

Research Article

GNP, Inequality, and Education: An Empirical Study of Rural Poverty

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Abstract: This study aims to analyze the effect of Agricultural GDP, Gini Ratio, and Education in influencing poverty in western Indonesia. A panel data model with Fixed Effect Model estimation was used for data of 17 provinces from 2019 to 2023. The results showed that partially the Agricultural sector GRDP had a significant negative effect, inequality with the Gini Ratio indicator had a significant positive effect, while education with the average years of schooling indicator had a negative but insignificant effect. These findings indicate that an increase in agricultural output and education can reduce poverty, while high income inequality can worsen poverty conditions in rural areas.

Keywords: Agricultural GDP; Average Years of Schooling; Gini Ratio; Panel Data; Rural Poverty.

1. Introduction

Poverty remains a critical development challenge in Indonesia. It is a widespread and complex issue that can significantly obstruct the progress and acceleration of development in various aspects of human life, including economic, social, and cultural dimensions (Putra et al., 2023). Poverty is a core issue that consistently draws the attention of governments across the globe (Badan Pusat Statistik Indonesia, 2023). According to the Central Bureau of Statistics (BPS), poverty is defined as the economic incapacity to fulfill essential food and non-food needs, which is assessed based on expenditure levels.

Table 1. Percentage of Rural and Urban Poor Population in Provinces in Western Indonesia in 2019-2023

Province	Urban	Rural
Aceh	9,97	16,92
Sumatra Utara	8,23	8,03
Sumatra Barat	4,67	7,23
Riau	6,73	6,65
Jambi	10,19	6,28
Sumatra Selatan	11,07	12,21
Bengkulu	14,21	13,96
Lampung	8,02	12,65
Kep. Bangka Belitung	3,54	5,85
Kep. Riau	5,05	10,69
Jawa Barat	7,19	9,3
Jawa Tengah	9,78	11,87
Di Yogyakarta	10,27	13,36
Jawa Timur	7,5	6,79
Banten	6	5,5
Kalimantan Barat	4,44	8,07

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Kalimantan Tengah	4,78	5,35
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Source: Central Bureau of Statistics, 2023

Rural poverty is one of the main challenges in Indonesia's economic development. Although various programs have been launched, the poverty rate in rural areas is still high. The problem of poverty and development cannot be separated from the role of agriculture regarding the stabilization of food security and self-sufficiency, improving the quality of nutrition, and increasing foreign exchange earnings as capital for national development (Ulfatussaniah et al., 2024). The agricultural sector as the backbone of the rural economy has an important role in alleviating poverty. However, inequality in income distribution and low levels of education are the main obstacles (Anggreani et al., 2023). Poverty in the agricultural sector is influenced by many factors that are often faced with the grip of structure and culture, namely the low productivity in this sector. This is due to the unequal distribution of agricultural land which is increasingly widespread, low education levels, low sensitivity to technology, weak exchange rates for farmers and difficult accessibility to capital (Nasrun et al., 2020).

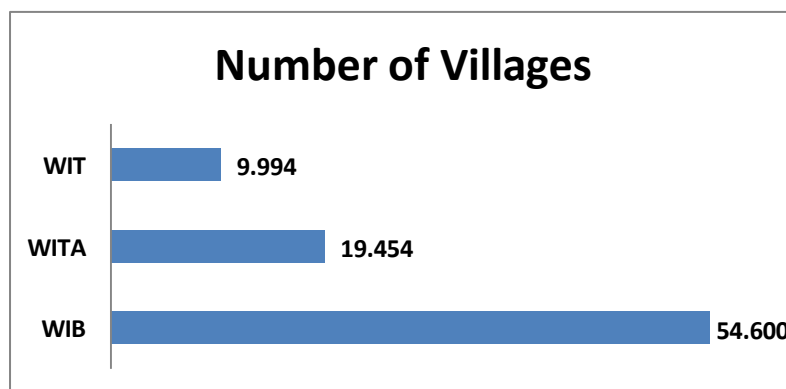


Figure 1. Number of Villages

Source: Central Bureau of Statistics, 2024

Based on the graph above, with the largest number of villages in WIB, this region is a broader representation in describing the dynamics of rural poverty, as well as the influence of economic variables such as GRDP, inequality (Gini Ratio), and education on these conditions. The large number of villages also means more socio-economic diversity and development challenges, so that the research results can provide policy recommendations that are more applicable and have a wider impact.

As an agricultural country, two-thirds of Indonesia's population works in the agricultural sector. Based on the Central Bureau of Statistics and the Ministry of Agriculture's study in 2020 that the region which is the granary of the agricultural sector and contributes to the high value added of the agricultural sector, poverty in Western Indonesia is still concentrated in a large half of the population with their livelihoods as farmers who do not have sufficient educational values, and the lack of support from related institutions or government, which has an impact on the slow flow of the green revolution on farming in this region. Given this, it is a sure step if the development of the agricultural sector becomes a strategic action in alleviating poverty, especially in rural areas.

Agricultural GRDP reflects the total value added generated by the agricultural sector in a region. An increase in agricultural sector GRDP indicates economic growth in the sector, which can increase the income of rural communities and reduce poverty levels. However, this positive impact is highly dependent on the distribution of the results of such growth. If economic growth is uneven, then an increase in GRDP may not significantly reduce poverty.

In addition to GRDP, the Gini Ratio is an indicator that measures the level of inequality in income distribution within a region. The Gini Ratio value ranges from 0 (perfect equity) to 1 (perfect inequality). High income inequality (high Gini Ratio) can cause most of the income to be concentrated in a small group of people, while other groups remain in poor conditions (PUTRI, 2022).

On the other hand, education, which is reflected in the average years of schooling, has great potential to reduce poverty through improving the quality of human resources (Sachs, 2018). In theory, skilled and knowledgeable human capital has a greater chance of getting a

job with a higher income, thus reducing poverty and economic inequality (Handayani & Hanifa, 2024) .

Based on this background, this study aims to analyze the effect of agricultural GRDP, inequality described by the gini ratio and education on rural poverty in Western Indonesia.

2. Method

This study uses a panel data regression model that combines time series and cross section data to analyze the effect of Agricultural GDP, Gini ratio, and education on rural poverty rates in 17 Province in western Indonesia during the 2019-2023 period.

The regression model used is as follows:

$$KP_{it} = \beta_0 - \beta_1 GRP_{it} + \beta_2 GRP_{it} - \beta_3 RLS_{it} + \epsilon_{it}$$

Description:

KP : Rural Poverty (%)

PDRB : Gross Regional Domestic Product of Agriculture Sector (Milliar Rupiah) GRP
: Rural Gini Ratio (%)

RLS : Average Years of Schooling in Rural Areas (Years)

ϵ_{it} : Error term (nuisance variable).

i : Region index (province/district).

t : Time index (year).

3. Results and Discussion

3.1 Analysis Results of Normality Test and Classical Assumptions

Normality and Classical Assumption Testing is carried out in order to obtain data to be studied with unbiased and best results.

Table 2. Normality Test Results

Jarque-Bera	Prob
3.527418	0.171408

Based on the results of the classical assumption tests on the Fixed Effect Model (FEM), it was found that the data follows a normal distribution, as indicated by the Jarque-Bera probability value of 0.171408, which is above the significance threshold of 0.05.

Table 3. Multicollinearity Test Results

	PDRB	GRP	RLS
PDRB	1.000000	0.256190	0.062659
GRP	0.256190	1.000000	-0.124899
RLS	0.062659	-0.124899	1.000000

From the results of Table 3. The correlation matrix value between independent variables is smaller than 0.80, so it can be said that there is no multicollinearity in this study.

Table 4. Heteroscedasticity Test Results

R-squared	0.553300	Mean dependent var	0.417352
Adjusted R-squared	0.422726	S.D. dependent var	0.595732
S.E. of regression	0.452629	Akaike info criterion	1.454834
Sum squared resid	13.31672	Schwarz criterion	2.029576
Log likelihood	-41.83046	Hannan-Quinn criter.	1.686011
F-statistic	4.237452	Durbin-Watson stat	1.938224
Prob(F-statistic)	0.000006		

Based on Table 4. Showing the results of the heteroscedasticity test results in a calculated χ^2 value of 6.65836 which is smaller than χ^2 table of 7.814728, so it can be concluded that

there are no symptoms of heteroscedasticity in the model. Thus, the regression model used has met the classical assumptions and is suitable for use in further analysis.

3.2 Model Selection Test Results

To identify the most appropriate model for use, the researchers conducted a selection test for panel data regression estimation methods by applying the Chow test and the Hausman test.

Table 5. Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	78.663494	(16,65)	0.0000
Cross-section Chi-square	256.167502	16	0.0000

When viewed from Table 5. shows the Prob value. Cross-section Chi-Square value of $0.0000 < \alpha$ ($\alpha = 0.05$), then reject H_0 which means that the model used is the Fixed Effect Model (FEM).

Table 6. Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.597655	3	0.0141

Based on Table 6, the probability value for the Cross-section random effect is 0.0446, which is less than the significance level $\alpha = 0.05$. This indicates that the appropriate model is the Fixed Effect Model (FEM). Therefore, it can be concluded that the panel data regression estimation method applied in this study is the Fixed Effect Model (FEM), as shown in the table below.

Table 7. FEM Regression Analysis Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.920640	2.356279	3.785901	0.0003
PDRB	-0.072396	0.017423	-4.155190	0.0001
GRP	25.55148	4.361069	5.858996	0.0000
RLS	-0.170705	0.110027	-1.551485	0.1256
R-squared	0.958196	Mean dependent var		9.978941
Adjusted R-squared	0.947276	S.D. dependent var		15.10256
S.E. of regression	0.770034	Sum squared resid		44.61684
F-statistic	772.8497	Durbin-Watson stat		1.220631
Prob(F-statistic)	0.000000			

Based on the results in Table 8. obtained the following regression equation results:

$$KP = 8.920640 - 0.072396PDRB_{it} + 25.55148GRP_{it} - 0.170705RLS_{it} + \epsilon_{it}$$

The regression results show that if all independent variables remain unchanged, the percentage of the rural poor will be 8.92%. Every increase in agricultural GRDP reduces poverty by 0.07%, while every decrease in the gini ratio reduces poverty by 25.5%, and every one-year increase in education reduces poverty by 0.17%.

The t-test results show that the agricultural GDP variable has a negative effect, the Gini ratio has a positive and significant effect on the percentage of poor people in rural areas with a probability value below 0.05, while the education variable has a negative but insignificant effect because the probability value is above 0.05. Meanwhile, the F-statistic test shows that the F-table is 2.468 and the probability value is $0.00000 < 0.05$. So this shows that poverty in Papua is simultaneously influenced by agricultural sector GRDP, gini ratio and education.

3.3 The Effect of Agricultural GRDP on Rural Poverty

The analysis results indicate that the relationship between the variables is of a negative nature, meaning that if the GRDP variable in the agricultural sector increases, it will cause a decrease in rural poverty in Western Indonesia. The higher the added value generated by the agricultural sector, the greater the potential for increasing the income of rural communities, the majority of which depend on agriculture. This is due to the purchasing power of farmers in the provision of fertilizers increasing so that and pesticides farmer productivity increases which have an impact on increasing GRDP per capita.

The results of the study are in accordance with the hypothesis proposed, so the research hypothesis is accepted. These results are in line with research (Sudiana & Sudiana, 2015) and (Manalu et al., 2024) which say an increase in GRDP will reduce the poverty rate. This supports the theory that primary sector economic growth can reduce poverty directly.

3.4 Effect of Gini Ratio on Rural Poverty

From the results of the analysis obtained, the nature of the relationship between the variables produced is positive, meaning that if the Gini ratio variable increases or decreases, it will cause a decrease or increase in the same direction as rural poverty. This result is in line with the conventional view that generally assumes that high inequality makes the benefits of economic growth uneven. A small portion of society gains more, while the poor remain left behind. This supports the theory that income inequality can worsen poverty conditions, especially in rural areas.

This finding is reinforced by research (Rahmawati, 2020) which states that income inequality (gini ratio) has a positive and significant effect on poverty, especially in the long run. This shows the need to focus on efforts to reduce inequality.

3.5 The Effect of Education on Rural Poverty

The results show that the relationship between the variables is negative, indicating that any increase or decrease in the education variable—measured by the Average Years of Schooling—will lead to a corresponding decrease or increase in rural poverty in Western Indonesia, but in the opposite direction. This inverse relationship aligns with human capital theory, which emphasizes that an individual's education and experience play a key role in supporting a country's economic growth. Enhancing knowledge and skills through education serves not only as a form of consumption but also as an investment and a vital resource for development (Todaro & Smith, 2009).

In addition, in line with empirical studies conducted by (Deswita Sari et al., 2022) states that there is no effect of average years of schooling on poverty. This shows poverty as a multidimensional problem that cannot only be solved by education alone.

Although the results show that education has no influence and is insignificant with a negative correlation direction towards poverty, based on the literature above, it can be concluded that by increasing education as a form of investment in human resources, it can expand individual access to more decent work and higher income, so that in the long run it has the potential to reduce poverty levels, especially in rural areas.

4. Conclusions and Suggestions

Based on the analysis of the Agricultural GRDP, Gini Ratio, and Education on Rural Poverty in Western Indonesia, the following partial conclusions can be drawn:

- Agricultural GRDP has a negative and significant impact on rural poverty in Western Indonesia;
- Income inequality, as measured by the Gini Ratio, shows a positive and significant influence on rural poverty in the region
- Education, represented by the Average Years of Schooling, has a negative but statistically insignificant effect on rural poverty in Western Indonesia.

Furthermore, when considered together, Agricultural GRDP, the Gini Ratio, and Education collectively have a significant impact on rural poverty in the region.

Regulations on poverty alleviation should pay attention to the characteristics of poverty in each region. Particularly in the Indonesian region, where the problem of poverty boils down to the agricultural sector, building the potential for sustainable development of the agricultural sector as an economic barn will also reduce other socio-economic problems such as unemployment. Some important things that must be taken are the need for the government's role in increasing the role of the agricultural sector in a localized manner,

optimizing employment as well as income distribution, and paying attention to sectors that can directly affect the poor. In addition, providing stability and facilities for the production factors needed by farmers such as the allocation of fertilizer and seed subsidies on target, the assistance of agricultural machinery and tools in reducing the capital spent, as well as the revitalization of agriculture, fisheries, and forestry and community development so as to make this sector a leading sector because its blessings are able to have a positive effect on the economy.

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