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Revisiting the Growth-Human Development-Poverty Nexus in Banda Aceh: Evidence from 2000 to 2024

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Abstract

This study revisits the relationship among regional economic welfare, human development, and poverty in Banda Aceh City, Indonesia, over the period 2000-2024. Poverty is specified as the dependent variable, while Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI) are specified as the independent variables. The study is situated within the growth-poverty, human development, and inclusive growth literature and is motivated by the substantial structural transformation experienced by Banda Aceh following the 2004 tsunami, post-disaster reconstruction, service-sector expansion, and post-pandemic recovery. Using annual secondary data obtained from official statistical publications and multiple linear regression analysis, the findings indicate that GRDP per capita has a positive and statistically significant association with poverty, whereas HDI has a negative and statistically significant association with poverty. The positive GRDP-poverty relationship suggests that rising average regional income has not automatically translated into pro-poor outcomes, possibly because the benefits of economic growth have been unevenly distributed or concentrated in sectors with limited absorption of low-income labor. Conversely, the negative HDI-poverty relationship underscores the importance of human capital, health, education, and welfare-enhancing capabilities in reducing poverty. This study contributes city-level evidence from Aceh and highlights the need to shift the policy emphasis from aggregate output expansion toward inclusive, labor-absorbing, and human development-oriented growth.

Introduction

Poverty remains one of the most persistent development challenges because it reflects not only low income but also limited access to education, health care, productive employment, social protection, and economic opportunities [1]. In regional development analysis, poverty reduction is often expected to accompany economic growth through higher incomes, increased employment, and improved fiscal capacity [2]. However, the empirical relationship between economic growth and poverty is neither automatic nor uniform [3]. Cross-country evidence indicates that economic growth can improve the incomes of poor households, but its poverty-reducing effect depends on income distribution, sectoral composition, labor absorption, and the initial level of inequality [4].

Poverty is commonly defined as the inability of individuals or households to attain a minimum standard of living. In official statistics, it is typically measured by the proportion of the population living below the poverty line. However, the contemporary development literature recognizes poverty as a multidimensional phenomenon in which low income is closely associated with inadequate education, poor health, limited asset ownership, vulnerable employment, and restricted access to public services [5,6]. Evidence from Indonesia further demonstrates that poverty is dynamic, with households moving into and out of poverty over time, while chronic

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poverty is closely linked to structural disadvantages, including limited education, insecure employment, insufficient assets, and high dependency burdens [7,8]. This study is grounded in the contemporary frameworks of inclusive growth and multidimensional well-being. Inclusive Growth Theory posits that economic expansion must be broadly shared across socioeconomic groups to effectively reduce poverty [9]. Similarly, Multidimensional Poverty Theory argues that poverty extends beyond income deprivation to include deficiencies in education, health, and living standards [10].

Gross Regional Domestic Product (GRDP) per capita is widely used as a proxy for regional economic welfare because it reflects the average value of goods and services produced per resident within a region. In theory, higher GRDP per capita should contribute to poverty reduction by increasing employment opportunities, household incomes, and government fiscal capacity. This expectation is consistent with the pro-growth perspective, which argues that growth in average income generally benefits poor households [1–4].

However, the effect of economic growth on poverty depends largely on whether that growth is inclusive. Dollar et al. [2] show that the composition of growth is critical, as sectors with greater reliance on unskilled labor tend to generate stronger poverty-reducing effects. By contrast, growth driven primarily by capital-intensive industries, high-skill services, or sectors with limited linkages to poor households may increase average income without substantially reducing poverty [11–13]. This argument is particularly relevant to Banda Aceh, where increases in GRDP per capita may primarily reflect the expansion of government services, trade, finance, construction, or other formal-sector activities that do not necessarily generate broad-based benefits for low-income households.

Previous studies have examined the relationships among economic growth, the Human Development Index (HDI), and poverty in Indonesia and Aceh [14–18]. However, most have focused on provincial or multi-district panel data, while city-level evidence for Banda Aceh over a longer study period remains limited. Moreover, existing local studies generally emphasize direct relationships without explicitly framing their findings within the broader literature on inclusive growth and human development. This study addresses these gaps by revisiting the growth-human development-poverty nexus in Banda Aceh over the period 2000-2024.

Drawing on the theoretical and empirical literature, this study conceptualizes poverty as the dependent variable, with Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI) as the explanatory variables. GRDP per capita represents regional economic capacity, whereas HDI captures the quality of human development. Modern developments in Human Capital Theory emphasize that investments in education and health enhance productivity and promote sustainable, inclusive improvements in welfare, suggesting that economic growth alone is insufficient to reduce poverty without corresponding improvements in human capabilities and a more equitable distribution of its benefits [19,20]. Similarly, the human development perspective argues that expanding individuals' capabilities through better education, health, and living standards strengthens productivity, employability, and resilience, thereby improving their capacity to participate in economic activities and escape poverty [21–23].

Accordingly, the conceptual framework considers GRDP per capita and HDI as two complementary development channels through which poverty may evolve over time. Higher GRDP per capita is expected to reduce poverty by expanding employment opportunities, increasing household incomes, strengthening local fiscal capacity, and generating productive linkages for low-income households. However, this relationship is conditional because growth concentrated in capital-intensive or high-skill sectors may not generate broad-based benefits for poorer households. By contrast, HDI is expected to reduce poverty by improving education, health, labor productivity, household resilience, and access to formal economic opportunities.

Together, these two development dimensions are expected to explain long-run changes in poverty within the structural context of Banda Aceh, which experienced post-tsunami reconstruction, urban transformation, service-sector expansion, and post-pandemic adjustment during the study period.

Banda Aceh City provides a particularly relevant setting for examining the growth-human development-poverty nexus. As the capital of Aceh Province, the city serves as the region's administrative, educational, commercial, and service hub. It has also undergone substantial socioeconomic transformation since the 2004 tsunami, including reconstruction-led investment, urban redevelopment, institutional recovery, service-sector expansion, and, more recently, post-pandemic adjustment [24,25]. These developments make Banda Aceh an appropriate urban case for assessing whether sustained economic growth and improvements in human development have translated into long-run poverty reduction.

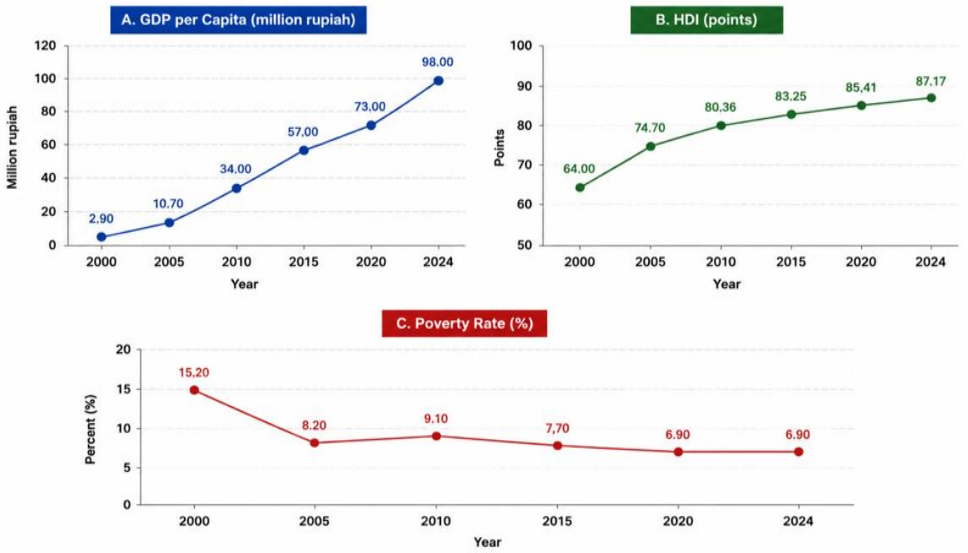

Figure 1. Trends in GDP per Capita, HDI, and Poverty in Banda Aceh City, 2020-2024.

Source: Statistics of Banda Aceh City (BPS Kota Banda Aceh) [26].

Figure 1 presents the trends in Gross Regional Domestic Product (GRDP) per capita, the Human Development Index (HDI), and the poverty rate in Banda Aceh City over the period 2000-2024. GRDP per capita increased markedly from Rp2.90 million in 2000 to Rp98.00 million in 2024, indicating substantial growth in regional economic output. During the same period, HDI rose steadily from 64.00 to 87.17, reflecting continuous improvements in education, health, and living standards. By contrast, the poverty rate declined from 15.20 percent to 6.90 percent, although the downward trend was interrupted by temporary increases in 2008 and 2021. Overall, the figure suggests that while economic output and human development improved substantially, poverty declined more gradually and with greater fluctuation, indicating that increases in GRDP per capita and HDI do not necessarily translate into a proportional reduction in poverty.

The central question addressed in this study is therefore not simply whether GRDP per capita and HDI influence poverty, but why sustained regional economic expansion may coexist with persistent urban poverty. If economic growth is concentrated in formal, capital-intensive, or high-skill sectors, its benefits may not reach low-income households proportionately. By contrast, improvements in human development may contribute more directly to poverty reduction by enhancing health, education, productivity, and access to employment opportunities. This perspective distinguishes aggregate economic growth from inclusive poverty reduction and situates Banda Aceh within the broader literature on pro-poor growth and human development.

Accordingly, this study examines the relationship among Gross Regional Domestic Product (GRDP) per capita, the Human Development Index (HDI), and poverty in Banda Aceh City over the period 2000-2024. Specifically, it analyzes the individual and joint effects of GRDP per capita and HDI on poverty using annual time-series data. This study contributes to the literature in three ways. First, it provides city-level evidence on the relationship between GRDP per capita and poverty in Banda Aceh over an extended study period, a context that has received limited attention in previous empirical research. Second, it evaluates the role of human development, as measured by HDI, in explaining poverty dynamics, thereby extending the discussion beyond income-based measures of development. Third, by jointly examining GRDP per capita and HDI within a multivariate framework, the study offers a more comprehensive assessment of how economic growth and human development interact to explain changes in urban poverty over an extended period characterized by post-disaster reconstruction, structural transformation, and post-pandemic recovery.

Materials and Methods

Research Design, Data, and Variables

This study employs a quantitative explanatory approach to examine the effects of Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI) on poverty in Banda Aceh City, Aceh Province, Indonesia. The analysis uses annual time-series data covering the period 2000-2024. Secondary data were obtained from official publications of Statistics of Banda Aceh City (BPS Kota Banda Aceh) [26]. The analysis includes three variables: the poverty rate, GRDP per capita at current market prices, and HDI.

The poverty rate, measured as the percentage of the population living below the official poverty line, serves as the dependent variable. GRDP per capita at current market prices, measured in million rupiah, represents average regional economic output per resident and serves as a proxy for regional economic welfare. HDI, measured in index points, captures achievements in health, education, and living standards and serves as an indicator of human development.

Conceptual Framework

Figure 2 and Table 1 present the conceptual framework of the study. Poverty is specified as the dependent variable, while Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI) are the explanatory variables. GRDP per capita represents regional economic capacity and reflects the economic-output channel through which growth may influence poverty. Because the poverty-reducing effect of growth depends on its inclusiveness, the expected relationship between GRDP per capita and poverty is treated as empirically ambiguous. In contrast, HDI represents the human-development channel and is expected to reduce poverty by improving education, health, productivity, and living standards. Together, these variables provide the analytical framework for examining the individual and joint determinants of poverty in Banda Aceh City.

Accordingly, the hypotheses of this study are as follows:

H_1: GRDP per capita has a significant effect on the poverty rate in Banda Aceh City.
H_2: HDI has a significant negative effect on the poverty rate in Banda Aceh City.
H_3: GRDP per capita and HDI jointly have a significant effect on the poverty rate in Banda Aceh City.

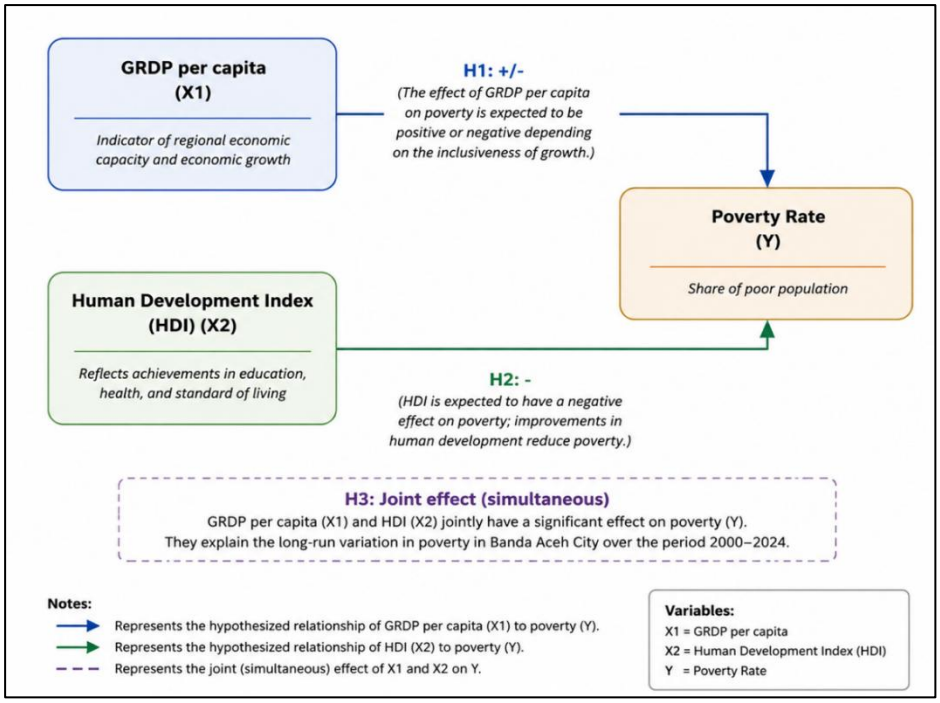

Figure 2. Conceptual framework of the study.

Table 1. Theoretical basis of the conceptual framework.

Construct	Operational Proxy	Transmission Mechanism	Expected Implication for Poverty
Regional Economic Capacity	GRDP per capita at current prices	Income growth, employment creation, fiscal capacity, sectoral linkages.	Potentially poverty-reducing if growth is inclusive; ambiguous if growth is uneven.
Human Development	Human Development Index	Education, health, productivity, employability, purchasing power.	Expected to reduce poverty through stronger capabilities and welfare resilience.
Urban Development Context	Banda Aceh, 2000-2024	Post-tsunami reconstruction, service-sector expansion, post-pandemic adjustment.	Shapes whether growth and human development translate into poverty reduction.
Poverty Outcome	Poverty rate	Observed percentage of poor population.	Dependent variable explained by economic and human-development channels.

Model Specification

The empirical model is estimated using multiple linear regression, which is widely employed to examine the relationship between a dependent variable and two or more explanatory variables while controlling for their simultaneous effects. This method enables the estimation of the individual contribution of each explanatory variable to changes in the dependent variable, holding the other variables constant [27]. Multiple linear regression is appropriate for this study because it assesses the extent to which Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI) explain variations in the poverty rate. The empirical model is specified as follows:

$$PR_t = \beta_0 + \beta_1 GRDP_t + \beta_2 HDI_t + \varepsilon_t \quad (1)$$

Where PR_t denotes the poverty rate in year t; $GRDP_t$ represents Gross Regional Domestic Product (GRDP) per capita at current market prices in year t; HDI_t denotes the Human Development Index in year t; β_0 is the intercept (constant term); β_1 and β_2 are the estimated regression coefficients associated with GRDP per capita and HDI, respectively; and ε_t is the random error term, which captures the effects of other factors influencing poverty that are not explicitly included in the model.

Results and Discussion

Classical Assumption Tests

Normality Test

The normality test was conducted using the Jarque-Bera (JB) statistic to examine whether the residuals are normally distributed. The results presented in Figure 3 show a Jarque-Bera statistic of 1.0676 with a probability value of 0.5864. Since the probability value (0.5864 > 0.05) exceeds the 5 percent significance level, it can be concluded that the residuals are normally distributed. Therefore, the normality assumption is satisfied, indicating that the t-statistics and F-statistics can be used for statistical inference.

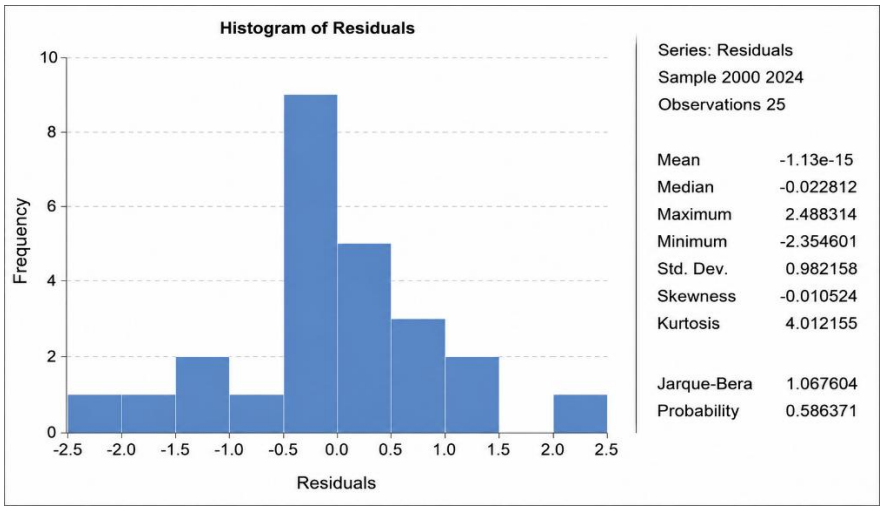

Figure 3. Normality test.

Multicollinearity Test

The multicollinearity test was performed using the Variance Inflation Factor (VIF) to examine the degree of correlation among the independent variables, namely Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI). The results presented in Table 2 indicate that both variables have identical VIF values of 7.07. Since these values are below the commonly accepted threshold of 10, it can be concluded that the model does not suffer from severe multicollinearity. This indicates that GRDP per capita and HDI provide distinct explanatory information regarding poverty in Banda Aceh City.

Table 2. Multicollinearity test.

Variable	Coef. Variance	Uncentered VIF	Centered VIF
GRDP	0.0003	20.394	7.0686
HDI	0.0088	1342.8	7.0686
C	46.423	1102.9	n.a.

Note: "n.a." denotes not applicable.

Heteroskedasticity Test

The heteroskedasticity test was conducted using the Breusch-Pagan-Godfrey test. The Breusch-Pagan test results presented in Table 3 show a probability value of 0.0447, which is below the 5 percent significance level, indicating the presence of heteroskedasticity. However, the White test yields a probability value of 0.1072, which exceeds 0.05, suggesting that heteroskedasticity is not confirmed under the more general White specification. Overall, these results indicate the presence of mild heteroskedasticity in the model.

Table 3. Heteroskedasticity test.

Breusch-Pagan-Godfrey Heteroskedasticity Test			
F-Stat.	2.1547	Prob. F	0.1027
Obs × R-squared	9.0461	Prob. Chi-Square	0.1072
Scaled Explained SS	10.551	Prob. Chi-Square	0.0611

Autocorrelation Test

Autocorrelation occurs when the error terms are correlated across time periods, potentially reducing the efficiency of the ordinary least squares (OLS) estimators, although the coefficient estimates remain unbiased. The results of the Breusch-Godfrey Serial Correlation LM Test, presented in Table 4, show a Prob. Chi-Square value of 0.1251, which is greater than the 5 percent significance level (0.1251 > 0.05). Therefore, the null hypothesis of no serial correlation cannot be rejected, indicating that the model does not exhibit autocorrelation.

Table 4. Autocorrelation test.

Breusch-Godfrey Serial Correlation LM Test			
F-Stat.	1.9943	Prob. F	0.1623
Obs × R-squared	4.1568	Prob. Chi-Square	0.1251

Estimation Results

Table 5 presents the results of the multiple linear regression estimating the effects of Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI) on the poverty rate in Banda Aceh City over the period 2000-2024. The estimated model is statistically significant, as indicated by an F-statistic of 31.855 with a probability value of 0.0000, suggesting that the explanatory variables jointly explain variations in the poverty rate.

The estimated coefficient of GRDP per capita is 0.0516 and is statistically significant at the 5 percent level (t = 2.3227; p = 0.0298). This result indicates that, holding HDI constant, an increase in GRDP per capita is associated with an increase in the poverty rate. By contrast, HDI has an estimated coefficient of -0.5213 and is statistically significant at the 1 percent level (t = -4.6497; p = 0.0001). This finding indicates that, ceteris paribus, improvements in human development are associated with lower poverty rates.

The coefficient of determination (R^2) is 0.7433, indicating that approximately 74.33 percent of the variation in the poverty rate is explained by GRDP per capita and HDI. The adjusted R^2 of 0.7199 suggests that the model retains substantial explanatory power after accounting for the number of explanatory variables. The remaining 25.67 percent of the variation in poverty is attributable to factors not included in the model.

Table 5. Results of multiple linear regression.

Variable	Coef.	Std. Er.	t-Stat.	Prob.
GRDP	0.0516**	0.0222	2.3227	0.0298
HDI	-0.5212***	0.1121	-4.6497	0.0001
C	47.842***	8.0045	5.9769	0.0000
R-squared	0.7433			
Adj. R-squared	0.7199			
F-Stat.	31.855***			
F-Stat. Prob.	0.0000			

Note: *** and ** indicate significant levels at 1% and 5%, respect.

Discussion

GRDP per Capita and Poverty

The positive and statistically significant effect of GRDP per capita on poverty suggests that economic expansion in Banda Aceh has not necessarily occurred through an inclusive growth mechanism. Under the conventional pro-growth framework, rising average income is expected to reduce poverty by increasing household income and expanding employment opportunities [1,2]. However, the findings of this study are more consistent with the argument of Loayza & Raddatz [4], who contended that the poverty-reducing effect of economic growth depends on its composition and distribution.

Several explanations may account for this finding in Banda Aceh. First, increases in GRDP per capita may reflect the expansion of sectors that are not sufficiently labor-intensive to generate employment opportunities for low-income households. Second, the benefits of economic growth may accrue primarily to formal-sector workers, business owners, and higher-skilled groups. Third, urban poverty may persist despite regional economic expansion because high housing costs, vulnerable informal employment, and skill mismatches limit the ability of poor households to benefit from growth. This interpretation is consistent with the findings of Lee & Sissons [28], who showed that urban economic growth may fail to reduce poverty when income gains are concentrated among higher-income groups.

HDI and Poverty

The negative and statistically significant effect of HDI on poverty supports the human development perspective. Improvements in education, health, and living standards contribute to poverty reduction by enhancing productivity, employability, and household resilience. This finding is consistent with the theoretical argument that human development is both an outcome of economic development and a key input into future economic performance [21–23].

In Banda Aceh, the continuous improvement in HDI throughout the study period reflects sustained progress in human capital development. Better access to education and health services can improve labor market outcomes and reduce households' vulnerability to poverty. These findings, consistent with recent evidence from Agussalim et al. [29] and Miharsih [30], suggest that poverty reduction policies should not rely solely on economic growth but should also prioritize improvements in the quality and accessibility of education, health care, and other essential public services.

Joint Effects and Policy Implications

The F-test indicates that GRDP per capita and HDI jointly explain variations in poverty in Banda Aceh City. This finding suggests that poverty is influenced by both regional economic capacity and the quality of human development. The relatively high coefficient of determination (R^2) further indicates that the two explanatory variables account for a substantial proportion of the variation in poverty, although other factors, including unemployment, inflation, income

inequality, minimum wages, social protection, population growth, and sectoral employment structure, may also influence poverty and should be incorporated into future research.

From a policy perspective, the findings imply that Banda Aceh requires a more inclusive and human development-oriented growth strategy. Although increasing GRDP per capita remains important, it should be accompanied by policies that expand productive employment, strengthen micro, small, and medium-sized enterprises (MSMEs), enhance labor market skills, and ensure that the benefits of economic growth are more broadly shared. At the same time, policies aimed at improving HDI should remain a central component of poverty reduction strategies, given the consistently negative association between human development and poverty observed in this study.

Conclusions

This study revisits the relationship among Gross Regional Domestic Product (GRDP) per capita, the Human Development Index (HDI), and poverty in Banda Aceh City using annual data from 2000 to 2024. The results show that GRDP per capita has a positive and statistically significant effect on poverty, whereas HDI has a negative and statistically significant effect. Furthermore, the two variables jointly explain variations in poverty in Banda Aceh City, with an R-squared value of 0.7433. The positive relationship between GRDP per capita and poverty suggests that economic growth must be more inclusive, labor-absorbing, and better connected to low-income households. In contrast, the negative relationship between HDI and poverty underscores the important role of human development in reducing poverty.

The findings suggest several policy implications. First, local governments should promote more inclusive economic growth by strengthening labor-intensive industries and supporting the development of micro, small, and medium-sized enterprises (MSMEs) to expand productive employment opportunities for low-income households. Second, investment in education, healthcare, and vocational training should be prioritized to improve human capital, enhance labor productivity, and increase access to formal employment. Third, urban development policies should be integrated with poverty reduction strategies by ensuring that infrastructure development, business investment, and local economic programs generate broad-based benefits for vulnerable communities. Finally, social protection programs should be complemented with skills development, entrepreneurship support, and job placement initiatives to improve household resilience and facilitate sustainable pathways out of poverty.

This study has several limitations that should be acknowledged. First, the analysis focuses exclusively on Banda Aceh City. Therefore, the findings may not be generalizable to other cities or regions with different socioeconomic characteristics. Second, the empirical analysis employs multiple linear regression, which identifies statistical associations but does not explicitly account for the dynamic properties of time-series data or establish causal relationships. Future studies could apply more advanced time-series techniques, such as cointegration analysis, autoregressive distributed lag (ARDL) models, or error correction models (ECMs), to provide more robust evidence. Third, the model includes only Gross Regional Domestic Product (GRDP) per capita and the Human Development Index (HDI) as explanatory variables. Future research should incorporate additional determinants, such as unemployment, income inequality, inflation, minimum wages, social assistance, fiscal expenditure, and sectoral employment structure, to provide a more comprehensive explanation of poverty dynamics.

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Data Availability Statement: The data used in this study are publicly available and can be downloaded from the official website of Statistics of Banda Aceh.

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Conflicts of Interest: All the authors declare that there are no conflicts of interest.

References

[1] Dollar D, Kraay A. Growth is Good for the Poor. *Journal of Economic Growth* 2002;7:195–225. https://doi.org/10.1023/A:1020139631000.

[2] Dollar D, Kleineberg T, Kraay A. Growth still is good for the poor. *European Economic Review* 2016;81:68–85. https://doi.org/10.1016/j.euroecorev.2015.05.008.

[3] Ravallion M. Why Don't We See Poverty Convergence? *American Economic Review* 2012;102:504–23. https://doi.org/10.1257/aer.102.1.504.

[4] Loayza N V., Raddatz C. The composition of growth matters for poverty alleviation. *Journal of Development Economics* 2010;93:137–51. https://doi.org/10.1016/j.jdeveco.2009.03.008.

[5] Hardi I, Kurniawan R, Ray S, Idroes GM, Noviandy TR, Majid MSA. Reducing the poverty gap and severity in Indonesia: The role of renewable energy access and consumption. *Human Settlements and Sustainability* 2025. https://doi.org/10.1016/j.hssust.2025.06.001.

[6] Smas MH, Mokay MM, Nurhayati E, Margana. Overcoming extreme poverty through the utilisation of Village Funds: A case study in Indonesia. *Societal Impacts* 2025;6:100128. https://doi.org/10.1016/j.socimp.2025.100128.

[7] Purwono R, Wardana WW, Haryanto T, Khoerul Mubin M. Poverty dynamics in Indonesia: empirical evidence from three main approaches. *World Development Perspectives* 2021;23:100346. https://doi.org/10.1016/j.wdp.2021.100346.

[8] Sugiharti L, Purwono R, Padilla MAE, Jayanti AD. Poverty dynamics in Indonesia: The prevalence and causes of chronic poverty. *Journal of Population and Social Studies* 2022;30:423–47.

[9] Kakwani N, Pernia EM. What is Pro-poor Growth? *Asian Development Review* 2000;18:1–16. https://doi.org/10.1142/S0116110500000014.

[10] Alkire S, Foster J. Counting and multidimensional poverty measurement. *Journal of Public Economics* 2011;95:476–87. https://doi.org/10.1016/j.jpubeco.2010.11.006.

[11] Sikdar A, Bani NY binti M, Salimullah AHM, Majumder SC, Idroes GM, Hardi I. Energy Poverty and Environmental Quality Nexus: Empirical Evidence from Selected South Asian Countries. *Ekonomikalia Journal of Economics* 2024;2:119–35. https://doi.org/10.60084/eje.v2i2.221.

[12] Quang Dao M. Human Capital, Poverty, and Income Distribution in Developing Countries. *Journal of Economic Studies* 2008;35:294–303. https://doi.org/10.1108/01443580810895590.

[13] Mulyadi A, Majid MSA, Suriani S. The Role of Employment Opportunities in Mediating the Impact of Human Capital and Wages on Provincial Poverty in Indonesia. *International Journal of Business, Economics & Financial Studies* 2024;2:42–54. https://doi.org/10.62157/ijbefs.v2i2.33.

[14] Naufal A, Fikriah F. Regional Nexus of Economic Growth, Income Inequality and Poverty. *Ekonomikalia Journal of Economics* 2023;1:61–8. https://doi.org/10.60084/eje.v1i2.114.

[15] Masrizal M, Zulham T, Aliasuddin A, Dawood TC. Testing the Impact of Education and Economic Growth on Poverty in Aceh Province: Evidence from Panel Data. Proceeding Int. Conf. Multidiscip. Res., vol. 6, 2024, p. 65–9.

[16] Yurina Y, Misla M. The Effect of Economic Growth, Human Development Index and Labor Force Participation Rate on Poverty in Aceh Province. *Journal of Malikussaleh Public Economics* 2023;6:11–9.

[17] Triani D, Sitorus A. The Influence of Human Development Index, Gini Ratio, Life Expectancy, and Economic Growth on Poverty in Aceh Province 2018-2022. Proc. Bengkulu Int. Conf. Econ. Manag. Business, Account., vol. 1, 2023, p. 64–71.

[18] Suriani S, Sartiyah S, Srinita S, Mustafa M, Usman M Bin, Saputra J. Does Social Assistance Reduce Poverty for Sustainable Development? The Mediating Roles of Income Inequality and Human Development. *International Journal of Sustainable Development and Planning* 2025;20:5091–101. https://doi.org/10.18280/ijsdp.201206.

[19] Barro RJ. Education and economic growth. *Annals of Economics and Finance* 2013;14:301–28.

[20] Hanushek EA, Woessmann L. The knowledge capital of nations: Education and the economics of growth. MIT press; 2023.

[21] Ranis G, Stewart F, Ramirez A. Economic Growth and Human Development. *World Development* 2000;28:197–219. https://doi.org/10.1016/S0305-750X(99)00131-X.

[22] Anand S, Sen A. Human Development and Economic Sustainability. *World Development* 2000;28:2029–49. https://doi.org/10.1016/S0305-750X(00)00071-1.

[23] Suri T, Boozer MA, Ranis G, Stewart F. Paths to Success: The Relationship Between Human Development and Economic Growth. *World Development* 2011;39:506–22. https://doi.org/10.1016/j.worlddev.2010.08.020.

[24] Irwansyah M, Nursaniah C, Qadri L, Mariana M. City of prone natural disasters: Mitigating post-tsunami on the coastal of Banda Aceh, Indonesia. *Environmental Challenges* 2024;15:100925. https://doi.org/10.1016/j.envc.2024.100925.

[25] Amri I, Giyarsih SR. Monitoring urban physical growth in tsunami-affected areas: a case study of Banda Aceh City, Indonesia. *GeoJournal* 2022;87:1929–44. https://doi.org/10.1007/s10708-020-10362-6.

[26] Statistics of Banda Aceh City. Kota Banda Aceh Dalam Angka 2025 2025. https://bandaacehkota.bps.go.id/id/publication/2025/02/28/6c7ba7eab9ff0b125dc805f6/kota-banda-aceh-dalam-angka-2025.html.

[27] Gujarati DN. Essentials of Econometrics. Sage Publications; 2021.

[28] Lee N, Sissons P. Inclusive growth? The relationship between economic growth and poverty in British cities. *Environment and Planning A: Economy and Space* 2016;48:2317–39. https://doi.org/10.1177/0308518X16656000.

[29] Agussalim A, Nursini N, Suhab S, Kurniawan R, Samir S, Tawakkal T. The Path to Poverty Reduction: How Do Economic Growth and Fiscal Policy Influence Poverty Through Inequality in Indonesia? *Economies* 2024;12:316. https://doi.org/10.3390/economies12120316.

[30] Miharsih A. Does Human Development Translate into Inclusive Welfare? Evidence from Regional Economic Dynamics in Indonesia. *Journal of Regional Economics Indonesia* 2026;7:105–22.