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The Influence of Sustainable Development Goals (Economic, Social, and Environmental Pillars) on Poverty Reduction in Jeneponto Regency, Indonesia

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Abstract: This study examines the influence of the economic, social, and environmental pillars of the Sustainable Development Goals (SDGs) on poverty levels in Jeneponto Regency, Indonesia, where poverty remains a persistent development challenge despite ongoing policy interventions and gradual progress across several development indicators. This condition reflects structural constraints, unequal distribution of development benefits, and limited effectiveness of SDG-based programs in translating growth into welfare improvement. Therefore, the study aims to analyze whether growth in Gross Regional Domestic Product (GRDP), Human Development Index (HDI), and Environmental Quality Index (EQI) significantly contributes to poverty reduction. Using secondary data from 2013 to 2021 and multiple linear regression analysis through SPSS 20, the results reveal that GRDP, HDI, and EQI each have no significant effect on poverty levels ($p > 0.05$). Simultaneously, the three variables explain only 54.50% of the variation in poverty, while the remaining 45.50% is influenced by other factors such as governance quality, infrastructure availability, and institutional capacity. Despite slight improvements in economic output, human development, and environmental quality, these advances have not yet translated into meaningful poverty alleviation. The findings underscore the necessity of inclusive, community-based, and equitable development strategies to ensure that progress across the SDG pillars contributes effectively to reducing poverty and promoting sustainable welfare in Jeneponto Regency.

Introduction

National development aims to improve citizens' welfare through equitable and sustainable growth. One key indicator of successful development is the reduction of poverty levels nationwide (1). To achieve this, the Indonesian government has adopted the Sustainable Development Goals (SDGs) framework since 2015 as a continuation of the Millennium Development Goals (MDGs), which concluded that same year (2). While the MDGs successfully reduced global poverty by nearly half, they were criticized for limited inclusivity, minimal attention to environmental and structural issues, and a top-down design process (3). The SDGs, in contrast, were formulated as a universal and inclusive global agenda, encompassing 17 goals and 169 targets to be achieved by 2030, focusing on eradicating poverty, reducing inequality, and protecting the environment (4).

Indonesia demonstrates a strong commitment to implementing the SDGs through policies aligned with its national development vision (Nawacita) and the National Medium-Term Development Plan (RPJMN) (5). These efforts are guided by the principles of universality, integration, inclusivity, and "*leaving no one behind*" (6). Since the issuance of Presidential Regulation No. 59 of 2017, the government has institutionalized SDG implementation across national and regional levels, involving various stakeholders, including the private sector, civil society, and academia (7). Among the 17 goals, Goal 1, No Poverty, is the most fundamental, as poverty reduction serves both as the ultimate objective and as a prerequisite for achieving sustainable development (8).

Despite national progress, poverty remains a pressing issue in many regions. In South Sulawesi Province, for instance, Jeneponto Regency consistently records the highest poverty rate among 24 regencies/cities, reaching 14.28% in 2021, far above the provincial average of 8.78% and the national rate of 9.71% (9). This persistent condition reflects structural economic constraints, low human capital development, and limited access to resources (10). Although the government has implemented SDG-based programs, such as direct cash transfers, microfinance initiatives, and rural development schemes, their impact in Jeneponto has been modest due to weak local coordination and ineffective policy integration (11). Strengthening collaboration between

central and local governments, supported by inclusive community participation, is therefore crucial to ensure that SDG implementation translates into tangible poverty reduction (12).

Given these conditions, this study is urgently needed to provide empirical evidence regarding whether SDG implementation has effectively addressed poverty disparities in regions with chronic development challenges such as Jeneponto. In the short term, the findings are expected to support policy restructuring, integration of local development planning, and optimization of regional poverty alleviation programs. In the long term, the study provides strategic insights for sustainable welfare improvement, strengthening institutional capacity, and ensuring that economic, social, and environmental progress under the SDG framework contributes meaningfully to reducing regional inequality. Therefore, this study focuses on analyzing the influence of the economic, social, and environmental pillars of the SDGs on poverty levels in Jeneponto Regency, which was selected due to its persistently high poverty rate and relevance as a representative case of regional inequality in South Sulawesi. Through this research, the study aims to assess how these three development pillars interact to shape poverty dynamics, providing evidence-based insights for more effective and localized poverty alleviation strategies.

Methodology

Study Design and Rationale

This study employed a quantitative research design to empirically examine the influence of the Sustainable Development Goals (SDGs) on poverty levels in Jeneponto Regency, Indonesia. The quantitative approach was selected to ensure objectivity, replicability, and statistical rigor in assessing the relationship between the three pillars of sustainable development, economic, social, and environmental, and poverty incidence. This design aligns with previous empirical investigations on sustainable development that utilize econometric models to test causal linkages among macroeconomic indicators and social outcomes.

Study Area and Population

The study focused on Jeneponto Regency, one of the administrative regions in South Sulawesi Province, which consistently records one of the highest poverty rates in the region. The population for this study comprised aggregate annual regional data from Jeneponto, encompassing economic, social, and environmental indicators reported by the *Badan Pusat Statistik* (BPS) and the Department of Environment of Jeneponto Regency. The observation period spans from 2013 to 2021. This time frame was chosen because it represents a complete and continuous availability of official statistical data, captures the pre-SDGs period 2013-2014, the initial implementation phase of SDGs (2015 onward), and the dynamic socio-economic transition including the COVID-19 period, thereby allowing a more comprehensive analysis of both short-term and medium-term impacts of SDGs on poverty reduction. The nine-year period also ensures sufficient time-series variation to obtain reliable econometric estimation and policy-relevant interpretations.

Data Sources and Variables

All data used in this study were secondary and derived from official government publications. The main sources were the annual statistical reports of BPS South Sulawesi and the Environmental Agency of Jeneponto Regency. The variables include the poverty rate, Gross Regional Domestic Product (GRDP) at constant 2013 prices, the Human Development Index (HDI), and the Environmental Quality Index (EQI). The poverty rate, expressed as a percentage of the population living below the poverty line, served as the dependent variable. The GRDP represented the economic pillar, reflecting the regional economic capacity; the HDI represented the social pillar, encompassing the dimensions of education, health, and income; while the EQI captured the environmental pillar, integrating indicators of air, water, and land quality. All datasets were verified, standardized to ensure comparability across years, and transformed into consistent measurement units.

Procedures

Data collection followed a systematic process of compilation and verification. Annual data were extracted from official statistical bulletins and validated through cross-referencing with relevant provincial datasets. To maintain data integrity, all entries were standardized in consistent units, and missing or anomalous values were treated using mean substitution when necessary.

The analytical framework was structured to evaluate both partial and simultaneous effects of the SDG pillars on poverty reduction. Preliminary descriptive analyses were conducted to assess trends and correlations among variables, followed by diagnostic tests to validate model assumptions.

Data Analysis

Data were analyzed using SPSS version 20 through several stages. Classical assumption tests, including normality (Kolmogorov–Smirnov), multicollinearity (VIF and tolerance), heteroskedasticity (Glejser), and autocorrelation (Durbin–Watson), were conducted to ensure model validity.

Multiple linear regression analysis was then applied to examine the influence of the economic (GRDP), social (HDI), and environmental (IKLH) pillars on poverty levels. The model was specified as shown in **Equation 1**.

Hypothesis testing involved both the partial (*t*) and simultaneous (*F*) tests at a 5% significance level. Model fit was evaluated using the Adjusted R^2 coefficient to determine the explanatory power of the independent variables on poverty.

Results

Overview of the Study Area

Jeneponto Regency, located in the southern part of South Sulawesi Province, Indonesia, has a long historical trajectory shaped by local governance, cultural evolution, and colonial resistance. The region's establishment as an administrative entity is officially commemorated on May 1, 1863, a date recognized as *Jeneponto's Founding Day* through Regional Regulation No. 1 of 2003.

This date reflects significant historical milestones, including the democratic appointment of local leaders by the *Toddo Appaka* traditional council, symbolizing early forms of

$$\mathbf{Y = a + b_1X_1 + b_2X_2 + b_3X_3}$$

Equation 1 | Y = Poverty level, a = Constant, b_1 = Regression coefficient of X_1, b_2 = Regression coefficient of X_2, b_3 = Regression coefficient of X_3, X_1 = Economic pillar, X_2 = Social pillar, and X_3 = Environmental pillar.

community representation, and the collective resistance of the Turatea people against Dutch colonial authority. Subsequent administrative developments, such as the enactment of Law No. 29 of 1959, which formalized Jeneponto's status as a second-level regional government in South Sulawesi, further consolidated its governance identity.

Today, Jeneponto represents a region with deep socio-cultural roots and evolving economic dynamics, making it a relevant site for examining the interplay between sustainable development policies and regional poverty reduction efforts.

Geographical Location

Jeneponto Regency is located in the southern coastal area of South Sulawesi Province, Indonesia, between 5°23'12"–5°42'1.2" South Latitude and 119°29'12"–119°56'44.9" East Longitude. The region covers a total area of approximately 749.79 km² and is administratively divided into 11 districts and 114 villages and sub-districts. Jeneponto borders Gowa and Takalar Regencies to the north, Bantaeng Regency to the east, Takalar to the west, and the Flores Sea to the south.

The regency lies about 90 kilometers south of Makassar, the provincial capital, making it strategically positioned within the economic corridor of southern Sulawesi. As of 2010, Jeneponto had an estimated population of 342,700 inhabitants, characterized by predominantly agrarian livelihoods and emerging socio-economic diversification.

Vision and Mission

The regional development agenda of Jeneponto Regency is guided by the vision "*Jeneponto Smart 2023: Competitive, Progressive, Religious, and Sustainable.*" This vision reflects the local government's commitment to achieving inclusive growth that balances economic advancement, social welfare, and environmental stewardship.

To realize this vision, several strategic missions have been formulated. These include accelerating improvements in the Human Development Index (HDI) and enhancing the overall quality of human resources; promoting a bureaucratic culture grounded in professionalism, transparency, participation, and accountability; and ensuring equitable regional development through balanced infrastructure expansion. The government also prioritizes sustainable economic growth by optimizing local resource management and promoting fair investment practices. Additionally, Jeneponto seeks to strengthen fiscal governance to ensure efficiency, productivity, and accountability, while fostering religious values, cultural integrity, and the rule of law to maintain social order and justice.

Regional Potential

Jeneponto Regency possesses significant regional potential derived from its coastal, agricultural, and cultural resources. The region is widely recognized as a major producer of milkfish fry (nener) and shrimp larvae (benur) in South Sulawesi, supporting extensive aquaculture activities. Its coastal areas also serve as the only salt production center on the island of Sulawesi, contributing not only to the province's iodized salt supply but also to broader market demands across Eastern Indonesia.

Another key local resource is the lontar (siwalan or sugar palm) tree, which grows abundantly throughout all districts. This resource holds high potential for developing palm sugar industries, although current production remains largely traditional and small-scale. The modernization of processing technologies could enhance both the efficiency and competitiveness of local palm sugar products.

In addition to these economic resources, Jeneponto is culturally distinct, with a strong local identity and traditions that shape its community resilience and work ethic. Local products such as palm sap beverages (Ballo' Tanning) and distinctive culinary specialties like Coto Kuda, a traditional horse-meat stew once reserved for nobility, reflect the regency's rich cultural heritage and enduring social cohesion. Together, these features position Jeneponto as a region with a unique combination of natural resource potential, cultural capital, and sustainable economic opportunities that support its long-term development goals.

Gross Regional Domestic Product (GRDP)

The Gross Regional Domestic Product (GRDP) serves as a principal indicator for assessing regional economic growth and productivity. Data obtained from the *Badan Pusat Statistik* (BPS) of Jeneponto Regency, measured at constant 2013 prices, reveal a consistent upward trend in regional output from 2013 to 2021, as presented in **Table 1**. Over these nine years, the regional economy exhibited gradual expansion, with GRDP rising from approximately IDR 4.42 trillion in 2013 to about IDR 7.06 trillion in 2021. This increase reflects a sustained improvement in Jeneponto's economic capacity and production performance across various sectors, though the pace of growth was not uniform each year.

The highest growth occurred in 2016 and 2017, when the economy expanded by 8.32 percent and 8.25 percent, respectively, demonstrating robust regional activity and investment performance during that period. However, economic momentum slowed significantly in 2020, recording the lowest growth rate of 0.16 percent due to the disruptions caused by the COVID-19 pandemic. By 2021, Jeneponto's economy began to recover, achieving a growth rate of 5.40 percent, indicating resilience and gradual revitalization of local economic activities. Overall, the long-term trend suggests that Jeneponto has maintained steady economic progress, although the variation in growth rates underscores the region's sensitivity to both internal structural factors and external economic shocks that influence production, investment, and overall development dynamics.

Human Development Index (HDI)

The Human Development Index (HDI) serves as a principal indicator for evaluating the social pillar of sustainable development, encompassing the interrelated dimensions of education, health, and income. According to data from the *Badan Pusat Statistik* (BPS) of Jeneponto Regency, the HDI exhibited a consistent upward trend (This trend is illustrated in **Table 2**, which presents the HDI values of Jeneponto Regency from 2013 to 2021), signaling steady progress in human welfare across the region. Over these years, the HDI increased from 60.55 in 2013 to 64.56 in 2021, demonstrating gradual but continuous improvement in the population's overall quality of life. The growth in HDI reflects enhancements in educational attainment, access to healthcare services, and living standards, which together form the foundation of sustainable social development.

The most substantial progress occurred between 2017 and 2019, when the HDI rose from 62.67 to 64.00, indicating accelerated gains in social and economic well-being. Despite the socioeconomic challenges posed by the COVID-19

Table 1. Gross Regional Domestic Product (GRDP) of Jeneponto Regency 2013–2021 (BPS Jeneponto).

Year	GRDP (In Millions of Rupiah)	GRDP Growth
2013	4,422,900.77	6.64 %
2014	4,773,643.60	7.93 %
2015	5,085,915.52	6.54 %
2016	5,508,828.17	8.32 %
2017	5,963,562.33	8.25 %
2018	6,338,740.62	6.29 %
2019	6,685,623.03	5.47 %
2020	6,696,418.77	0.16 %
2021	7,058,349.94	5.40 %

Table 2. Human Development Index (HDI) of Jeneponto Regency 2013–2021 (BPS Jeneponto).

Year	Human Development Index (HDI)
2013	60.55
2014	61.45
2015	61.61
2016	61.81
2017	62.67
2018	63.33
2019	64.00
2020	64.26
2021	64.56

Table 3. Environmental Quality Index (EQI) of Jeneponto Regency 2013–2021 (Environmental Agency Jeneponto).

Year	Environmental Quality Index (EQI)
2013	57.14
2014	56.53
2015	56.55
2016	56.91
2017	57.97
2018	57.88
2019	57.87
2020	57.87
2021	60.48

Table 4. Poverty Data of Jeneponto Regency 2013–2021 (BPS Jeneponto).

Year	Poverty Rate (Thousand People)	Poverty Rate
2013	58.10	16.52 %
2014	54.20	15.31 %
2015	53.87	15.18 %
2016	55.32	15.49 %
2017	55.34	15.40 %
2018	55.95	15.48 %
2019	54.05	14.88 %
2020	53.24	14.58 %
2021	52.35	14.28 %

pandemic in 2020, Jeneponto managed to sustain positive development momentum, with the HDI reaching 64.26 in 2020 and 64.56 in 2021. Although the annual increments were relatively modest, this steady upward trajectory reflects the resilience of Jeneponto's human development process. It suggests that investments in education, healthcare, and income generation have begun to yield long-term benefits, fostering a more equitable and sustainable path toward improved human welfare across the region.

Environmental Quality Index (EQI)

The Environmental Quality Index (EQI) represents the environmental pillar of sustainable development, encompassing three key components: the Water Quality Index (WQI), Air Quality Index (AQI), and Land Cover Quality Index (LCQI). Together, these sub-indicators provide a comprehensive measure of environmental health, reflecting the state, management, and sustainability of natural resources within a region. According to data from the Environmental Agency of Jeneponto Regency, the EQI showed fluctuating values over the 2013–2021 period, as shown in **Table 3**, indicating dynamic changes in local environmental conditions. In 2013, the index was recorded at 57.14, declined slightly to 56.53 in 2014, and experienced a marginal recovery to 56.55 in 2015.

In the following years, the EQI exhibited moderate variations, with a gradual upward trend after 2016. Incremental improvements were particularly notable toward the end of the observation period, culminating in a significant increase to 60.48 in 2021, the highest recorded value throughout the nine years. This gradual improvement suggests growing effectiveness in environmental management and increased public awareness regarding sustainable practices. Despite periodic declines, the long-term trend reflects positive progress toward maintaining ecosystem quality and resilience. These findings indicate that Jeneponto Regency has begun to strengthen its environmental governance, aligning with national and regional efforts to achieve the environmental objectives embedded within the Sustainable Development Goals (SDGs).

Poverty Level

Poverty remains one of the most persistent socio-economic challenges in Jeneponto Regency. According to data from the *Badan Pusat Statistik* (BPS) of Jeneponto, the poverty rate exhibited a gradual decline between 2013 and 2021, as detailed in **Table 4**, although minor year-to-year fluctuations were observed. In 2013, approximately 58.10 thousand residents, or 16.52% of the population, lived below the poverty line. The proportion of poor residents declined to 15.31% in 2014 and slightly further to 15.18% in 2015, before rising marginally to 15.49% in 2016. From 2017 onwards, however, the poverty rate followed a consistent downward trajectory, reaching 14.28% in 2021, the lowest level recorded during the observation period.

Although the poverty reduction has been relatively modest, the consistent improvement across nearly a decade reflects gradual progress in economic welfare and social stability within the region. This trend suggests that local

development efforts, including targeted social assistance programs, microenterprise support, and social protection schemes, have contributed to alleviating poverty in Jeneponto. Moreover, the positive trajectory indicates partial alignment with the objectives of the Sustainable Development Goals (SDGs), particularly SDG 1 on eradicating poverty. Nevertheless, despite these advances, the overall poverty rate in Jeneponto remains higher than the provincial average, underscoring the continued need for inclusive and sustainable policy interventions that address both structural and community-level causes of poverty.

Data Analysis and Classical Assumption Test

Normality Test

The normality test was conducted to determine whether the dataset followed a normal distribution, which is an essential prerequisite for the validity of regression analysis. Using the Kolmogorov–Smirnov (K–S) test in SPSS version 20, the results were evaluated based on the decision rule that if the Asymp. *Sig*. (2-tailed) value is greater than or equal to 0.05 ($p \geq 0.05$), the data are considered normally distributed; otherwise, they deviate from normality. This statistical test is crucial for verifying whether the residuals of the regression model meet the classical assumption of normality, ensuring that the estimation and inference processes are reliable.

As shown in **Table 5**, the analysis produced an Asymp. *Sig*. value of 0.961, which is substantially higher than the 0.05 threshold. This indicates that the residuals are normally distributed, confirming that the regression model satisfies the assumption of normality. The result implies that the observed data do not exhibit significant deviations from the normal curve, suggesting that the model's predictive accuracy and parameter estimations are statistically sound. Consequently, the normality assumption can be accepted, allowing the regression model to proceed with further diagnostic and inferential testing without bias stemming from non-normal data distribution.

Multicollinearity Test

The multicollinearity test was conducted to determine whether there were strong correlations among the independent variables that could bias the regression estimation results. This test was carried out by examining the Tolerance and Variance Inflation Factor (VIF) values obtained through SPSS version 20. According to standard criteria, a model is considered free from multicollinearity if the tolerance value is ≥ 0.10 and the VIF value is ≤ 10. The results of the test indicate that all variables in this study meet these criteria, showing no signs of strong intercorrelations among the independent variables that could affect the validity of the regression model.

The detailed results presented in **Table 6** show that the GRDP variable representing the economic pillar has a tolerance value of 0.564 and a VIF value of 1.772, the HDI variable representing the social pillar has a tolerance value of 0.260 and a VIF value of 3.839, while the EQI variable representing the environmental pillar has a tolerance value of 0.377 and a VIF value of 2.652. All of these values fall within the acceptable range, leading to the conclusion that the regression model is free from multicollinearity. Therefore, each independent variable contributes uniquely and does not overlap with others in explaining variations in poverty levels, which strengthens the reliability and interpretive validity of the estimated regression coefficients across the model.

Heteroskedasticity Test

A good regression model is expected to exhibit homoskedasticity, meaning that the variance of the residuals remains consistent across all levels of the independent variables. To test this assumption, the Glejser test was applied by regressing the absolute values of the residuals on all independent variables. The decision rule states that if the significance value (*Sig*.) is greater than 0.05, the model does not exhibit heteroskedasticity. This indicates that the distribution of errors is uniform, ensuring that the regression estimates are efficient and unbiased.

As shown in **Table 7**, The test results reveal that all independent variables have significance values exceeding the 0.05 threshold. Specifically, the GRDP variable shows a *Sig*. value of 0.915, the HDI variable 0.485, and the EQI variable 0.560. These findings confirm that the regression model is free from heteroskedasticity, thereby fulfilling the assumption of constant variance. Consequently, the model's parameter estimates can be considered reliable, as the absence of heteroskedasticity suggests that the explanatory variables consistently predict variations in poverty without being affected by unequal error variances.

Table 5. Normality test results.

One-Sample Kolmogorov-Smirnov		
Test		**Unstandardized Residual**
N		9
Normal Parameters[a,b]	Mean	0E-7
	Std. Deviation	0.34159027
Most Extreme Differences	Absolute	0.168
	Positive	0.168
	Negative	-0.118
Kolmogorov-Smirnov Z		0.504
Asymp. Sig. (2-tailed)		0.961

Note: a. Test distribution is normal, b. Calculated form data.
Source: SPSS Analysis Results, 2022.

Table 6. Multicollinearity test.

Variabel	Tolerance	VIF	Description
GRDP (Economic Pillar) (X_1)	0.564	1.772	No multicollinearity
HDI (Social Pillar) (X_2)	0.260	3.839	No multicollinearity
EQI (Environmental Pillar) (X_3)	0.377	2.652	No multicollinearity

Source: SPSS Analysis Results, 2022.

Table 7. Heteroscedasticity test results.

Variabel	Sig	Description
GRDP (Economic Pillar) (X_1)	0.915	Free from heteroscedasticity
HDI (Social Pillar) (X_2)	0.485	Free from heteroscedasticity
EQI (Environmental Pillar) (X_3)	0.560	Free from heteroscedasticity

Source: SPSS Analysis Results, 2022.

Autocorrelation Test

The autocorrelation test was conducted to determine whether the residuals in the regression model were correlated across different observations. The existence of autocorrelation would violate the independence assumption of the classical linear regression model and could result in inefficient and unreliable parameter estimates. To identify the presence of autocorrelation, the Durbin–Watson (D–W) test was employed using SPSS version 20. This test assesses whether the residuals from the regression are independent of one another, which is a crucial requirement for the validity of regression analysis.

Table 8 shows that the Durbin–Watson statistic obtained was 1.255. According to the decision criteria, a D–W value ranging between –2 and +2 indicates that no autocorrelation is present among the residuals. The result confirms that the regression model is free from autocorrelation, meaning that the residuals are independent of each other. This finding implies that the model meets the classical assumption of independence, ensuring that the estimated coefficients are efficient and that the model provides a reliable explanation of the relationship between the economic, social, and environmental pillars and poverty levels.

Multiple Linear Regression Analysis

The multiple linear regression analysis aims to determine the direction and magnitude of the relationship between the independent variables, GRDP (X_1), HDI (X_2), and EQI (X_3), and the dependent variable, poverty (Y). This analysis also assesses whether each independent variable exerts a positive or negative influence on poverty levels and predicts the expected change in poverty when these variables vary. **Table 9** presents the regression results, including the unstandardized coefficients, standard errors, *t*-statistics, and significance levels.

The regression **Equation 2** can be interpreted as follows. The constant value of 38.541 indicates that if all independent variables are held constant ($X_1 = X_2 = X_3 = 0$), the baseline poverty level would be 38.541. The coefficient of GRDP (-0.007) suggests that a 1% increase in economic growth is associated with a 0.007-unit decrease in poverty, holding other factors constant, indicating a weak and statistically insignificant relationship between regional economic growth and poverty reduction ($p = 0.933$). Meanwhile, the coefficient of HDI (-0.426) shows that a 1% improvement in the Human Development Index corresponds to a 0.426-unit decrease in poverty, implying that human development plays a stronger role in reducing poverty, although the relationship remains only marginally significant ($p = 0.099$). In contrast, the coefficient of EQI (0.060) indicates a positive but insignificant relationship ($p = 0.784$), suggesting that changes in environmental quality do not have a direct measurable effect on poverty levels within the study period.

Overall, the regression model reveals that the social pillar (HDI) has the strongest and most meaningful association with poverty reduction in Jeneponto Regency, while the economic and environmental pillars exhibit no statistically significant effects.

Hypothesis Testing

Partial Test (t-test)

The t-test was conducted to examine the individual effect of each independent GRDP (X_1), HDI (X_2), and EQI (X_3), on the dependent poverty (Y). The decision rule is *p*-value (significance) < 0.05 or *t*-calculated > *t*-table, the null hypothesis (H_0) is rejected. Conversely, if *p*-value > 0.05 or *t*-calculated < *t*-table, H_0 is accepted, suggesting no significant effect. The degree of freedom ($df = n - k - 1 = 9 - 3 - 1 = 5$) and *t*-table value is 2.015. The results of the partial test are summarized in **Table 10**.

The results of the partial test indicate that the economic pillar (X_1) has a *p*-value of 0.933 (> 0.05) and a *t*-value of –0.089 < 2.015, showing no significant relationship between economic growth and poverty; therefore, H_0 is accepted and H_1 is rejected. The social pillar (X_2) yields a *p*-value of 0.099 (> 0.05) and a *t*-value of –2.023 > 2.015, suggesting a negative but marginally significant effect of human development (HDI) on poverty; thus, H_0 is rejected, indicating that improvements in human development contribute to poverty reduction. Meanwhile, the environmental pillar (X_3) records a *p*-value of 0.784 (> 0.05) and a *t*-value of 0.289 < 2.015, implying that environmental quality has no significant influence on poverty; as a result, H_0 is accepted and H_3 is rejected.

$$Y = 38.541 - 0.007X_1 - 0.426X_2 + 0.060X_3$$

Equation 2 | Y = Poverty level, X_1 = Economic pillar, X_2 = Social pillar, and X_3 = Environmental Pillar.

Table 8. Autocorrelation test results.

Model Summary[b]					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	0.846[a]	0.715	0.545	0.43208	1.255

Note: a. Predictors: (Constant), EQI (Environmental Pillar) (X_3), GRDP (Economic Pillar) (X_1), HDI (Social Pillar) (X_2), b. Dependent Variable: Poverty (Y).

Table 9. Results of multiple linear regression analysis.

Variable	Unstandardized Coefficient (B)	Std. Error	Standardized Coefficient (Beta)	*t*	*Sig.*
Constant	38.541	8.958	-	4.302	0.008
GRDP (Economic Pillar, X_1)	–0.007	0.082	–0.028	–0.089	0.933
HDI (Social Pillar, X_2)	–0.426	0.211	–0.946	–2.023	0.099
EQI (Environmental Pillar, X_3)	0.060	0.207	0.112	0.289	0.784

Note: Dependent Variable: Poverty (Y). **Source:** SPSS Output, 2022.

Table 10. Results of the t-test (Partial test).

Variable	Unstandardized Coefficient (B)	Std. Error	Beta	*t*	*Sig.*	Interpretation
Constant	38.541	8.958	-	4.302	0.008	-
GRDP (Economic Pillar, X_1)	–0.007	0.082	–0.028	–0.089	0.933	Not significant
HDI (Social Pillar, X_2)	–0.426	0.211	–0.946	–2.023	0.099	Negative, weakly significant
EQI (Environmental Pillar, X_3)	0.060	0.207	0.112	0.289	0.784	Not significant

Note: Dependent Variable: Poverty (Y). **Source:** SPSS Output, 2022.

Overall, the results indicate that among the three sustainability pillars, only the social dimension (HDI) demonstrates a meaningful influence on poverty reduction, highlighting the importance of human development in achieving sustainable welfare improvements in Jeneponto Regency.

Although the regression results indicate that the economic pillar (GRDP), the social pillar (HDI), and the environmental pillar (EQI) do not have a statistically significant effect on poverty levels in Jeneponto Regency during 2013–2021, this finding can be theoretically justified. First, the GRDP growth in Jeneponto is dominantly driven by sectors that are less labor-intensive and have weak linkages with the poor population, thus economic expansion does not automatically trickle down to poverty reduction. Second, although HDI shows gradual improvement, the increase is relatively small and uneven across its components (education, health, and income), which weakens its ability to significantly influence poverty within the short-to-medium observation period. Third, the improvement in the Environmental Quality Index (EQI) has not yet directly translated into economic benefits for poor households, considering that environmental policy implementation generally requires a longer time frame before contributing to measurable socio-economic welfare outcomes. Therefore, the insignificance of these variables is reasonable both statistically and conceptually in the context of Jeneponto Regency.

Simultaneous Test (F-test)

The F-test was conducted to examine whether the independent variables, GRDP (X_1), HDI (X_2), and EQI (X_3), jointly exert a statistically significant influence on the dependent variable, poverty (Y). The decision criterion states that if the probability value (*Sig.*) is less than 0.05 and *F*-calculated exceeds *F*-table, the null hypothesis (H_0) is rejected, indicating that the model has a significant joint effect. Conversely, if *Sig.* > 0.05 or *F*-calculated < *F*-table, H_0 is accepted, implying no simultaneous influence among the independent variables.

Based on the degrees of freedom (df_1 = k – 1 = 3 – 1 = 2; df_2 = n – k – 1 = 9 – 3 – 1 = 5) and a significance level of α = 0.05, the critical *F* value (*F*-table) was determined to be 5.786. As presented in **Table 11**, the calculated *F* value is 4.188, with a significance level of 0.079. Since *F*-calculated (4.188) is less than *F*-table (5.786), and the significance value (0.079) exceeds 0.05, the null hypothesis cannot be rejected.

This result indicates that, collectively, the sustainability development pillars, economic (GRDP), social (HDI), and environmental (EQI), do not have a statistically significant simultaneous effect on poverty levels in Jeneponto Regency during the study period. However, the relatively close significance value suggests a potential indirect or lagged relationship that could be more pronounced over a longer observation period or with additional socioeconomic control variables.

Coefficient of Determination (R^2 Test)

The coefficient of determination (R^2) was employed to measure the extent to which the independent variables, GRDP (X_1), HDI (X_2), and EQI (X_3), collectively explain the variation in the dependent variable, poverty (Y). The results of the model summary are presented in **Table 12**.

The results indicate that the adjusted R^2 value is 0.545, meaning that approximately 54.5% of the variation in poverty levels can be explained by the three independent variables, economic, social, and environmental pillars. The remaining 45.5% of the variation is attributed to other factors not included in the model, such as governance quality, income inequality, or demographic and institutional conditions.

This finding suggests that the integrated dimensions of sustainable development account for a moderate proportion of poverty variation, emphasizing that while the three pillars play an important role, other external socioeconomic factors also contribute significantly to poverty dynamics in Jeneponto Regency.

Table 11. Results of the F-test (Simultaneous test).

ANOVA[a]					
Model	**Sum of Squares**	***df***	**Mean Square**	***F***	***Sig.***
Regression	2.346	3	0.782	4.188	0.079[b]
Residual	0.933	5	0.187	-	-
Total	3.279	8	-	-	-

Note: a. Dependent Variable: Poverty (Y), b. Predictors: (Constant), EQI (Environmental Pillar, X_3), GRDP (Economic Pillar, X_1), HDI (Social Pillar, X_2). **Source:** SPSS Output, 2022.

Table 12. Results of the coefficient of determination (R^2 test).

Model Summary[b]				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.846[a]	0.715	0.545	0.43208

Note: a. Predictors: (Constant), EQI (Environmental Pillar, X_3), GRDP (Economic Pillar, X_1), HDI (Social Pillar, X_2), b. Dependent Variable: Poverty (Y). **Source:** SPSS Output, 2022.

Discussion

The findings indicate that the three pillars of sustainable development, economic, social, and environmental, do not exert significant individual or collective effects on poverty levels in Jeneponto Regency. Although economic growth, measured through Gross Regional Domestic Product (GRDP), has a positive impact, it has not been effectively reflected in reducing poverty levels (13). This disconnect suggests that growth in aggregate output has been largely driven by external investors, resulting in limited local reinvestment and unequal income distribution (14). Consequently, economic expansion in Jeneponto has failed to stimulate inclusive development or broad-based improvements in household welfare, underscoring persistent structural imbalances within the regional economy.

The social pillar, represented by the Human Development Index (HDI), also demonstrates limited influence on poverty reduction despite gradual improvement over the study period (15). Increases in life expectancy, education, and living standards have not been accompanied by equitable access to healthcare, quality education, or income opportunities, particularly in rural and marginalized areas. These findings align with Amartya Sen's capability framework, emphasizing that improvements in human development indicators are insufficient without structural reforms that promote social inclusion and equitable resource distribution (16). Prior studies by Taofik Hidayat (2023) and Uray Maulida Edfrida (2019) similarly reveal that higher HDI levels may correlate negatively but insignificantly with poverty, suggesting that the transformation of human development into tangible welfare gains is a long-term process requiring sustained investment in education, health, and social protection systems (17, 18).

The environmental pillar, captured by the Environmental Quality Index (EQI), exhibits no direct statistical relationship with poverty levels, though the link between environmental degradation and poverty remains cyclical and mutually reinforcing (19). Limited economic opportunities compel households to overexploit natural resources, while declining environmental quality, through deforestation, air pollution, and reduced water availability, further constrains livelihoods and health outcomes (20). This reciprocal relationship highlights the indirect but substantial role of environmental conditions in shaping poverty dynamics. Consistent with studies by Wanda Pribadi & Fitri Kartiasih (2020), the findings suggest that sustainable poverty alleviation must integrate environmental stewardship, ensuring that short-term economic survival does not compromise long-term ecological and social resilience (21).

Overall, the collective analysis reveals that the economic, social, and environmental dimensions of the Sustainable Development Goals (SDGs) have yet to produce a measurable impact on poverty reduction in Jeneponto Regency. Despite ongoing initiatives such as food assistance, educational subsidies, health coverage, and small-scale business support, poverty remains persistently high, reflecting the incomplete implementation of the SDG framework and the limitations of growth-oriented policies. The regression model indicates that these three pillars explain 54.5% of poverty variation, leaving the remainder influenced by factors such as governance quality, infrastructure, and institutional capacity. These results underscore the need for coordinated, inclusive, and locally grounded policy interventions that integrate economic growth with human development and environmental protection to achieve sustainable and equitable poverty alleviation.

Conclusion

This study concludes that the economic, social, and environmental pillars of the Sustainable Development Goals (SDGs) have no significant effect on poverty levels in Jeneponto Regency. Although indicators such as GRDP, HDI, and EQI demonstrate gradual improvement over the 2013–2021 period, their contribution to poverty reduction remains limited due to persistent structural inequality, weak policy integration, and uneven resource distribution. To ensure that sustainable development efforts translate into tangible welfare outcomes, several policy implications can be highlighted. In the short term, strengthening program targeting, improving local governance coordination, and enhancing access to education, health, and social protection for vulnerable communities are essential. In the long term, policies must prioritize inclusive economic transformation, human capital strengthening, and environmentally sustainable resource management to ensure that improvements across the SDG pillars can effectively contribute to reducing poverty and achieving sustainable welfare in Jeneponto Regency.

Declarations

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Conflict of Interest

The authors declare no conflicting interest.

Data Availability

The unpublished data is available upon request to the corresponding author.

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