

TECHNOLOGY ADOPTION OF FARMERS TO MASTER TREEGROWERS TRAINING PROGRAM IN GUNUNGKIDUL DISTRICT

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ABSTRACT

Master TreeGrowers program is a training program for cultivation and marketing of forestplants. The Master TreeGrowers program is held to train the forest farmers to be more skilled and helps the forest farmers to manage their forest better than before as well as to increase the economic value of their forest products. This research is held in Playen, Nglipar, and GiriSubo Sub-districts, Gunungkidul Regency. The aims of this research are: (1) Analyzing the farmers' adoption rate of Master TreeGrowers technology in Gunungkidul Regency and (2) Analyzing of factors that influence the farmers' adoption rate of Master TreeGrowers technology in Gunungkidul Regency. A descriptive method with a quantitative approach is used in this research. This research took 60 samples of the forest farmers with random sampling in Playen Sub-district, Nglipar Sub-district, GiriSubo Sub-district. The samples consist of 30 persons of female farmers and 30 persons of male farmers that take part in Master TreeGrowers Training Program. This research used the proportion test and multiple linear regression method. The result of this research shows that the female farmers adoption rate of Master TreeGrowers technology in Gunungkidul Regency is classified as rare with percentage of 33,32%. The male farmers adoption rate of Master TreeGrowers technology in Gunungkidul Regency is classified as medium stage with percentage of 42,07%. The factors that significantly influence the farmers adoption rate of Master TreeGrowers technology in Gunungkidul Regency is gender type, the farmer perception of Master TreeGrowers program, the role of village apparatus, and the intensity of extension program that followed by farmers.

Keywords: *Adoption, technology, MasterTreeGrowers, farmers, Gunungkidul Regency*

INTRODUCTION

The majority of people in Indonesia rely on the agricultural sector to improve the economy and fulfillment needs to survival. One of the agricultural sectors that has an effect on the survival of the Indonesian people, namely the forest. Forests are very beneficial for human survival, both mentally and economically. Economically, forests provide profitable income to farmers who manage forests (Ningrumsari, 2018). The income is obtained from the sale and use of trees in the forest. In addition to the high selling price of trees, there are several obstacles in the sale of these trees which have caused the selling price of the trees to be low, including the physiological defects of the trees and the length of time to harvest. These constraints are caused by the low level of knowledge of farmers in tree cultivation. Therefore, Master TreeGrowers Program (MTGs) is a training program, where this program trains community forest farmers, both female farmers and male farmers, so that farmers can be more advanced and can achieve their welfare. The wishes of Master TreeGrowers program, both male and female farmers can manage their forests well and the resulting trees

can provide high economic value so that they can improve community welfare. in it properly and in accordance with cultivation procedures, and includes technologies in maximizing the process of tree cultivation and developing farming.

Master TreeGrowers (MTGs) is a training program for annual plant cultivators, one of which was implemented in Gunungkidul in 2014 and 2018. In 1996, the MTG program began to be developed in Australia. Then in 2012, the program was introduced in Uganda and Nigeria. In Indonesia, this MTGs training has been carried out in five districts, namely Pati District, Central Java Province, Bulukumba Regency, South Sulawesi Province, South Konawe Regency, Southeast Sulawesi Province, and Sumbawa Regency, West Nusa Tenggara Province, Gunungkidul Regency, Yogyakarta Special Region.

Gunungkidul Regency is a district with the highest forest area in Yogyakarta Province. According to Mutijo et al (2016), the forest area in DIY in 2015 reached 95,397.31 hectares or about 30% of the DIY area. The forest area is abundant, making the people of Gunungkidul Regency able to use the forest for their

livelihoods as forest farmers. Forest farmers in Gunungkidul include female forest farmers and male forest farmers. Both women and men farmers cultivate forests on private land and state-owned land. It's just that these forest farmers still have very minimal technical knowledge of cultivation, which causes the adoption rate of Master TreeGrowers (MTGs) technology to be low. Besides, influenced by the cultural constraints of the people who have the principle of a crop-stay-harvest cultivation system. Not only the culture of the community, the factor that affects the level of farmer adoption is the role of gender in daily activities, such as female farmers acting as housewives so that they do not have much time in other activities. Meanwhile, male farmers act as the backbone of the family who have to earn a living and take care of their agricultural land so that they have plenty of time to participate in other activities such as MTGs training. Therefore, between female farmers and male farmers have different responses and adoption rates related to the Master TreeGrowers Program (MTGs).

Information regarding innovations in agriculture is an important thing to know, discuss and apply. This is because knowing and discussing innovations in agriculture will affect the process of technology adoption which has benefits both for the welfare of farmers and for the government in order to build better agriculture. Innovations need to be held and disseminated in order to achieve certain goals and to solve certain problems. Meanwhile, we know that currently there are still some farmers who have not adopted agricultural technology for forest management so that the results obtained in their forest plant farming are not maximized. In addition, both male and female farmers have different adoption rates related to an innovation. Therefore, it's important to determine the level of farmer adoption of technology and factors that influence the level of farmer adoption of technology in the Master TreeGrowers (MTGs) Program in Gunungkidul Regency.

METHODS

The used method in this research is descriptive analysis with a quantitative approach. This research was conducted in 3 (three) districts in Gunungkidul Regency, namely Nglipar District, Playen District, and Girisubo District. The fertilizers used in this study were forest cultivators and had attended MTGs training. The sample of farmers taken was 20 people from each district, so the total sample was 60 forest farmers. The method used in determining the sample is simple random

sampling. Data were collected by means of a questionnaire, observation, and documentation. The data obtained are primary data and secondary data.

Data analysis are a research process that is carried out after all the data needed to solve the problem under study has been obtained completely. This research is analyzed quantitatively by using the research data that has been obtained to be processed or interpreted by statistical formulas and theories.

1. First Hypothesis Testing (Proportion Test)

- a) Testing the hypothesis Ho: $P \leq 50\%$
Ha: $P > 50\%$

With the translation:

Ho: It is assumed that less than or equal to 50% of farmers in Gunungkidul District have a low level of technology adoption in the Master TreeGrowers program.

Ha: It is estimated that more than 50% of farmers in Gunungkidul District have a low adoption rate of technology in the TreeGrowers Master Program.

- b) Significance level at $\alpha = 5\%$ (0.05)

- c) Test statistics

$$Z \text{ value} = \frac{\frac{x}{n} - P_0}{\sqrt{\frac{P_0(1-P_0)}{n}}}$$

Information :

X : the number of farmers in Gunungkidul Regency who have low adoption rates

n : the total number of farmers in Gunungkidul Regency used as the sample

Po: population proportion

- d) Testing criteria

$Z_{hitung} < Z_{table}$: Ho is accepted, Ha is not accepted

$Z_{hitung} > Z_{table}$: Ho is not accepted, Ha is accepted

2. Second Hypothesis Testing (Multiple Linear Regression Analysis)

The equation is:

$$Y = A + b_1.D + b_2.X_1 + b_3.X_2 + b_4.X_3 + b_5.X_4 + b_6.X_5 + b_7.X_6 + b_8.X_7 + b_9.X_8 + b_{10}.X_9 + b_{11}.X_{10} + b_{12}.X_{11} + b_{13}.X_{12}$$

Information:

Y: The level of farmer adoption of the

Master TreeGrowers (MTGs) Program in Gunungkidul Regency

A: Constant value

b1- b9: Regression coefficient

D: Gender dummy (D = 1 if male, D = 0 if female)

X1: Age

X2: Education

X3: Land area

X4: Perception of farmers X5: Motivation of farmers

X6: The intensity of farmers in following the counseling on annual crop cultivation

X7: Attitudes of farmers

X8: Role of farmer group

X9: Role of Trainer

X10: The role of village officials

X11: Perception of the suitability of the material

X12: Experience in cultivating perennial crops with knowledge of MTGs

Hypothesis test :

Ho: There is no influence between gender, age, education, land area, perception farmers, farmer motivation, farmer intensity in participating in counseling on annual crop cultivation, farmer attitudes, the role of farmer groups, the role of trainers, the role of village officials, perceptions of material suitability, experience of annual crop cultivation with knowledge of the Tree Growers Master Program in districts Gunungkidul.

Ha: There is an influence between gender, age, education, land area, farmer perceptions, farmer motivation, farmer intensity in participating in annual crop cultivation counseling, farmer attitudes, the role of farmer groups, the role of trainers, the role of village officials, the suitability of materials, the experience of plant cultivation yearly with knowledge of the TreeGrowers Master Program in Gunungkidul Regency.

By using SPSS 23.0 for windows software, the following analysis was carried out:

- a. R square or the coefficient of determination shows the percent of the dependent variable that can be explained by the independent variable. For the number of independent variables that are more than 1, the adjusted R square is

used.

- b. From the ANOVA test or F test to find out whether the independent variables together have an effect on variable dependent. The conclusion is drawn as follows: If the value of F count > F table then the independent variables together have an effect on the dependent variable.
- c. The t test is conducted to determine whether there is an effect of each independent variable on the dependent variable, then the decision making is as follows (with a significance level = 0.05). If the sig value < α then Ho is rejected. If the sig value $\geq \alpha$ then Ho is accepted

RESULTS AND DISCUSSION

Farmer Adoption Rate of Master TreeGrowers (MTGs) Technology

Adoption is a process of coming out of ideas from one party and then conveying them to the other party (the second party) until the idea is accepted or rejected by the second party (society) (Samsudin, 1948 in Dayana and Sinurat, 2011), where these ideas are an innovation or something new. The adoption of a new technology in agriculture will have an impact on the progress of a country's agricultural sector, one of which is in Indonesia, which has a population with the majority of jobs being farmers (Dewi et al, 2017). Based on the research results, the following test results were obtained:

PROPORTION TEST

$$Z \text{ value} = \frac{\frac{x}{n} - P_0}{\sqrt{\frac{P_0(1-P_0)}{n}}}$$

Information :

x: the number of farmers in Gunungkidul Regency who have low adoption rates (38)
 n: total sample size (60) Po: population proportion (50%)

- a. The hypothesis used: Ho: P < 50%
 Ha: P > 50%

With the translation:

Ho: It is assumed that less than or equal to 50% of farmers in Gunungkidul District have a low level of technology adoption in the Master TreeGrowers program.

Ha: It is estimated that more than 50% of farmers

in Gunungkidul District have a low adoption rate of technology in the Master TreeGrowers program

b. Significance Level = 0.05 (5%)

c. Testing Statistics

$$Z \text{ value} = \frac{\frac{38}{60} - 0,5}{\sqrt{\frac{0,5(1-0,5)}{60}}}$$

d. Testing criteria

$Z_{\text{count}} < Z_{\text{table}}$: Ho is accepted, Ha is not accepted

$Z_{\text{count}} > Z_{\text{table}}$: Ho is not accepted, Ha accepted.

e. Conclusion

Z value: 9,894

Z table: 1,645

Based on the results of the analysis using the proportion test, the Zhitung value was 9.894 with a Z table value of 1.645. This means that the value of Z count > Z table, so that Ho is rejected and Ha is accepted. It can be concluded that more than 50% of farmers in Gunungkidul Regency have a low level of technology adoption in the Master TreeGrowers program.

REGRESSION TEST

Table 1. Results of Multiple Linear Regression Analysis of the Factors suspected to Affect the Application of Master TreeGrowers Technology (MTGs) in Gunungkidul Regency in 2019 (Model 1)

No.	Variable	Regression Coefficient (B)	t-value	Sig	Ket
1	Gender (D)	31,247	0.589	0.023	*
2	Age (X1)	-0,448	-0.195	0.197	NS
3	Education (X2)	0.839	0.608	0.546	NS
4	Land area (X3)	0.001	0.657	0.515	NS
5	Perceptions of Farmers (X4)	-2,418	-2,577	0.013	*
6	Motivation of Farmers (X5)	0.376	0.886	0.380	NS
7	Farmers' Intensity in Following Education (X6)	4,319	2,752	0.008	*
8	Attitude of Farmers (X7)	0.188	0.785	0.436	NS
9	The Role of Farmer Groups (X8)	0.174	0.631	0.531	NS
10	Role of Trainer (X9)	0.158	0.578	0.566	NS
11	The role of Village officials (X10)	2,173	2,156	0.036	*
12	Perception of Conformity Matter (X11)	0.356	0.635	0.529	NS
13	Experience cultivating perennial crops with knowledge regarding MTGs (X12)	0.356	0.635	0.940	NS
Constant		14,066			
R Square		0.494			
Adjusted R Square		0.352			
F count		3,461			
F table		1.96			
t table		2,012			
Information: * significant at the 5% level NS: Non Significant					

Source: Primary Data Analysis, 2019

Based on the factors that are thought to affect the level of application of MTGs technology in Gunungkidul Regency, these factors are analyzed by multiple linear regression using the Enter method so as to produce Model 1. Based on Table 1 shows that the variables of gender, perception, intensity of farmers in following counseling, and the role of village officials has a significant effect on the application of MTGs technology in Gunungkidul Regency. Meanwhile, the variables of gender, age, education, land area, motivation, farmers attitude, the role of farmer groups, the role of trainers, farmers' perceptions of material suitability, and experience of annual crop cultivation with knowledge of MTGs have no effect. Factors with Significant Influence on Farmer's Adoption Rate of the Master TreeGrowers (MTGs) Program in Gunungkidul Regency:

1. Gender

Gender is the difference between men and women biologically. Based on the research results, the regression coefficient for the farmer gender variable is positive. While the significance value is 0.023 so that it has a significant effect on the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program.

In implementing the MTGs program, there are activities that can only be done by men on a job basis, such as pruning which requires energy to climb trees in pruning. Therefore, there is a significant influence between the sexes of men and women. Even so, it does not rule out that female farmers can also carry out activities carried out by male farmers. This right because women farmers in the Gunungkidul area are required to be able to do the type of work that is usually done by men when their husbands are working outside the city, so that inevitably, the heavy work for the women category is still done.

2. Perceptions of Farmers

Perception is a person's interpretation of a certain activity or subject. The significance value of the farmer perception variable is 0.013, which means that the farmer perception variable has a significant effect on the level of farmer adoption technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency. The regression coefficient value for the farmer perception variable is negative, which indicates that every increase of one unit of farmer perception will reduce the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program.

Based on research that has been conducted, the average farmer who has the perception of agreeing to MTGs has a low level of MTG technology adoption, meaning that even though farmers have a positive perception, it does not necessarily apply the results of MTGs training. Vice versa, if farmers have negative perceptions regarding MTGs, it is not necessarily that they do not implement the MTGs program. This happens because farmers think that MTGs training is for directing annual crop cultivation to get good wood yields, but besides that many of the results obtained from MTGs training are not applied, such as measuring logs, trees and forests. They think the measurements are too complex and difficult for them to understand and apply. So even though farmers actually have a good perception of the MTGs program, to adopt the MTGs program it cannot be adopted as a whole so it can be said that the level of farmer adoption of the MTGs program is low. Negative farmer perceptions only exist in a few aspects, including measurement and market surveys, where these two aspects are difficult aspects to apply to farmers' annual crop cultivation areas.

3. Farmer's Intensity in Attending Extension

The intensity of farmers participating in training is whether farmers routinely participate in extension activities, whether carried out by in-service extension workers, head of farmer groups, or during MTGs training. The significance value of the farmer perception variable is 0.008, which means that the variable intensity of farmers in participating in the training has a significant effect on the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency. The regression coefficient value for the farmer intensity variable in participating in the training is positive, which indicates that each increase of one unit of farmer intensity in participating in the training will increase the level of farmer adoption of technology. In the MTGs training, farmers were taught about proper and correct forest plant cultivation materials, invited to do direct practice in the field by the Trainer. From these activities they get a lot of knowledge and information to implement MTGs technology. Farmers are also always enthusiastic about participating in official training activities and MTGs training. In addition, when farmers actively participate in counseling, they will often meet other farmers and reflect on other farmer friends, that is, when other farmers apply a new technology that is not difficult to do, then farmers who have not implemented it will tend to apply the technology.

4. The Role of Village Officials

Village officials are a group of people who gather in government organizations in the village area, which regulate village government activities in a hamlet and mobilize community activities under it. The significance value of the variable of the role of village officials is 0.036, which means that the variable of the role of village officials has a significant effect on the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency. The regression coefficient value for the variable of the role of village officials is positive which indicates that every increase of one role of village officials will increase the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program.

Based on the research that has been done, although the role of village officials has a significant effect on the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program, the role of village officials is still very low in supporting the application of MTGs technology by farmers. This is because village officials almost never introduce MTGs technology to farmers, almost never assist farmers in applying MTGs technology, providing assistance for infrastructure facilities is still very low, and almost never provide capital assistance in implementing MTGs technology. But apart of this, the role of village officials in motivating (giving encouragement) to farmers to actively implement the MTGs program is very impactful. Like when implementing the MTGs program training.

When farmers are gathered to take part in the MTGs training, farmers will spend more of their time attending the meeting, if at that time they are told that there are village officials present. Based on this, the farmers felt that the activities they carried out were recognized by the village and appreciated by the village.

CONCLUSION

1. Adoption rate farmers towards technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency for women are classified as rare and men are classified as sometimes. Based on the results of the analysis using the proportion test, it was found that more than 50% of farmers in Gunungkidul Regency had a low adoption rate of technology in the Master TreeGrowers program.
2. Factors that significantly influence the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency are gender, farmer perceptions, intensity of farmers in participating in extension services, and village officials.
3. In this study, the perception factor of farmers has a negative effect, which assumes that the MTGs program is a very good program and can increase the yield of their annual crop cultivation. However they are reluctant to apply program MTGs because they have difficulty in applying one of the aspects in it, namely the measurement aspect where farmers have difficulty in calculating log volume, tree volume, and other measurements. And farmers are reluctant to carry out market surveys because they are accustomed to the custom of selling wood directly without first surveying the market.
4. Factors that do not significantly influence the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency are age, education, land area, farmer motivation, farmer attitudes, the role of farmer groups, the role of trainers, perceptions of material suitability, cultivation experience. annual plant with knowledge of MTGs.
5. The adoption of female farmers to the MTGs program that is often carried out is in the pruning and thinning aspects, while for male farmers the aspects of pruning, thinning, fertilizing, and exploring farmers' decisions. Adoption of female farmers to the MTGs program
6. What has never been done, namely in the aspect of nurseries and irrigation and aspects that are rarely done are marketing and market surveys, measurement, fertilization, agroforestry systems, and exploration of farmers' decisions. Meanwhile, male farmers that are rarely carried out are marketing and market surveys, measurement, nurseries, irrigation, and agroforestry systems.

SUGGESTION

1. On training MTGs, female farmers are given facilities such as pruning tools in the form of poles so that it will make it easier for women farmers to adopt MTGs.
2. Increasing the application of MTG technology in Gunungkidul Regency should be done by increasing farmer activeness in extension, namely by increasing MTG training activities and inviting formal farmers to attend every training, so as to attract forest farmers to be active in participating in training, which can then be obtained. improve the application of MTG technologies.

3. Efforts that can be made to increase the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency can be increased by involving village officials who work as forest farmers to attend every training activity, so as to increase the enthusiasm of farmers in applying MTG technology in Gunungkidul Regency, as well as with the existence of village officials, farmers can be used as role models for farmers in applying MTGs technology.
4. Efforts that can be made to increase the level of farmer adoption of technology in the Master TreeGrowers (MTGs) program in Gunungkidul Regency can be increased by creating a tool to assist farmers in counting, so that it will speed up and make it easier for farmers to determine the volume of a tree or logs. In addition, a tool that is more friendly to women has been created so that farmers can easily apply aspects of the MTG.

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