

# Community Participation toward The Preservation of The Forest Slopes of Merapi through a Program Agroforestry Coffee in The Village Tlogolele Selo District

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**Abstract**— Forest destruction of Merapi's slope was caused by fire of volcanic eruption and excessive deforestation. This research intends to identify the community activities in an effort to minimize deforestation, especially the community participation towards the forest conservation through the coffee agroforestry and the influence of community participation on the coffee agroforestry program in Tlogolele Village, Selo District. Sample of this study is Stabelan hamlet and Tlogomulyo hamlet society to amount 175 KK. Proportional Sampling was used in this study. Data collection methods in this study are Questionnaire method, observation, interviews and documentation. Data analysis techniques used were descriptive statistics and simple linear regression. Tlogolele people have not made efforts to preserve the forests of the Merapi area before the existence of the Agroforestry program. The level of community participation in each partitioning stage is low with a score of 18.8. Low community participation is caused by a long coffee harvest period, that is up to two years, so the harvest cannot be directly useful. The results of a simple linear regression analysis  $Y = 9.040 + 0.791 X$  indicate a positive relationship, meaning that the higher the community participation, the higher the success of the coffee agroforestry program. Tlogolele Village community participation is low. The number of coffee plant seeds that have not been moved into the forest is a benchmark for the lack of success of the coffee agroforestry program. This was influenced by the low participation of the Tlogomulyo Hamlet community who was not active during the program implementation.

**Keywords**— *Participation; Preservation of Merapi; forest slopes, Agroforestry Program*

## I. INTRODUCTION

Indonesia has the largest forest with its richest biodiversity and at the same time, it occupies the second place as the nation which lost its forests after Brazil. The deforestation is caused by the natural factors and human factors. The natural factors which caused the deforestation are the high temperature caused by the wild fire, heavy rain which is at risk of landslides, volcano eruption, and other disasters. Meanwhile, the human activities which

caused the deforestation are illegal logging, wild burning of forest for settlement and industrial areas.

Forest is very important for our life, it is trusted as something which can affect the period and transmission of water, even, manage the water transmission. It saves the water during the rainy season and leaves them in dry season. Thus, it is necessary to have any activities to support forest conservation. In the same opinion, Sabarnurdin [1] said that there is a new approach for land conservation that called land husbandry. It is manifested in farming and environmental conservation approaches. Furthermore, Sabarnurdin [1] explained that this new approach gives a chance to use the Agroforestry system.

Agroforestry is the combination of agricultural science and forestry. In language term, agroforestry comes from two basic words. They are *agros* and *forestry*. *Agros* comes from Greek language, which means a combination of farming activities and other activities on some lands while *forestry* comes from English word which means something dealing with forest. Forestry belongs to any activities, science, process and all programs in managing forest and natural resource for human prosperity. Agroforestry is a form of the land management, which combines the principle of agricultural science and forestry. Agriculture in the sense of a land is used to obtain food, fiber and animal protein. Meanwhile, Forestry is to obtain woodworking or forestry wood production in order to obtain woodworking or firewood production and aesthetic functions, hydrology and flora and fauna conservation [2].

Boyolali Regency is a district that implements the Agroforestry program in the forest of the Merapi slope area in the Tlogolele Village, Selo District. The type of plant used as Agroforestry is a combination of acacia trees and coffee plants. Physically, the forest is located at an altitude of  $\pm 1500$  meters above sea level with a temperature of 15-30 °C, rainfall is 1000-2000 mm, and the type of soil is volcanic, so it is suitable for planting Arabica coffee. In 2009, the forest on the slopes of Mount Merapi experienced a fire. The fire that spread and burned the forest is estimated to be 5 hectares. The cause of the fire came from a fire that emerged from the bottom of the Apu River. Apu River is a river that accommodates cold

lava flows from the top of Mount Merapi. There were no fatalities in the fire incident, but forest damage was increasing.

Community-based education is carried out by providing socialization and training that can increase knowledge and build human resources. Community-based education referred to this study is based to Zubaedi [3]. It is education that actively involves the community in all programs designed to answer their needs. The Coffee Agroforestry Program is implemented to provide additional income for the Tlogolele Village people as well as the efforts to conserve the Merapi area's forests. Coffee Agroforestry materials are provided by Business watch Indonesia (BWI) Civil Society Organizations. After being given coffee agroforestry material, it can be seen how much public awareness participates during the program.

Participation is the involvement of a person or group in a program [4]. Tlogolele peoples' participation will be measured based on four stages of participation from Cohen and Uphoff. It is namely as participation in decision making, participation in implementation, participation in taking benefits, and participation in evaluation. This study aims to determine the activities of Tlogolele people in an effort to minimize damage to forests on the slopes of Merapi, to identify the effect of community participation on the conservation of the Merapi slope forest through the Agroforestry program, and to determine the level of community participation in the Agroforestry program.

The theoretical benefits of this research are expected to be used as a study in the world of agriculture and forestry, especially in the study of the agricultural pattern of agroforestry. While the practical benefits for researchers are to obtain answers to the objectives by linking the geography education rules that have been obtained in universities and adding information about learning in the community through the Coffee Agroforestry program, for the village government, as evaluation materials and guidelines on policy making in the Coffee Agroforestry program, and for the program manager, that is, as a benchmark for achieving the program implemented and evaluating the sustainability of coffee agroforestry programs.

## II. METHODS

This research uses a quantitative descriptive method. The populations used by the researchers in this study were all Tlogolele people in Stabelan Hamlet and Tlogomulyo Hamlet by 339 households. The sample technique used in this study is Proportional Sampling. It is a sampling that takes into account the consideration of elements or categories in the study [5], [6]. The researcher took the sample that the population administratively lived in Stabelan and Tlogomulyo Hamlets based on the age of 20-65 years.

The decisions making of the number of samples of researchers was based on the sample tables of Krejcie and Morgan with an error level of 5%. In the Krejcie and Morgan tables, if the population is 320-399, then the sample obtained is 175. In this study, the total population was 339 family, so the number of samples obtained was 175 families.

The variables in this study consisted of community participation as the independent variable and the coffee agroforestry program as the dependent variable. Community participation is the involvement of a person or a group in an activity. The variable in this study is forest conservation on the slopes of Merapi. Forest conservation is a forest management business that can provide products and services as expected without reducing the function of the forest and does not cause undesirable environmental impacts. The dependent variable (Y) in this study is the Agroforestry program. Data collection techniques in this study are observation, questionnaires, interviews, and documentation. The analysis techniques used in this study are descriptive analysis, descriptive statistics, and simple linear regression.

TABLE I. PARTICIPATION CRITERIA

Interval score	Persentase	Criteria
33 – 40	81,25% - 100%	Very high
25 – 32	62,25% - 81%	High
17 – 24	43,25% - 62%	Low
9 – 16	24,25% - 43 %	Very low

Source: Data proceed (2018).

## III. RESULTS AND DISCUSSIONS

### A. General Description of Research Location

Astronomically, Tlogolele Village is located between 7°30'41" South latitude - 7°32'21" South latitude and 110°22'50" East longitude - 110°26'40" East longitude. Administratively, the Tlogolele Village is limited to other areas, which are to the north bordering Klakah Village, Selo District, Boyolali Regency. The southern border is Sengi Village, Dukun District, Magelang Regency. The western border is Sengi Village, Dukun District, Magelang Regency. The east of the border is Mount Merapi.

Tlogolele village is a village in Selo Subdistrict, Boyolali, Central Java, Indonesia. The village is located at 1200 meters above sea level, the west of the peak of Merapi. The distance between the village to the top is 4 kilometers, with the highest hamlet is Stabelan which is 3.5 kilometers from the peak of Merapi. The village area is 5,854 km<sup>2</sup> with an administrative division divided into 8 hamlets, 5 RWs, 19 RTs, namely Tlogolele Hamlet, Tlogomulyo Hamlet, Stabelan Hamlet, Takeran Hamlet. Meanwhile, the eight hamlets are Tlogolele, Tlogomulyo, Ngadirojo, Karang, Gumukrejo, Belang, Takeran, and Stabelan. The locations of this study are Tlogomulyo and Stabelan Hamlet, and the location of the forest applies the coffee agroforestry program.

Based on the hydrological area, to the north of the village of Tlogolele there is Apu River which is upstream at the peak of Merapi, and it is the pathway to the descent of cold lava. This river flows down towards Sawangan Subdistrict, merging with the Tlising River, and the Senawa River into the Pabelan River which empties into the Progo River. The rainfall is 2000 mm per year. The

average temperature is between 22-30 °C with an average of 61-84%. The type of soil is grayish volcanic soil.

This village is flanked by two rivers, the Apu River and the Tlising River, making it suitable for agricultural land. The use of land in Tlogolele Village is divided into 35.40 ha of paddy fields, 550 ha of dry land, simple irrigation 35.4 ha, 122.90 ha of buildings, moorland 138.90 ha, state forest 186.80, village cash land 48 ha. The potential of Tlogolele Village is agriculture and animal husbandry.

*B. Tlogolele Villagers' activities in an effort to minimize forest damage on the slopes of Merapi.*

The activities of Tlogolele villagers in minimizing forest damage in the slopes of Merapi are led by RHL Farmers Group (Rehabilitation of Protected Forests). But its activities are carried out in the forest of Mount Merapi National Park, not in the community forest. Activities carried out are included 22 hectares of tree planting, fertilization, and removal. This activity is a form of preventing forest destruction. Whereas in the community forest, the activity is in the form of coffee agroforestry program which is on-going since 2017.

The continuous logging of trees in the forest which the land is steep, can cause erosion. When it rains, waterfalls directly into the ground because there are no trees that can absorb water. As a result of this, the soil becomes saturated with water, so it is easily degraded. The choice of coffee plants under the canopy of acacia trees is very suitable because coffee can absorb the large amounts of water to resist erosion. The linkage of the Stabelan Hamlet with the forest of Mount Merapi area has a reciprocal relationship. Community of Stabelan Hamlet depends on nature. Volcanic soil from Mount Merapi makes agriculture flourish. Logging in the community forests of the Merapi slopes is used by the community to cook and to burn wood for heating the body at night when the air starts to cool. The forest of Mount Merapi area also requires conservation as a natural counterweight. Stabelan Hamlet as the location of the implementation of the Agroforestry program in the forests of the Merapi area can become a supply rea for coffee needs for the surrounding areas.

*C. Tlogolele Village Community Participation Level towards the Preservation of the Merapi Slope Forest through the Agroforestry Program.*

Community participation in Tlogolele Village is the key to the success of the Coffee Agroforestry program. Communities that act as subjects and forests as objects in the coffee agroforestry program on the slopes of the Merapi forest. The low level of community participation is influenced by the lack of socialization from Bussines Watch Indonesia (BWI) about the Agroforestry program to the community. During this time, BWI provided socialization only in Stabelan Hamlet because it focused on areas closer to the Merapi slope forest. Hence, for Tlogomulyo Hamlet, it is only given information through the cadre to be informed to the community.

In addition, the factors are the lack of awareness and interest of the community towards the Agroforestry program. Due to the planted plant is coffee, the harvest period of up to two years makes people less interested in growing coffee. In fact, the coffee cultivation aims to increase community income every two years while maintaining the function of the forest, so that it does not transfer land function.

TABLE II. RESPONDENT PARTICIPAION RATE

Question's number	score	Average score per question	Average score per participati on stage	Participation stages
1	362	2,1	318	Decisions making
2	274	1,6		
3	316	1,8		
4	335	1,9	330	Implementati on
5	345	2,0		
6	326	1,9		
7	401	2,3	386	Benefits taking
8	372	2,1		
9	286	1,6	276	Evaluation
10	267	1,5		
Total	3284	18,8	1310	

Source: Data proceed (2018)

Based on the table above, it can be seen that the highest participation in the benefits taking stage, with a score of 386. Then, participation in the implementation phase with a score of 330, the third participation in the decision-making stage with a score of 318, and the low is participation in the evaluation stage with a score of 276. Tlogolele village's overall community participation is low with a score of 18.8.

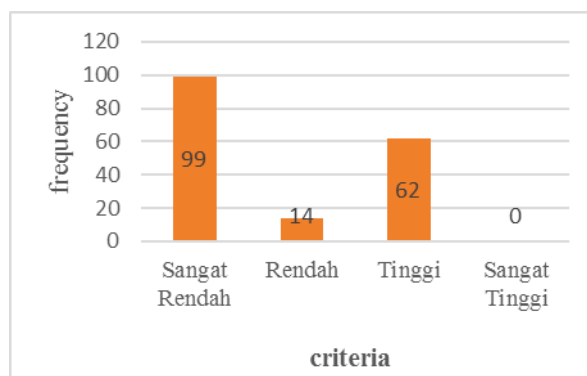


Fig. 1. Graph of Respondent Participation Rate

Based on the graph above, there were 99 respondents who participated very low, 14 respondents participated low, 62 respondents participated high, and no respondents who participated were very high. The overall community participation rate is low with a score of 18.8. The low level of community participation was caused by the lack of socialization of the Agroforestry program that was communicated to the community, the lack of awareness of

the importance of maintaining and conserving the forest, the level of public knowledge about coffee in terms of low management and marketing. Regarding the low participation of the community in participating the coffee agroforestry program, many coffee plant seeds are not planted to the forest, so the program does not run efficiently. Achievement of goals in terms of forest preservation has not been maximized. Hence, people rely more on wood from Acacia trees than coffee as an additional income.

*D. The influence of Tlogolele Village community participation on forest conservation through the coffee agroforestry program.*

Based on the results of a simple linear regression test, it is known that the significant value of  $0.000 < 0.05$  can be concluded that the variable X affects the variable Y. Based on the t value, it is known t count equal to  $(30,241) > t$  table (1,973). Therefore, the variable X affects the variable Y. The high and low level of community participation in the village of Tlogolele influence the running of the coffee agroforestry program. The provision of Agroforestry learning materials by Business Watch Indonesia (BWI) includes the socialization of the Agroforestry program, trainings ranging from nurseries to marketing of Arabica coffee. BWI gives material to KTH first, then from KTH teaches agroforestry material to the community. The provided socialization and training were still in Stabelan Hamlet as well as the location of the forest in the Merapi slope area under the Coffee Agroforestry program. Whereas in Tlogomulyo Hamlet, its citizens received information from the Kadus.

*E. Coffee Agroforestry Program in the Merapi forest slopes.*

Agroforestry program is one of the efforts to conserve forests that will be applied in the forests of the mountain region in Central Java. One of them is in the forest area of Merapi. The reason for choosing coffee plants is that Business Watch Indonesia (BWI) sees the potential of Tlogolele Village as a coffee producing area that has existed since the Dutch era, and the physical condition of the area also supports the growth of coffee. In addition, the Coffee Agroforestry program addresses the needs of the community to supplement additional incomes and to develop the Tlogolele Village with the potential for typical Merapi slope coffee.

The introduction of the Coffee Agroforestry program was accompanied by Business Watch Indonesia (BWI) by inviting Perhutani officials to provide training ranging from nurseries, planting, to the harvest market. The training was attended by all members of *Kepengen Maju Forest Farmers Group (KTH)*. Furthermore, KTH Kepengen Maju teaches Agroforestry material to the community. The parties involved in the implementation of the Agroforestry program are the Dutch Embassy as a market development, Solidaridad as an international community development organization, Business Watch Indonesia (BWI) as a pioneer and companion of Agroforestry, Forest Farmers Group (KTH) as a medium to channel information to the public, Pemdes (Village Governemnt) as a motivator and channeler of information from villages to hamlets, palm communities as helpers of KTH, and all communities as subjects or implementers of the Coffee Agroforestry program.

#### IV. CONCLUSION

Tlogolele villagers have never carried out activities to minimize forest damage in the Merapi slope area prior to the implementation of the coffee agroforestry program. They only take forest resources without making conservation efforts. The participation of the Tlogolele Village community is low with a score of 18.8. This shows that the coffee agroforestry program has not been attractive for the public interest because the production cannot be directly harvested. The results of simple linear regression analysis  $Y = 9.040 + 0.791 X$  indicate a positive relationship, meaning that the higher the community participation, the higher the success of the coffee agroforestry program.

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