# Analyzing the Impact of Poverty, Unemployment and Education on the Human Development Index (HDI) in Sragen Regency

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*Abstract*: This study aims to analyze the effect of poverty rate, unemployment rate, and education level on the Human Development Index (HDI) in Sragen Regency. Using annual time series data from 2015 to 2024 obtained from the Central Bureau of Statistics, the study applies multiple linear regression with the Ordinary Least Squares (OLS) method. The results show that the education variable has a positive influence on HDI and is nearly significant, while poverty and unemployment have negative but insignificant effects. Despite the lack of statistical significance, the direction of the relationship aligns with theoretical expectations. The classical assumption tests indicate that the model is free from multicollinearity, heteroscedasticity, and autocorrelation, and the residuals are normally distributed. These findings suggest that improving education should remain a development priority, while poverty and unemployment need continuous attention to support human development in Sragen.
*Keywords*: Human Development Index, Poverty, Unemployment, Education

## Introduction

A publication on human development by the United Nations Development Programme (UNDP) in 1990 introduced the Human Development Index (HDI), which serves as a basis for measuring a country's progress not only through Gross Domestic Product (GDP) per capita, but also through life expectancy, education level, and standard of living (Badan Pusat Statistik, 2025). The primary goal of HDI is to promote human development by expanding each individual's choices in life. This aims to provide better opportunities in education, health, and income.

HDI is not only used as a benchmark for regional progress but also serves as a consideration for government decision-making in formulating sustainable development policies (Pratama et al., 2025). Particular attention must be given to specific sectors in policy-making to improve population welfare. Enhancing the quality of life of the

community will ultimately contribute to improving the HDI of a region (Hierdawati & Adipura, 2024).
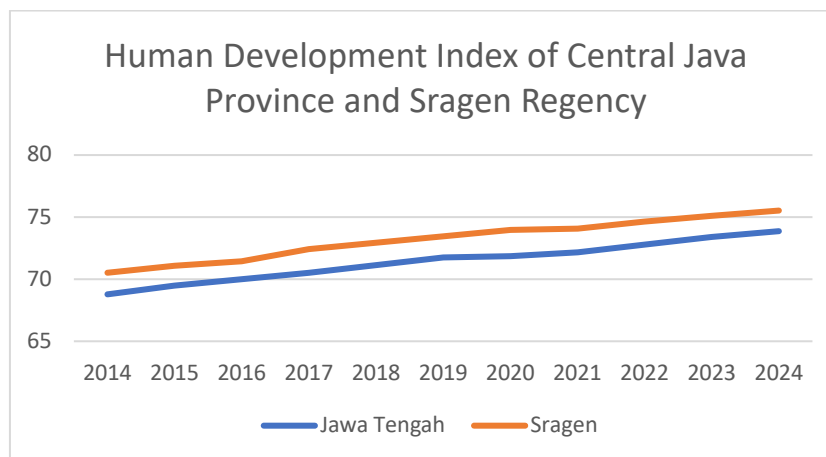


**Figure 1.** Human Development Index of Central Java Province and
Sragen Regency, 2014–2024
Source: BPS, 2024

The Human Development Index (HDI) is a crucial indicator in assessing the quality of development in a region. Based on data from the Central Bureau of Statistics (2024), the HDI of Sragen Regency has shown a rising trend from 70.52 in 2014 to 75.53 in 2024. Meanwhile, the HDI of Central Java Province also increased from 68.78 to 73.87 during the same period. Despite this, Sragen's HDI consistently remains above the provincial average. This increase indicates improvements in the aspects of education, health, and standard of living in Sragen Regency. However, the initially significant gap has gradually narrowed, indicating the need to evaluate variables that influence HDI in the region.

The Human Development Index is measured not only through life expectancy, education level, and living standards, but also more specifically through socio-economic conditions, including poverty rate, unemployment rate, and education. These three variables have a significant impact on the increase or decrease of HDI (Hannan et al., 2023).
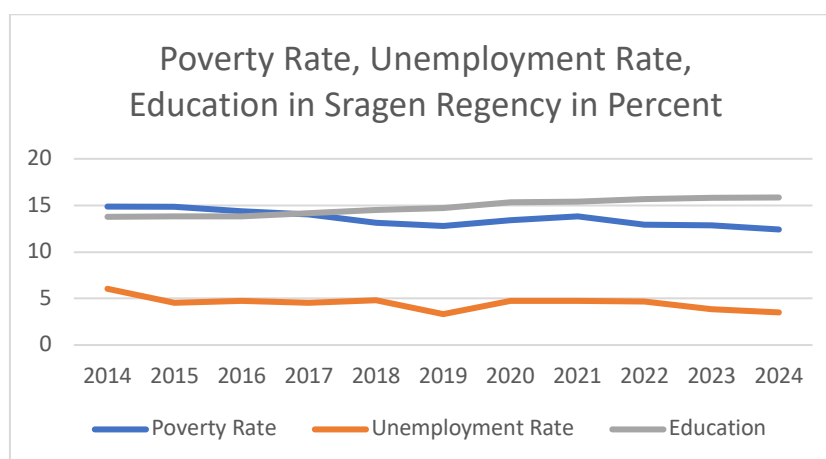
**Figure 2.** Poverty Rate, Unemployment Rate, and Education
in Sragen Regency (in Percent), 2014–2024
Source: BPS, 2024

Several key social indicators have a notable influence on human development. The poverty rate in Sragen Regency decreased from 14.87% in 2014 to 12.41% in 2024, indicating an improvement in the community's standard of living. Meanwhile, the unemployment rate also declined from 6.04% to 3.53% during the same period, despite experiencing slight fluctuations in certain years. On the other hand, the average length of schooling increased from 13.77 years to 15.85 years, reflecting better access to education and increased participation in formal education. Overall, these three indicators support the growth of the Human Development Index (HDI) in Sragen and point to an improving socio-economic development trend.

Poverty and unemployment rates are negatively and significantly associated with HDI (Kiha et al., 2021). This means that a decline in poverty and unemployment can increase HDI and ultimately improve the welfare and quality of life of the population. In the education dimension, the average length of schooling also has a significant positive effect on HDI (Meilinna et al., 2024). An increase in educational attainment contributes to a higher HDI and better overall quality of life.

Although Sragen Regency has shown positive trends in reducing poverty and unemployment and increasing educational attainment, its Human Development Index (HDI) still requires further improvement to remain competitive with other regions in Central Java.

Theoretically and empirically, the three variables have been proven to significantly influence HDI in various previous studies (Ningrum et al., 2020; Syafira et al., 2024). However, few studies have specifically examined the simultaneous effect of poverty, unemployment, and average years of schooling on HDI at the regency level, particularly in Sragen. Therefore, this research is important to determine the extent to which these three factors influence human development in Sragen, and to provide a more targeted and data-driven basis for formulating regional development policies.

**Literature Review**

**Human Development Index (HDI)**

The Human Development Index (HDI) is an indicator used to measure the quality of life of a population across three key dimensions: health, education, and a decent standard of living (United Nations Development Programme, 2024). In Indonesia, HDI serves as a primary reference for evaluating regional development performance (Badan Pusat Statistik, 2025).

HDI is considered more comprehensive than economic indicators such as Gross Regional Domestic Product (GRDP) because it emphasizes humans as the central focus of development (Todaro & Smith, 2007). Therefore, it is essential to examine the factors that influence HDI, such as poverty, unemployment, and education, in order to promote inclusive and sustainable development.

**Poverty**

Poverty is a condition in which individuals are unable to fulfill basic needs such as food, education, and healthcare. In the context of human development, high poverty levels often correlate with low HDI due to limited access to education and health services (Todaro & Smith, 2007).

Various studies have shown that poverty has a negative and significant effect on HDI. The higher the poverty rate, the lower the HDI of a region (Hannan et al., 2023). Therefore, poverty alleviation efforts are a crucial strategy in enhancing the quality of human development.

**Unemployment**

Unemployment is a key indicator for assessing labor market performance and community welfare. A high unemployment rate indicates low labor absorption, which leads to reduced income and purchasing power. This situation indirectly lowers the quality of life and negatively affects HDI (Todaro & Smith, 2007).

Previous research found that unemployment significantly influences HDI, both directly and through mediating variables such as poverty (Kiha et al., 2021). This indicates that efforts to improve human development must be accompanied by effective job creation policies.

**Education**

Education is one of the main pillars of human development, as it enhances human resource quality, opens up employment opportunities, and improves living standards. Within the HDI framework, education is a vital indicator that reflects access to and attainment in formal education (United Nations Development Programme, 2024).

One of the education indicators used in HDI is the average length of schooling, which refers to the average number of years completed by individuals aged 25 and above in formal education. A higher average length of schooling increases individuals' chances of acquiring skills and obtaining decent jobs, ultimately contributing to HDI improvement (Badan Pusat Statistik, 2025).

The average length of schooling is positively correlated with HDI. The higher the education level of a population, the higher the quality of life it achieves (Meilinna et al., 2024). This emphasizes that improving education access and quality is a key strategy for enhancing human development at the regional level.

**Theoretical Framework**

Based on relevant phenomena, theories, and previous research, the relationship of Islamic wealth to economic growth and financial stability which can be described in the following framework:
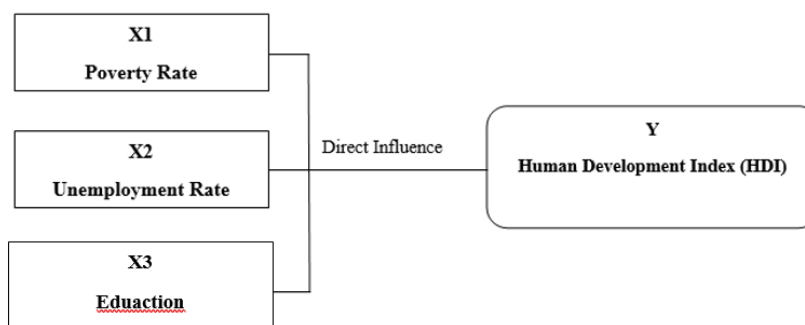
**Figure 3.** Theoretical Framework

The hypotheses in this study are as follows:

**Poverty Rate and Human Development Indeks (HDI)**

According to research conducted by (Sabitta et al., 2024) It was found that the percentage of poverty in a community affects people's access to health and education two main components in the calculation of the Human Development Index (HDI). Individuals living in poverty tend to suffer from malnutrition, are unable to complete their education, and have low productivity, which in turn hinders human development. Todaro & Smith (2007) In his book titled *Economic Development*, it is stated that high levels of poverty are negatively correlated with the quality of human development. A study by Djohan et al. (2023) in Indonesia also found that a significant reduction in poverty has a positive impact on the improvement of the Human Development Index (HDI).

*H1 : The poverty rate has a negative and significant effect on the Human Development Index (HDI).*

**Unemployment rate and Human Development Indeks (HDI)**

In a study conducted by Hierdawati & Adipura (2024), The research results show that, simultaneously, unemployment has a significant effect on the Human Development Index (HDI). However, partially, unemployment does not have a significant effect on the HDI. A study by Adim (2024) stated that poverty has a positive and significant effect on the Human Development Index (HDI) in Indonesia.

*H2 : The unemployment rate has a negative and significant effect on the Human Development Index (HDI).*

**Education and the Human Development Indeks (HDI)**

In the research conducted by Djohan et al. (2023) shows that the test results indicate the education variable has a negative and significant effect on the Human Development Index (HDI). Anantika & Sasana, (2020) It also states that the level of education has a positive and significant impact on the Human Development Index (HDI) in APEC countries.

*H3 : Education has a positive and significant effect on the Human Development Index (HDI).*

**Methodology**

This study is a quantitative research aimed at analyzing the influence of poverty rate, unemployment rate, and social spending on the Human Development Index (HDI) in Sragen Regency. The data used are annual time series data for the period from 2015 to 2024, obtained from official publications of the Central Bureau of Statistics (BPS) and financial documents of Sragen Regency.The analytical method used in this study is multiple linear regression with the Ordinary Least Squares (OLS) approach. OLS is chosen because it can estimate linear relationships between variables simply and effectively, even with a limited number of observations. In this model, the Human Development Index (HDI) is the dependent variable, while the poverty rate, unemployment rate, and regional social spending are the independent variables. The general form of the regression equation used is as follows:

$$IHDI_t = \alpha + \beta 1 Poverty_t + \beta 2 Unemployment_t + \beta 3 Education_t + \varepsilon_t \qquad .........(1)$$

Description:

| | | |
|---|---|---|
| HDIt | : | The Human Development Index in year t, as the dependent variable. |
| A | : | The constant, which is the HDI value when all independent variables are equal to zero. |
| $\beta_1$, $\beta_2$, $\beta_3$ | : | The regression coefficients of each independent variable. |
| $\varepsilon_t$ | : | The error term or disturbance in year t. |

## Results

## Stationarity Test

**Table 1.** Stationarity Test Results of HDI

Null Hypothesis: D(D_IPM) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -5.367934 | 0.0041 |
| Test critical values: | 1% level | -4.582648 | |
| | 5% level | -3.320969 | |
| | 10% level | -2.801384 | |

Source: output Eviews, processed secondary data

**Table 2.** Stationarity Test Results of Poverty

Null Hypothesis: D(D_PVRTY) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

| | | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic | | -3.376178 | 0.0465 |
| Test critical values: | 1% level | -4.582648 | |
| | 5% level | -3.320969 | |
| | 10% level | -2.801384 | |

Source: output Eviews, processed secondary data

**Table 3.** Stationarity Test Results of Unemployment

Null Hypothesis: D(D_UNEMPLOY) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

|  |  | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic |  | -6.124203 | 0.0018 |
| Test critical values: | 1% level | -4.582648 |  |
|  | 5% level | -3.320969 |  |
|  | 10% level | -2.801384 |  |

Source: output Eviews, processed secondary data

**Table 4.** Stationarity Test Results of Education

Null Hypothesis: D(D_EDUC) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

|  |  | t-Statistic | Prob.* |
|---|---|---|---|
| Augmented Dickey-Fuller test statistic |  | -5.023709 | 0.0060 |
| **Test critical values:** | **1% level** | -4.582648 |  |
|  | **5% level** | -3.320969 |  |
|  | **10% level** | -2.801384 |  |

Source: output Eviews, processed secondary data

Based on the stationarity test conducted, all variables—namely the Human Development Index (HDI) as the dependent variable (Y) and all independent variables (X), which include Education Level, Unemployment Rate, and Poverty Rate—showed stationarity at the first difference level according to the root test results.

## Estimation Equation

**Table 5.** Estimation Equation

Dependent Variable: D_IPM
Method: Least Squares
Date: 06/07/25   Time: 19:47
Sample (adjusted): 2015 2024
Included observations: 10 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.273458 | 0.111953 | 2.442611 | 0.0503 |
| D_EDUC | 0.808442 | 0.374970 | 2.156022 | 0.0745 |
| D_PVRTY | -0.134099 | 0.126361 | -1.061235 | 0.3294 |
| D_UNEMPLOY | -0.105169 | 0.085871 | -1.224732 | 0.2666 |

| | | | | |
|---|---|---|---|---|
| R-squared | 0.496186 | Mean dependent var | | 0.501000 |
| Adjusted R-squared | 0.244279 | S.D. dependent var | | 0.213513 |
| S.E. of regression | 0.185612 | Akaike info criterion | | -0.241147 |
| Sum squared resid | 0.206710 | Schwarz criterion | | -0.120113 |
| Log likelihood | 5.205737 | Hannan-Quinn criter. | | -0.373921 |
| F-statistic | 1.969720 | Durbin-Watson stat | | 1.790431 |
| Prob(F-statistic) | 0.220003 | | | |

Source: output Eviews, processed secondary data

The variable of change in education (D_EDUC) has a positive effect of 0.808 on the HDI and is almost significant (p=0.0745), indicating that an increase in education tends to increase the HDI. The poverty change variable (D_PVRTY) has a negative effect of -0.134 with p=0.3294, and the unemployment change variable (D_UNEMPLOY) also has a negative effect of -0.105 with p=0.2666, both of which are not significant.

## Classical Assumption Test Results

The advantages of research using panel data are that the data used becomes more informative, the variability is greater, and has low collinearity. Thus, a greater df (degree of freedom) will be produced as well as more efficiently (Gujarati, 2013). The data panel can detect and measure impact better, which cannot be done with cross section or time series methods. From the advantages possessed by panel data, the classical assumption test used is the multicollinearity test and heteroscedasticity test.

## Multicollinearity Test

Multicollinearity testing is used to detect whether there is correlation between independent variables in a regression model. A good regression model is one in which the independent variables are not strongly correlated with each other. In this study, the multicollinearity test was conducted by examining the correlation coefficients between the independent variables. If the correlation between the independent variables is sufficiently high (greater than 0.05), this indicates the presence of multicollinearity.

**Table 6.** Multicollinearity Test Results

Variance Inflation Factors
Date: 06/07/25   Time: 19:49
Sample: 2014 2024
Included observations: 10

| Variable | Coefficient Variance | Uncentered VIF | Centered VIF |
|---|---|---|---|
| C | 0.012534 | 3.638004 | NA |
| D_EDUC | 0.140602 | 3.228187 | 1.462520 |
| D_PVRTY | 0.015967 | 1.315408 | 1.034937 |
| D_UNEMPLOY | 0.007374 | 1.636067 | 1.501222 |

Source: output Eviews, processed secondary data

Based on the existing VIF values on table 6, no serious multicollinearity issues were found between the independent variables in this regression model. All independent variables are safe to use and are not overly correlated with each other. The regression model can be considered stable in terms of multicollinearity.

## Heteroscedasticity Test

Heteroscedasticity occurs when the variance of the errors in the model differs across observations. To test for the presence of heteroscedasticity in this study, the Glejser test is used by regressing the absolute values of the residuals on the independent variables. If the significance value of an independent variable in relation to the absolute residuals is less than the chosen significance level, heteroscedasticity is considered present. Conversely, if the significance value is greater than the significance level, it indicates that heteroscedasticity does not exist.

**Table 7.** Glejser Test Results

Heteroskedasticity Test: Glejser

| | | | |
|---|---|---|---|
| F-statistic | 0.846856 | Prob. F(3,6) | 0.5166 |
| Obs*R-squared | 2.974706 | Prob. Chi-Square(3) | 0.3955 |
| Scaled explained SS | 2.214156 | Prob. Chi-Square(3) | 0.5292 |

Source: Eviews *output*, processed secondary data

Based on the Glejser test, the F-statistic and Obs\*R-squared values are both greater than α (0.05). This indicates that heteroscedasticity does not occur in the regression model.

**Autocorellation Test**
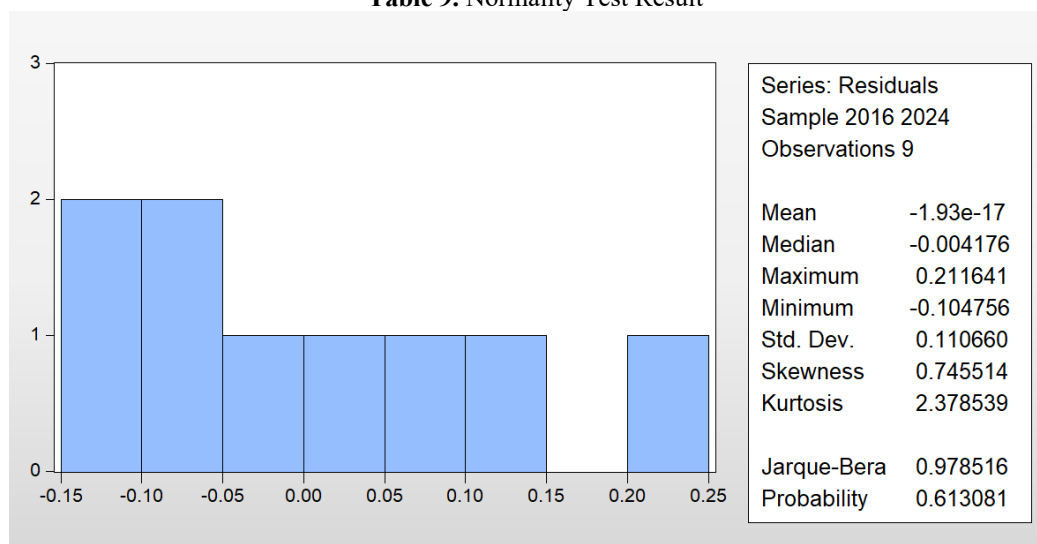
**Table 8.** Autocorelltion Test Results

Breusch-Godfrey Serial Correlation LM Test:

| | | | |
|---|---|---|---|
| F-statistic | 0.012226 | Prob. F(2,4) | 0.9879 |
| Obs*R-squared | 0.060760 | Prob. Chi-Square(2) | 0.9701 |

Source: output Eviews, processed secondary data

**Normality Test**

**Table 9.** Normality Test Result



Source: output Eviews, processed secondary data

The results of the residual normality test using Jarque-Bera show that the statistical value is 0.978516 with a probability of 0.613081, which is greater than the significance level of 0.05. This indicates that the residuals are normally distributed, thus fulfilling the normality assumption in the regression model. The skewness value of 0.745514 and kurtosis of 2.378539 are still within the acceptable range for a normal distribution. Therefore, the regression model can be considered valid in the context of the classical assumption of residual normality.

**Discussion**

The results of the study indicate that the education variable has a positive influence on the Human Development Index (HDI) in Sragen Regency with a coefficient of 0.808, although it is not yet statistically significant at the 5% level (p = 0.0745). This finding reinforces the theoretical view that improvements in education have a real contribution to human development, as education opens access to economic opportunities, improves quality of life, and strengthens individual competitiveness. Although not yet statistically significant, the p-value approaching the significance threshold indicates that improvements in the education variable remain worthy of primary attention in regional development policies.

Meanwhile, the variables of poverty and unemployment levels show a negative effect on the HDI, but neither is statistically significant. The negative coefficients for poverty (-0.134) and unemployment (-0.105) confirm that the higher the poverty and unemployment rates, the greater the potential for a decline in the HDI. However, since the probability values for each are above 0.05, there is insufficient evidence to conclude that they directly affect the HDI in the short term. This may be due to the socio-economic dynamics in the region, which require more time to observe the actual impact of reductions in poverty and unemployment on human development.

Overall, the regression model used in this study has met the classical assumptions, such as the absence of multicollinearity, heteroscedasticity, and autocorrelation, as well as normally distributed residuals. This indicates that the regression model has sufficient validity for use in public policy decision-making. Although not all variables show a

significant effect, the direction of the relationship between the independent variables and the Human Development Index (HDI) remains consistent with theory and previous research findings. Therefore, the focus on improving the quality of education and addressing poverty and unemployment remains a priority strategy in strengthening human development in Sragen Regency.

**Conclusion**

Based on the results of the regression analysis, it can be concluded that of the three independent variables studied—poverty rate, unemployment rate, and education level—only the education variable showed a positive effect on the Human Development Index (HDI) in Sragen Regency, although this effect was not statistically significant ($p = 0.0745$). Meanwhile, the poverty and unemployment variables show a negative effect on the HDI, but both are also not statistically significant. This indicates that improvements in education have the potential to drive improvements in the HDI, while high poverty and unemployment rates tend to hinder human development.

However, this study has several limitations that need to be considered. First, the number of observations used is limited to only 10 years (2015–2024), which may affect the generalizability of the study results. Second, the variables used only reflect quantitative aspects, without considering qualitative indicators such as education quality or inter-regional disparities, which can also influence HDI achievements. Additionally, the local context of Sragen Regency may have unique socio-economic characteristics that are not fully captured by a simple linear regression model.

For further research, it is recommended to use inter-regional panel data (e.g., districts/cities in Central Java Province) in order to capture spatial variations in factors affecting HDI. The study could also include other relevant variables, such as regional spending on health and education, infrastructure access, and labor force participation rates. As a result, the analysis will be more comprehensive and provide more insightful recommendations for policymakers in designing strategies for sustainable human development.

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