



## Analysis of the impact of the independent agrarian reform program on farmer welfare in Indonesia

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### Abstract

Agricultural land conflict is a common phenomenon among Indonesian society, with various efforts made by the government to reduce the level of agricultural land conflicts in Indonesia in order to improve the welfare of farmers. This study aims to examine the impact of the independent agrarian reform program on the welfare of farmers in Indonesia. The study employs a mixed-method approach, using a quantitative method with the Difference in Differences (DiD) model and a qualitative method through interviews. The secondary data used in this study comes from the Indonesian Family Life Surveys (IFLS) in 1997, 2000, 2007, and 2014, using farmer respondents, both household heads and members of farming households aged over 15 years. The results of the study using the DiD model indicate that after the implementation of the independent agrarian reform program, there was an improvement in income, per capita expenditure, and the housing conditions of farmers. However, farmers who gained land access after the agrarian reform program showed no significant improvement in income and expenditure, but there was an improvement in their housing conditions. In addition, based on interviews with several farmers who implemented the independent agrarian reform (land reclamation), they stated that after participating in the agrarian reform program, their welfare increased. Their income, per capita expenditure, and housing conditions improved and became better. The independent agrarian reform program can improve the lives of individual farmers and benefit many people, including improving the quality of clean water and providing better road access.

**Keywords:** Land reclamation, land access, farmer's welfare

### Introduction

Indonesia's population growth, which continues to increase every year, has implications for the increasingly limited agricultural land, especially due to the conversion of land for infrastructure development. This condition has an impact on declining food production, especially rice, which increasingly threatens national food security. In addition, land conflicts also continue to grow, characterized by inequality in the distribution and allocation of land between communities and corporations. Agrarian problems arise due to the sectorality of policies and institutions that regulate the use of land resources, such as infrastructure development and plantation expansion. This reflects the injustice in the control, utilization, and ownership of land (Salfutra & Agustian, 2019) [17].

The case of agrarian conflict in Pakel Village, Banyuwangi, is one of the real examples. Since 1985, the issuance of the Right to Use Business (HGU) by PT Bumi Sari has included unilateral claims to the land of Pakel village, although the permit should only be valid in the villages of Songgon and Kluncing. This has led to disputes between corporations and communities that have managed land for generations. The dependence of farmers on the land makes this conflict not only a legal dispute, but also a struggle to maintain their livelihoods. The solution requires a more inclusive approach, taking into account legal aspects and the socio-economic welfare of the community (Pancarani & Wahyuni, 2023) [19].

A similar conflict occurred in Genteng Village, Sukasari District, Sumedang Regency, between Perum Perhutani and farmers. Many farmers use Perhutani's abandoned land to grow crops, but then the land is taken back for forest conservation purposes. The difference in interests between economic utilization by farmers and ecosystem preservation by Perhutani triggered a dispute. This shows that the

resolution of agrarian conflicts cannot be viewed only from a socio-economic or ecological perspective, but must be through a comprehensive dialogue that accommodates the interests of all parties (Nulhaqim *et al.*, 2019) [14]. The decline in the availability of agricultural land also has an impact on the welfare of farmers. Many farmers have lost access to land and have to leave their professions. This condition is contrary to the government's efforts to achieve food self-sufficiency, where the sustainability of agricultural land is the main key. The massive conversion of productive agricultural land threatens local and national food sufficiency (Purwaningsih, Sutomo, & Istiqomah, 2015) [34]. Inequality in land tenure structure is one of the factors that worsen the poverty conditions of farmers. BPS data (March 2023) recorded a national poverty rate of 9.36 percent or 27.76 million people, with 17.28 million of them coming from rural areas where the majority of them work as farmers. In fact, Indonesia has fertile agricultural land that should be able to support the welfare of rural communities. This reality shows that increasing access to land tenure for farmers is one of the important solutions to reduce poverty (BPS, 2023). Research by Komala *et al.* (2021) [9] confirms that the agricultural sector has a significant role in improving the welfare of farmers and maintaining food security. Land is the main factor for farmers because it functions as production capital. BPS data (2019) noted that 49.41% of poor households depend on the agricultural sector for their livelihood, with the majority (63.73%) living in rural areas. This shows that fair and sustainable land management is crucial to support farmers' welfare and ensure food availability.

In an effort to overcome these problems, the government through the Ministry of Agriculture encourages the implementation of the Omnibus Law on Job Creation, including amendments to Law No. 41 of 2009 concerning

Sustainable Food Agricultural Land (LP2B). This policy affirms the prohibition of LP2B land conversion. However, its implementation has not been effective because national strategic projects continue to narrow agricultural land without adequate replacement land provision (Purwaningsih *et al.*, 2015) [34]. In fact, BPS data shows that rice production and harvest area have decreased from 2018 to 2023. Agrarian reform as an effort to redistribute land has actually been running since the birth of UUPA No. 5 of 1960. However, its implementation still faces challenges. Research by Saimar *et al.* (2024) [29] identified three main obstacles, namely land ownership imbalances, overlapping redistribution policies, and socio-ecological challenges in rural areas. This condition shows that productive land is still controlled by a few parties, while small farmers have difficulty obtaining proper access.

A comparative study by Wang *et al.* (2019) in China showed that land acquisition can indeed increase farmers' incomes, but it actually reduces their level of happiness. On the contrary, the certainty of fair land ownership supports more equitable economic growth and has positive implications for farmers' welfare. This is relevant for Indonesia, where agrarian reform needs to be strengthened in order to truly provide justice in land distribution. Some regions, such as Tasikmalaya, have implemented agrarian reform agendas in response to the growing population and increasing demand for residential land. However, the dynamics of urbanization and non-agricultural development cause agricultural land to shrink, so that many farmers lose their source of livelihood. This shows that agrarian reform not only aims to reduce land ownership inequality, but also provides new land for landless farmers to increase agricultural productivity (Saimar *et al.* 2024) [29].

Thus, it is important to re-evaluate the impact of agrarian reform on the welfare of farmers in Indonesia. This study aims to analyze the extent to which agrarian reform programs can improve access to agricultural land, identify factors that affect farmers' welfare, and assess the effectiveness of independent agrarian reform carried out by the community. The results are expected to be the basis for the government to formulate more fair, inclusive, and

sustainable agrarian policies.

**Research Methods**

**Research Focus**

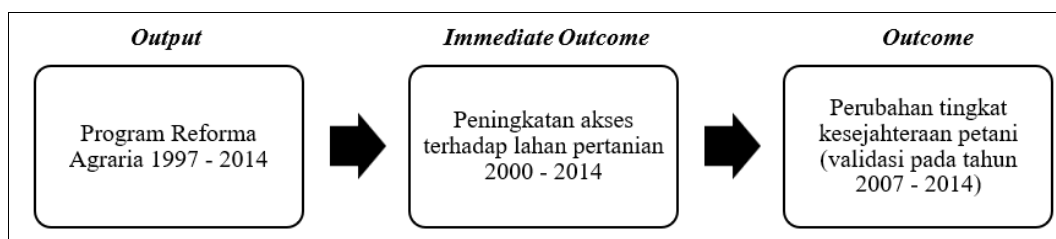
This study aims to measure the extent of changes caused by agrarian reform programs and land reclaiming carried out by farmers since 2001 on agricultural land ownership in the long term. Qualitatively, a number of previous studies have shown that agrarian reform has an influence on the status of land ownership which has implications for increasing farmers' incomes. However, this study seeks to make further contributions by quantitatively calculating the impact of the program. With a quantitative approach, this study can provide a more measurable estimate of the extent to which agrarian reform affects the welfare of farmers, using the Difference in Differences (DiD) method.

**Analysis Model**

The main variables in this study were analyzed using the Mincerian Earning Function model. According to Arshad (2016), this model is often used to describe the influence of education and age factors on income or wages. The Mincerian model explains the difference in income between individuals based on the level of education taken. Mincer argues that each individual will choose a certain level of education by considering the *present value* of the lifetime income earned, using a specific individual discount rate (*r*). Thus, educational decisions are directly related to differences in income potential (Ali & Akhtar, 2014; Suryana, 2020).

**Types of Research**

The type of research used is causal inference, which aims to analyze the cause-and-effect relationship of reclaiming agricultural land to changes in land ownership status. The focus is to assess the significance of the effect of access to agricultural land due to changes in ownership status, as well as how this has an impact on increasing farmers' incomes. The relationship between the variables of this study is illustrated through the interaction scheme between output and outcome (Figure1).



Source: Processed Author (2024)

Fig 1: Output and Outcome Interaction Scheme

**Research Data and Samples**

This study uses secondary data sourced from the Indonesia Family Life Survey (IFLS) which is publicly provided by the RAND Corporation (RAND Corporation, 2024). IFLS is a longitudinal survey that contains comprehensive information on the lifestyle patterns of the Indonesian people, covering aspects of household, health, education, employment, and the agricultural sector. The data available includes the individual and household levels. However, this study only utilizes data at the household level with the

analysis unit of heads of households over 15 years old. These considerations are based on the fact that reclaiming agricultural land is generally carried out by farmers who are old enough and have the main responsibility for the family. Although other household members have the potential to reclaim, this study adjusts the variables of land ownership status with the role of the head of household as the main decision-maker.

IFLS has been held periodically in five waves, namely in 1993, 1997, 2000, 2007–2008, and 2014–2015. This survey

involved around 7,200 to 10,400 randomly selected households from various regions in Indonesia, so that it could represent the socio-economic conditions of the community nationally. The sample selection method was carried out randomly, with respondents coming from various social strata, ranging from the upper, middle, to lower classes. As the panel's data, IFLS tracked the same households in each survey period, allowing researchers to observe the long-term impact of farmers' agrarian reform and land reclaiming programs.

**Data Engineering and Analysis**

The analysis method used is Difference in Differences (DiD) by utilizing IFLS data in 1997 and 2000 as the initial condition (pre-reclaiming), as well as data from 2007 and 2014 as the post-reclaiming period carried out by farmers in 2001. The use of these four periods aims to test the validity of the assumption of *parallel trends*, namely to ensure that before the land reclaiming movement is carried out, the variable trends between the affected and unaffected groups are relatively in line.

In this study, there were two groups that were compared:

1. The treatment group is households that did not have land access in 1997 or 2000, but obtained land access in 2007 or 2014 after land reclaiming.
2. Control groups, namely households that do not get land access despite reclaiming, or households that already have land access before the reclaiming movement takes place.

Comparisons between the two groups allowed researchers to estimate the causal impact of land reclaiming on agricultural land ownership status and farmers' welfare. Furthermore, the basic model of calculation for research on the effect of reclaiming agricultural land carried out by farmers (*bottom-*

*up*) on the level of farmers' welfare in Indonesia is as follows:

$$Tingkat\ kesejahteraan\ petani = \beta_0 + \beta_1 Reform + \epsilon \tag{3.1}$$

The *Difference in Difference* (DiD) analysis attempted to see a comparison between the treated group and the control group before and after the model. The DiD analysis model is usually performed by looking at the interaction between time with the dummy variable or. The DiD research model in this study is generally as follows:

$$Y = \beta_0 + \beta_1 * [waktu_i] + \beta_2 * [treatment_i] + \beta_3 * [waktu_i * treatment_i] + \epsilon \tag{3.2}$$

**Information**

- Y = The outcome variable that was studied changed due to the influence of other variables
- $\beta_0$  = The initial value of the outcome when it has not been affected by any variable (initial condition)
- Time = Dummy variable from time to time that can have a value of 0 (before treatment) or a value of 1 (after treatment)
- $Treatment_i$  = Dummy variable of treatment that can have a value of 0 (untreated group or control group) or a value of 1 (treatment group or treatment group)
- $Time_i * Treatment_i$  = interaction between dummy time and treatment

The description of the two dummy variables is as follows:

	Time = 0 (before treatment)	Time = 1 (after treatment)
Treatments = 0 (Control Group)	$Y = \beta_0 + \beta_1 * [waktu_i] + \beta_2 * [treatment_i] + \beta_3 * [waktu_i * treatment_i] + \epsilon$ <ul style="list-style-type: none"> <li>▪ <math>Y = \beta_0 + \beta_1 * [0] + \beta_2 * [0] + \beta_3 * [0 * 0] + \epsilon</math></li> <li>▪ <math>Y = \beta_0 + \epsilon</math></li> </ul>	$Y = \beta_0 + \beta_1 * [waktu_i] + \beta_2 * [treatment_i] + \beta_3 * [waktu_i * treatment_i] + \epsilon$ <ul style="list-style-type: none"> <li>▪ <math>Y = \beta_0 + \beta_1 * [1] + \beta_2 * [0] + \beta_3 * [0 * 1] + \epsilon</math></li> <li>▪ <math>Y = \beta_0 + \beta_1 + \epsilon</math></li> </ul>
Treatments = 1 (Treatment Group)	$Y = \beta_0 + \beta_1 * [waktu_i] + \beta_2 * [treatment_i] + \beta_3 * [waktu_i * treatment_i] + \epsilon$ <ul style="list-style-type: none"> <li>▪ <math>Y = \beta_0 + \beta_1 * [0] + \beta_2 * [1] + \beta_3 * [0 * 0] + \epsilon</math></li> <li>▪ <math>Y = \beta_0 + \beta_2 + \epsilon</math></li> </ul>	$Y = \beta_0 + \beta_1 * [waktu_i] + \beta_2 * [treatment_i] + \beta_3 * [waktu_i * treatment_i] + \epsilon$ <ul style="list-style-type: none"> <li>▪ <math>Y = \beta_0 + \beta_1 * [1] + \beta_2 * [1] + \beta_3 * [1 * 1] + \epsilon</math></li> <li>▪ <math>Y = \beta_0 + \beta_1 + \beta_2 + \beta_3 + \epsilon</math></li> </ul>

The DiD analysis in this study will look at the comparison between changes in the treatment group before and after treatment and the control group before and after treatment was given to the treatment group. The following is the calculation model in this study based on the analysis of *difference in difference*:

$$Farmers' \ welfare \ level = \beta_0 + \beta_1 * [waktu_i] + \beta_2 * [reclaiminglahan_i] + \beta_3 * [waktu_i * pelaksanaanreclaiminglahan_i] + \epsilon \tag{3.3}$$

Based on the calculation model above, in order to determine the impact of land *reclaiming*/agrarian reform carried out from the bottom up (*bottom-up*) on the level of farmers' welfare is  $\beta_3$ .

**Results and Discussion**

**Results of Analysis of the Impact of the Independent Agrarian Reform Program on the Welfare Level of Farmers in Indonesia**

The Independent Agrarian Reform Program, as one of the programs carried out directly by farmers with the aim of overcoming inequality in land distribution so that it can improve the welfare of farmers. To measure the impact of these policies, this study uses a regression approach to analyze the relationship between several variables, including farmers' income, personal consumption expenditures, and housing conditions, as indicators of farmers' well-being. The following are the results of a regression test that illustrates the influence of independent agrarian reform policies on farmers' welfare, taking into account time factors, policy

treatment, and interaction between the two. Using STATA 18, regression analysis was carried out using the command 'regress' the results of the analysis were as follows:

**Table 1:** Results of the DiD Regression Test on the Impact of Agrarian Reform Policy on Farmers' Welfare (Indonesia)

Variabel	Income	lnPCE	Condition of the house
1.Time	9.250.000***	107.200.000.000***	0.484***
1.treatment	70.75	-27.430.000.000	0.0000000000000000359
Time#Treatment	-3.957.000	24.650.000.000	0.568***

Standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Processed Author (2024)

The results of the regression test showed that the implementation of the independent agrarian reform program in 2001 had a significant influence on the increase in income, per capita expenditure, and the condition of farmers' houses. Farmers' income increased by an average of Rp 9,250,000, while per capita expenditure increased by around Rp 107.2 billion in aggregate. The increase in income is also reflected in the improvement of the physical condition of farmers' houses through renovation and improvement of the quality of housing. This confirms the positive relationship between agrarian reform and farmers' welfare, both in economic and social dimensions. However, further analysis showed that land ownership after the program did not have a significant influence on all three welfare indicators. This means that land access alone is not enough to increase farmers' income and expenditure in a sustainable manner. Other supporting factors such as land management, market access, availability of capital, and government policies are important determinants for the success of agrarian reform in improving welfare.

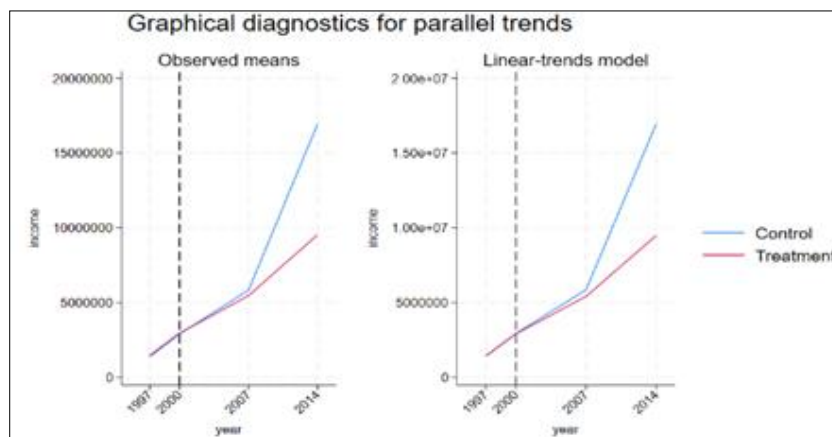
In addition, the results of the interaction between time (before and after agrarian reform) and the status of farmers receiving land access showed a significant effect only on the condition of farmers' houses, but not on income or expenditure per capita. Farmers who gained access to land after 2001 experienced an improvement in the quality of their homes, although the direct economic impact was not significant. This shows that land access contributes to improving the quality of life of farmers, especially in the aspect of housing, which at the same time reflects the dimension of non-material welfare. Regression analysis of

the 1997, 2000, 2007, and 2014 Indonesian Family Life Survey (IFLS) data shows that the independent agrarian reform program in 2001 did not significantly prove an increase in farmers' income. The increase in income, per capita expenditure, and the condition of farmers' houses is more influenced by the time factor, not directly by land access after the agrarian reform program. The *treatment* variable (land access after 2001) did not show a significant effect on income or expenditure, but had a positive effect on improving the condition of farmers' houses, especially in groups that previously did not have access to land.

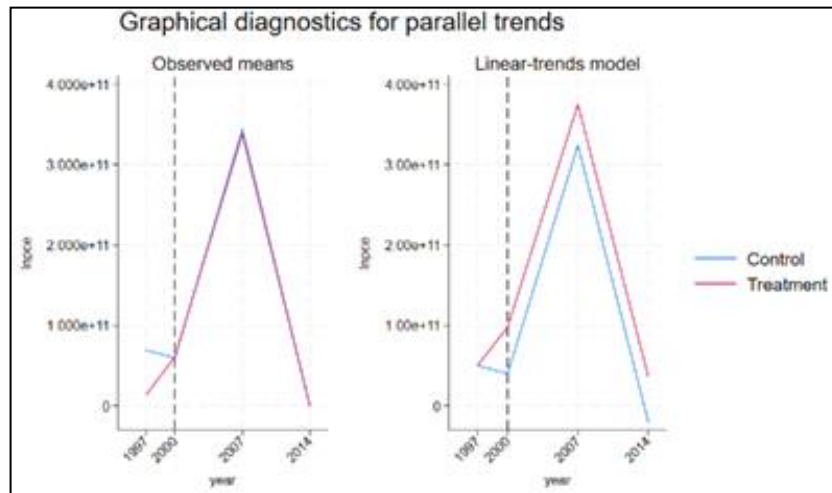
Furthermore, based on Mincerian theory, income is influenced by education and work experience. The regression results showed that education had no significant effect on income or expenditure, although it was positively related to the quality of the house. In contrast, work experience has been shown to contribute to increased income and expenses, confirming the importance of practical skills in the agricultural sector. The age variable shows a non-linear pattern: income and expenses increase until peak productive age, then decrease as physical productivity decreases. The results of the regression analysis also revealed that land area, loans, health status, and marital status play different roles. Land area and loans do not have a significant effect on income, but home ownership status is significant to expenses and housing conditions. Health status has an effect on expenses, while marital status has a positive effect on the condition of the house. Overall, these findings confirm that the success of agrarian reform in improving farmers' welfare is not only determined by access to or ownership of land, but is also influenced by other factors such as work experience, health conditions, and socio-economic aspects of households.

**Results of the Parallel Trend Assumption Test (Indonesia)**

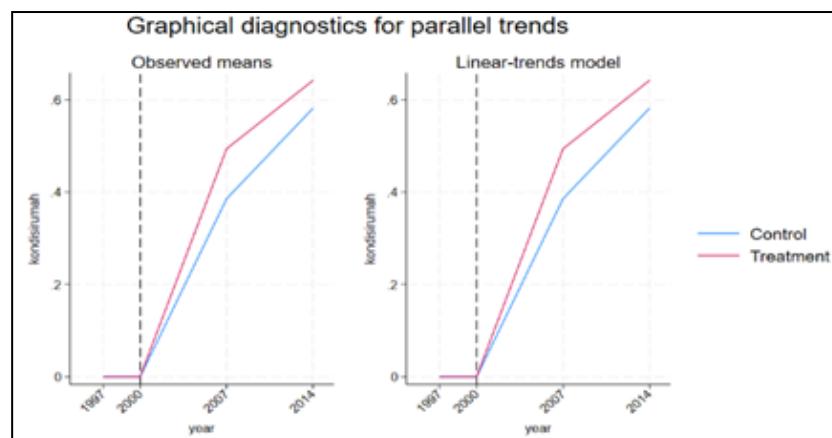
Parallel trend assumptions in *difference-in-differences* (DiD) analysis are essential to reduce potential biases that can affect the validity of the results of the impact calculation of a variable. To obtain a graph of the table of parallel trend assumptions use the 'trendplot stat' *command* which is based on the results of the analysis when running the *command* 'didregress.' The result of the graph is as shown in Figure 2.



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel F(1, 233)=0.00 Prob>F=0.9653



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel  $F(1, 233)=1.04$   $Prob>F=0.3092$



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel  $F(1, 233)=0.00$   $Prob>F=1.0000$

Source: Processed Author (2024)

Fig 2: Assumption of Parallel Trends between the Treatment Group and the Control Group (Indonesia)

The results of the analysis of the indicators of welfare variables displayed in the two graphs show differences in interpretation. The graph on the left shows a parallel trend between the treatment and control groups based on the level of income from access to agricultural land. However, the chart on the right showing the linear trend actually indicates a difference in trend since before the intervention in 2001, where the treatment and control group lines do not intersect perfectly as the ideal parallel trend assumption conditions. However, the results of the statistical test showed that the p-values (0.96; 0.30; and 1,000) were well above the significance level of 5 percent. Thus, the zero hypothesis cannot be rejected, which means that there is no strong evidence to suggest a difference in trends between the treatment and control groups before the intervention. These findings indicate that the assumption of parallel trends is fulfilled, because both the treatment and control groups followed a similar development pattern before the independent agrarian reform program in 2001.

**Results of Analysis of the Impact of the Independent Agrarian Reform Program on the Welfare Level of Farmers in Java**

In this section, we will present the results of the Difference in Differences (DiD) analysis which aims to evaluate the impact of independent agrarian reform policies on the level of farmers' welfare, especially in Java. Analyze the direct

impact of independent agrarian reform policies on variables such as income, personal consumption expenditure (PCE), and housing conditions that reflect farmers' welfare. The following table presents the results of the regression test of the interaction between time and treatment (Java), which illustrates the influence of these policies on the level of welfare of farmers on the island of Java.

Table 2: Results of the DiD Regression Test The Impact of Agrarian Reform Policies on Farmers' Welfare (Java)

Variabel	Income	lnPCE	Condition of the house
1.time	11.600.000*	110.000.000.000**	0.521***
1.treatment	222.585,9	-2.475.000.000	0.000000000000000204
Time#Treatment	6.406.196	-34.210.000.000	0.153**

Standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Processed Author (2024)

Based on the results of the regression test, it was stated that after the implementation of the independent agrarian reform program in 2001, it had a significant effect on the increase in income, per capita expenditure, and the condition of farmers' houses. Farmers' income increased by Rp. 11,600,000, farmers' expenditure increased by Rp. 110,000,000,000, and the condition of farmers' houses has improved significantly, this is reflected in the renovation

and improvement of the quality of farmers' houses. These findings show that there is a significant positive relationship between independent agrarian reform and improved farmers' welfare, both from economic (farmers' income and expenditure) and social (farmer house conditions) aspects. However, although the implementation of the independent agrarian reform program succeeded in changing the structure of land access, land ownership after the implementation of the independent agrarian reform program did not show a significant influence on the three indicators of farmer welfare. The results of this study show that the success of independent agrarian reform does not only depend on land access, but is also influenced by other factors such as land management, market access, capital availability, and supportive government policies.

Analysis of the interaction between time (the period after the implementation of the independent agrarian reform program) and farmers who gained access to land after the independent agrarian reform program, showed that although it did not have a significant effect on income and expenditure per capita, this interaction had a positive effect on improving the condition of farmers' houses. Farmers who previously did not have access to land, but obtained land access after the independent agrarian reform program, experienced improvements in house conditions, which can be explained by renovating houses. These findings emphasize the importance of access to land as a factor that affects the quality of life of farmers, especially in terms of housing conditions as one of the indicators of farmers' welfare in Indonesia. Regression analysis using IFLS data (1997, 2000, 2007, and 2014) showed that the 2001 independent agrarian reform program did not have a significant effect on increasing farmers' income and expenditure, both nationally and in Java. Increases in income, per capita expenditure, and housing conditions are more influenced by post-2001 time factors, rather than direct land access.

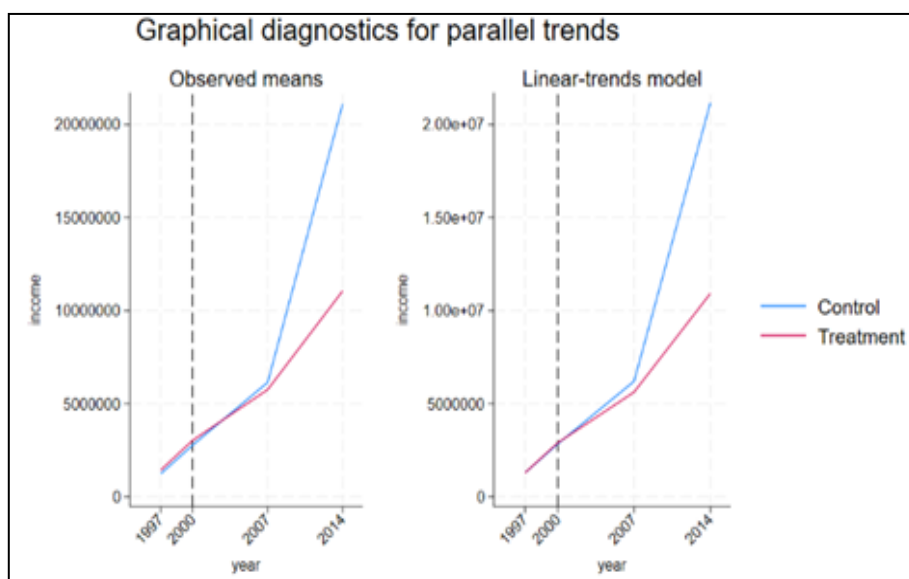
In the *treatment variable*, the results of the analysis indicated that land access after 2001 did not increase income or expenditure, even in some cases it was correlated with a decrease in the condition of farmers' houses due to the

absence of renovation. On the other hand, the results of *difference-in-difference* (DiD) show that farmers who previously did not own land but gained access after 2001 experienced improvements in housing conditions, especially through land *reclaiming* activities that allow renovation or improvement of their homes. The findings on the island of Java show a different pattern compared to the national scale. The Mincerian model, which emphasizes education and experience as determinants of income, is not statistically proven. Education and age do not have a significant effect on income or expenses, but both have a positive effect on the condition of the home. This suggests that the improvement in the quality of farmers' dwellings is more related to social and demographic factors than purely economic aspects.

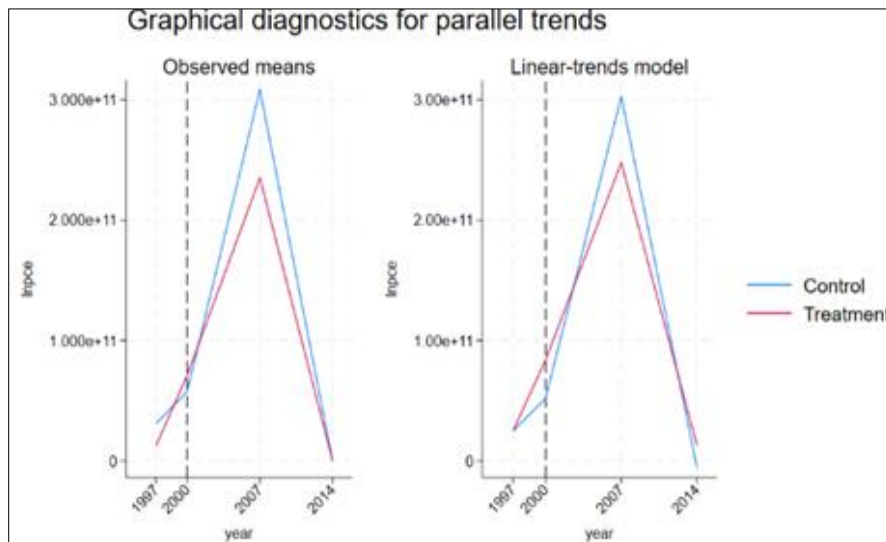
Control variables such as land area, home ownership, loans, health, and marital status contributed differently. Land area and loans are not significant to income or expenditure, but house ownership status and marital status have a significant positive effect on the condition of farmers' houses. Home ownership provides economic stability and a sense of security, while marital status improves social stability and the management of household resources. Overall, this study concludes that access to agricultural land does not automatically improve the welfare of farmers, both in terms of income and expenditure. On the other hand, social factors such as home ownership, marital status, and work experience factors actually determine welfare in the non-economic dimension, especially the quality of housing. These findings underscore the importance of a comprehensive approach in assessing the impact of agrarian reform, taking into account capital constraints, climate change, and socio-economic conditions of farmer households.

**Results of the Parallel Trend Assumption Test (Java)**

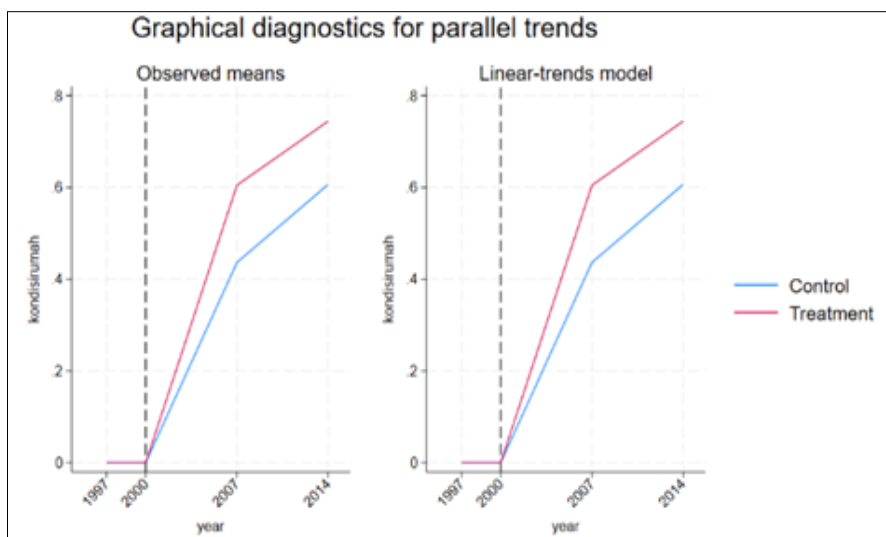
To obtain a graph depicting the assumption of a parallel trend, a *'trendplot state'* command generated based on the analysis of the *'didregress'* command is used. The results of the graph obtained can be seen in Figure 4.2.



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel F(1, 136)=0.01 Prob>F=0.9100



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel  $F(1, 136)=0.78$   
 $Prob>F=0.3788$



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel  $F(1, 136)=0.00$   
 $Prob>F=1.0000$

Source: Processed Author (2024)

Fig 3: Assumption of Parallel Trends between the Treatment Group and the Control Group (Java)

The analysis of welfare indicators is displayed through two graphs. The first graph (left) shows the development of income levels based on access to agricultural land between the treatment and control groups, which appear to move in parallel. Meanwhile, the linear trend graph (right) shows the difference in trend direction between the two groups since before the 2001 intervention. Ideally, the trend lines of the treatment and control groups should intersect in the period before 2001 to ensure comparable initial conditions, so that differences after the intervention truly reflect the effects of treatment. Although visually there is a difference in the initial trend, the results of the statistical test show a p-value of 0.96; 0,37; and 1,000, all of which are well above the 5 percent significance level. Thus, the zero hypothesis fails to be rejected, meaning there is no significant evidence to suggest a trend difference between the treatment and control groups before the intervention. These results confirm that the assumption of parallel trends is fulfilled, because both the treatment group and the control group followed a similar

development pattern before the implementation of the independent agrarian reform program in 2001.

**Results of Analysis of the Impact of the Independent Agrarian Reform Program on the Level of Farmers' Welfare Outside Puau Java**

The independent agrarian reform policy, commonly known as land reclaiming, is carried out by farmers to be able to increase farmers' access to agrarian resources, and is expected to improve the welfare of farmers which consists of 3 welfare indicators, namely income, per capita expenditure and the condition of farmers' houses on the island of Java. By comparing the welfare conditions of farmers before and after land access was obtained, we can assess the extent to which this policy has been successful in improving the quality of life of farmers, both economically and socially. The following is a table that presents the results of the analysis of the impact of the independent agrarian reform policy on the level of farmers' welfare on

the island of Java, this table describes the changes that occur in the three indicators after farmers gain access to land through the land reclaiming process.

**Table 3:** Results of the DiD Regression Test on the Impact of Agrarian Reform Policies on Farmers' Welfare (Outside Java)

Variabel	Income	lnPCE	Condition of the house
1.time	5.470.000** *	102.800.000.00 0	0.398***
1.treatment	-171,53	65.070.000.000	-0.0254*
Time#Treatment	-1.184.000	92.530.000.000	0.0491
Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1			

Source: Processed Author (2024)

Based on the results of the regression test, it was stated that after the implementation of the independent agrarian reform program in 2001, it had a significant effect on the increase in income, per capita expenditure, and the condition of farmers' houses. Farmers' income increased by Rp. 5,470,000, farmers' expenditure increased by Rp. 102,800,000,000, and the condition of farmers' houses has improved significantly, this is reflected in the renovation and improvement of the quality of the condition of farmers' houses. These findings show that there is a significant positive relationship between independent agrarian reform and improved farmers' welfare, both from economic (farmers' income and expenditure) and social (farmer house conditions) aspects.

Although the period of the independent agrarian reform program has an effect on increasing income, per capita expenditure and the condition of farmers' houses. However, farmers who gained access to land after 2001 (*treatment*) outside Java also did not show a significant effect on farmers' income and per capita expenditure, and instead had a significant negative effect on the condition of farmers' houses. This states that farmers who get access to land after 2001, do not have the ability to renovate their houses. An analysis of the interaction between time and treatment (did) showed that although farmers gained access to agricultural land after the agrarian reform program occurred, it did not have a significant effect on the increase in income, per capita expenditure, or the condition of the farmer's house. These findings suggest that changes in access to agricultural land do not directly contribute to improving farmers' welfare in terms of the economic and social aspects measured in this study.

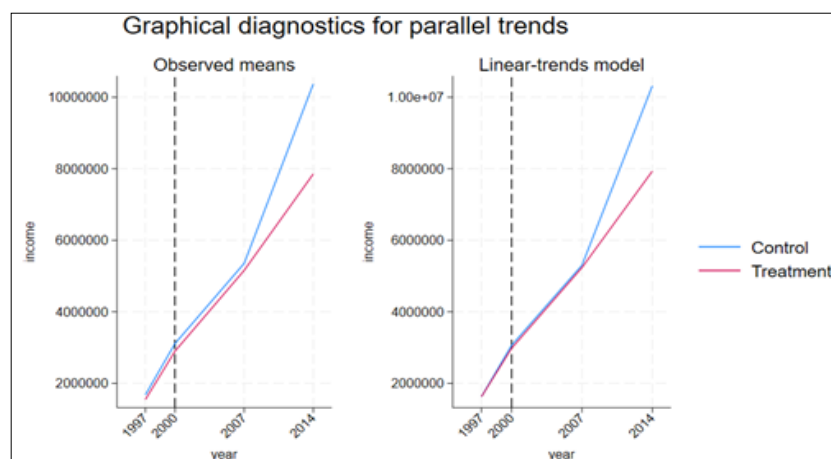
Regression analysis using data from the Indonesian Family

Life Survey (IFLS) 1997, 2000, 2007, and 2014 showed that the Independent Agrarian Reform program did not have a significant effect on increasing income, per capita expenditure, and the condition of farmers' houses. The observed improvement in welfare was more influenced by the post-2001 time factor, rather than by direct land access. The results of the estimation of the *treatment* variable indicate that land access after 2001 did not have a positive impact on the income, expenditure, or condition of farmers' houses. These findings are consistent with *the difference-in-difference* (DiD) results which also did not find a significant effect on three indicators of well-being. However, there are regional differences: on the island of Java, land access through agrarian reform contributes to improving the condition of farmers' houses, while outside Java there is no similar impact. This indicates that there are differences in socio-economic context and institutional readiness between regions. In the framework of the Mincerian Earning Function, the results of the study support the assumption that education and experience (age) have a positive effect on farmers' income. Education and age increase income, although after reaching peak age, income tends to decline as productivity decreases. However, only age has been shown to have a significant effect on per capita expenditure, while education has no direct effect, especially outside Java which is still limited to subsistence agriculture.

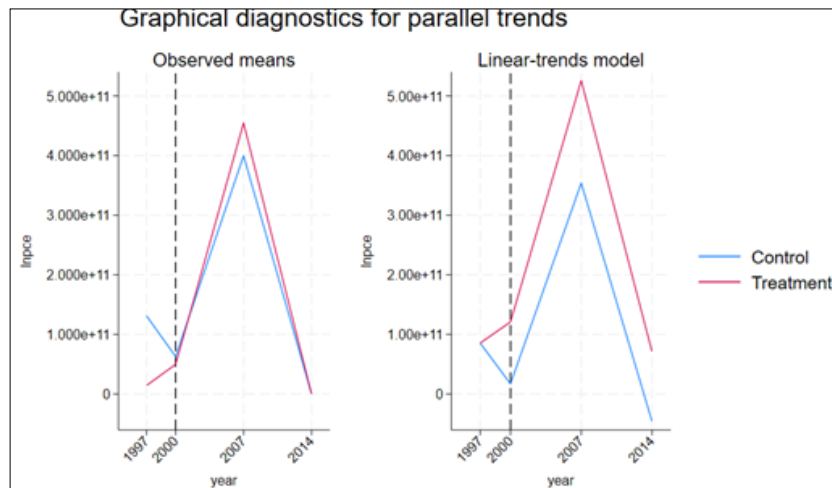
In terms of house conditions, the age of farmers is more influential than education, because experience and accumulated resources allow renovation and repair of houses. Household socio-economic factors also play an important role: marital status has a positive effect on income, home ownership status has a negative effect on the quality of the house, while loans have a negative impact on per capita expenditure. In contrast, health status increases spending because it correlates with productivity and purchasing power. Overall, this study emphasizes that the success of agrarian reform in improving farmers' welfare cannot only be measured from land access. Social, demographic, and local conditions such as markets, regional policies, and infrastructure are important determinants that determine the success of the program in improving farmers' incomes, expenditures, and quality of life.

**Results of Parallel Trend Assumption Test (Outside Java)**

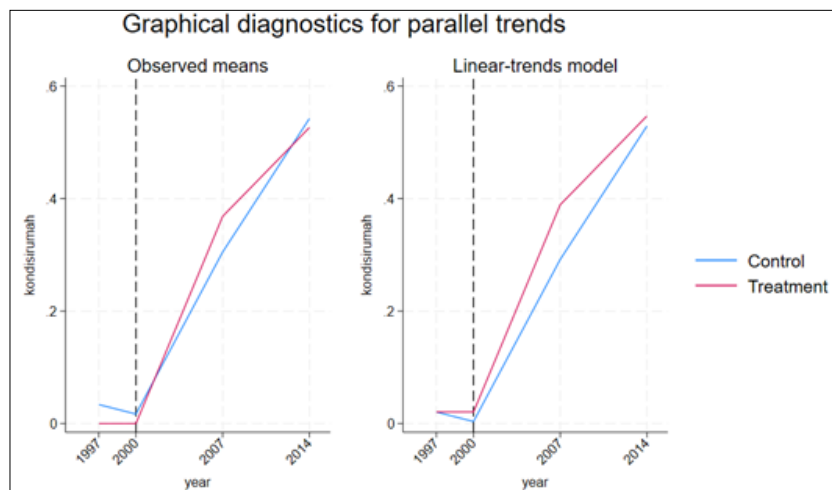
To obtain a graph depicting the assumption of a parallel trend, a *'trendplot state'* command generated based on the analysis of the *'didregress'* command is used. The results of the graph obtained can be seen in Figure 4.



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel F(1, 96)=0.01 Prob>F=0.9034



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel  $F(1, 96)=0.56$   
 $Prob>F=0.4542$



Parallel-trends test (pretreatment time period) HO: Linear trends are parallel  $F(1, 96)=0.74$   
 $Prob>F=0.3914$

Source: Processed Author (2024)

Fig 4: Assumption of Parallel Trends between the Treatment Group and the Control Group (Outside Java)

In the image above, the welfare variable indicator has two different graphs, namely the graph on the left showing the development of income levels based on access to agricultural land between the treatment group and the control group, and the graph on the right which is a linear trend that will occur between the treatment group and the control group. If you look at the image on the left alone, it can be seen that there is a parallel trend between the control group and the treatment group. However, when viewed based on the linear trend of the graph on the right, there is a difference in trend from the beginning before treatment between the control group and the treatment group. Ideally, on the chart on the right before the 2001 period, the trend of the treatment and control groups is on the same line in the sense that they intersect with each other. When this happens, it means that from the beginning before the treatment is given, the treatment group and the control group are in the same condition. So the ideal condition is that after 2001 there is a sharp difference between the treatment group and the control group.

Based on the results of the analysis that has been carried out, it can be seen that the result is that after 2001 there was a change in trend from the treatment group to the control group. The p-values (0.90, 0.45 and 0.39) are much greater than the significance level used (0.05), meaning that they

fail to reject the null hypothesis. This suggests that there is not enough evidence to say that the trends between the treatment group and the control group differ before the treatment, meaning that the assumption of a parallel trend is met due to very large p-values (0.90, 0.45 and 0.39), which indicate that before the treatment, the control group and the treatment group follow a similar or parallel trend.

**Classical Assumption Test Results**

To ensure the quality and validity of the analysis results, the step that can be taken is to conduct a classical assumption test on the regression model. This test aims to evaluate whether the basic assumptions in linear regression, such as the absence of multicollinearity and heteroscedasticity, have been met. The fulfillment of these assumptions is very crucial, because if they are not met, then the estimates produced by the regression model can be inefficient and biased, which will certainly affect the validity of the conclusions that can be drawn from the research results. In this study, two types of classical assumption tests were carried out, namely the multicollinearity test and the heteroscedasticity test. The multicollinearity test aims to check whether there is a strong relationship between independent variables that can affect the stability of the regression coefficient estimation, while the

heteroscedasticity test is performed to ensure that the residual variance is constant across the entire range of values of independent variables. The following is a table of the results of the classical assumption test that includes the

two tests, which provides an overview of the extent to which the basic assumptions in linear regression are acceptable in the analysis conducted in this study.

**Table 4:** Results of the Classical Assumption Test of the Regression Model for DiD

Types of Classical Tests	Technical	Result			Information
Multicollinearity Test	<i>Variance Inflation Factor (VIF)</i>	Variabel	BRIGHT	1/LIVE	Passing the Multicollinearity Test
		Treatment Time (DiD)	4.85	0.206081	
		Age	1,10	0,906533	
		Education	1.09	0.915305	
		Marry	1.08	0.929601	
		Home Ownership	1.06	0.939603	
		Health Status	1.03	0.973710	
		Loan			
		Agricultural land area	1.01	0.986644	
Heteroscedasity Test	Tes Breusch-Pagan	Chi2(1) = 91.29 Prob > Chi2 = 0.0000			Not Passing the Heteroskedasity Test (Regression Carried Out with 'robust')

Source: Processed Author (2024)

Multicollinearity tests were performed to identify the presence of high correlations between independent variables in the regression model. High multicollinearity can lead to instability in the estimation of regression coefficients and increase the error standard, which in turn can reduce the accuracy and significance of the analysis results. Based on the table above, the *Variance Inflation Factor (VIF)* coefficient for all variables in the model is at a number that shows no significant multicollinearity problems. Variables such as Time\*Treatment (DiD) have a VIF value of 4.85, which is still far below the threshold of a VIF value that is considered problematic (VIF value > 10). Likewise with other variables, such as Age (VIF = 1.10), Education (VIF = 1.09), Marriage (VIF = 1.08), and other variables that have very low VIF values. All 1/VIF values also indicate that there is no significant multicollinearity between independent variables in this regression model. Therefore, it can be concluded that this model passed the multicollinearity test and that the relationships between independent variables did not affect the estimation of coefficients inappropriately. Based on the results of the *Breusch-Pagan* test, which has a value of Chi2(1) = 91.29 and p-value = 0.0000, it can be concluded that this model does not pass the heteroscedasticity test. A very small p-value (p-value < 0.05) indicates heteroscedasticity in the model, which means that the variance of error is not constant and there is a difference in variance across observations. In this case, to overcome the problem of heteroscedasticity, regression is carried out with robust standard errors, which aims to produce more efficient and consistent estimates despite the heteroscedasticity problem.

**Discussion**

**The Impact of the Agrarian Reform Program on Farmers' Welfare**

The results of the regression analysis using the Difference in Differences (DiD) method show that the time factor has a greater influence on the increase in income, expenses, and the condition of farmers' houses compared to the direct impact of the implementation of the agrarian reform program. Based on data from the Indonesia Family Life Survey (IFLS) in 1997, 2000, 2007, and 2014, it is known

that after the independent agrarian reform program in 2001, there was indeed an increase in income, per capita expenditure, and the condition of farmers' houses. However, in the *treatment* group, agrarian reform does not have a significant effect on income or expenditure per capita, but only has an impact on improving the physical condition of farmers' houses. This indicates that despite policy interventions, external factors such as long-term socio-economic dynamics remain the dominant variable in influencing farmers' welfare. In addition, education has not been shown to have an effect on income, while age has a positive influence, in line with the Mincerian model that emphasizes the importance of experience in influencing an individual's income (Ali & Akhtar, 2014; Suryana, 2020).

**Land Area and Farmers' Welfare**

The land area variables in this study did not show a significant influence on farmers' income, both in Java and outside Java. This finding is different from the research of Razi and Wahyuni (2022) [23] which emphasized that land area has a positive effect on agricultural production and income. On the contrary, the results of this study are consistent with the findings of Susanti D & Widayat T (2016), who stated that land area does not always correlate with crop production. Thus, this study confirms that extensive land ownership does not automatically guarantee an increase in farmers' income, considering that land management efficiency and productivity factors also determine the success of farming.

**Improvement of Condition of Houses and Assets**

The results of the analysis also found that the condition of farmers' houses improved after the land reclaiming process. This is in line with the research of Afriliyeni *et al.* (2021) [1], who stated that agrarian reform can improve the physical quality of farmers' houses. Before gaining access to land ownership, most of the farmers' houses were in a condition that was not livable. After working on their own land, they are able to do renovations such as repairing the kitchen and expanding parts of the house. Komala *et al.*'s (2021) [9] research on farmer households in Ciamis also shows that agrarian reform increases household assets and facilities,

although it does not have a significant impact on farmer empowerment. Thus, agrarian reform tends to have more impact on increasing physical assets than on empowerment.

### Differences in Quantitative and Qualitative Findings

The quantitative results of this study show that land access does not have a significant effect on improving the welfare of farmers. However, qualitative findings from interviews with farmers in Tanjungkarang Village, Tasikmalaya, showed different results. Most farmers stated that land access had a real impact on increasing income and socio-economic conditions. Cepi, the Village Secretary, emphasized that reclaiming land changes people's lives, from low-income farm workers to more independent farmers. The reclaiming process also improves environmental conditions, such as water availability and road access. This indicates that there is a discrepancy between the results of quantitative analysis and the empirical experience of the community, so further study is needed on the mediating factors in the relationship between land ownership and welfare.

### Farmers' Struggles, Legal Certainty and Economic and Education Impacts

Interviews with farmers also reveal the major challenges they face, especially pressure from interested parties, including the apparatus and paid groups used to evict the community (Cepi, Sekdes). Through the support of the Pasundan Farmers Union (SPP), the community succeeded in reclaiming and continuing the administrative procedure to obtain a Certificate of Ownership (SHM) from the Ministry of Agrarian Affairs. Erni, a representative of SPP, stated that Tanjungkarang Village has been designated as a priority location for resolving agrarian conflicts, even though an official certificate has not been issued. This step is important to strengthen the legal legitimacy of land managed by farmers. The results of an interview with Wiwin, one of the land warrior farmers, show that land reclaiming has a real impact on increasing income and home renovation. In addition, Karna, the Chief Coordinator of OTL Tanjungkarang, emphasized that the increase in income from cultivated land also allows the community to send children to school up to the high school level, even college. This confirms the close relationship between improving land access, economic conditions, and educational achievements. Community education increased significantly after land access was obtained, which in turn encouraged the development of the quality of human resources in the village.

### Social Impacts, Infrastructure and Challenges of Agrarian Policy and Impact on Health and Nutrition

In addition to increasing individual income and assets, land reclaiming also has a positive impact on village infrastructure development. Road access and the availability of clean water improved after the community managed the land. This shows that self-sustaining agrarian reform not only impacts individual well-being, but also creates a multiplier effect on the overall quality of life of society. These findings indicate that land access plays an important role in supporting inclusive and sustainable village development. Although the *bottom-up* agrarian reform program has proven to bring real benefits, the government still tends to implement a top-down approach. Iwan, a

member of the SPP, emphasized that the government has not been fully present in supporting the legalization and production of agriculture. Therefore, a participatory approach that involves farmers as the main actor in policy formulation is needed. A community participation-based approach is believed to be able to produce policies that are more relevant and responsive to the real needs of farmers. The latest data from the village officials shows that there are only seven children who are stunted, and all of them come from families who are not involved in the reclaiming movement. This indicates that land access has a positive impact on children's nutritional status through increasing the availability of family food. Thus, reclaiming land not only increases farmers' income and assets, but also contributes to improving the health of rural communities.

### Conclusion

The results of the study using the Difference in Differences (DiD) model show that the period of the independent agrarian reform program in 2001 had an effect on increasing income, per capita expenditure, and the condition of farmers' households. However, for farmers who obtained land access after 2001 (treatment group), agrarian reform did not have a significant impact on income or expenditure, but only had an impact on improving the condition of their homes. The analysis of the interaction between time factors and treatment groups also did not show a significant effect on improving the economic welfare of farmers. Interestingly, these quantitative findings are not entirely in line with the results of field interviews with community leaders and land warrior farmers in Tanjungkarang Village, Tasikmalaya, which actually affirms the positive impact of land reclaiming on increasing income, household expenditure, fulfilling family nutrition, and improving living conditions. This research also confirms that access to land is much more important than the area of land owned. Large land area does not necessarily guarantee an improvement in farmers' welfare, as limited manpower and capital often hinder land optimization. On the other hand, the provision of land access, although relatively small, is able to provide a great opportunity for smallholders to manage their farming business independently and contribute directly to the improvement of their welfare.

### Suggestion

The government has a central role in guaranteeing farmers' rights to land, especially on land that has long been managed by the community but does not have legal certainty. Efforts that can be made are to strengthen the legalization mechanism, for example through accelerating the issuance of Certificates of Ownership (SHM) on reclaimed land, so that farmers have clear legal legitimacy. In addition, the government also needs to supervise the use of land from agrarian reform to ensure its use is in accordance with the goal of increasing agricultural productivity and farmers' welfare. In formulating policies, the government should not only rely on statistical data, but also conduct comprehensive studies through a participatory approach. This approach can be done by going directly to the field and interacting with farmers to understand the real conditions, challenges, and needs they face. By considering both quantitative data and the qualitative experience of farmers, the resulting policies will be more contextual, relevant, and able to provide sustainable solutions.

### Research Limitations

This study has limitations in delving deeper into the problems faced by Indonesian farmers because it only uses variable indicators available in BPS data and several literature. Therefore, further research is expected to conduct more in-depth field studies in various areas that are experiencing land reclaiming. This approach is expected to provide a more comprehensive understanding of the problems faced by farmers in rural areas, as well as produce policy recommendations that are more targeted and in accordance with the real needs of the farming community.

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