
Relationship between Human Development Index and Gross Regional Domestic Product on Sanitation Access in East Java Region in Achieving Sustainable Development Goals

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Abstract

The policy of full access to sanitation through the Sustainable Development Goals (SDGs) (2015–2030) requires community participation. The role of society in this regard can depend on the Human Development Index (HDI) and Gross Regional Domestic Product (GRDP). The incidence of diarrhea in all age groups is only 3.5%. East Java is a province that contributes significantly to the number of cases of diarrhea in children under five in Indonesia, so sanitation is critical. This study aimed to determine the effect of HDI and GRDP simultaneously on sanitation access in districts and cities in East Java Province. This research was conducted using secondary data from the Central Statistics Agency of East Java Province. The data analysis method used is multiple linear. HDI and GRDP variables positively and significantly impact the number of sanitation access districts and cities of East Java Province in 2016-2019. GRDP partially has a regression coefficient of 0.223 greater than HDI, which means that an increase in GRDP by one unit of rupiah causes an increase in the achievement of sanitation access in East Java Province. As policymakers and implementers, local governments must pay attention to HDI and GRDP to access proper sanitation in East Java Province.

Keywords: SDGs; Sanitation Access; HDI, GRDP.

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I. Introduction

When the 193 member states of the United Nations General Assembly unanimously approved the 2030 Agenda for Sustainable Development in 2015, they introduced the most ambitious global development goal (Frey & Sabbatino, 2018; Setó-Pamies & Papaioikonomou, 2020; Terama *et al.*, 2016). Sustainable Development Goals (SDGs) (2015–2030) commit member countries to end poverty, shifting the world on a sustainable path, and ensuring greater inclusion. This article discusses how well this broad goal is to facilitate sanitation in the country of East Java. The SDGs provide a continuation of the MDGs and a roadmap for ensuring sustainable social and economic progress worldwide. Thus, the SDGs seek not only to eradicate extreme poverty but also to integrate the three dimensions of sustainable development. The significant relationship between poor sanitation and poor health means that water supply must be seen in conjunction with sanitation and the promotion of hygiene as a coherent whole (Totin Vodounon *et al.*, 2022).

Expanding access to sanitation is a goal with broad implications for achieving other SDGs. Access to sanitation is directly related to health outcomes, especially for infants and children. Despite some advantages in reducing child mortality, it still has the highest under-five mortality rate (with 98 deaths per 1000) (UN Inter-Agency Group for Child Mortality Estimation, 2017). Worldwide, diarrheal diseases, most often caused by gastrointestinal infections and transmitted by the oral-fecal route, are the most common cause of child mortality (Botting *et al.*, 2010). Diarrhea and other diseases that often result from lack of access to water and sanitation undermine human capital formation and reduce the productivity of adults who fall ill or have to care for the sick (Ndikumana & Pickbourn, 2017). Therefore, increasing access to sanitation can help improve health and human resource outcomes, thereby contributing to greater overall productivity and decrease environmental impact (I. W. K. Suryawan *et al.*, 2021; Zhang *et al.*, 2010).

Development is a tool used to achieve the nation's goals, and economic growth is one indicator to assess the success of a country's development (Malhotra, 2003). Therefore, high economic growth is the main target for developing countries in implementing development. This is because economic growth is closely related to the increase in goods and services produced in society, so with more goods and services being produced, the welfare of society will increase. The development paradigm currently developing is economic growth as measured by human development as seen by the quality of human life in each country. The benchmarks used to measure the quality of human life are the Human Development Index (HDI) and Gross Regional Domestic Product (GRDP) (Kummu *et al.*, 2018; Najla *et al.*, 2021). Through this increase, it is hoped that there will be an increase in the quality of human life, including access to sanitation.

Diarrheal disease is the number one cause of death in children under five (25.2%) in Indonesia (Trisnaini, 2015). East Java is a province that contributes significantly to the number of cases of diarrhea in children in Indonesia (Raini & Isnawati, 2017). The risk of under-fives dying when suffering from diarrhea is greater than the risk of adults because the proportion of water in a toddler's body is greater than the proportion of water in an adult human body (BUKOLA, 2011). This is supported by the still high metabolic rate of toddlers, causing toddler kidneys to tend to be less able to conserve water than adult kidneys, making it easier for toddlers to become dehydrated, leading to death when suffering from diarrhea.

To support the efforts of the East Java government in achieving sustainable development goals, especially the 6th goal, a deeper study of the capacity and conditions of supporting the achievement of safe sanitation targets for districts and cities in East Java province is needed. Safe sanitation can also affect the achievement of access to safe drinking water. Several things that can be done with sanitation development. These include consolidating and coordinating with districts or cities to plan and implement working groups, reviewing the Provincial Sanitation Roadmap, and providing assistance for sanitation updates. This study is to determine the effect of HDI and GRDP simultaneously on access to sanitation in districts and cities of East Java Province from 2016-2019.

II. Method

The data used in this study is secondary data from the Central Statistics Agency of East Java Province (Badan Pusat Statistik Provinsi Jawa Timur, 2022). The data used is data from 2016-2019 where the data was before COVID-19. This is used to prevent bias in the data. In addition, any significant changes during the pandemic will change the data. Because the data used in the data is secondary data from the government, it is assumed that it has been validated and filled out correctly. The data used consists of 38 regions with 29 regencies and 9 cities in East Java. The total data used is 151 data, including from 2016 to 2019.

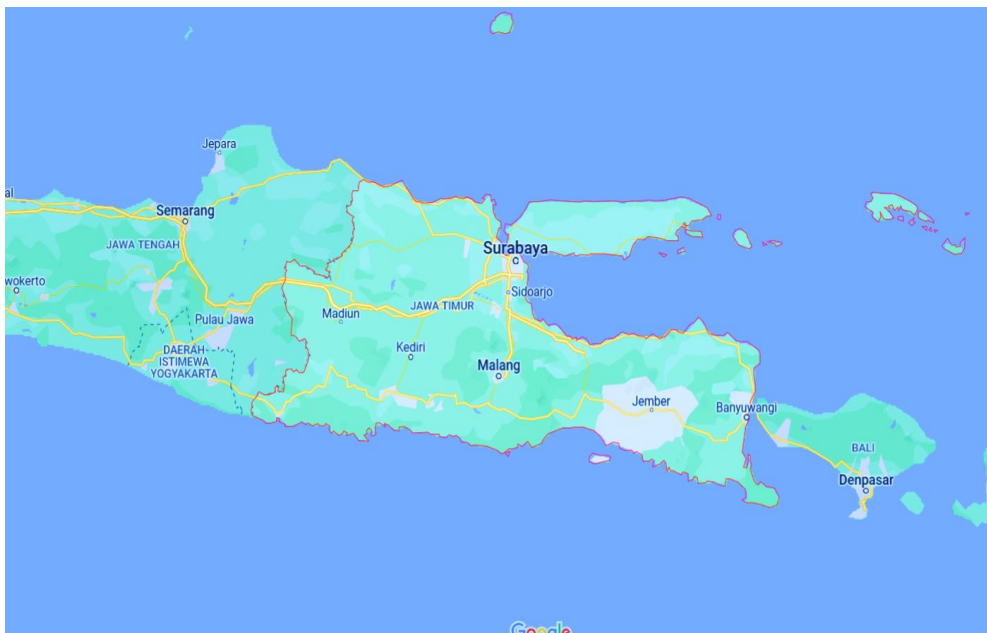


Figure 1. East Java Province Study Area Map
Source: (Google Map, 2021)

The analytical model used to explain the relationship between the dependent variable and the independent variable in this study uses multiple linear regression panel data. The econometric model of this research is as equation (1)

$$AS = \beta_0 + \beta_1HDI + \beta_2EGRDP \quad (1)$$

Where:

AS = Sanitation Access

HDI = Human Development Index

GRDP = Gross Regional Domestic Product

β_0 = Intercept

The regression coefficient was tested after obtaining a regression model with two independent variables. This study used the partial correlation test and the coefficient of determination. It is used to determine how much influence all the independent variables together on changes in the dependent variable Y and measure how strong the relationship between the independent variables that have been set in the best model on the dependent variable. After that, the F test was carried out to measure the significance level. After the F test, the regression model was tested.

III. Result and Discussion

One indicator used to measure development outcomes is the Human Development Index (HDI). HDI is a composite index calculated from the life expectancy index, education index, and decent standard of living index. The calculation of the life expectancy index, education index, and decent standard of living index involves economic and non-economic components such as the quality of education, health, and population. Therefore, the HDI is considered relevant as a benchmark in determining development success. The extent to which these economic and non-economic variables can support the HDI can determine the success of sanitation access goals in East Java Province. Based on HDI calculations from 2014 to 2019, all regions in East Java Province have HDI above 55% (Figure 2).

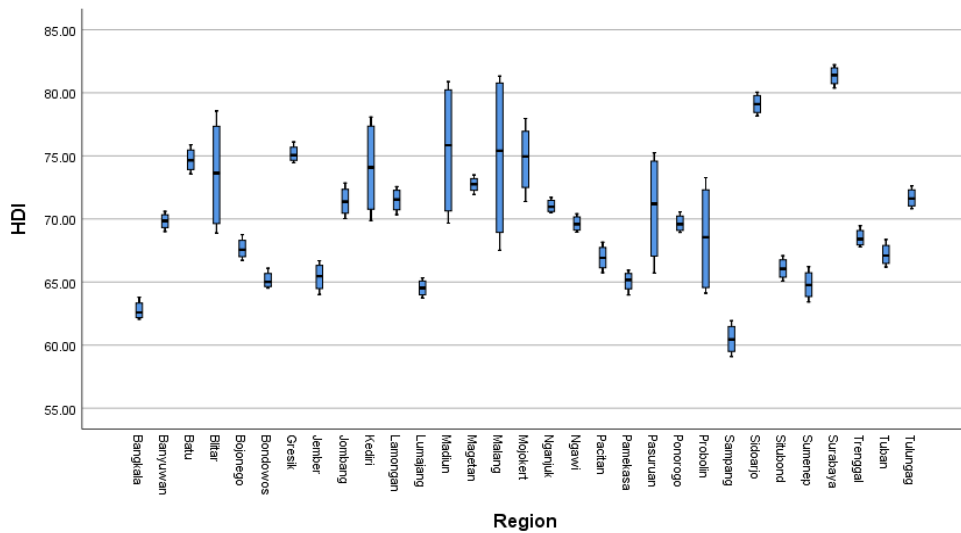


Figure 2. Boxplot HDI in East Java Province from 2016 to 2019
 Source: Processed from (Badan Pusat Statistik Provinsi Jawa Timur, 2022)

The next factor influencing the number of unemployed is the Gross Regional Domestic Product (GRDP). An increase in GRDP will affect the number of unemployed because the total value added of final goods and services in all economic units in a region will increase. An increase in the value-added of final goods and services can absorb higher labour (Yudhiarso, 2015). In GRDP per capita, and constant price ln GRDP using the same two control variables, namely urban population and ln total per capita spending. Furthermore, the unemployment rate and the number of workers use the same three control variables: the urban population variable, ln total per capita expenditure, and constant price ln GRDP. Still, one control variable is different by adding the ln population variable to the variable. Meanwhile, three control variables are used for the poverty level variable: the population in urban areas, ln of total expenditure per capita, and ln of GRDP per capita.

Figure 2 shows that the city of Surabaya is at the highest GRDP value compared to other regions in East Java. The GRDP of Surabaya City from 1987 - 2016 tends to increase every year. The highest increase in GRDP from 2010 to 2011 was from 211,620 billion rupiah to 261,772 billion rupiahs in 2011. Since 2010 the Surabaya City Government has changed policies to optimize GRDP revenue from the regional tax sector, especially taxes on restaurants, hotels, and entertainment venues. (Beritajatim.com, 2016). As a result, the value of Surabaya's GRDP continues to increase significantly to reach 451.486 billion rupiah in 2016.

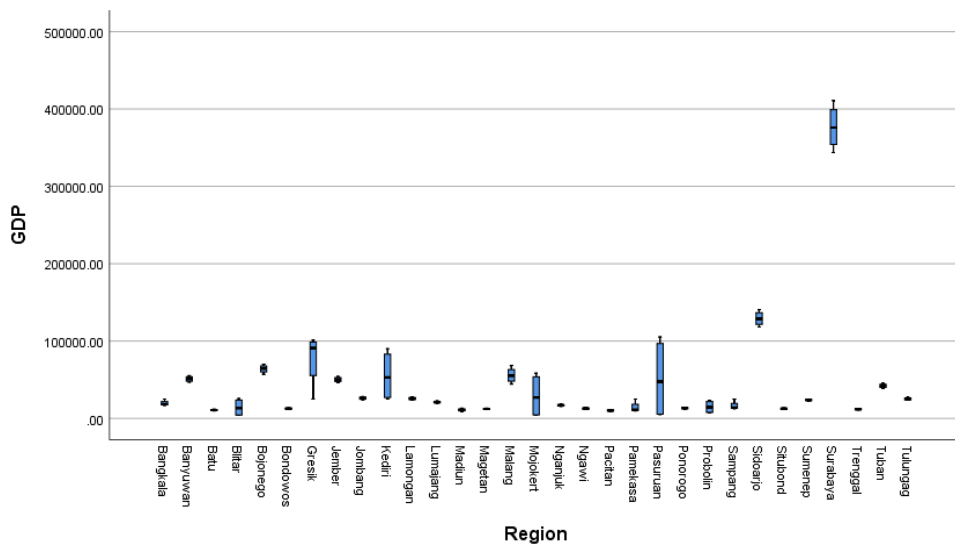


Figure 3. Boxplot GRDP in East Java Province from 2016 to 2019

Source: Processed from (Badan Pusat Statistik Provinsi Jawa Timur, 2022)

East Java Province continues to develop community-based sanitation program policies in various regions. Based on existing data, the distribution of sanitation is above 80% (Figure 3). It can be seen from all areas that Bondowoso, Bangkalan, and Situbondo are the areas that had the lowest access to sanitation from 2016 - 2019. In Bondowoso, community-based sanitation program activities include access to proper sanitation (healthy latrines) as much as 58.97% (Aryani & Riyandry, 2019). Situbondo Regency is one of the regencies in

East Java that has not yet reached ODF district status. Proper sanitation is a basic need of every human being (Nurika, 2018). Sanitation does not only include basic sanitation such as latrines, clean water supply, garbage disposal, and sewerage but also includes ventilation and humidity (Rahayu *et al.*, 2021). Maintaining good sanitary and wastewater treatment conditions at home can prevent the spread of pollution (Koko *et al.*, 2022; Priutama *et al.*, 2022; I. E. K. Suryawan & Sofiyah, 2020).

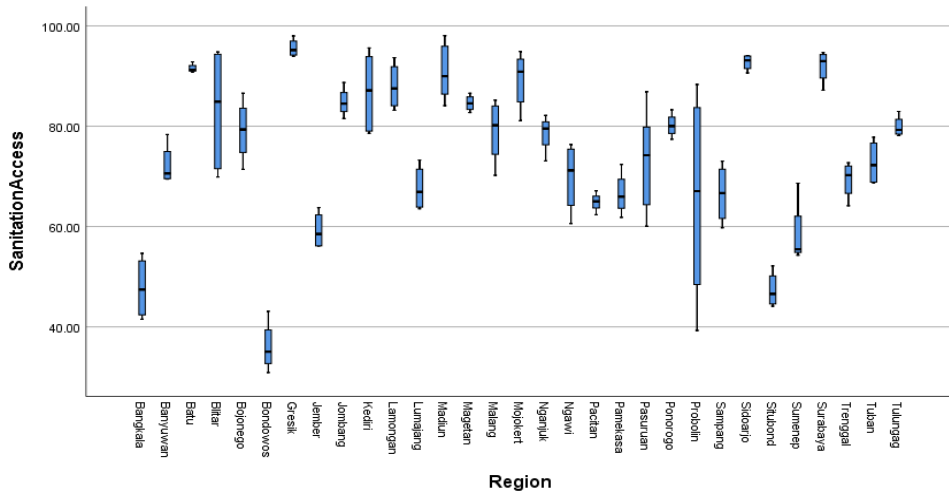


Figure 4. Boxplot Sanitation Access in East Java Province from 2016 to 2019
Source: Processed from (Badan Pusat Statistik Provinsi Jawa Timur, 2022)

Descriptive data of all variables used can be seen in Table 1. For example, the mean value of total sanitation access is 75.83, HDI is 70.7, and GRDP is 40484.2.

Table 1. Descriptive Analysis for Variable in Study

Variable	Mean	Std. Deviation	N
Sanitation Access (%)	75.8327	15.29643	152
HDI (%)	70.7001	5.25641	152
GRDP	40484.2	62628.87	152

Through the estimation results in Table 2, it can be seen the influence of the independent variables on sanitation access. HDI and GRDP variables have a positive and significant influence on sanitation access in districts and cities of East Java Province in 2014-2019. Based on the results of panel data regression in this study, in Table 2, it can be seen that the coefficient of determination (R^2) is 0.667. This means that all independent variables have the ability of 67% to explain the variation of the dependent variable in the regression model. Furthermore, in Table 2, the probability value of the F-statistical test shows the number 0.0000 with a significance level of $p < 0.1$. This means that all independent variables, such as HDI and PDRB, significantly influence sanitation access in districts and cities of East Java Province in 2016-2019.

Table 2. Estimation Sanitation Access Analysis Based on HDI and GRDP

Model	Unstandardized Coefficients	Std. Error	Standardized Coefficients
	B		Beta
(Constant)	64.771***	1.135	
HDI	0.63**	0.335	0.135
GRDP	0.223***	0.034	0.467
R	0.817		
R Square	0.667		
Adjusted R Square	0.662		

***, **, * are significant at $p < 0.01$, $p < 0.05$, and $p < 0.1$, respectively.

ANOVA statistical testing is a form of hypothesis testing that can draw conclusions based on data or statistical groups. Decision-making seen from this test is done by looking at the F value contained in the ANOVA table; the significance level used is 0.05. Thus, it can be concluded that this multiple regression model is feasible to use, and the independent variables, which include HDI and GRDP, have a simultaneous influence on the dependent variable of sanitation access (Table 3).

Table 3. The Dependent Variable of Sanitation Access

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	986.27	2	493.135	23.064	.000b
Residual	3185.838	149	21.381		
Total	4172.108	151			

***, **, * are significant at $p < 0.01$, $p < 0.05$, and $p < 0.1$, respectively

GRDP partially had a positive and significant influence on access to sanitation in districts and cities of East Java Province from 2016 to 2019. This can be seen from the regression coefficient of 0.223, which means that an increase in GRDP of one unit of rupiah causes an increase in access to sanitation. Capital intensive or capital intensive occurs because the skills or education of the existing workforce are still low. Hence, companies prefer to increase capital intensiveness and use the latest technology to achieve production efficiency and maximize company profits.

Lewis (2017) conducted a study on the impact of regional expansion in Indonesia on public services in Indonesia using the Difference in Difference (DiD) and Generalized Method of Moment (GMM) methods as analytical tools. The observed impact is access to education and infrastructure. Control variables used in the analysis include total local government spending per capita, population size, percentage of households that have access to electricity, the ratio of poor people, Gini coefficient, and household expenditure per capita. The existence of regional expansion does not impact the educational aspect. In contrast, from the infrastructure aspect, the condition of the child area is lower than the parent area.

The new growth theory of the importance of the government's role, especially in increasing human capital and improving human resource quality, can be demonstrated by

one's knowledge and skills (Suliswanto, 2012). Increased knowledge and skills will be able to encourage an increase in one's work productivity so that it will be able to assist in increasing access to sanitation based on how much influence the regional gross domestic product (GDP) and the Human Development Index (IPM) (Figure 4).

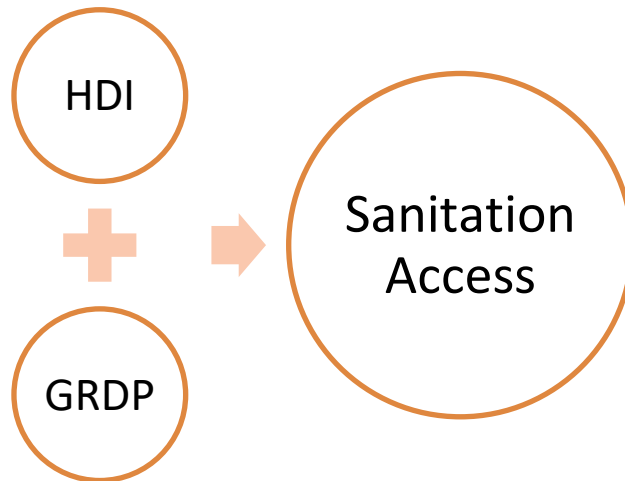


Figure 4. Framework relation HDI and GRDP to Sanitation Access in East Java Province

IV. Conclusion and Recommendation

HDI and GRDP variables have a positive and significant influence on the number of sanitation access in districts and cities of East Java Province in 2016–2019. GRDP partially has a regression coefficient of 0.223 greater than HDI, which means that an increase in GRDP by one unit of rupiah causes an increase in the achievement of sanitation access in East Java Province. Therefore, local governments as stakeholders and policy implementers need to pay attention to HDI and GRDP in achieving access to proper sanitation in East Java Province.

More specific research for social mapping of community access to sanitation is needed to support policies for achieving SDGs on access to sanitation. In addition, HDI and GRDP are significant factors affecting access to sanitation. Therefore, it is necessary to elaborate on the pillars of HDI and GRDP, which can be the key to achieving sanitation access.

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