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# Population and Poverty as Determinants of the Human Development Index in East Luwu Regency

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ABSTRACT
*This study examines the influence of population size and poverty on the Human Development Index (HDI) in East Luwu Regency. Employing secondary time-series data covering 2014-2023, the research utilizes multiple linear regression analysis supported by classical assumption tests, with data processing performed using SPSS version 22. The empirical results reveal that neither population size nor poverty exerts a statistically significant effect on HDI, as indicated by significance levels exceeding 0.05 for both variables. These findings suggest that demographic expansion and poverty reduction alone are insufficient to drive substantial improvements in human development outcomes in the region. Instead, advancing HDI in East Luwu Regency requires more comprehensive policy approaches that prioritize investment in education, healthcare accessibility, and the overall quality of human resources. Theoretically, the study enriches development economics literature by underscoring regional disparities in HDI determinants, while practically, it offers evidence-based insights for local governments to formulate more targeted and effective strategies for enhancing human development.*

**Keywords:** Population, poverty, human development index, regression, East Luwu.

## A. INTRODUCTION

Human development is widely regarded as a fundamental indicator of the success of regional development initiatives because it encapsulates the overall well-being of a population. Improvements in health, education, and income three critical dimensions of the Human Development Index (HDI) are essential not only for measuring economic progress but also for ensuring that growth is inclusive and equitable. In Indonesia, while national HDI scores have generally improved over the past two decades, considerable disparities persist between regions, highlighting the importance of context-specific development strategies.

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The Human Development Index (HDI), as defined by the United Nations Development Programme (UNDP), integrates three key components: life expectancy as a proxy for health, mean and expected years of schooling to represent education, and per capita expenditure as a measure of standard of living. These components collectively provide a comprehensive picture of human welfare. According to Statistics Indonesia (BPS), East Luwu Regency has seen steady population growth, increasing from 296,741 people in 2020 to 313,404 in 2023. The regency's HDI has also improved, albeit modestly, rising from 72.80 in 2019 to 73.34 in 2021, placing it in the "medium development" category.

Despite these positive trends, East Luwu continues to face structural socio-economic challenges. Poverty rates remain relatively high, and income inequality persists, particularly in rural and remote communities where access to quality education and healthcare remains limited. These disparities hinder more significant HDI progress and reveal the uneven distribution of development benefits, despite the regency's substantial economic growth over recent years.

East Luwu represents a compelling case study due to its paradoxical nature: it is both an industrial hub and a region struggling with basic human development challenges. As one of South Sulawesi's leading mining and industrial centers, East Luwu contributes significantly to the regional gross domestic product (GDP). However, the benefits of this economic expansion have not been equitably distributed across its population. Rural communities, in particular, often lack adequate infrastructure, public services, and opportunities for upward mobility, thereby slowing improvements in human development indicators.

This imbalance between industrial advancement and persistent socio-economic disparities underscores the importance of investigating the determinants of HDI in East Luwu. While economic growth can generate resources for improving education and healthcare, demographic pressures such as population growth and persistent poverty may offset these gains. Understanding the interplay of these factors is crucial to designing targeted interventions that address the root causes of stagnation in human development outcomes.

A review of prior studies reveals that population growth and poverty are often cited as key determinants of HDI at both national and regional levels. Research by Estrada and Wenagama (2020) and Kiha, Seran, and Lau (2021) supports this notion, demonstrating that rapid population expansion without adequate social investment can strain public services, while poverty directly constrains access to essential health and education resources. However, there is a paucity of empirical research focusing specifically on East Luwu, particularly in the context of the regency's recent industrial growth and demographic shifts. This gap in the literature highlights the need for further investigation.

Building on this context, the present study seeks to analyze the influence of population size and poverty on the HDI in East Luwu Regency over the period

2014-2023. The findings are expected to make both theoretical and practical contributions: theoretically, by enriching the discourse on regional development economics and the dynamics of HDI determinants; and practically, by offering evidence-based insights for policymakers to design inclusive and sustainable human development strategies tailored to the specific needs of East Luwu.

## B. THEORITICAL

### Human Development Index

Human development reflects the extent to which societies ensure access to health, education, and income for their citizens. According to UNDP (2021), the Human Development Index (HDI) was introduced as a composite indicator that goes beyond economic growth and emphasizes the overall quality of life. HDI incorporates three fundamental dimensions health, education, and standard of living making it one of the most widely accepted tools for assessing welfare levels.

HDI has been extensively adopted by governments, academics, and practitioners to evaluate the effectiveness of development policies. In Indonesia, BPS (2023) employs HDI to analyze disparities among provinces and districts, enabling more targeted and inclusive policymaking. Thus, understanding the determinants of HDI is crucial to ensuring that regional development strategies foster equitable progress and reduce socio-economic inequalities.

### Population Growth Impact

Population dynamics such as fertility, mortality, and migration significantly influence the demand for basic services, including education, healthcare, housing, and employment opportunities (Harris & Todaro, 2020). A growing population can support economic expansion by providing an abundant labor force and increasing consumer demand for goods and services, thereby contributing positively to human development when adequately managed.

Rapid and uncontrolled population growth may strain public resources and infrastructure, particularly if it is not accompanied by improvements in human capital. As noted by Yulianto (2018), this imbalance often leads to declining per capita income, unequal access to services, and slower HDI progress. Hence, population growth plays a dual role in shaping human development outcomes either as a driver of progress or a potential barrier.

### Poverty and Welfare

Poverty reflects the inability of individuals or households to meet essential needs such as food, education, healthcare, and adequate housing (Khomsan, 2015; BPS, 2020). Communities with high poverty levels often experience lower life expectancy, reduced school enrollment, and limited access to decent living standards, which negatively affect all three core dimensions of HDI.

Reducing poverty can significantly improve human development outcomes by enabling households to invest more in education and health. Poverty reduction

efforts, therefore, not only address income inequality but also enhance long-term well-being by improving indicators of health, education, and standard of living key drivers of higher HDI scores.

## Empirical Study Results

Empirical studies exploring the relationship among population, poverty, and HDI have produced mixed results across regions. For example, Jasasila (2020) found that population and poverty significantly influenced HDI in Batang Hari Regency, while Amelinda & Rachmawati (2022) concluded that poverty had a stronger effect on HDI than economic growth in Tulungagung.

Similarly, Kiha, Seran, & Lau (2021) revealed that population, unemployment, and poverty jointly affected HDI in Belu Regency. In contrast, Shaleh, Mallongi, & Rahman (2021) discovered that in East Luwu, GRDP and unemployment were more dominant determinants of HDI than population and poverty. These varied outcomes underscore that the relationship between these factors is context-dependent and shaped by local socio-economic conditions.

## Development Economics View

From a theoretical perspective, the connection between these variables can be explained using the framework of development economics. Todaro & Smith (2021) argue that population growth influences HDI by increasing the burden on education and health systems, which, if not addressed, leads to declining living standards and human welfare.

Poverty exerts additional pressure by restricting access to essential services and resources necessary for improving life quality. When combined, these factors often create a "double burden" in regions experiencing both rapid demographic expansion and persistent poverty. Conversely, effective poverty alleviation and strategic human capital investment can transform population growth into a catalyst for raising HDI levels.

Based on the synthesis of theories and previous studies, this research positions population (X1) and poverty (X2) as independent variables that influence the Human Development Index (Y). The relationship can be expressed in the following regression equation:

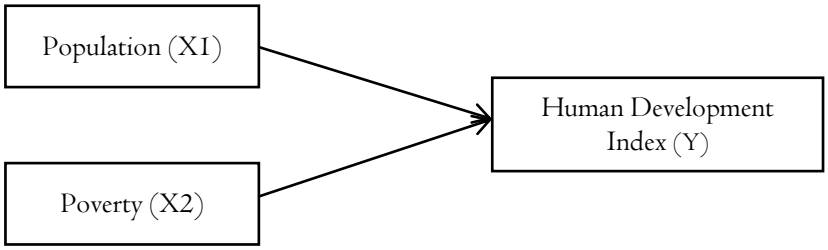
$$HDI=\alpha+\beta 1(Population)+\beta 2(Poverty)+e$$

Where :

$\alpha$ = constant,
$\beta 1, \beta 2$ = regression coefficient of each variable,
e = error term,
Population(X1) = Total population,
Poverty(X2) = Poverty level
HDI(Y) = Human Development Index.

Thus, the conceptual framework of this research can be described as follows:

**Figure 1.** Research framework




## C. METHODOLOGY

This study adopts a quantitative explanatory research design to examine the causal effect of population size and poverty on the Human Development Index (HDI) in East Luwu Regency. The explanatory approach is appropriate because it seeks to identify the direction and magnitude of influence among measurable variables. Quantitative methods allow the relationships to be analyzed objectively through statistical models, enhancing the reliability and replicability of the findings (Hakim, 2015; Sugiyono, 2017; Creswell & Creswell, 2018).

The research utilizes secondary time-series data published by the Central Statistics Agency (BPS) of East Luwu Regency covering 2014–2023. The data set includes annual records of total population, poverty rate, and HDI. A purposive sampling technique was applied by selecting the 10 years of data that matched the research objectives. Secondary data were chosen for their credibility and accessibility, as they are officially compiled and regularly updated by the BPS (BPS, 2024; Sekaran & Bougie, 2019).

Data were collected using a documentation technique, extracting figures from printed and electronic BPS reports, supported by a literature review of relevant books, journal articles, and prior studies to establish the theoretical framework. The analysis employed multiple linear regression using SPSS version 22, accompanied by classical assumption tests (normality, multicollinearity, heteroskedasticity, and autocorrelation) to ensure model validity (Gujarati & Porter, 2020; Ghozali, 2021). The HDI data refer to the official indicator published annually by the United Nations Development Programme (UNDP, 2023) and adopted in the BPS regional statistics. The operationalization of variables is summarized in the following table:

**Table 1**. Operational definition of variables

| Variable | Conceptual Definition | Indicator | Source |
|---|---|---|---|
| Population (X1) | Total number of residents in East Luwu Regency, including permanent and non-permanent residents (Purba, 2021). | Annual number of population (people). | BPS (2014–2023) |
| Poverty (X2) | Percentage of people whose | Annual poverty | BPS (2014– |

| | | | |
|---|---|---|---|
| | consumption level is below the poverty line (Todaro & Smith, 2021). | rate (%). | 2023) |
| Human Development Index (Y) | Composite index measuring life expectancy, education, and decent living standards (Syaifullah & Malik, 2017). | Annual HDI value. | BPS (2014–2023) |

## D. RESULTS AND DISCUSSION

The regression analysis was conducted to examine how population size and poverty rate influence the Human Development Index (HDI) in East Luwu Regency over the period 2014-2023. This approach aimed to determine whether demographic and socio-economic factors contribute significantly to variations in HDI across the observed years. By applying both partial and simultaneous tests, the study assessed the independent and combined effects of the two explanatory variables on human development outcomes.

The statistical findings, which include the results of the t-tests for individual variables and the F-test for their joint impact, are summarized in Table 2. These tests provide a comprehensive overview of the extent to which population dynamics and poverty levels have shaped HDI performance in East Luwu during the study period.

Table 2. Regression test results (t-test and F-test)

| Variable | B | Std. Error | Beta | t | Sig. | Test Type |
|---|---|---|---|---|---|---|
| Population ($X_1$) | 0.557 | 0.252 | 0.970 | 2.212 | 0.063 | t-test |
| Poverty ($X_2$) | -0.606 | 0.352 | -0.754 | -1.719 | 0.129 | t-test |
| F-statistic | – | – | – | 2.451 | 0.156 | F-test |
| $R^2$ | – | – | – | – | – | 0.412 |

Source: Data processed by researchers (2025)

The t-test results show that both population (Sig. = 0.063; t = 2.212 < t-table = 2.364) and poverty (Sig. = 0.129; t = –1.719 < t-table = 2.364) do not have statistically significant effects on the Human Development Index (HDI) in East Luwu Regency. These findings indicate that, when analyzed separately, changes in population size or poverty rate during the study period were not strong enough to drive substantial variation in HDI.

The F-test result (F = 2.451; Sig. = 0.156 > 0.05) confirms that, even when tested simultaneously, the two variables together do not significantly influence HDI. The coefficient of determination ($R^2$) further highlights that the model explains only 41.2% of the observed HDI variation, meaning that the remaining 58.8% is attributed to other unobserved factors such as education quality, healthcare infrastructure, and local government development programs.

## Discussion

### Population and HDI

The regression results show that population size does not significantly influence the Human Development Index (HDI) in East Luwu Regency. This finding highlights that population growth in the region has not translated into tangible improvements in human development outcomes. While an increasing population can provide a larger labor force and stimulate market demand, these potential benefits may remain unrealized if human capital development such as education, skills, and healthcare fails to keep pace. This suggests that population alone cannot be regarded as a direct driver of HDI improvement.

Theoretically, population growth can act as both a resource and a constraint for human development (Todaro & Smith, 2021). When managed effectively, a growing population contributes to labor supply, innovation, and economic expansion. However, if growth is accompanied by inadequate investment in education and public services, it can place excessive pressure on existing resources and infrastructure. In East Luwu, the insignificant statistical effect implies that the region's population increase has yet to be transformed into productive human capital that significantly raises welfare indicators.

This finding contrasts with Kiha, Seran, and Lau (2021), who observed a significant positive relationship between population and HDI in Belu Regency. The difference suggests that contextual factors such as local economic structure, spatial distribution of services, and levels of industrialization play critical roles in shaping population's impact on HDI. East Luwu's reliance on extractive industries, which require limited labor absorption, may explain why population growth does not directly contribute to improving living standards.

### Poverty and HDI

Poverty, as a multidimensional indicator of deprivation, typically exhibits a negative relationship with HDI since it restricts access to education, healthcare, and a decent standard of living (Khomsan, 2015). However, this study's results indicate that poverty in East Luwu does not significantly affect HDI. One possible explanation is that year-to-year reductions in poverty have been too small to produce notable shifts in human development indicators. Additionally, poverty in East Luwu may not fully capture disparities in access to public services because the HDI also reflects broader investments in infrastructure and human capital.

Another explanation for the insignificant effect is the buffering role of the local economy. East Luwu's mining and industrial sectors may provide alternative income sources that reduce the adverse impacts of poverty on human development. While certain rural areas still face deprivation, aggregate indicators may not show a strong statistical link between poverty reduction and HDI gains, particularly when improvements in education and health services are uneven.

This finding differs from studies such as Jasasila (2020), who reported that poverty had a significant negative effect on HDI in Batang Hari Regency. The contrasting results underscore the importance of local context, as structural differences such as the dominance of resource-based industries in East Luwu may mitigate the typical poverty-HDI relationship. Hence, poverty alleviation programs in East Luwu should be integrated with sector-specific initiatives, especially those aimed at improving access to education and healthcare for disadvantaged communities.

### Combined Effect

The simultaneous F-test result reveals that population and poverty together do not significantly influence HDI in East Luwu Regency. This outcome suggests that other determinants, such as government expenditure on health and education, infrastructure development, or disparities in urban-rural service delivery, may play a larger role in shaping human development outcomes. The relatively low coefficient of determination ($R^2 = 41.2\%$) reinforces the notion that HDI is driven by multiple interacting factors that extend beyond demographic size and poverty levels.

From a policy standpoint, this highlights the need for multidimensional approaches to human development. Addressing HDI improvement in East Luwu requires a stronger focus on enhancing the quality and accessibility of education and healthcare services, especially in rural and remote areas. Investment in these sectors could amplify the benefits of both population growth and poverty reduction, transforming them into more direct drivers of human development.

This finding aligns with Shaleh, Mallongi, and Rahman (2021), who emphasized that government spending on social services has a more substantial impact on HDI than demographic or poverty factors. For East Luwu, future development strategies must prioritize inclusive public service delivery to bridge disparities and unlock the full potential of its growing population while simultaneously addressing poverty.

## E. CONCLUSION

This study analyzed the influence of population size and poverty rate on the Human Development Index (HDI) in East Luwu Regency during the period 2014–2023 using multiple linear regression analysis. The findings reveal that neither population size nor poverty individually has a statistically significant effect on HDI. Furthermore, when tested simultaneously, these two variables also do not show a significant influence on HDI. The coefficient of determination ($R^2$) indicates that only 41.2% of the variation in HDI is explained by population and poverty, while the remaining 58.8% is influenced by other factors such as education, healthcare, infrastructure, and government development policies.

These results underscore that demographic growth and poverty reduction alone are insufficient to drive meaningful improvements in human development. The insignificant relationship highlights the importance of multidimensional strategies that go beyond economic and demographic considerations. Policymakers in East Luwu need to focus on enhancing access to quality education and healthcare services, as well as ensuring equitable distribution of resources between urban and rural communities. Such measures can help transform demographic potential into productive human capital and reduce disparities in welfare outcomes.

This research is not without limitations. The study relied solely on secondary time-series data from BPS and focused only on two independent variables population and poverty over a ten-year period. Consequently, it may not fully capture the broader set of socio-economic and institutional factors that affect HDI. Future studies should consider including additional variables such as government expenditure on education and health, infrastructure development, labor market conditions, and urban-rural disparities to obtain a more comprehensive understanding of HDI determinants. Employing panel data or mixed-method approaches could also provide deeper insights into causal mechanisms.

The implications of this study extend to both theory and practice. Theoretically, the findings contribute to the literature on development economics by reinforcing the notion that HDI is shaped by complex, interrelated factors beyond population size and poverty. Practically, the study offers valuable insights for regional policymakers: efforts to enhance human development should prioritize investments in human capital, particularly in education, healthcare, and public service infrastructure. By adopting a holistic approach, East Luwu Regency can achieve more sustainable and equitable improvements in human development over time.

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