision in using hybrid corn seeds.

Education of farmers (X3), t-count is smaller than the t-table, so it can be concluded that age had no significant effect to the farmers.with margin of error 10 % (Table 4). Most of the Farmers' education in this study is junior high school level. The level of education does not significantly influence the decision-making of farmers in adopting the use of single varieties. Amala *et al.* [13] and Burhansyah [14] showed that farmer education has no influence on agricultural innovation adoption. Van Bac *et al.* [15] mentioned that formal education did not have a real influence on farmers' decision-making in adopting tea farming systems.

Table 4. Factors affecting the level of adoption of conservation farming.

Variable	t-count	Sig
Constants	1,370	.178
Land area	1,155	.255
Farmer Age	1,013	.317
Formal education	0.607	.547
Non-formal education	1,770 *	.085
Sloping Land	2,119 *	.040
Land Conservation Farming Knowledge	0.409	.684
Knowledge of Land Conservation	1,714 *	.094
Knowledge of the importance of land conservation	2,341 *	.024

= 0.706, F count = 12.908
Ftable = 2.98 (significant with an error rate of 1%)
Ttabel   = 1,675 (* significant with an error rate of 10%)

The non-formal education coefficient (X4) has an influence on farmers' decision-making in applying conservation levels with margin of error 15%. Non-formal education in this case is the participation of farmers in farmer groups. The extension staff in this research did not only discuss related to pest disease problems that are often complained by farmers but also the treatment of land processing for sloping land in order to obtain maximum production. Indraningsih [16] revealed that the role of extension workers and membership of farmer groups has an influence on farmers in adopting farming technology innovations. The role of the extention in farmer group in delivering innovations related to farming conservation on sloping land to group members is important with the active participation of members of the farmer group which become a force for farmers in adopting farming conservation.

The slope land (X5) has a positive effect on the level of implementation of conservation farming for rice farming. The greater the slope of the land used in rice farming, the higher the level of application of conservation both in the treatment of terrace use, water disposal, drainage, terrace plants and annual crop planting. Conservation treatment serves to reduce the rate of water so as to minimize erosion and loss of water. Darmadi *et al.* [17] suggested that land conditions that have high land slope required a land conservation technology in an effort to maintain land fertility and crop productivity.

Farmers' knowledge of conservation methods (X7) and the importance of land conservation (X8) affect the level of implementation of conservation farming. Farmers who understand how to conserve conservation and the importance of conservation on sloping land will increase the level of conservation to produce maximum productivity. Farmers in this study understand the benefits of applying conservation, one of which is to avoid erosion, so that sloping land must be treated with shading. While the knowledge of farmers related to conservation farming (X6) does not affect the level of application of rice farming conservation

4. Conclusion
The level of implementation of farming conservation with a high category of 65.38% of the total respondents means that the majority of farmers have understood the importance of conservation on sloping land. Factors that have a significant effect on the level of implementation of conservation farming in rice plants on sloping land are non-formal education (participation of farmer groups), sloping land, knowledge of ways and importance of conservation farming and knowledge of the importance of conservation farming.

It is needed to conduct counseling related to the use of crop residues to avoid mulch or allocations that can be used as organic fertilizer. The need for approaching from the instructor of the problem of making terraces because there is still the making of terraces that are not opposite to the speed contour of the water and the terraces that are still tilted.

Acknowledgements

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FINAL GRADE

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GENERAL COMMENTS

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