

THE EFFECT OF ENVIRONMENTAL QUALITY ON POVERTY IN REGIONS OF CENTRAL JAVA PROVINCE

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Abstract

Poverty persists as a significant developmental challenge in Central Java Province, marked by elevated poverty rates and disparities in poverty levels among regencies and cities. Conversely, environmental quality is intrinsically connected to community well-being, as it influences individuals' capacity to fulfill their fundamental needs and enhance their quality of life. This study seeks to examine the influence of environmental quality on poverty levels in the regencies and cities of Central Java Province from 2021 to 2023. This study utilizes Amartya Sen's capability approach, which perceives poverty as a constraint on an individual's ability to attain well-being. The study employed a quantitative methodology utilizing panel data from 35 regencies and cities in Central Java Province from 2021 to 2023. The independent variables comprised access to safe drinking water, adequate sanitation, forested areas, health facilities, healthcare personnel, disaster risk, and regional administrative structure, whereas the poverty rate functioned as the dependent variable. The analysis utilized panel data regression employing the Random Effects Model (REM). The research findings demonstrate that access to sufficient sanitation and healthcare personnel significantly exacerbates poverty levels, whereas disaster risk and the type of regional governance substantially alleviate poverty levels. Conversely, access to potable water, wooded regions, and healthcare services does not substantially adversely impact poverty levels. The findings suggest that environmental quality affects poverty, especially via sanitation, health, and disaster risk. Poverty alleviation policies must be bolstered by enhancing access to sufficient sanitation, ensuring equitable allocation of healthcare professionals, fortifying disaster mitigation efforts, and diminishing developmental disparities between rural and urban regions to attain greater sustainable community well-being.

Keywords: Poverty, Environmental Quality, Capability Approach, Panel Data, Sustainable Development

INTRODUCTION

Poverty remains a significant challenge faced by many countries globally, especially in developing nations. It is characterized not only by economic deprivation or low income but also by limited access to essential services and barriers to education, healthcare, housing, and employment opportunities (Sarpin et al., 2025). This highlights that poverty is a multidimensional and complex issue. Within the framework of the Sustainable Development Goals (SDGs), eradicating poverty is a primary objective under the No Poverty agenda (SDG 1). High poverty rates undermine the quality

of life and productivity of communities, which can hinder economic growth and development; therefore, addressing poverty is crucial.

In Indonesia, poverty continues to be a critical issue in national development, particularly in Central Java Province. During the 2021–2023 period, Central Java had the second-highest average percentage of the poor population on the island of Java. Furthermore, there are disparities in poverty rates among regencies and cities within Central Java, with Kebumen Regency reporting an average poverty rate of 16.86%, whereas Semarang City has only 4.35%. These differences indicate variations in regional characteristics and environmental quality that may affect community well-being.

In poverty theory, one approach to explaining the causes and dynamics of poverty is the capabilities approach proposed by Amartya Sen. This viewpoint perceives poverty as a constraint on the capacity to perform essential life functions, including the attainment of a satisfactory environmental quality. Sen (1999) emphasizes the close relationship between physical and environmental quality and an individual's capacity to generate income, which can subsequently enhance quality of life. Therefore, adequate environmental quality, as a fundamental life function, can contribute to improving community well-being and alleviating poverty.

There are also several studies discussing the relationship between environmental quality and poverty, such as those by Heger et al. (2018) and Rohman & Suryanto (2023). These studies suggest that one can assess environmental quality from various aspects, including physical, ecological, health-related, and environmental risk and vulnerability factors. However, some studies still yield inconsistent results, further emphasizing the complex nature of the relationship between environmental quality and poverty.

Table 1. Data on the Environmental Quality Index (IKLH) and the Percentage of the Poor Population in Central Java, 2021–2023

Year	Environmental Quality Index (IKLH)	Percentage of the Poor Population
2021	66.27	11.79
2022	66.85	10.93
2023	68.59	10.77

Source: Central Statistics Agency (2025;2026), processed

Empirical evidence from Central Java, as illustrated in Table 1, highlights the intricate relationship between environmental quality and poverty. The data indicates that a significant increase in the Environmental Quality Index (EQI) during the 2023 period was accompanied by a smaller reduction in poverty compared to the 2022 period. This observation implies that the connection between environmental quality and poverty in Central Java is multifaceted and necessitates further empirical investigation.

Consequently, this study seeks to analyze the impact of environmental quality on poverty levels in regencies and cities within Central Java Province for the years 2021–2023. Environmental quality in this research is assessed through various dimensions: basic physical aspects (such as access to safe drinking water and adequate sanitation), ecological aspects (including forest areas), health aspects (like health facilities and health personnel), and environmental risk and vulnerability aspects (focusing on disaster risk). Furthermore, this study incorporates a dummy variable representing the administrative form of the region to account for structural differences between regencies and cities in Central Java. It is anticipated that this research will enrich the existing literature on poverty and contribute valuable insights to the development of more comprehensive and sustainable poverty alleviation policies.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Poverty

Poverty is defined as a condition in which an individual or group is unable to meet their needs, such as economic, social, or cultural needs. Riyanto (2025) states that there are various factors that can cause poverty, such as economic, social, geographic, political, and institutional factors. In the capabilities approach, poverty is understood as the inability to achieve basic life functions; thus, poverty is not merely measured by income levels but also by access to various basic services and an adequate quality of the environment. This aligns with research by Heger et al. (2018), Khan et al. (2025), Mateus & Escobar (2018), which indicates a correlation between environmental quality and poverty. Thus, poverty is not caused solely by income levels but also by environmental quality as part of basic life functions.

Access to Safe Drinking Water

Drinking water is one of the essential elements of daily life (Arwin et al., 2024). According to the Central Statistics Agency (BPS), safe drinking water is water that comes from a safe source and is used by households for daily drinking needs. From a capabilities approach, access to safe drinking water can be viewed as a form of human capacity to live healthily and carry out daily activities, thereby promoting well-being and contributing to reduced vulnerability to poverty.

Access to Adequate Sanitation

Sanitation is defined as an effort to prevent the spread of disease that focuses on public health initiatives (Firdanis et al., 2022). One such public health initiative is the provision of adequate sanitation. According to the Central Statistics Agency (BPS), adequate sanitation refers to facilities for the disposal of human waste that meet health standards, such as sanitary toilets, watertight septic tanks, or disposal systems that do not pollute the environment. In the capabilities approach, limited access to adequate sanitation—which can lead to a high risk of disease—constitutes a form of deprivation of basic capabilities. This is grounded in the argument that the freedom to be free from preventable diseases is a fundamental human function. Thus, the deprivation of basic capabilities in the form of inadequate sanitation can reduce human well-being and contribute to poverty.

Forest Areas

Forests are a natural resource that provides significant benefits to human well-being (Muthmainnah & Tahnur, 2018). According to Government Regulation No. 23 of 2021 on Forestry Management, forest areas are specific regions designated by the government to be preserved as permanent forests. In the capabilities approach, forest areas are viewed as a form of environmental diversity that can lead to variations in the levels of income or benefits obtained by communities. Thus, these variations in income or benefits can be linked to quality of life and human well-being, including issues of poverty.

Health Facilities

According to the Central Statistics Agency (BPS), health facilities refer to the facilities, infrastructure, and equipment in the form of services provided by the central government, local governments, or the private sector to the public to maintain or improve health through preventive, curative, or rehabilitative measures. This situation indicates that if the availability of health facilities is low, the public's ability to access health services will be hindered. From a capabilities approach, the low availability of health facilities also indicates a lack of freedom for the public to obtain health services, thereby leading to a deprivation of capabilities in achieving the basic function of a healthy

life. Consequently, the inability to achieve this basic function will lower the level of public well-being and trigger poverty.

Health Workers

According to Law No. 23 of 2017, a health worker is any person who dedicates themselves to the field of health and possesses a professional attitude, knowledge, and skills acquired through higher education; for certain types of roles, this requires authorization to perform health-related activities. The availability of an adequate number of health workers can promote improved access to public health services. If the availability of health workers is low, such situation can hinder access to health services. From a capability perspective, a lack of healthcare personnel indicates a lack of freedom for the public to access healthcare services; consequently, this lack of freedom can lower the level of public well-being and may lead to increased poverty.

Disaster Risk

According to Presidential Regulation No. 75 of 2021 on the Joint Disaster Management Fund, disaster risk is defined as the potential for loss resulting from a disaster in a specific region and over a specific period of time, which may include death, injury, illness, life-threatening situations, loss of security, displacement, damage to or loss of property, and disruption of community activities. In the capability approach, low disaster risk in a region can be viewed as a form of protective security, which is one of the instrumental aspects of freedom. This definition indicates that regions with high disaster risk will result in the community's inability to attain freedom. Consequently, this inability makes it difficult for the community to maintain or improve their quality of life, thereby increasing their vulnerability to poverty.

Forms of Regional Administration

Regional administrative units consist of regencies led by regents and cities led by mayors. Cities are often identified as areas serving as centers of social activity, economic activity, and residential areas, characterized by high population density as well as heterogeneous and materialistic socioeconomic strata (Manumpil et al., 2020). In contrast, regencies tend to be identified as areas with lower population densities and homogeneous economic structures. This analysis indicates structural differences between regencies and cities that can lead to disparities in basic services. From a capabilities approach, this can be viewed as a form of social opportunity gap, referring to available facilities such as education and healthcare. Consequently, such social opportunity gaps can impact communities' ability to meet basic needs and achieve well-being.

The Impact of Access to Safe Drinking Water on Poverty

Limited access to safe drinking water can increase the risk of disease, which ultimately raises household expenses and reduces labor productivity. This decline in productivity leads to lower income and well-being, thereby potentially increasing poverty. This aligns with research by Aguilar-pinto et al. (2023) and Armah et al. (2018), which states that limited access to drinking water can trigger poverty and reduce well-being, and vice versa. Thus, it is hypothesized that increased access to safe drinking water can reduce poverty levels.

H1: Access to safe drinking water has a negative effect on poverty levels

The Impact of Access to Adequate Sanitation on Poverty

Limited access to adequate sanitation can increase the risk of disease and healthcare costs, thereby reducing labor productivity, which in turn can decrease household income and increase the likelihood of poverty. This aligns with research by Atapattu (2020) and Aguilar-pinto et al. (2023),

which states that a lack of access to sanitation is one of the primary sources or causes of poverty. Conversely, improved access to adequate sanitation can reduce the risk of disease and improve community well-being, thereby promoting poverty reduction. Thus, it is hypothesized that improved access to adequate sanitation can reduce poverty levels.

H2: Access to adequate sanitation has a negative effect on poverty levels.

The Impact of Forested Areas on Poverty

Forested areas can provide various benefits, such as sources of livelihood, ecosystem protection, and disaster risk reduction, thereby improving economic opportunities and environmental quality. In general, an increase in forested areas is expected to reduce poverty levels. This aligns with research by Braber et al. (2024) and Akhtar et al. (2024), which demonstrates a correlation between increased tree cover or forest area and poverty reduction. Thus, there is a hypothesis that an increase in forest areas can lower poverty rates.

H3: Forest areas have a negative impact on poverty rates.

The Impact of Health Facilities on Poverty

Limited access to health facilities can increase the risk of illness and the financial burden of medical treatment borne by households, thereby reducing income and increasing the risk of poverty. This is consistent with research by Zhou et al. (2020), which states that lagging medical infrastructure can increase vulnerability to poverty. Conversely, increased availability of health facilities can reduce the risk of illness and improve quality of life, thereby reducing the burden of medical costs and lowering poverty rates. This aligns with research by Guerra et al. (2024), which states that increased health service coverage can reduce poverty rates. Thus, there is a hypothesis that improved health facilities can reduce poverty rates.

H4: Health facilities have a negative effect on poverty rates.

The Impact of Healthcare Workers on Poverty

Low availability of healthcare workers can increase the risk of illness, leading to reduced labor productivity and higher household expenses, which in turn can drive up poverty rates. Conversely, increased availability of healthcare workers can improve public health and productivity, thereby reducing poverty rates. This aligns with research by Hidayat et al. (2019) and Li et al. (2026), which states that an increase in the number or availability of healthcare workers can reduce poverty levels. Thus, there is a hypothesis that an increase in the availability of healthcare workers can reduce poverty levels.

H5: Healthcare workers have a negative effect on poverty levels.

The Impact of Disaster Risk on Poverty

High disaster risk in a region can lead to disruptions in economic activity, damage to assets, increased spending on post-disaster recovery, and heightened economic vulnerability among communities. These conditions can reduce income and worsen community well-being, thereby increasing vulnerability to poverty. This conclusion is supported by research findings by Diwakar et al. (2019), which explain that the occurrence of disasters can reduce household income, potentially triggering poverty. Conversely, if disaster risk is low or reduced, this conclusion can decrease economic uncertainty, thereby reducing poverty. This aligns with the research by Okuda & Kawasaki

(2022), which states that efforts to reduce disaster risk can lower poverty rates. Thus, there is a hypothesis that high disaster risk can increase poverty rates.

H6: Disaster risk has a positive effect on poverty rates.

The Impact of Regional Administrative Structures on Poverty

Differences in characteristics between urban and rural areas can lead to disparities in access to basic services and economic benefits. This is consistent with research by Ngowi et al. (2025), which explains that differences between urban and rural areas—particularly in infrastructure—can result in varying capacities to access economic benefits. Areas with better access to basic services, such as urban areas, have higher levels of productivity and income, so poverty rates in urban areas tend to be lower compared to rural areas. Thus, it is hypothesized that poverty rates in rural areas are higher than in urban areas.

H7: The administrative structure of rural areas has a positive effect on poverty rates

RESEARCH METHODS

This study employs a quantitative approach using secondary panel data. The units of analysis include 35 regencies and cities in Central Java Province during the 2021–2023 period. The research data were obtained from the Central Statistics Agency, the Central Java Provincial Health Office, and the National Disaster Management Agency. The data collection techniques consisted of data search and collection, data recording, and checking the completeness, consistency, and suitability of the data. The following is a breakdown of the variables used in the study.

Table 2. Details of Research Variables

Variable		Symbol	Operational Variable
Dependent			
Poverty		KMS	Percentage of the Poor Population
Independent			
Access to safe drinking water		AML	Percentage of Households with Access to Safe Drinking Water
Access to Adequate Sanitation		SANITASI	Percentage of Households with Access to Adequate Sanitation
Forest Areas		HUTAN	Ratio of Forest Area to Total Area of Each Regency/City
Health Facilities		FASKES	Ratio of Health Facilities to the Area of Each Regency/City
Healthcare Workers		NAKES	Ratio of Health Workers to the Population of Each Regency/City
Disaster Risk		IRB	Disaster Risk Index
Control Variable			
Regional Structures	Administrative	ADMIN	Dummy variable where city = 0 and regency = 1

Data analysis in this study utilized panel data regression. The selection of the panel data regression model was conducted through the Chow test, the Hausman test, and the Lagrange

Multiplier test. This study also performed classical assumption tests, such as, including tests for normality, multicollinearity, autocorrelation, and heteroscedasticity. Additionally, the study performed tests for the coefficient of determination (R^2), the F -statistic, and the t -statistic. The following is the panel data regression model used in this study.

$$KMS_{it} = \beta_0 + \beta_1 AML_{it} + \beta_2 SANITAS_{it} + \beta_3 HUTAN_{it} + \beta_4 FASKES_{it} + \beta_5 NAKES_{it} + \beta_6 IRB_{it} + \beta_7 ADMIN_{it} + \varepsilon_{it}$$

Notes:

- β_0 : Constanta
 $\beta_1 - \beta_7$: Regression coefficients for each independent variable
 i : Regency/City in Central Java
 t : Time period (2021–2023)
 ε : Error term

RESULTS AND DISCUSSION

Model Selection Tests

In the Chow test, a near-singular matrix emerged, which is believed to be caused by the characteristics of the panel data in this study, specifically the larger number of cross-sections compared to the number of observation periods. Consequently, the fixed-effects model requires a relatively large number of parameter estimates, causing the matrix to approach singularity. Therefore, the selection of the panel data regression model in this study was conducted using the Hausman test and the Lagrange multiplier test.

Based on the results of the Hausman test in Table 3, the P-value of the model is 0.2107, which is greater than 0.05; therefore, the selected model is the Random Effects Model (REM). The results of the Lagrange Multiplier test also showed a probability value of 0.0000, which is less than 0.05, indicating that the REM is more appropriate for use. Consequently, the model used in this study is the Random Effects Model (REM).

Table 3. Model Selection Test Results

Test	P-Value	Result
Hausman	0.2107	Random Effect Model (REM)
Lagrange Multiplier	0.0000	Random Effect Model (REM)

Classic Assumption Tests

Normality Test

Based on the results of the normality test, the Jarque-Bera statistic was 0.806696 with a probability of 0.668080, which is greater than 0.05 (Table 4). This indicates that the residuals in the research model are normally distributed, thus fulfilling the assumption of normality.

Table 4. Results of the Normality Test

Normality Test	Value
Jarque-Bera	0.8067
P-Value	0.6681

Multicollinearity Test

The results of the multicollinearity test indicate that all independent variables have a Centered Variance Inflation Factor (VIF) value of less than 10. Therefore, it can be concluded that there is no evidence of multicollinearity within the research model (see Table 5).

Table 5. Results of the Multicollinearity Test

Variable	Centered VIF
<i>AML</i>	1.0678
<i>SANITASI</i>	1.1600
<i>HUTAN</i>	1.4914
<i>FAKES</i>	4.3179
<i>NAKES</i>	1.2170
<i>IRB</i>	1.2057
<i>ADMIN</i>	4.0077

Autocorrelation Test

Based on Table 6, the results of the autocorrelation test show that the Durbin-Watson value of 1.7862 falls within the range of d_L and d_U ($1.5428 \leq 1.7862 \leq 1.8261$). Therefore, the results of the autocorrelation test in this study fall within the borderline region, so no conclusion can be drawn from the autocorrelation test results. Nevertheless, this Durbin-Watson value indicates that the model tends to suggest the absence of autocorrelation.

Table 6. Results of the Autocorrelation Test

Autocorrelation Test	Value
Durbin-Watson (DW)	1.7862
d_U	1.8261
d_L	1.5428

Heteroscedasticity Test

Table 7 shows the results of the heteroscedasticity test that indicate there is still a variable with a probability value of less than 0.05, namely the variable for access to adequate sanitation, with a probability of 0.0078. This suggests that the research model is not yet entirely free from the issue of heteroscedasticity, which constitutes a limitation of this study.

Table 7. Results of the Heteroscedasticity Test

Variable	P-Value
Constanta	0.4307
<i>AML</i>	0.2684
<i>SANITASI</i>	0.0078
<i>HUTAN</i>	0.8113
<i>FAKES</i>	0.7454
<i>NAKES</i>	0.1269
<i>IRB</i>	0.4831
<i>ADMIN</i>	0.5489

Coefficient of Determination

Based on Table 8, the R-squared value is 0.5487 and the adjusted R-squared value is 0.5161. The R-squared value of 0.5487 indicates that 54.87 percent of the variation in poverty rates across the regencies and cities of Central Java Province can be explained by the variables of access to safe drinking water, access to adequate sanitation, forest areas, health facilities, health workers, disaster risk, and regional administrative structure. Meanwhile, the remaining 45.13 percent is explained by other variables outside the research model.

Table 8. Results of Coefficient of Determination

Coefficient of Determination	Value
R-Squared	0.5487

Adjusted R-Squared 0.5161

F-statistic test

The F-statistic test results show an F-statistic value of 16.8476 with a probability of 0.0000, which is less than alpha 0.05, indicating that all independent variables collectively influence poverty levels.

Table 9. Results of F-Statistic test

Test	Value
F-statistic	16.8476
P-Value (F-statistic)	0.0000

t-statistic test

Based on Table 10, the results of the t-test indicate that the variables of access to adequate sanitation and health workers have a significant negative effect on poverty, while the variables of disaster risk and regional administrative structure have a significant positive effect on it. Conversely, the variables of access to safe drinking water, forested areas, and health facilities do not have a significant negative effect on poverty.

Table 10. Results of t-statistic test

Variable	Coefficient	t _{statistic}	t _{table}	Description
AML	2.81E-05	0.1201	-1.6607	H ₀₁ accepted & H ₁₁ rejected
SANITASI	-0.0006	-3.3944	-1.6607	H ₀₂ rejected & H ₁₂ accepted
HUTAN	0.0122	0.2283	-1.6607	H ₀₃ accepted & H ₁₃ rejected
FASKES	0.2833	0.9075	-1.6607	H ₀₄ accepted & H ₁₄ rejected
NAKES	-0.0014	-2.9590	-1.6607	H ₀₅ rejected & H ₁₅ accepted
IRB	0.0003	6.6339	1.6607	H ₀₆ rejected & H ₁₆ accepted
ADMIN	4.7190	1.8441	1.6607	H ₀₇ rejected & H ₁₇ accepted

The Effect of Access to Safe Drinking Water on Poverty

The research results indicate that the variable “access to safe drinking water” has a coefficient of 2.81×10^{-5} or 0.0000281, and that this variable does not have a significant negative effect on poverty rates in the regencies and cities of Central Java Province. These results suggest that an increase in access to safe drinking water tends to increase poverty rates in the regencies and cities of Central Java Province. However, the direction of this relationship remains uncertain because it is not statistically significant.

Theoretically, according to Amartya Sen’s capabilities approach, access to safe drinking water is viewed as a fundamental human capability necessary for a healthy life and increased productivity; thus, it is expected to contribute to poverty reduction. However, the findings of this study suggest that access to safe drinking water has not yet been able to directly influence poverty levels. This situation may be attributed to the fact that, despite improvements in access, the quality of the available water does not consistently meet health standards (Khaerunnisa & Purnamaningrum, 2025). This situation can then have a direct impact on the quality of life and well-being of the community. Furthermore, even if access to safe drinking water is adequate, there must also be public awareness regarding the provision of adequate nutrition for family members (Purwaningsih et al., 2021). If access to safe drinking water is adequate but water quality and nutritional intake remain poor, this situation will still undermine community well-being.

The findings of this study are consistent with a study by Sitepu (2023) that states that access to safe drinking water does not affect poverty. These findings suggest that improved access to safe drinking water does not necessarily directly reduce poverty levels unless accompanied by improvements in the quality of clean water services, as well as improvements in community

nutrition and health conditions. Therefore, the government should not only focus on expanding access to safe drinking water but also on improving the quality of clean water and raising public awareness regarding the adoption of healthy lifestyles as part of efforts to alleviate poverty in regencies and cities across Central Java.

The Effect of Access to Adequate Sanitation on Poverty Rates

The results of the study show that the variable access to adequate sanitation has a coefficient of -0.0006 and that this variable has a significant negative effect on poverty rates in regencies and cities in Central Java Province. These results indicate that increased access to adequate sanitation tends to reduce poverty rates in the regencies and cities of Central Java Province. This is because adequate sanitation access can improve the quality of life for the poor (Aziz et al., 2025). Increased access to adequate sanitation can reduce the risk of environment-related diseases, such as typhoid and diarrhea, thereby increasing community productivity and reducing vulnerability to poverty.

Conversely, if access to sanitation is poor, communities generally face a high health burden and reduced productivity (Silfani et al., 2025). Furthermore, when sanitation facilities are inadequate, poor families often have to spend a great deal of time caring for sick family members (Aziz et al., 2025). Consequently, these families lose time and energy that could otherwise be directed toward productive activities, making it increasingly difficult to address the issue of poverty.

Theoretically, the results of this study align with Amartya Sen's capability approach, which views poverty as a form of limited ability to fulfill basic life functions, one of which is access to adequate sanitation. Access to adequate sanitation reflects a community's ability to secure a healthy living environment that supports well-being. The results of this study are also consistent with the findings of Gabriela & Utomo (2023), Aziz et al. (2025), Atapattu (2020), Aguilar-pinto et al. (2023), and Silfani et al. (2025), which state that access to adequate sanitation has a negative impact on poverty. Thus, efforts to improve access to basic services, particularly adequate sanitation, are crucial to incorporate into poverty alleviation policies, especially in regencies and cities across Central Java.

The Effect of Forest Areas on Poverty

The results of the study show that the forest area variable has a coefficient of 0.0122 and that forest area does not have a significant negative effect on poverty levels in the regencies and cities of Central Java Province. These results indicate that an increase in the percentage of forest area tends to increase poverty levels in the regencies and cities of Central Java Province. However, the direction of this relationship cannot yet be determined because it is not statistically significant.

Theoretically, according to Amartya Sen's capability approach, the extent of forest areas is considered a form of environmental diversity that could drive income variation and should, in turn, promote community well-being and reduce poverty levels. However, the findings of this study indicate that forest areas have not yet been able to exert a direct influence on poverty levels. The community might underestimate the economic benefits that forest areas can provide. This situation also depends on the patterns or methods of forest utilization that are employed.

Herwirawan et al. (2017) support these findings, stating that forest cover has a weak correlation with poverty levels. This suggests that forested areas do not directly impact poverty reduction. Therefore, poverty alleviation policies should not solely focus on the presence of forest areas but also aim to strengthen forest management to ensure that the benefits are fully realized by the broader community, ultimately contributing to improved well-being in the regencies and cities of Central Java.

The Effect of Health Facilities on Poverty

The results of the study show that the health facilities variable has a coefficient of 0.2833 and that health facilities do not have a significant negative effect on poverty rates in the regencies and cities of Central Java Province. These results indicate that an increase in the availability of health facilities tends to raise poverty rates in the regencies and cities of Central Java Province. However, the direction of this relationship remains uncertain because it is not statistically significant.

Theoretically, according to Amartya Sen's capability approach, the availability of adequate health facilities is considered a form of freedom for communities, enabling them to achieve healthier lives and improved well-being, which should contribute to reducing poverty levels. However, this study's results indicate that the availability of health facilities has not yet demonstrated a direct influence on poverty levels. This conclusion arises from the fact that increased health facility availability has not consistently been paired with enhanced quality of health services, such as inadequate medical equipment.

Moreover, the enhancement of health facilities does not always correlate with public awareness about their optimal usage (Simanjuntak & Solihin, 2025). Therefore, simply increasing the availability of health facilities does not directly affect poverty. As a result, poverty alleviation policies should not solely focus on increasing health facility availability but also on enhancing service quality and raising public awareness about the use of these facilities, particularly in regencies and cities throughout Central Java.

The Effect of Healthcare Personnel on Poverty

The results of the study show that the health workforce variable has a coefficient of -0.0014 and that the health workforce has a significant negative effect on poverty rates in the regencies and cities in Central Java Province. These results indicate that an increase in the availability of health workers tends to reduce poverty rates in the regencies and cities of Central Java Province. This is because the availability of health workers plays a crucial role in improving public access to health services. Adequate access to health care can improve quality of life and maintain labor productivity, thereby reducing the risk of poverty.

On the other hand, a low level of healthcare workforce availability restricts access to healthcare services, which can result in heightened public health issues. These health problems can escalate medical costs and create a financial burden for households, leading to decreased assets and income (Wei et al., 2023). As a result, households become increasingly susceptible to poverty.

According to Amartya Sen's capabilities approach, the inadequate availability of healthcare workers is viewed as a form of deprivation for the community in accessing essential healthcare services. This deprivation can diminish community well-being and potentially increase poverty levels. The findings of this study align with previous research, such as that by Hidayat et al. (2019) and Li et al. (2026), which indicate a negative relationship between the number/availability of healthcare workers and poverty levels. Research by Rahayu et al. (2019) also indicates that the number of doctors who are also healthcare workers has a negative relationship with poverty levels. Therefore, effective poverty alleviation strategies should include policies aimed at improving public access to healthcare services, particularly by increasing the availability of healthcare workers in regencies and cities across Central Java.

The Impact of Disaster Risk on Poverty

The results of the study show that the disaster risk variable has a coefficient of 0.0003 and that disaster risk has a significant positive effect on poverty levels in the regencies and cities of Central Java Province. These results indicate that an increase in disaster risk tends to raise poverty levels in the regencies and cities of Central Java Province. This is because high disaster risk can cause damage to household assets and lead to economic uncertainty and disruption.

Furthermore, elevated disaster risk can result in a decline or even a total loss of household income. Diwakar et al. (2019) highlight that disasters in Kenya can significantly reduce household income. Such conditions can further deteriorate community well-being by burdening households with the costs of post-disaster recovery and the loss of livelihoods. As a result, communities residing in areas with high disaster risk are more susceptible to poverty.

The findings of this study align with Amartya Sen's capability approach, which defines poverty as a societal inability to achieve essential freedoms, including security. Regions with a high risk of disasters illustrate this inability, obstructing communities' capacity to attain well-being. Furthermore, these findings support the research conducted by Pranandari et al. (2022), which state that disaster risk has a significant positive influence on poverty, meaning that high disaster risk can increase the potential for poverty. Additionally, Desinta & Sitorus (2021) found that the frequency of disaster events, which can increase disaster risk, also has a positive effect on poverty. Therefore, it is crucial for the government to strengthen disaster mitigation and risk reduction strategies as part of poverty alleviation initiatives in regencies and cities across Central Java, with the aim of minimizing the negative impacts of disasters on community well-being.

The Effect of Regional Administrative Structure on Poverty

The results of the study show that the dummy variable for regional administrative form has a coefficient of 4.7189 and that the regional administrative form variable has a significant positive effect on poverty rates in regencies and cities in Central Java Province. These results indicate that poverty rates in regencies tend to be higher than those in cities. This is because regencies generally have different characteristics than cities.

Urban areas are often identified as centers of economic and social activity (Manumpil et al., 2020). Economic activity in urban areas tends to be more diverse and capable of creating more job opportunities. In contrast, economic activity in most rural regencies remains homogeneous and dependent on the primary sector, making it more vulnerable to price fluctuations and climate change. Furthermore, regency areas—which are generally dominated by rural regions—have more limited access to public services compared to urban areas. These limitations in access to public services can further exacerbate the socioeconomic conditions of the population (Karnaen et al., 2025). These conditions result in higher poverty rates in regency areas compared to urban areas.

Theoretically, the findings of this study align with Amartya Sen's capabilities approach. This approach reflects the differences in access to public services and economic characteristics between regencies and cities as a form of disparity in social opportunities. These social opportunities can influence communities' ability to meet their basic needs and achieve well-being. Areas with a lack of social opportunities, such as regencies, tend to have difficulty accessing basic services, making it harder for residents to achieve well-being and leaving them more vulnerable to poverty. The results of this study are also consistent with the findings of Karnaen et al. (2025), who state that a region's administrative status is closely linked to the socioeconomic conditions of its population. These findings indicate that regions organized as regencies tend to have limited access to basic services, which can exacerbate socioeconomic conditions, including poverty. Therefore, the government needs to strengthen poverty alleviation efforts tailored to the conditions of each region. Regencies can enhance infrastructure quality and foster productive economic activities to create more job opportunities and elevate community welfare. In this way, the disparity in poverty levels between regencies and cities can be minimized.

CONCLUSION

This study aims to analyze the impact of environmental quality on poverty rates in regencies and cities across Central Java Province for the 2021–2023 period using panel data regression with the Random Effects Model (REM). The results show that access to adequate sanitation and

healthcare personnel has a significant negative impact on poverty rates, while disaster risk and the form of regional administration have a significant positive impact on poverty rates. These findings suggest that improving access to adequate sanitation and the availability of healthcare personnel can support a reduction in poverty rates, while high disaster risk has the potential to increase communities' vulnerability to poverty. Furthermore, the positive effect of regional administrative structure suggests that poverty rates in regencies tend to be higher than in cities. Meanwhile, access to safe drinking water, forested areas, and health facilities did not have a significant negative effect on poverty rates in the regencies and cities of Central Java.

The results of this study indicate that poverty alleviation efforts should not only focus on economic aspects but also take environmental and social aspects into account. Therefore, the government needs to improve access to adequate sanitation, strengthen the equitable distribution of health workers, and optimize disaster mitigation and risk reduction efforts, particularly in areas with high vulnerability levels. Furthermore, the differences in poverty levels between regencies and cities highlight the importance of development policies tailored to regional characteristics. Consequently, poverty alleviation policies should be directed toward improving basic services, enhancing the quality of human resources, expanding economic opportunities, and reducing development disparities across regions to achieve more equitable and sustainable community well-being.

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