

# The Effect of GRDP, Foreign Investment and Population Density on Environmental Quality in Java Island (2010-2019)

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# The Effect of GRDP, Foreign Investment and Population Density on Environmental Quality in Java Island (2010-2019)

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**Abstract.** This study aims to analyze and determine the effect of GRDP, Foreign investment and population density on the quality of the environment in Java Island from 2010 - 2019. The method used in this study is Panel Least Square (PLS) with Common Effects Model (CEM). The results of the analysis conducted show that the three independent variables have effects on the dependent variable EQI. With a confidence level of 95% and a significant result, With a confidence level of 95% and significant results, the GRDP variable has a positive and significant effect, while the foreign investment variable and population density have a negative effect on the quality of the environment on the island of Java in 2010 - 2019. From the result of this study, the right steps can be taken for policy makers to achieve sustainable economic development and issue programs or policies that can support environmental quality improvement.

**Keywords:** Environmental Quality Index, GRDP, Foreign investment, Population Density.

## 1 Introduction

Economic development to improve people's welfare needs to be carried out in various aspects, but all economic activities require natural/environmental resources so that economic and environmental activities cannot be separated. The environment can be optimized to support economic development, a country must be able to utilize natural resources as well and efficiently as possible to support economic growth so that the use of natural resources is directed to protect the environment in an effort to grow. One of the challenges of national and regional development in Indonesian is the issue of resource utilization for the economy and environmentally sound resource management. Regional resource development has a dual role in utilizing it as a capital for economic growth (Resourced Based Economy) and at the same time as a support for life systems (Life Support Economy) [1]

According to the Central Bureau of Statistics Indonesia, Indonesia's economic growth is still supported by the island of Java as the center of the national economy and as the largest contributor to national economic growth compared to other islands outside Java. However, important issues in economic development in recent decades are the linkages between economic development and changes in environmental quality which tend to decline.

Based on the presentation of the data on the value of environmental quality and the classification of the EQI category and it is clarified from the comparison in Figure 2 provinces

on the Java Island, there are problems which indicate that no province has yet received the predicate of a good category in increasing the value of environmental quality. The achievement of the value of environmental quality in Java is predicted because of the high economic activity of the island of Java as an industrial island in supporting the development of the national economy. This study aims to examine the effect of GRDP, foreign investment and population density on environmental quality in Java.

## 2 Literature Review

### Development Economic Theory

Economic development according to [2] is a process of increasing total income and per capita income by taking into account population growth accompanied by fundamental changes in the economic structure of a country and income distribution for all residents of a country. Economic development is an effort to increase per capita income by processing potential economic power into a real economy through investment, use of technology, addition of knowledge, improvement of community skills, as well as additional organizational and management capabilities.

### Sustainable Development

Definition of sustainable development by [3] in *World Commission on Environment and Development* (WCED) are included in *Our Common Future* or report Brundtland yaitu development that meets the needs of the present generation without compromising the fulfillment of the needs of future generations whose concept consists of three A-spec economic, social and the environment [4]. According to the *International Union for Conservation of Nature and Natural Resources* (IUCN) (1980) in the *world conservation strategy* explained that to carry out sustainable development, the implementation of development must consider environmental, social and economic factors based on living resources and consider long-term and long-term advantages or disadvantages. short term of an alternative course of action.

### Environmental Economics

According to Lopez, and Thomas [5] states that the economy derives most of its income from natural resources in the country or region. This means that the quality of existing natural resources (including the environment therein) has a considerable influence, where if a country or region is not able to preserve and maintain natural resources and its environment, it will be threatened with stagnation in its growth rate or even decline, especially in the long term.

### Environmental Kuznet Curve (EKC)

The Environmental Kuznets Curve (EKC) theory states that cases in developing countries over time, technological advances can damage nature and the environment. Meanwhile, in developed countries over time, technological advances can improve environmental sustainability. This theory is known as the first theory to describe how the relationship between the level of economic growth and environmental degradation. This theory states that when a country's income is still relatively low, the country's attention - both in terms of production, is investment that can encourage an increase in income by ignoring environmental problems [6]. As a result, income growth will be followed by pollution levels and then it will decrease with continuous growth.

### 3 Methodology and Data Analysis

#### Variable Operational Definition

This study uses secondary data sourced from the Central Statistics Agency (BPS) of Indonesia and the Ministry of Environment and Forestry of the Republic of Indonesia. The following are the variables, in this study .

- Y : Environmental Quality Index
- X<sub>1</sub> : Gross Regional Domestic Product
- X<sub>2</sub> : Foreign Investment
- X<sub>3</sub> : Population Density

#### Data Types and Sources

The data used is a combination of *cross section* data and *time series* data which is also known as panel data. The *cross section* data is data from six provinces on the island of Java and *time series* data is data from the last four years, namely 2010 - 2019.

#### Analysis Method

The model used in this study is the specification of the research model as follows:

Description :

- $EQI_{it}$  = Environmental Quality Index
- $GRDP_{it}$  = Gross Regional Domestic Product
- $PMA_{it}$  = Foreign Investment Realization
- $DEN_{it}$  = Population Density
- $\beta$  = Constant
- $\beta_{1,2}$  = Coefficient
- $\varepsilon$  = Residual (*error term*)
- $i$  = Province
- $t$  = Time
- $log$  = Logarithmic transformation

### 4 Research Result and Discussion

#### Discussion of Research Results

From the results of the research that has been done, the results obtained in the model are as follows:

#### The Influence of GRDP on EQI in Java Island

Gross Regional Domestic Product (GRDP) according to the Central Statistics Agency is the overall value of all goods and services produced in a region within a certain period of time which is used as an indicator to determine the economic growth of a region, analysis material for the level of community prosperity and the level of change in goods and services. services, meaning that the success of the economic development of a country or region is reflected or can be seen from the country's GDP. Based on the results of the GRDP regression, it is positive and significant to the IKLH. This means that if there is an increase in GRDP of 1%, it will cause an increase in the IKLH value of 0.55563% with the assumption of *ceteris paribus*.

The positive relationship between GRDP and environmental quality can be caused by several underlying factors, one of which is the comparison between the value of *Eco Regional Domestic Product* (ERDP) and GRDP. ERDP is the value of conventional GRDP minus the

value of GRDP from The extractive and polluting sectors, the calculation was initiated by *The Statistical Office of the United Nations* (UNSO) in 1990 as one of the *Systems of Integrated Environmental and Economic Accounting* (SEEA). Research conducted by [9] discusses related to ERDP in 30 provinces in Indonesia, the results of the study indicate that the province in Java is not included in the province that has a low proportion of ERDP value to GRDP, this means that the economy is dominant in Java Island. not supported by extractive or environmental resource sectors such as oil, gas, mining and forestry.

Then according to the Central Statistics Agency of Indonesia that economic growth in this case is GRDP in Java Island is still supported by the industrial and agricultural sectors. Gross Regional Domestic Product (GDP) in Java Island which is supported by the Industrial sector and the Agricultural sector when associated with (Law of the Republic of Indonesia Number 32 of 2009 concerning Environmental Protection and Management) concerning Environmental Protection and Management, in article 36 paragraph (1) it is explained that “Every businesses and or activities that are required to have an Amdal or UKL-UPL must have an environmental permit”. It is very evident that if every industrial activity actor can comply with this law to preserve the environment and get strict supervision by government agencies that allow these activities, then the positive influence on GRDP in affecting the environment in Java Island. Then research conducted by [11] discusses the green industrial policy (*Green industrial Policy*) which shows that industrial policy can achieve green growth (*Green Growth*) which is based on the use of sustainable renewable resources and green technology (*Green Technology*) or production techniques that save on non-renewable resources, and that produce fewer greenhouse gases.

The implementation and commitment of the government to maintain a sustainable quality of the environment, through the Ministry of Environment and Forestry of the Republic of Indonesia (KLHK RI) issued a Program for Rating Performance Ratings for Companies in Environmental Management (PROPER) which began in 1995 to encourage companies to improve their performance. sustainable environmental management. From the PROPER assessment, the company will get an image or reputation according to how it manages its environment. The image is divided into 5 upgrades, namely: assessed with Gold, Green, Blue, Red and Black Colors.

Based on the results of the evaluation of the KLHK and Provincial PROPER Technical Teams as well as considerations from the PROPER Advisory Council, then through the Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number Sk. Environment in 2019 – 2020 (can be seen in appendix 9) that in Java there are 19 companies rated GOLD, 53 companies rated GREEN, 651 companies rated BLUE, 110 companies rated RED and 1 company rated BLACK. Of the 834 companies, these companies consist of Agroindustry, Manufacturing, Service Infrastructure, and Oil and Gas Energy Mining (Ministry of Environment and Forestry of the Republic of Indonesia).

From the KLHK publication report, the achievements of PROPER performance in 2019–2020 have achievements that are able to reduce greenhouse gas emissions by 131,238,206 tons of CO<sub>2</sub>e, carry out energy efficiency of 430,244,918 GJ, are able to reduce pollution loads by 46,160,473 tons, provide the impact of water efficiency is 339,529,963 m<sup>3</sup> and 3R (Reuse, Reduce and Recycle) B3 waste 16,403,947 tons and 3R non-B3 waste 5,029,181 tons and are able to reduce conventional emissions by 5,942,514 tons. This achievement needs to be maintained and optimized to improve all aspects that are already running well so that the goal of the importance of a sustainable environmental condition can be achieved optimally and continue to be able to improve environmental quality, especially in Java.

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The results of this study, which is a positive influence between GRDP and the quality of the environment in Java, are in accordance with previous research by [12], [13], as well as research from [14] which suggests that environmental quality will improve along with high economic growth.

#### **The Influence of Foreign Investment on EQI in Java**

Based on the regression calculation, Foreign Investment is negative and significant to IKLH. This means that every time there is an increase in the level of Foreign Investment by 1%, it will cause a decrease in the EQI value of 0.024166% with the assumption of *ceteris paribus*. The results of this study are in accordance with the hypothesis that has been determined by the author and the results of this study are in accordance with research conducted by Pranoto & Halim (8)16 and (Hitam & Borhan, 2012) which research results show that foreign investment has a negative and significant effect on the environmental quality of the provinces in Indonesian.

The realization of foreign investment in Java, which can be seen through publications issued by the Indonesian Investment Coordinating Board, that the development of foreign investment in Java is still dominated by the housing, industrial estates and offices, electricity, gas, water transportation, telecommunications, Chemical and Pharmaceutical Industry and Motor Vehicle Industry.

The achievement of the realized value of foreign investment cannot be separated from the role of the government in efforts to increase income through various laws and regulations to regulate the flow of foreign investment funds into Indonesia. These regulations include (Law of the Republic of Indonesia Number 23 of 2007 concerning Investment, 2007 and later refined again in (Law of the Republic of Indonesia No. 11 of 2020 concerning Job Creation), one of which regulates the ease of doing business and improving the investment ecosystem and business activities. However, as a result of suboptimal adherence and less strict enforcement of regulations related to the environment and foreign investment so that there is a negative impact due to the high activity of industry that does not pay attention to environmental aspects then there are a variety of environmental issues, especially on water quality in Java. And based on the results of the evaluation of the KLHK and Provincial PROPER Technical Teams as well as the considerations of the oldest PROPER Advisory Council in the Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number Sk.460/Menlhk/Setjen/Kum.1/12/2020 concerning the results of the assessment of company performance ratings Life Management in 2019 – 2020 (can be seen in appendix 9) there are still as many as 110 companies getting the image or RED, which means that the company is carrying out environmental management efforts but has not complied with the requirements stipulated in the applicable law in this case including (Assessment) Water Management, Land Damage Assessment, Marine Pollution Control, Hazardous Waste Management, Air Pollution Control, Water Pollution Control, AMDAL Implementation) so that it causes environmental problems on water quality in Java Island. The following is the average water quality index on the island of Java.

#### **The Effect of Population Density on EQI in Java**

Based on the results of the Population Density regression, the value is negative and significant, so it can be interpreted that if there is an increase in population density by 1%, it will cause a decrease in the IKLH value of 0.0136004% with the assumption of *ceteris Paribus*. This means that as the population density increases in each province on the island of Java, the EQI will decrease as well.

The results of this study indicate that areas with high population density tend to have low environmental quality. In 2019, from a publication published by the Indonesian Central Bureau of Statistics that the largest population density in six provinces on the island of Java is DKI Jakarta province of 15900 people / KM<sup>2</sup> with an environmental quality value of 42.84 and is included in the alert category, then West Java. as the second province with the highest population density after DKI Jakarta with a population density of 1394 people / KM<sup>2</sup> and the value of environmental quality of 51.64 which is included in the very poor category. In addition, centers of economic activity such as in big cities can also lead to increased population density. The desire to urbanize with reasons to find work, study, etc. is the main factor in increasing population density. For example, the DKI Jakarta area which is the center of education, and as the economic capital of the country certainly causes people to flock to urbanize there and there is a rapid increase in population density. That is, in theory population density will certainly increase the number of settlements as residential areas, besides that the population spike also results in environmental degradation or the erosion of very limited natural resources [2]. Therefore, the results of this study are in accordance with previous research conducted by Pranoto & Halim (2016) and [18] in which the results showed that population density had a negative and significant influence on environmental quality in 33 provinces of Indonesia.

#### **The Influence of GRDP, PMA and Population Density on EQI in Java Island**

In this study, the variables of GRDP, PMA and population density together have a significant effect on the Environmental Quality Indeks variable. This means that changes in economic growth can lead to changes in the quality of the environment in six provinces of Java Island. Thus, these results are consistent with the hypothesis that has been determined, as well as previous research Y ang done by (Hitam & Borhan, 2012) Pranoto & Halim (2016), and RA & Arsyad (2015).

#### **5 Implication and suggestion for Future Research**

For the creation of sustainable development and the protection of natural sustainability, the government as a policy maker is expected to pay more attention to the management of natural resources and the environment. Together with this, GRDP will have a positive effect on the quality of the environment for managing laws and regulations and also tightening regulations related to the environment in all economic activities that are carried out properly. The existence of these regulations and policies can later provide education about resources and the environment.

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