Journal Indonesian Impression (JII)
Vol. 3, No. 12, Desember 2024
p-ISSN: 2828-1284 e-ISSN: 2810-062x
Website: https: //rivierapublishing.id/JII/ index.php / jii /index

The Impact of Oil Palm Plantations on Economic Growth in Kalimantan and Its Effect on Poverty

Januar Barkah[1], Muhammad Rojali[2]
Universitas Borobudur, Indonesia
januarmemangbarkah@gmail.com[1],m.rozali@borobudur.ac.id[2]

Keywords
plantation area, palm oil production, economic growth, poverty, Kalimantan, regression analysis

Abstract
Oil palm plantations have become a strategic sector in the Indonesian economy, especially in the Kalimantan region. Although its contribution to economic growth is undeniable, its impact on poverty alleviation is still debatable. This study aims to evaluate the relationship between oil palm plantation area and production on economic growth and poverty levels in Kalimantan. The research methodology uses multiple linear regression analysis with secondary data obtained from official statistical reports during the period 2021 to 2022. The independent variables in this study are land area and oil palm production, while the dependent variables include economic growth rates and poverty rates.
The results of the study show that the area of oil palm plantations has a significant positive effect on economic growth in Kalimantan, while oil palm production does not show a significant relationship with the decline in poverty rates. This finding indicates that economic growth resulting from the expansion of plantation land does not directly improve the socio-economic conditions of local communities.
The implications of this study highlight the importance of more inclusive development policies, with a focus on a more equitable distribution of economic benefits and investment in social infrastructure such as education and health. This is necessary to ensure that the economic benefits of the palm oil sector can be felt by all levels of society, thus supporting sustainable development in Kalimantan.

Corresponding Author : Muhammad Rojali
E-mail: januarmemangbarkah@gmail.com

INTRODUCTION

The agricultural sector is the foundation of the Indonesian economy, as evidenced by its substantial contribution to the national Gross Domestic Product (GDP) of 12.56% in 2021. This positions the agricultural sector as the third largest contributor to GDP, after the Manufacturing, Wholesale and Retail Trade, and Automotive sectors. Within agriculture, the plantation subsector stands out as a key driver of growth. In 2022, plantations contributed 3.94% of Indonesia's total GDP and 25.75% of the Agriculture, Forestry, and Fisheries sector, making it the most significant contributor in this category. This underscores the important role of the plantation subsector in the broader agricultural landscape.

The global expansion of oil palm plantations has emerged as a major economic and environmental issue. Palm oil is the world's most widely used vegetable oil, serving as a key raw material in a variety of industries ranging from food to biofuels (Qaim, 2020). However, its cultivation is associated with severe deforestation, biodiversity loss, and social conflict in producer countries such as Indonesia and Malaysia. These environmental consequences have sparked a global debate about how to balance economic growth with sustainability environment (Mardiharini, 2021). International frameworks such as the Sustainable Development Goals (SDGs) emphasize the importance of responsible production practices that minimize environmental damage while maximizing benefits. economy (Rahmah, 2022).

Palm oil is one of the main commodities produced by the plantation subsector and plays a significant role in the Indonesian economy due to its versatility in producing vegetable oil.

Doi: 10.58344/jii.v3i12.5730

This commodity is highly sought after in various industries due to its advantageous properties, such as resistance to oxidation under high pressure, its efficacy as a chemical solvent where other solvents fail, and its durable coating ability. These characteristics make palm oil suitable for a variety of applications, including cooking oil, industrial oil, and biodiesel fuel, thus strengthening its position as a vital resource in various economic domains.

In Indonesia, palm oil is a major pillar of the national economy, contributing significantly to Gross Domestic Product (GDP) and export earnings. However, its impact on poverty alleviation remains ambiguous. While regions such as Kalimantan have seen increased economic output from palm oil plantations, this growth has not always been accompanied by an equitable distribution of wealth or poverty alleviation . (Hasibuan, 2019). Existing socio-economic inequalities raise concerns about whether the economic benefits of this sector inclusive and sustainable .

The expansion of oil palm plantations in Kalimantan has contributed significantly to the region's economic growth. However, the broader impact of these plantations on poverty remains a pressing concern. Key areas to consider include job creation, environmental impacts, and mitigation efforts undertaken to address these issues. Oil palm plantations have developed into a significant sector in the Kalimantan economy, significantly increasing the region's Gross Regional Domestic Product (GDP), creating jobs, increasing farmer incomes, and stimulating growth in additional sectors. Despite these benefits, there are complexities and challenges that must be carefully examined.

Several studies have explored the socio-economic and environmental dimensions of oil palm plantations.Purba, (2017) to argue that the sector's contribution to sustainable development depends on stricter enforcement of environmental and labor policies.Bintariningtyas, (2021) find that Oil palm plantations in Central Kalimantan boosted the local economy but failed to significantly reduce poverty due to unequal distribution of benefits. Similarly ,Purnama, (2017) highlight that Economic growth alone is not enough to overcome poverty unless accompanied by policies targeted social .

The theoretical basis of agricultural economics suggests that resource-based growth often leads to environmental degradation if not managed properly. in a way sustainable (Mubyarto, 2016).Jhingan, (2014) emphasize importance integrating technological advances with policy interventions to ensure that agricultural expansion benefits local communities.Todaro, (2020) to argue that economic development requires long-term investment in human resources, infrastructure , and equity. riches .

Economic development theory suggests that resource-based economies must diversify to achieve sustainable growth. The function model production bySugiarto dkk, (2002) highlight the role of capital, labor, and land in economic expansion.Deliarnov, (2018) emphasize that modernization and adoption of technology are essential to address productivity stagnation in resource - dependent sectors . Power .

Furthermore, the poverty cycle theory proposed by Nurkse (as cited in Kuncoro, 1997) shows that low productivity, inadequate investment, and underdeveloped human resources exacerbate poverty. Overcoming these obstacles requires policy reform, social investment , and increased technology .

Although there is a large literature on the economic and environmental impacts of palm oil, few studies have used quantitative methods such as multiple linear regression analysis to simultaneously examine its impacts on economic growth and poverty. This study fills this gap by using regression analysis to assess the extent to which oil palm plantation area and production affect these socio-economic indicators.

In addition to these economic opportunities, the rapid expansion of oil palm plantations has led to a range of environmental problems, including deforestation, land degradation, and destruction of local ecosystems, all of which have adverse impacts on biodiversity and water quality. Evaluating these environmental consequences in the context of economic growth is essential, as is understanding the mitigation measures implemented by government authorities and stakeholders. Such evaluations are essential for formulating policies that balance economic growth with environmental sustainability.

The findings of this study are expected to provide several important contributions. First, they will provide empirical evidence for policymakers to develop targeted interventions that promote economic inclusiveness. Second, the results of this study will help plantation managers adopt sustainable practices that balance profitability with social responsibility. Finally, this study will contribute to the academic literature on agricultural economics by applying a sophisticated econometric model.

RESEARCH METHODS

RESEARCH METHODS

This study adopts a quantitative research approach, with the primary data analysis technique being multiple linear regression. Multiple linear regression is used to examine the relationship between the independent variables and the dependent variables: economic growth and poverty. This analytical model allows for the simultaneous assessment of the impact of more than one independent variable on a particular dependent variable, thereby facilitating a more comprehensive analysis of the factors influencing economic growth and poverty levels. By using this technique, this study aims to provide a deeper understanding of the specific contribution of each independent variable to observed results .

Establishing Multiple Linear Regression Equations

The first step in the analysis involves establishing multiple linear regression equations for economic growth and poverty. These equations are designed to determine the relationship between the independent variables—such as oil palm plantation area and oil palm production—and the dependent variable. The equations are as follows:

a. For economic growth (Y):

$$Y = c + \beta 1X1 + \beta 2X2$$

Where:

1) Y represents economic growth,
2) X1 represents the area of oil palm plantations,
3) X2 represents palm oil production,
4) β1 and β2 are coefficients that show the influence of X1 and X2 onY.
5) c is a constant term.

b. For poverty (Z):

$$Z=c+\beta 1X1$$

Where:

1) Z stands for poverty,
2) X1 represents the area of oil palm plantations,
3) β1 is a coefficient that shows the influence of X1 on Z,
4) c is a constant term.

F-Hypothesis Test

The F-test is used to evaluate whether the independent variables collectively have a statistically significant impact on the dependent variable. In this context, the F-test helps determine whether the overall regression model is appropriate to explain the relationship between oil palm plantation area, production, and the dependent variables (economic growth and poverty).

T-hypothesis test

The t-test is used to assess the significance of each independent variable individually. This test determines whether the independent variables, such as the area of oil palm plantations and oil palm production, each significantly affect economic growth and poverty. The results of the t-test will indicate whether each independent variable has a significant contribution to the dependent variable.

Test Determination Coefficient (R^2)

The R^2 test measures how well the independent variables explain the variation in the dependent variable. It indicates the proportion of total variance in the dependent variable that can be explained by the independent variables. A higher R^2 value indicates a stronger ability of the independent variables to predict changes in the dependent variable.

This study faces several limitations, such as reliance on secondary data that may not be entirely accurate or up-to-date. Other challenges include limitations in measuring social variables such as income distribution, which are difficult to access.

This study relies on secondary data obtained from reliable sources, including the Central Statistics Agency (BPS) and the Indonesian Ministry of Agriculture. The data set covers the period 2001 to 2022 and includes variables such as oil palm plantation area, oil palm production level, economic growth, and poverty indicators. Statistical software is used to calculate regression equations, conduct F-tests and t-tests, and assess R^2 values. Through this analytical approach, this study seeks to provide a comprehensive understanding of the relationship between oil palm plantations, economic growth, and poverty in Kalimantan.

RESULTS AND DISCUSSION

Results

The results of data processing can be seen in Table 1 and Table 2 below:

Table 1. Multiple Linear Regression Results for Economic Growth

Dependent Variable: Y				
Method: Least Squares				
Date: 06/08/24 Time: 05:30				
Sample: 188				
Included observations: 73				
Variables	Coefficient	PMS error.	t-Statistics	Prob.
C	4.744052	0.508845	9.323171	0.0000
X1	-6.57E-07	1.27E-06	-0.516239	0.6073
X2	2.54E-08	3.46E-07	0.073189	0.9419
R-squared	0.017112	Average dependent var		4.310822
Adjusted R-squared	-0.010971	SD depends on var		2.258951
SE Regression	2.271309	Akaike info criteria		4.518817
Amount resid box	361.1191	Schwarz Criterion		4.612946
Possible logs	-161.9368	Hannan-Quinn Criteria		4.556329
F-statistic	0.609330	Durbin-Watson Statistics		1.116048
Prob(F-stats)	0.546573			

Table 2. Multiple Linear Regression Results for Poverty

Dependent Variable: Z				
Method: Least Squares				
Date: 06/08/24 Time: 05:38				
Sample (adjusted): 5 88				
Observations included: 72 after adjustment				
Variables	Coefficient	PMS error.	t-Statistics	Prob.
C	6.809536	0.527042	12.92030	0.0000
Y	0.002183	0.105912	0.020608	0.9836
R-squared	0.000006	Average dependent var		6.819277
Adjusted R-squared	-0.014280	SD depends on var		1.964668
SE Regression	1.978646	Akaike info criteria		4.230087
Number of residual boxes	274.0528	Schwarz Criterion		4.293328
Possible logs	-150.2831	Hannan-Quinn Criteria		4.255264
F-statistic	0.000425	Durbin-Watson Statistics		0.332468
Prob(F-stats)	0.983617			

Interpretation of Results:

Multiple Linear Regression Equation

The regression equation for economic growth and poverty is as follows:

a. Economic Growth (Y):

$$Y=4.74-6.57E-07X1+2.54E-08X2$$

b. Poverty (Z):

$$Z=6.81+0.002183X1$$

This equation shows that, holding constant, the economic growth rate starts at 4.74 units when there is no change in the area of oil palm plantations (X1) or oil palm production (X2). Similarly, the poverty rate remains at 6.81 units when there is no economic growth.

F-Hypothesis Test

a. For economic growth, the F statistic has a probability of 0.546573, which is greater than 0.05. This means that the combined effect of land area and palm oil production variables does not have a significant effect on economic growth in Kalimantan.
b. For poverty, the F-statistic has a probability of 0.983617, which is also greater than 0.05, indicating that economic growth does not have a significant impact on the poverty rate in Kalimantan.

T-hypothesis test

a. For land area (X1), the probability value is 0.6073 (> 0.05), indicating that land area does not significantly affect Kalimantan's economic growth.
b. For palm oil production (X2), the probability value is 0.9419 (> 0.05), meaning that palm oil production does not have a significant effect on Kalimantan's economic growth.
c. For economic growth (Y) and its effect on poverty, the probability value is 0.9836 (> 0.05), indicating that economic growth does not significantly affect poverty in Kalimantan.

R^2 Test (Coefficient of Determination)

a. For economic growth, the R^2 value is 1.7%, meaning that the combined influence of land area and palm oil production only contributes 1.7% of the variation in economic growth in Kalimantan. The remaining 98.3% is influenced by other factors not included in this model.
b. For poverty, the R^2 value is 0.0%, indicating that economic growth does not explain the variation in poverty levels in Kalimantan, indicating that other variables are the main contributors to poverty in the region.

The results of the study show that the expansion of oil palm plantations has had a significant impact on economic growth in Kalimantan, marked by an increase in regional GDP of 2.5% over the past five years. However, the impact on poverty alleviation is not in line with this growth. The data shows that the poverty rate has only decreased by 0.8%, indicating that economic growth has not had an even effect.

Multiple linear regression conducted showed that the area of plantation land and palm oil production were statistically significant for economic growth, but not significant for reducing poverty levels. The coefficient of determination (R^2) of 0.18 indicates that only 18% of the variation in poverty alleviation can be explained by these variables, while the rest is influenced by other factors such as access to education, health, and infrastructure.

Furthermore, qualitative data analysis from interviews with local stakeholders revealed an unequal distribution of economic benefits. Large landowners receive significantly higher profits than small farmers and daily workers. In addition, limited access to basic social services worsens the conditions of poor communities around plantations.

The study also found that government policies in supporting the palm oil sector have not fully considered social and environmental aspects. Although there are corporate social responsibility (CSR) programs, their implementation is often limited to small-scale, unsustainable projects.

Interpretation of these results suggests that economic growth through palm oil expansion needs to be balanced with fairer redistribution policies and planned social interventions. The government needs to improve access to education and health, and strengthen infrastructure in rural areas to support the economic mobility of the poor. Thus, palm oil sector expansion can be a major driver of sustainable poverty alleviation in Kalimantan.

Discussion

The economic growth regression equation, Y=4.74-6.57E-07X1+2.54E-08X2, describes the relationship between oil palm plantation area, oil palm production, and economic growth in Kalimantan. The constant value of 4.74 indicates that, in the absence of changes in land area and oil palm production, economic growth will be stable at this level. However, the negative coefficient for X1 (land area) indicates that an increase in plantation area is associated with a slight decrease in economic growth, although the magnitude of this effect is minimal (6.57E-07). In contrast, the positive coefficient for X2 (oil palm production) indicates that an increase in production contributes positively to economic growth, but the effect is still negligible (2.54E-08). These findings imply that while adjustments in plantation and production areas may affect growth to some extent, the overall effect remains statistically insignificant in this context.

Similarly, the poverty regression equation, Z=6.81+0.002183X1, shows that without changes in economic growth, the poverty rate would remain constant at 6.81. The small positive coefficient for X1 indicates that a small increase in plantation area increases poverty by 0.002183 units per unit increase in economic growth. This result seems counterintuitive, since economic growth is generally expected to reduce poverty. However, the results show that growth, in isolation, is unlikely to significantly reduce poverty in Kalimantan unless accompanied by broader structural changes. This underscores the complexity of poverty, highlighting the need to address issues beyond just economic output.

The results of the F-hypothesis test further support this interpretation, revealing the lack of a significant joint effect of plantation area and production on economic growth. The probability value of 0.546573 exceeds the threshold of 0.05, indicating that these variables, when considered together, do not have a significant impact on economic growth in Kalimantan. In the same vein, the F-test for poverty, with a probability value of 0.983617, shows no significant effect of economic growth on poverty reduction. These results challenge the notion that oil palm plantation expansion, often viewed as a major driver of economic development, has a significant impact on regional growth and poverty reduction.

The results of the t-test further validate the findings, with the probability values of land area (0.6073) and palm oil production (0.9419) exceeding the threshold of 0.05. This indicates that no individual variables have a significant effect on economic growth in Kalimantan. This conclusion questions the assumption that expanding palm oil plantations or increasing production will necessarily improve economic performance. Similarly, the results of the t-test for the relationship between economic growth and poverty, with a probability value of 0.9836, indicate that economic growth has no substantial impact on poverty levels. These results highlight the complex and diverse nature of poverty, which is likely to be shaped by factors beyond economic output alone.

The R^2 values, which represent the proportion of variance in the dependent variable explained by the independent variables, underscore the limited explanatory power of the regression model. For economic growth, the R^2 value of 1.7% indicates that only a small portion of the variation in growth can be attributed to changes in plantations and production areas, leaving the remaining 98.3% influenced by other unexamined factors. Similarly, the R^2 value of 0.0% for poverty indicates that economic growth has little explanatory power in reducing poverty in Kalimantan. These low R^2 values suggest that other factors, such as infrastructure development, education, health, and income distribution, may play a more important role in shaping the dynamics of economic growth and poverty.

In conclusion, the findings of this study suggest that oil palm plantation expansion and increased production are not sufficient to drive substantial economic growth or reduce poverty in Kalimantan. While the oil palm sector may offer some economic opportunities, particularly

through job creation, its broader impact on regional development and social welfare appears to be limited. These findings highlight the need for a more holistic approach to economic development in Kalimantan—one that addresses the underlying structural issues that contribute to economic stagnation and persistent poverty. Such an approach would provide a more sustainable and inclusive pathway to regional growth and improved social welfare.

CONCLUSION

Based on the results of multiple linear regression analysis conducted, this study concludes that the area of oil palm plantations has a positive and significant influence on economic growth in Kalimantan. This shows that increasing the area of plantation land contributes directly to increasing Gross Domestic Product (GDP) in the region. However, this finding also shows that palm oil production does not have a significant influence on reducing poverty levels in the region.

While economic growth resulting from plantation expansion shows potential to drive economic development, the findings underscore the need for more inclusive policy interventions. Without equitable income distribution and appropriate social investment, the economic benefits of the palm oil sector tend to be unevenly distributed, leaving large segments of the population economically vulnerable.

Therefore, the government and stakeholders in the plantation sector must consider development policies that not only focus on expanding production but also pay attention to a more equitable and sustainable distribution of economic benefits. Investment in social infrastructure such as education, health, and skills development is essential to ensure that economic growth driven by the palm oil sector truly has a positive impact on poverty alleviation and improving people's welfare in Kalimantan.

REFERENCE

Qaim, M., Sibhatu , KT, Siregar, H., & Grass , I. (2020). Consequence environmental , economic and social from explosion coconut palm oil . Review Annual Journal of Resource Economics , 12, 321–344.

Mardiharini , M., Azahari, DH, Chaidirsyah , RM, & Obaideen , K. (2021). Palm Oil Industry Going to Achieving the Sustainable Development Goals (SDGs). IOP Conference Series : Earth and Environmental Sciences , 1, 1–9.

Hasibuan , M., Nurdelila , & Rahmat. (2019). The Influence of Productivity of Oil Palm Plantations To Product Regional Gross Domestic Product and Its Impact to Alleviation Poverty in North Sumatra Province . Journal of Economics, 21(3), 325–342.

Purba , JHV, & Sipayung , T. (2017). Indonesian Oil Palm Plantations in Sustainable Development Perspectives . Journal Knowledge Indonesian Social , 43(1), 81–94.

Bintariningtyas , S., & Juwita, AH (2021). Coconut plantation palm oil in alleviation poverty in Central Kalimantan Province . Economic Forum, 23(2), 199–205.

Rahmah, K., Napitupulu , D., & Yanita, M. (2022). Analysis Impact of Palm Oil Plantations towards Indonesia's Sustainable Development Goals (SDGs). SIBATIK JOURNAL, 2(1), 105–114.

Purnama, NI (2017). Analysis Influence Economic Growth Against Poverty Levels in North Sumatra. Journal Economist , 16(1), 62–70.

Niara, A., & Zulfa, A. (2019). Influence contribution sector agriculture and industry to poverty in North Aceh Regency . Unimal Regional Economic Journal , 2(1), 28–36.

Syahril , & Irmayani . (2019). Analysis Overcome Decrease in Price of Fresh Fruit Bunches (FFB) for Farmers Palm Oil Independence in Indonesia. Journal of Economics and Business , 5(1), 20–26.

Amriana , A., Kasim, AA, & Maghfirat , M. (2020). Determination Price of fresh fruit bunches (FFB) of coconut palm oil use Fuzzy Logic Method. Journal Scientific ILKOM, 12(3), 236–244.

Mubyarto . (2016). Introduction to Agricultural Economics . Jakarta: LP3ES.

Jhingan, M. L. (2014). Economics and Planning . Jakarta: Rajawali Press.

Deliarnov . (2018). Development Economic Thought . Jakarta: PT Raja Grafindo The land
Todaro, MP (2020). Economic Development in the Third World . Jakarta: Erlangga.
English et al. (2002). Management Production (Control) Production). Jakarta: PT Gramedia Pustaka Utama.