

# *Farmers' Participation In No-Burn Land Management Policies For Oil Palm Plantations In Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province*

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**Abstract:** This study aims to examine the level of participation of farmers in no-burn land management policies for oil palm plantations and to examine the relationship between internal and external factors of farmers and their level of participation in no-burn land management policies for oil palm plantations from April to May 2024. The data collection methods used were observation and interviews using a questionnaire that had been tested for validity and reliability, while the data analysis methods used were the Ratio scale, Likert scale, and Spearman's Rank correlation. The results of the study indicate that the level of farmer participation in the no-burn land management policy for oil palm plantations is very high, with a percentage of 85.3%. Furthermore, the Spearman's rank correlation test revealed a significant relationship between internal and external factors, namely land area, experience, income, the role of extension workers, capital assistance, and the availability of production facilities, with farmers' participation in the No-Burn Land Management Policy policy for oil palm plantations. Meanwhile, the internal factors that were not significantly related were age and formal education.

**Keywords:** Participation, No-Burn Land Management, Farmers, Spearman's Rank Correlation, Internal Factors, and External Factors

## INTRODUCTION

Forest fires and land clearing in Indonesia are nothing new, but recently they have become a hot topic of discussion in society due to their negative impacts. Land fires in Indonesia are currently considered a regional and global disaster [1]. The Indonesian government itself has contributed to addressing the issue of forest and land fires by introducing policies on land clearing without burning or land clearing without burning to the public. The government's support for land clearing without burning is reinforced in various government policies that prohibit forest burning for the purpose of land clearing and to prevent environmental damage and pollution [2]. The policy on land clearing without burning is regulated in Government Regulation No. 18 of 2004, Article 26 on Plantations, which states that all plantation businesses are prohibited from preparing plantation land through burning, which causes pollution and environmental damage. Additionally, in accordance with existing laws and regulations in Indonesia, sustainable oil palm land cultivation must be carried out using non-burning land cultivation methods [3].

According to [4], palm oil commodities contribute significantly to the Gross Regional Domestic Product (GRDP) of Deli Serdang Regency. The total area of oil palm plantations in Deli Serdang District in 2022 was 18,162.24 hectares. Oil palm

plantations in Deli Serdang District are spread across several sub-districts, namely: Gunung Meriah Sub-district, Tanjung Morawa Sub-district, Sibolangit Sub-district, Kutalimbaru Sub-district, Pancur Batu Sub-district, Namorambe, STM Hilir, Sibiru-biru, Bangun Purba, Galang, STM Hulu, Patumbak, Deli Tua, Sunggal, Hamparan Perak, Labuhan Deli, Percut Sei Tuan, Batang Kuis, and so on [5].

To promote the No-Burn Land Management Policy for Oil Palm Plantations, in 2023, an outreach program was conducted in Deli Serdang. One of the campaign locations was Percut Sei Tuan District. The outreach program was attended by 305 people from 3 villages. The results of the awareness campaign have changed the behavior of oil palm farmers. According to data from agricultural extension officers, out of the 305 participants who attended the campaign, 180 (59%) farmers have adopted the No-Burn Land Management Policy for Oil Palm Plantations, while 125 farmers have not yet implemented it. Some of their reasons include low costs, lack of labor, and time-consuming processes. This indicates a lack of awareness among the community. According to [6], land clearing through burning can disrupt the physical and biological properties of the soil, as well as the ecosystem, which affects living organisms [6].

To make the No-Burn Land Management Policy for Oil Palm Plantations in Percut Sei Tuan District a success, we need farmers and the farming community to get involved. According to [8], participation is when people get involved in an activity, which is influenced by several factors, like the conditions around them and their own personal circumstances. There are three conditions that must be met for participation to occur: the opportunity to participate, the individual's willingness to engage, and the capacity to participate. However, involvement is a unique way for community members to share authority, responsibilities, and tasks. When participating in an activity, the community will take part in reaping the benefits and elevating their status [7].

After the dissemination of the No-Burn Land Management Policy for Oil Palm Plantations in Percut Sei Tuan Subdistrict, no study has been conducted on community participation in implementing the program. This is necessary in order to take the next steps in ensuring the success of the policy. By understanding the level of participation, it is possible to estimate how successful the program will be and what further action is needed. If community participation is high, the program is likely to run smoothly and successfully. For this reason, a study has been conducted on the level of participation of farmers in the No-Burn Land Management Policy for Oil Palm Plantations in Percut Sei Tuan Subdistrict, Deli Serdang Regency, North Sumatra Province.

## MATERIALS AND METHODS

The research was conducted from March to July 2024 in Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province. The research location was selected purposively based on the consideration that socialization of oil palm plantation land clearing without burning had been carried out in Percut Sei Tuan District.

This research used a quantitative research method with a descriptive approach. For primary data, data collection techniques such as observation, interviews, and questionnaires were conducted with oil palm farmers in the research location. For secondary data, it was obtained from the BPP Program, Simluhtan, and the Central Statistics Agency 2021 (Subdistrict in Figures), related journals, and other references.

The population in this study consisted of 305 farmers in Tanjung Rejo, Pematang Lalang, and Sei Rotan villages who owned oil palm plantations and received information about the policy of No-Burn Land Management Policy for oil palm plantations. The sample was determined using simple random sampling with the Taro Yamane equation and a precision level of 10%. The sample size for this study was 76 farmers from three villages in Percut Sei Tuan District.

The variables and measurement indicators for this study are presented in Table 1.

Table 1. Variables and Measurement Indicators

No.	Variables	Indicators
A.	Independent Variables (X)	
1	Internal Factors	
a.	Age (X1)	Age of farmers at the time of assessment
b.	Formal Education (X2)	The educational level of farmers at the time of the study
c.	Land Area (X3)	Area of oil palm land owned by farmers
d.	Experience (X4)	Farmers have long been engaged in oil palm cultivation.
e.	Revenue (X5)	The amount of income earned by farmers from oil palm cultivation
2	External Factors	
f.	Extension Workers' Role (X6)	The role of extension workers as educators, Motivator, Fasilitator
g.	Capital Assistance (X7)	Government assistance in implementing No-Burn Land Management Policy policies for oil palm plantations
h.	Availability of Production Facilities (X8)	Availability of supporting facilities to implement No-Burn Land Management Policy policies for oil palm plantations
B.	Variable Independent (Y)	
	Farmer Participation	Planning and implementation stage for no-burn land management policy for oil palm plantations

The measurement of the assessment variables used a Likert scale 1 to 5, with the following criteria: Strongly agree : 5, Agree : 4, Undecided: 3, Disagree: 2 and Strongly disagree: 1. Analysis of the Level of Farmer Participation in No-Burn Land Management Policies for Oil Palm Plantations, using Equation 1.

$$N = \frac{\text{Obtained Score}}{\text{Maximum Score}} \times 100\% \dots \text{Pers. 1}$$

The criteria for assessing the level of farmer participation are as follows:

Assessment Index (%)	Assessment Criteria
20– 36	Very Low
>36 – 52	Low
>52 – 68	Moderate
>68 – 84	High
>84 – 100	Very High

The Spearman's rank correlation test was used to examine the relationship between internal and external factors and the level of participation of farmers in No-Burn Land Management Policy policies for oil palm plantations in Percut Sei Tuan District. Equation 2 was used to calculate the Spearman's rank correlation coefficient [9].

$$r_s = 1 - \frac{6 \sum d^2}{n(n^2-1)} \dots \text{Pers. 2}$$

Where:

$r_s$  = Spearman's rank correlation coefficient

$N$  = Number of farmer samples

$d_i$  = Ranking difference between variables

Correlation Coefficient Strength Value [11] :

0,00 – 0.25 = Weak

0,26 – 0,50 = Moderate

0,51 – 0,75 = Strong

0,76 – 0,99 = Very Strong

1,00 = perfectly

To test the significance of the relationship between farmer participation levels and internal and external factors, a t-test with a 90% confidence level was used [10]. Equation 3 was used to calculate t..

$$t = \frac{r_s \sqrt{n-2}}{1-r_s} \dots \text{Pers. 3}$$

Where :

$r_s$  = Spearman's rank correlation coefficient

$d^2$  = Square Difference between the rankings of variables

$n$  = Number of farmer samples

$t$  = Calculated t-value

The testing criteria are as follows:

1. If  $t \text{ value} > t \text{ table } (\alpha = 0.05)$ , it means that there is a significant relationship between internal and external factors and farmer participation.
2. If  $t \text{ value} \leq t \text{ table } (\alpha = 0.05)$ , there is no significant relationship between internal and external factors and farmer participation.

## RESULTS AND DISCUSSION

### *Level of Farmer Participation*

Based on the measurement results of the participation level variable, the maximum score obtained was 4.180 and the score obtained was 3.568. Using equation 1, the participation level value obtained was 85.3%. Furthermore, using the criteria for assessing farmer participation levels, it can be stated that the participation level of farmers in the No-Burn Land clearing Program for Oil Palm Plantations in Percut Sei Tuan Subdistrict, Deli Serdang Regency, falls into the very high category.

The level of farmer participation in the planning stage indicator was 84.2%, which is classified as very high. This shows that at the planning stage, farmers were actively involved in supporting the No-Burn Land Management Policy program for oil palm plantations. At various discussion meetings, socialization events, coordination meetings, and other events, farmers actively provided input, suggestions, criticism, and feedback. Even in the field, farmers are willing to invest capital during the preparation stage by providing venues, meeting facilities, and refreshments for events related to the no-burn land clearing program. Farmers also actively coordinate with agricultural extension officers, agricultural agencies, and government officials. The level of participation in this planning stage will help improve the program. According to [12], through community activities, community members can improve conditions that are less than optimal and require improvement.

The level of farmer participation in the implementation stage indicator was 86.2%, which is classified as very high. Farmer participation in the implementation stage was demonstrated by carrying out land clearing activities without burning when clearing land for oil palm plantations. Farmer participation in the implementation stage was demonstrated by the use of labor, time, capital, agricultural machinery, and the involvement of farmer partners in implementing the program. The labor referred to is oil palm farmers contributing to the implementation of the no-burn land clearing policy. The time referred to is the time required by an oil palm farmer to implement the no-burn land clearing policy from start to finish, as well as to identify any challenges or issues that arise during implementation. The capital referred to is the financial contribution from oil palm farmers in implementing the program.

Agricultural machinery refers to mechanized equipment such as tractors and excavators used for land clearing. The farmer partners referred to are collaborations between farmers and companies during the implementation of the no-burn land management policy, which assist in providing agricultural machinery and financial support to oil palm farmers in the form of corporate social responsibility (CSR) programs implemented by companies for the community.

### ***The Relationship Between Internal and External Factors of Participation and Participation Levels***

With Pers. 2, the Spearman's rank correlation coefficient was calculated, and with Pers. 3, the t-value was calculated to test the significance of the correlation. The results of the Spearman's rank correlation coefficient calculation and the t-value significance for testing the relationship between internal and external factors of farmers and farmer participation in the no-burn land clearing program for oil palm crops can be seen in Table 4.

Table 4 Spearman's Rank Correlation Coefficient and t-value

No.	Variable Factors – Internal and External Factors	<i>Rs (Rank Spearman)</i>	<i>Sig. (2-tailed)</i>	t value	t table
1	Age	0,113	0,330	0,977	1,992
2	Formal Education	-0,131	0,258	-1,136	1,992
3	Land Area	0,227*	0,048	2,004	1,992
4	Experience	0,241*	0,036	2,135	1,992
5	Revenue	0,251*	0,029	2,230	1,992
6	Extension Workers' Role	0,227*	0,048	2,004	1,992
7	Capital Assistance	0,242*	0,035	2,144	1,992
8	Availability of Production Facilities	0,235*	0,041	2,079	1,992

Note :

- *Sig.(2-tailed)* = shows probability/significance value
- *Ttabel* = 1,992
- \*= significant at  $\alpha$  (0,05)

#### ***Relationship Between Age and Farmer Participation***

Based on Table 4, it can be seen that for the age factor, the t-value ( $0.977 \leq t\text{-table}$  (1.992)), so it can be stated that there is no significant relationship between age and farmer participation. The results of interviews conducted in the field show that age is not a determining factor for farmers to actively participate in the implementation of No-Burn Land Management Policy practices for oil palm plantations. As observed in the field during land clearing activities without burning in Percut Sei Tuan District, farmers aged 76 and those aged 22 actively participated together in the implementation of land clearing without burning for oil palm plantations. Farmers do this because they still want to earn money to meet their daily needs, and they also feel that they are still capable and strong enough to carry out these activities. The productive age is defined as 15-64 years, so it can be concluded that age is not significantly related to the implementation of No-Burn Land Management Policy for oil palm plantations. Furthermore, based on research by [13], it is also known that age differences are not related to farmer participation. This is because both older and younger farmers have similar needs regarding the sustainability of their farming businesses. The program targets basic needs, so participation can be evenly distributed across all age groups.

#### ***Relationship between Formal Education and Farmer Participation***

Based on Table 4, it can be seen that for the formal education factor, the t-value ( $-1.136 \leq t\text{-table}$  (1.992)), so it can be stated that there is no relationship between formal education and farmer participation. The majority of farmers have completed junior high school (SMP). Under such educational conditions, the community typically lacks extensive knowledge and understanding. People are usually more willing to cooperate if they trust their leaders. This condition is similar to the results of study [14], which states that the formal education of respondents also has no significant relationship with the level of farmer participation in land cultivation activities without burning. Urgent economic needs are the main driver of participation, overshadowing the level of education. The program offered provides opportunities for income improvement for all farmers regardless of their education.

#### *Relationship between Land Area and Farmer Participation*

Based on Table 4, it can be seen that for the land area factor, the  $t\text{-value} (2.004) > t\text{-table} (1.992)$ , meaning that there is a relationship between the land area owned by farmers and their participation. With a significance value of 0.048, this means that the strength of the relationship is very weak. Based on interviews and field observations, farmers who own large areas of oil palm plantations are more enthusiastic about participating in the Land clearing Without Burning Program. Farmers with large land areas pay attention to the program because it will affect their income. The oil palm plantation is their primary source of income. This aligns with the findings of [15], which state that the extent of land controlled by farmers in managing their agricultural activities is significantly related to the well-being of farming families. Similarly, research [16] states that the larger the land area controlled, the higher the participation of farmers in a program. Another reason is that farmers who own large areas of land are more active and want to make the best use of their land [17].

#### *Relationship Between Experience and Farmer Participation*

Based on Table 4, it can be seen that for the experience factor, the  $t\text{-value} (2.135) > t\text{-table} (1.992)$ , indicating a relationship between experience and farmer participation. With a significance value of 0.036, the relationship can be considered very weak. This aligns with the findings of [18], which show that the extent of farmers' participation in land clearing activities without burning—whether in planning, implementation, or utilization—correlates with farming experience.

Based on interviews and field observations, experienced farmers generally have expertise in oil palm cultivation and are quick to respond to and implement government programs. Generally, experienced farmers have a high-quality and wise mindset in carrying out oil palm cultivation. This is also consistent with the findings of [1], which state that the longer a farmer's experience in agricultural activities, the higher their capacity becomes. Experienced farmers in agricultural activities usually have a better understanding and knowledge of agricultural conditions compared to novice farmers, which influences their decision-making and policy-making in developing their agricultural businesses. Similarly, research findings [19] state that the longer farmers engage in oil palm farming, the more they will contribute to planning, implementation assistance, supervision and participation in activities, as well as maintenance of oil palm plants to increase productivity.

#### *Relationship Between Income and Farmer Participation*

Table 4 shows that for the income factor, the  $t\text{-value} (2.230)$  is greater than the  $t\text{-table value} (1.992)$ , indicating a direct relationship between income and farmer participation. With a significance value of 0.026, the relationship is very weak. This result is consistent with the findings of [20], which state that respondents' income has a significant relationship with participation in the planning and implementation stages of land clearing without burning. The same is stated by [12], which indicates that the higher the farmer's income, the greater their participation in program implementation. Based on interviews and field observations, farmers with higher income and earnings from their oil palm farming are more willing to implement the program because it will provide benefits for their farming business. They have a greater interest in increasing their income. Farmers use their income to actively participate in land clearing without burning. This is done by farmers in attending socialization on land clearing without burning, and they achieve increased oil palm production after implementing it on their respective lands.

#### *Relationship between Extension Workers' Role and Farmers' Participation*

Based on Table 4, it can be seen that for the factor of extension workers' role, the  $t\text{-value} (2.004) > t\text{-table} (1.992)$ , so it can be stated that there is a significant and unidirectional relationship. With a significance value of only 0.027, it indicates that the relationship is very weak. The results of this study are consistent with the findings of [14], which state that there is a significant relationship between the role of extension workers and farmer participation in the no-burn land management program.

Based on interviews and field observations, agricultural extension workers in Percut Sei Tuan Subdistrict also play a significant role in the field by providing education, facilitation, and motivation to farmers to continue implementing the No-Burn Land Management Policy policy for oil palm crops effectively. In the context of education, extension workers provide oil palm farmers with knowledge or technical information on No-Burn Land Management Policy. In the context of facilitation, extension workers



provide facilities for discussion meetings and cooperation among farmers in planning and implementing No-Burn Land Management Policy, and then provide examples of the use of production tools in No-Burn Land Management Policy. In the context of motivation, extension workers provide actual encouragement or motivation to farmers to participate in No-Burn Land Management Policy for oil palm plantations.

#### *Relationship between Extension Workers' Role and Farmers' Participation*

Based on Table 4, it can be seen that for the factor of extension workers' role, the  $t$ -value (2.144) >  $t$ -table (1.992), so it can be stated that there is a direct and significant relationship between capital assistance and the participation of oil palm farmers in the implementation of No-Burn Land Management Policy policies in Percut Sei Tuan District. The research results are consistent with those of [21], which stated that there is a significant relationship between the capital assistance variable and farmer participation in no-burn land management for oil palm plantations. Furthermore, based on research by [22], which stated that capital is a significant burden for farmers when implementing no-burn land management, farmers greatly need capital assistance in carrying out such activities.

Based on field observations, farmers receive capital assistance from the company (PT Charlie) through its CSR program. The capital provided to oil palm farmers is in the form of facilities and funds for implementing no-burn land clearing. Farmers also receive capital from private partners such as cooperatives that provide capital assistance with very low interest rates to farmers in developing their oil palm farming businesses. This assistance greatly encourages farmers to actively participate in the land cultivation program without burning on their respective land.

#### *Relationship between Availability of Production Facilities and Farmer Participation*

Based on Table 4, it can be seen that for the factor of availability of production facilities, the  $t$ -value (2.079) >  $t$ -table (1.992), so it can be stated that there is a direct and significant relationship between the availability of production facilities and farmer participation. With a significance value of 0.041, the relationship can be considered weak. This result is consistent with the findings of [14], which stated that there is a significant relationship between the availability of production facilities and the level of farmer participation in the no-burn land management policy program.

This is because production facilities are very important in the success of oil palm cultivation, especially in the planning and implementation of no-burn land clearing for oil palm plantations. To support the policy of no-burn land clearing for oil palm plantations, agricultural machinery is needed to facilitate farmers in carrying out no-burn land clearing. These agricultural machinery are very useful in producing high-quality and effective results, saving working time, and reducing labor efforts. Field observations by the company and private partners have helped in providing production facilities, namely tractors and excavators. Private partners also provide auxiliary tools for using mechanical methods to carry out land clearing without burning. Therefore, it can be concluded that with the availability of production facilities, the policy of land clearing without burning for oil palm plantations can be implemented effectively and systematically. This aligns with the view [4] that as production facilities become more readily available, farmer participation in the program increases accordingly.

### **CONCLUSION AND IMPLICATIONS**

Based on the results of this study, it can be concluded that: a) The level of participation of farmers in the No-Burn Land Management Policy policy for oil palm plantations in Percut Sei Tuan District, Deli Serdang Regency, North Sumatra Province is very high, with a percentage of 85.3%. b) There is a significant relationship between internal factors such as land area, experience, and income with farmer participation. Additionally, external factors significantly related to participation include the role of extension workers, capital assistance, and availability of production facilities, while internal factors not significantly related to farmer participation are age and formal education.

The implication is that extension workers should be more active in fulfilling their roles as motivators, educators, and facilitators, and assist farmers in coordinating with government and private sectors to secure capital assistance and production facilities for the implementation of land clearing without burning.

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