



# Analysis Of The Impact Of Infrastructure Development On Poverty In The Island Of Sumatra

Nursalam M. A. <sup>1)</sup>; Hutapia <sup>2)</sup>; Purmini <sup>3)</sup>

<sup>1),2),3)</sup> Master of Applied Economics Faculty Of Economics and Business, University of Bengkulu, Indonesia

Email: <sup>1),2),3)</sup> [alinursalam8@gmail.com](mailto:alinursalam8@gmail.com)

## How to Cite :

Nursalam, M, A., Hutapia. Purmini. (2024). Analysis Of The Impact Of Infrastructure Development On Poverty In The Island Of Sumatra. EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis, 12(4). DOI: <https://doi.org/10.37676/ekombis.v12i4>

## ARTICLE HISTORY

Received [20 September 2024]

Revised [28 October 2024]

Accepted [31 October 2024]

## KEYWORDS

Poverty, Infrastructure, Population.

*This is an open access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license*



## ABSTRACT

This research aims to find out the influence of the development of road infrastructure, education infrastructure, health infrastructure, clean water and electricity on poverty rates on the island of Sumatra, both simultaneously and partially. This research uses quantitative methods in the form of multiple regression analysis with panel data. This type of research is explanatory research, namely testing the relationship between the dependent variable and the independent variable. In this research the data used is secondary data. The data used was obtained from the Badan Pusat Statistik and Kementerian PUPR which includes: data on the percentage of poor people, data on the percentage of roads in a stable condition, data on the ratio of the number of schools per number of students, data on the number of hospitals, data on the ratio of the amount of clean water distributed per number of residents, and data ratio of the amount of electricity distributed per population on the island of Sumatra for the 2014-2022 period. This research uses a random effect model approach analysis. The research results show that simultaneously and partially road infrastructure, education, health, clean water and electricity have an effect on poverty. This shows that, if there is an increase in each infrastructure variable, it can reduce the percentage of poor people on the island of Sumatra.

## INTRODUCTION

One of the primary objectives of national development is to improve economic performance in order to achieve public welfare, create employment opportunities, and enhance the standard of living for all citizens. A key goal of national development is poverty reduction. According to Law Number 24 of 2004, poverty is defined as a social and economic condition in

which individuals or groups are unable to fulfill their basic rights to live and develop a decent life. Poverty becomes a social problem because when poverty rates increase, they trigger various social issues such as criminal activity, poor environmental conditions, low levels of education, and inadequate health status. Consequently, poverty is often referred to as the root cause of social and economic problems.

Based on data from the Central Bureau of Statistics (BPS), the poverty rate in Indonesia in March 2023 was 9.36 percent, equivalent to 25.90 million people, representing a decrease of 0.21 percent compared to the previous year. As of 2023, Papua Province recorded the highest poverty rate at 26.03 percent, while Bali Province had the lowest poverty rate at 4.25 percent (BPS, 2023).

**Figure 1 The Ten Provinces with the Highest and Lowest Poverty Rates in Indonesia in 2023**

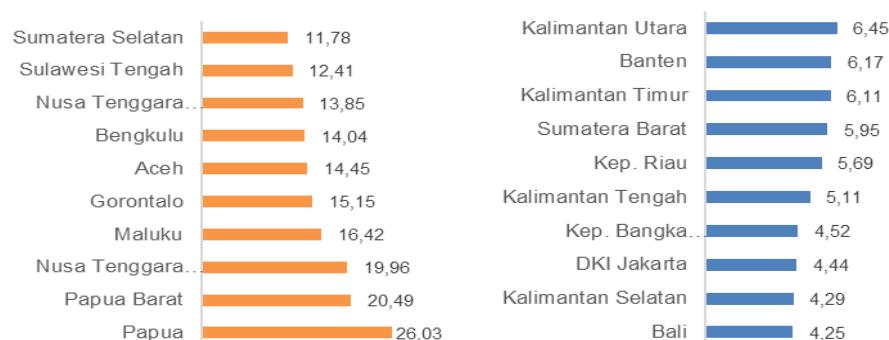


Figure 1 illustrates that as of 2023, Papua Province recorded the highest poverty rate at 26.03 percent, while Bali Province had the lowest rate at 4.25 percent. The most significant poverty disparity is observed on Sumatra Island, where three provinces are included among the ten provinces with the highest poverty rates, while three other provinces are also ranked among the ten provinces with the lowest poverty rates. This condition indicates that poverty on Sumatra Island requires greater attention compared to other regions. High poverty levels in Sumatra are frequently associated with inadequate infrastructure. Access to basic infrastructure, such as roads, electricity, clean water, and other essential services, has a substantial impact on people's livelihoods, particularly for low-income communities. Conversely, limited infrastructure development can hinder overall economic growth and development (Andrianus, 2023).

One of the policy approaches to combat poverty is to improve public services and provide basic facilities, including healthcare, education, sanitation, electricity, and road infrastructure for poor communities. The direction set by the President of the Republic of Indonesia, as stated in the National Medium-Term Development Plan (RPJMN) 2020–2024, emphasizes sustainable infrastructure development to connect production and distribution areas, facilitate tourism access, stimulate job creation, and enhance economic value added. One of the main development priorities in the RPJMN 2020–2024 is economic development and the strengthening of basic service infrastructure. Infrastructure development on Sumatra Island has shown significant progress in recent years (BPS, 2023). The construction of toll roads, ports, clean water supply systems, and power plants represents tangible achievements by the government.

In general, the relationship between infrastructure development and poverty alleviation is indirect. According to Situmorang (2011), the development of road, water, electricity, and irrigation infrastructure has a positive and significant impact on economic growth in North Sumatra Province. Economic growth can reduce unemployment and poverty levels. Consistent with the findings of Andrianus (2023), the presence of road infrastructure improves access to various facilities that can enhance economic conditions and directly contribute to poverty reduction. Furthermore, the availability of electricity infrastructure has a negative effect on poverty rates, indicating that increased access to electricity can reduce poverty. Electricity

enables access to technology, which plays a crucial role in expanding employment opportunities and increasing the income of low-income communities.

Astridasari (2018) explains that the development of water infrastructure can improve economic conditions and reduce poverty in many cities and villages across Indonesia. This is supported by Fadila (2018), who states that education is the most important factor in reducing poverty rates in Java and surrounding regions. In addition, Sukmawati (2016) demonstrates that hospital development has a positive impact on gross domestic product and poverty alleviation in Indonesia. Infrastructure development plays a vital role in promoting economic growth, reducing unemployment, combating poverty, and improving living standards. Well-developed road infrastructure facilitates community mobility, boosts economic activity, and contributes to poverty reduction. Education and health are independent factors in alleviating poverty, as higher levels of education and better health conditions lead to lower poverty rates. Electricity infrastructure, as a primary energy source, encourages the use of technology, thereby increasing labor productivity, reducing unemployment, and alleviating poverty. Clean water also plays a critical role in public health, particularly in supporting community well-being (Tinambunan et al., 2019). Therefore, infrastructure development is essential in efforts to reduce poverty.

This study aims to analyze the effects of road infrastructure development, education infrastructure, health infrastructure, clean water, and electricity on poverty rates in ten provinces on Sumatra Island from 2014 to 2022.

## LITERATURE REVIEW

Various previous studies indicate that infrastructure plays a strategic role in influencing poverty levels, both directly and indirectly, although the magnitude and significance vary across regions and types of infrastructure. In general, infrastructure development is viewed as an important instrument in promoting community welfare and poverty alleviation.

Monoarfa et al. (2022) examined the impact of service infrastructure expenditure on poverty in Kotamobagu City using APBD data and poverty data for the period 2008–2021. The results show that spending on drinking water and wastewater has a negative but insignificant effect on poverty, while road infrastructure expenditure shows mixed effects. Although not all variables are significant individually, at a significance level of  $\alpha = 0.10$ , expenditure on drinking water infrastructure, wastewater, and infrastructure simultaneously is proven to influence poverty levels. These findings indicate that the effectiveness of infrastructure in reducing poverty is highly dependent on the scale and management of budget allocation.

Furthermore, Hastuti and Syafitri (2016) examined the role of basic infrastructure in reducing rural poverty in the Southern Cross Road (JLS) area of East Java. The results show that improvements in road infrastructure as well as increased access to electricity and water have a significant impact on reducing rural poverty. However, health, education, and sanitation infrastructure have not shown significant effects. This indicates that infrastructure directly related to economic access has a stronger impact on poverty reduction.

The study by Humantito and Ide Juang (2009) reinforces these findings by showing that various infrastructure indicators, such as road networks, electricity, educational facilities, and health services, have a negative and significant effect on the percentage of the poor population. These findings confirm that increased availability of infrastructure in general is able to suppress poverty levels. The study by Mardiana and Utary (2017) conducted in Kalimantan Province shows that government expenditure in the health sector has a direct and significant impact on poverty, while education and infrastructure expenditures tend to have indirect and marginal effects. This indicates differences in the mechanisms of influence among types of public expenditure, where the benefits of the health sector are more quickly felt by poor communities.

Research by Sari et al. (2017) in Tangerang City found that public investment in infrastructure contributes 26.7% to variations in poverty levels. These findings emphasize the

importance of urban infrastructure investment as one of the main instruments for poverty alleviation.

Jamco (2015), in a study conducted in Southeast Maluku, shows that economic growth and infrastructure development have a negative effect on poverty levels, while unemployment has a positive and significant effect. These results indicate that infrastructure development not only directly affects poverty but also operates through increased economic activity and employment absorption. The study by Budiono and Purba (2022) emphasizes the role of education, access to clean water, and sanitation in reducing poverty disparities. Education and access to clean water are proven to significantly reduce poverty, indicating that basic infrastructure development policies need to be accompanied by equitable access and service quality.

The study by Putra and Rianto (2017) highlights the impact of access to clean water on household income and poverty. Simulation results show that households without access to clean water have significantly lower income levels and higher poverty risk. This indicates that clean water infrastructure plays an important role in improving household productivity and welfare.

Nurmala and Hutagaol (2022) compared the impact of infrastructure on poverty in Western and Eastern Indonesia. The results show that infrastructure is more effective in reducing poverty in Western Indonesia than in Eastern Indonesia. Variables such as road conditions, industrial electricity, health facilities, and sectoral GDP structure are important factors, although their impacts vary across regions. These findings indicate regional disparities in the effectiveness of infrastructure development.

The study by Fardilla and Masbar (2020) in Aceh shows that road and school infrastructure have a negative and significant effect on poverty, while electricity infrastructure and GRDP do not show significant effects. This indicates that not all types of infrastructure have the same impact on poverty. Finally, Amalia (2019) examined the role of infrastructure in economic growth in Indonesia and found that the electricity, water, education, and overall infrastructure sectors have a positive and significant effect on GDP per capita. These findings indicate that infrastructure development is an important foundation for promoting economic growth, which ultimately can contribute to poverty reduction.

## METHODS

This study employs a quantitative explanatory approach using panel data, which combine time series data from 2014–2022 and cross-sectional data from 10 provinces in Sumatra Island, Indonesia. The data were obtained from the central bureau of statistics (BPS Indonesia) and the ministry of public works and housing (PUPR).

The dependent variable in this study is poverty rate ( $y$ ). The independent variables consist of road infrastructure ( $x_1$ ), education infrastructure ( $x_2$ ), health infrastructure ( $x_3$ ), clean water ( $x_4$ ), electricity ( $x_5$ ). The data were collected using the documentation method, by compiling and processing secondary data obtained from official publications of BPS and the ministry of PUPR, as well as relevant supporting sources. This study uses panel data regression analysis to examine the impact of infrastructure development on poverty. The general regression model is specified as follows:  $Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \epsilon_{it}$

The test results indicate that the random effect model (REM) is the most appropriate model. Hypothesis testing is performed using t-test (partial test), f-test (simultaneous test), and coefficient of determination ( $r^2$ ).

## RESULTS

Based on the results of the Chow test, Hausman test, and Lagrange multiplier test, the random effect model (REM) is selected as the best model for this study. The estimated regression equation is:  $Y = (16.92473 + \alpha) - 0.03198X_1 - 0.22175X_2 - 0.02249X_3 - 0.04630X_4 - 1.38161X_5$

The estimation results show that all infrastructure variables have negative coefficients, indicating that improvements in infrastructure significantly reduce poverty levels. Partially road infrastructure (x1) has a negative and significant effect on poverty. Education infrastructure (x2) has a negative and significant effect on poverty. Health infrastructure (x3) has a negative and significant effect on poverty. Clean water (x4) has a negative and significant effect at the 10% significance level. Electricity (x5) has a negative and significant effect on poverty.

The f-test result shows a probability value of  $0.00000 < 0.05$ , indicating that all independent variables simultaneously have a significant effect on poverty. The value of  $r^2 = 0.4408$ , which means that 44.08% of the variation in poverty can be explained by the infrastructure variables, while the remaining 55.92% is explained by other factors outside the model. Based on the adjusted intercept values, provinces with the highest structural poverty potential are aceh (22.46601) and bengkulu (21.06339). The province with the lowest poverty potential is bangka belitung (10.64100).

## DISCUSSION

This study investigates the impact of road, education, health, clean water, and electricity infrastructure on poverty reduction in ten provinces on the island of Sumatra during the period 2014–2022. The results indicate that all infrastructure variables significantly reduce poverty, both simultaneously and partially, emphasizing the critical role of integrated basic infrastructure development in improving accessibility, strengthening human capital, and stimulating economic activities. These findings confirm that infrastructure development is a key instrument for regional poverty alleviation, particularly in areas with persistent development disparities.

## CONCLUSION

Based on the results of this study, it can be concluded that, both simultaneously and partially, road infrastructure, educational infrastructure, health infrastructure, clean water, and electricity have a significant effect on reducing poverty levels in Sumatra Island. Improvements in road quality, the availability of education and health infrastructure, and the equitable distribution of clean water and electricity support economic activities, enhance human resource quality, and ultimately contribute to poverty reduction. Therefore, basic infrastructure development should be prioritized in government policy, while future studies are encouraged to explore additional variables that may also influence poverty.

## LIMITATION

Some limitations of this study include the following; 1. The proxies used to represent each variable in this study are still limited, such as roads, which only use national and provincial roads; educational infrastructure, which only uses data from elementary and junior high schools; health infrastructure, which only uses data from hospitals; and clean water, which only uses data on water distribution. 2. There are still other variables and factors that could explain the dependent variable that are not yet known, as evidenced by the small R-Square value of 0.440847 or 44.0847%.

## REFERENCES

- Amalia, Dyah (2019). *Analysis of the Impact of Infrastructure on Economic Growth (A Study of 33 Provinces in Indonesia, 2008–2017)*. Scientific Journal, Faculty of Economics and Business, Universitas Brawijaya.
- Andrianus, F., & Alfatih, K. (2023). *The Effect of Infrastructure on Poverty Using Panel Data of 34 Provinces in Indonesia*. Journal of Business Economics Informatics, No. 1, p. 57.

- Astridasari, Sarah (2018). *The Impact of Infrastructure Development on Poverty Levels and Equity in Indonesia* [Undergraduate Thesis]. Bogor, Indonesia: IPB University.
- Budiono, Sidik, & Purba, Jhon Tampil (2022). *Reducing Poverty Strategies through Educational Participation, Clean Water, and Sanitation in Indonesia*. Journal of Economics and Business, Vol. 25, pp. 177–198.
- Case, K. E., & Fair, R. C. (2007). *Principles of Economics* (8th ed.). Translated by Y. Andri Zaimur. Jakarta: Erlangga.
- Chalid, P. (2006). *Development Theory and Issues*. Jakarta: Universitas Terbuka Press.
- Chatterjee, S., & Turnovsky, S. (2012). *Infrastructure and Inequality*. European Economic Review.
- Diputra, T. F., Sadik, K., & Angraini, Y. (2012). *Spatial Panel Data Modeling with Spatial and Temporal Dimensions*. Journal of Statistics and Computation, Vol. 17, No. 1, pp. 6–14.
- Fadila, A. R. (2018). *Comparing the Impact of Education on Poverty in Java and Non-Java Regions and Its Policy Implications* [Undergraduate Thesis]. Bogor, Indonesia: IPB University.
- Fardilla, S., & Masbar, R. (2020). *Analysis of the Effects of Road Infrastructure, Electricity, Schools, and GRDP on Poverty in Aceh*. Student Scientific Journal, No. 3, August 2020, pp. 175–183.
- Gujarati, D. N., & Porter, D. C. (2012). *Basic Econometrics*. Jakarta: Salemba Empat.
- Hastuti, T. H., et al. (2016). *Analysis of Poverty and Infrastructure Availability in Rural Areas along the Southern Cross Road of East Java*. Scientific Journal, Faculty of Economics and Business, Universitas Brawijaya, Malang.
- Humantito, Ide Juang (2009). *Analysis of the Relationship between Infrastructure Availability and Poverty in Indonesia (Panel Data Regression Model of 26 Provinces, 2001–2007)* [Master's Thesis]. Jakarta: Universitas Indonesia.
- Jamco, Muhammad T. (2015). *The Effect of Economic Growth, Infrastructure, and Unemployment on Poverty Levels in Southeast Maluku Regency*. Biology & Science Journal, Vol. 4, No. 1, January–June 2015.
- Kuncoro, Mudrajad (1997). *Development Economics: Theory, Problems, and Policies* (3rd ed.). Yogyakarta: UPP AMP YKPN.
- Kuncoro, Mudrajad (2006). *Development Economics: Theory, Problems, and Policies*. Yogyakarta: UPP STIM YKPN.
- Nurkse, R. (1953), cited in Kuncoro (1997). *Development Economics: Theory, Problems, and Policies* (3rd ed.). Yogyakarta: UPP AMP YKPN.
- Mardiana, et al. (2017). *Analysis of the Impact of Local Government Expenditure on Education, Health, and Infrastructure Sectors on Unemployment and Poverty Levels*. Journal of FEB Unmul, Vol. 13(1), pp. 50–60.
- Münkner, Hans H., & Walter, Thomas (2001). *The Informal Sector as a Source of Income for the Poor*, in *Attacking the Roots of Poverty* (Izzedin Bakhit et al.). Jakarta: Yakoma-PGI.
- Monoarfa, Windy H., et al. (2022). *Analysis of the Impact of Basic Service Infrastructure on Poverty in Kotamobagu City*. Journal of Regional Economic and Financial Development, Vol. 23, No. 3.
- Nachrowi, N. Djalal, & Usman, Hardius (2006). *Popular and Practical Approaches to Econometrics for Economic and Financial Analysis*. Jakarta: LPFE Universitas Indonesia.
- Nurmala, Nilda, & Manuntun, P. H. (2022). *Comparing the Impact of Infrastructure on Poverty in Western and Eastern Indonesia and Its Policy Implications*. Journal of Agricultural and Environmental Policy Studies, Vol. 9, No. 3, December 2022, pp. 188–207.
- Pattinama, M. J. (2009). *Poverty Alleviation through Local Wisdom (Case Studies in Buru Island–Maluku and Surade–West Java)*. Makara Journal of Social Humanities, 13(1), pp. 1–12.
- Widarjono, Agus (2007). *Econometrics: Theory and Applications for Economics and Business* (2nd ed.). Yogyakarta: Ekonisia, Faculty of Economics, Universitas Islam Indonesia.