EFFECT OF WATER QUALITY, ENVIRONMENTAL QUALITY ON ECONOMIC GROWTH IN SOUTH SUMATRA PROVINCE 2013-2017

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Abstract

Environmental problems are currently the most common problems in the Indonesian environment. This environmental problem can be caused by the characteristics of humans as economic beings from several things, ranging from natural factors or factors from humans themselves. Most of these problems sometimes do not have a solution to solve them. So that it causes natural and environmental damage to continue. This study aims to determine the influence of development on water quality, air quality on economic growth in South Sumatra Province. Secondary data used is time series sourced from the Central Bureau of Statistics, IKPLHD and related agencies during the period 2013 to 2017. The analytical tool used in this study is multiple linear regression based on Ordinary Least Square (OLS) along with statistical tests and tests. Classic Assumptions. The estimation results conducted show that the variables of air quality and water quality have a significant influence and have a positive relationship to per capita economic growth in South Sumatra.
Keywords: Air Quality, Water Quality, Economy Growth per capita.

1. INTRODUCTION

An important problem in economic development is how to deal with trade-offs between development and environmental conservation efforts. Development that does not pay attention to these two aspects will cause problems in the future. In short, economic development which merely refers to an advantage without considering the sustainability of nature and the environment will not only have a negative impact on nature but on humans as well. Economic development, namely how to deal with the trade-off between meeting the needs of economic development and efforts to maintain environmental sustainability.

Natural resources in South Sumatra are basically a production factor for companies and activities to improve the economy. However, the output issued by the production sector also produces an impact that is received by the quality of life and in the end has an effect on humans. With a human need, both household and consumer, that is, it has an impact on nature. South Sumatra is one of the autonomous regions that manages its region by increasing industry and maintaining its natural resources. This is evident from the manufacturing sector and the agricultural sector which provide high contributions. South Sumatra Province has a high level of economic activity with abundant resources. As is the case in an area which is an area that has industry, mining, agriculture, plantations and others. Broadly speaking, economic activities in South Sumatra in general are production, consumption in South Sumatra has abundant natural resources, so that if it can be managed properly, it can contribute to regional income and regional development in South Sumatra.

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Table 1. Air Environmental Quality Index in South Sumatra Province
2015 - 2019 (percent)

Air Quality Index	2013	2014	2015	2016	2017	2018	2019
Numbers	54 987	57 476	60 905	67 028	74 900	81 925	88 089
Percent	55.01%	57.45%	60.27%	67.8%	74.28%	81.01%	88.94%

Source: IKPLHD

Based on the data in Table 2, it can be concluded that the high level of income cannot guarantee the improvement of environmental quality. When viewed from the Air Quality Index, which in 2015 was the highest index value of 56.72% and then increased, so that in 2017 it was 74.99% and in 2019 it increased by 88.94%. This means that environmental quality indicators are quite good.

Table 2 Water Environmental Quality Index in South Sumatra Province
2015 - 2019 (percent)

Water Quality Index	2013	2014	2015	2016	2017	2018	2019
Numbers	50 845	53 756	56 841	59 090	60 507	62 124	65 521
Percent	51.03%	53.76%	56.72%	59.07%	60.65%	62.86%	65.47%

Source: IKPLHD

Based on the data in Table 3, it can be concluded that the Water Quality Index was initially 51.03%. Meanwhile, the Water Environment Quality Index has experienced a trend that continues to increase from year to year, but not so drastically. In 2019 the Water Quality Index was 65.47, meaning that it was in a fairly good predicate.

The value of this predicate will later serve as a benchmark indicator in making policies regarding processing issues and protecting environmental quality. The threshold set is in accordance with Law Number 32 Year 2009 concerning Environmental Protection and Management. The impact of the economic growth process can not only increase income from the process of economic activity itself but also cause negative externalities as a form of social costs arising from economic activity. Government Regulation of the Republic of Indonesia Number 74 of 2001 concerning the Processing of Hazardous and Toxic Materials states that with the increase in development activities in certain fields, especially in the trade and industry sectors, there is a tendency for the use of hazardous and toxic materials to increase.

The view that economic growth ultimately benefits the environment leads economists to argue that sustaining economic growth is important because the most powerful way to improve the environment is to get rich. Sometimes this problem does not have a solution to solve it, so that natural and environmental damage continues to occur. This study aims to determine the influence of development on water quality, air quality on economic growth in South Sumatra Province

2. LITERATURE REVIEW

Economic Development

Economic development is the process of creating an environment by the community that affects the results of economic indicators such as an increase in employment opportunities and economic growth. The environment referred to as a planning resource includes the physical, regulatory and behavioral environment.

Schumpeter, defines economic development as a spontaneous and discontinuous change in a circular flow channel which is a disturbance to the balance that always changes and replaces the previous equilibrium state.

Economic development is the main determinant of the success of a country, but on the other hand, development is also a big problem that must be faced, especially the impact of the process of development activities on the quality of the environment.

Economic growth

Simon Kuznets, stated that economic growth is marked by an increase in capacity in the long run in providing various economic goods to the community and this is manifested by the continuous increase in national output and accompanied by technological advances.

Economic development and economic growth work together in achieving national development goals. However, if the two aspects do not pay attention to environmental sustainability, new problems will arise in the future. The existence of technological advances that are not environmentally friendly can endanger their natural habitat. Production process activities are not environmentally friendly as a form of effort to increase output, besides being able to increase income, it will also generate quite large social costs.

Environmental Kuznet Curve

The Environmental Kuznets Curve (EKC) theory states that the case in developing countries over time, technological advances can destroy nature and the environment. Meanwhile, in developed countries over time technological advances can improve environmental sustainability. This theory is known as the first theory that describes the relationship between the rate of economic growth and environmental degradation. This theory states that when a country's income is still low, the country's attention - both in terms of production, is an investment that can encourage an increase in income by ignoring environmental problems. As a result, income growth will be followed by pollution levels and then will decline with continued growth.

Environmental Kuznet Curve divided into three stages, (Panayotou, 2003), among others; first, the beginning of the economic development process will be followed by environmental damage which is known as the pre-industrial economy; second, the industrial economic stage, and third, the post-industrial economic or post-industrial stage. Initially, industrialization started as a small industry and then developed into a large industry. This movement will increase natural resources and increase environmental

degradation. After that, industrialization will expand its role in the formation of domestic national products. This occurs in the second stage, along with the investment that drives the economic transformation from the agricultural sector to the industrial sector.

In the third stage, there is a movement of economic transformation from the industrial sector to the service sector. This movement will be followed by a decrease in air pollution in line with an increase in income. Simultaneously, the demand for environmental quality goes hand in hand with an increase in income. The community began to be able to pay for environmental losses arising from economic activities.

Environmental Externalities

Environmental damage in Economics is caused by human activities, specifically called externalities. Losses or gains that economic behavior suffers or enjoys due to the actions of other economic actors are called externalities. Externalities arise when some activities of producers and consumers have an indirect effect and the externalities that arise can be positive or negative.

Positive externalities occur when activities carried out by a person or group provide benefits to other individuals or groups (Sankar, 2008). Meanwhile, negative externalities occur when a factory process in an area has a negative impact, such as disposing of waste in a river which results in water pollution or causes air pollution resulting in environmental pollution. The residents around the factory will bear the external costs of this economic activity in the form of health problems, difficulty accessing clean water, and reduced clean air.

Pollution in water is not only caused by factory waste, but also caused by the use of chemical pesticides and fertilizers in the agricultural production process. Then, air pollution is not only caused by motorized vehicles and factory fumes but also caused by burning rice barns, which until now is still often done by farmers.

Positive externalities occur when the marginal social benefits are greater than individual costs, therefore individual output is less than social output. Meanwhile, negative externalities occur when the marginal social costs are greater than the marginal individual costs. Therefore, the level of individual output is greater than social output.

3. RESEARCH METHODS

Variable Operational Definition

The operational definition is an explanation of all the variables used in this study in order to avoid misunderstanding for the reader in interpreting the meaning of the study. Based on the variables used, the value of the Environmental Quality Index (ILKH) is a quality standard that reflects environmental conditions. In addition, it can also be used as information material in supporting policy-making that is closely related to environmental protection. The IKLH value is obtained from the calculation of the sum of environmental indicators such as water quality, air and land cover, where each indicator is multiplied by 30%. Conceptually, the IKLH value is comparative, meaning that the value of one province is relative to other provinces.

Meanwhile, economic variables such as the Industry, Agriculture and Transportation sectors are the result of Gross Regional Domestic Product by Business Field at Current Prices with a production approach. All variables used in this study use units in the form of percent.

Types and Sources of Data

In this study, the data source used was secondary data obtained from the Central Bureau of Statistics and IKPLHD. Secondary data used is data from the Indonesian time series from South Sumatra 2013-2019 in the form of data on water quality, air quality and real GDP per capita.

Method of Analysis

The analytical tool in this study uses multiple linear regression analysis based on Ordinary Least Square (OLS). With time series data along with statistical tests and classical assumption tests which aim to determine whether the data is suitable for dieting and to see the effect simultaneously on the dependent variable, the data processing tool used is the E-Views 9.0 program. The following regression equation model is used:

$$Y = a + \beta 0 + \beta 1 X1 + \beta 2 X2 + e$$

Information:

Y	= Economic Growth
B0	= Regression constant
$\beta_1 X1$	= Water Quality Coefficient
$\beta 2 X2$	= Air Quality Coefficient
E	= Error

4. RESULT AND DISCUSSION

Multiple Linear Regression Test

Table 3. Multiple Linear Regression Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.2308	6.5808	-1.099548	0.3333
QA	2,9608	4.1408	0.716786	0.5131
QW	-1.0209	1.0409	-0.981354	0.3820
R-squared	0.268652	Mean dependent var		133988.1
Adjusted R-squared	-0.097022	SD dependent var		43383.26
SE of regression	45439.12	Akaike info criterion		24.58366
Sum squared resid	8.26E + 09	Schwarz criterion		24,56048
Log likelihood	-83.04281	Hannan-Quinn criter.		24,29714
F-statistic	0.734676	Durbin-Watson stat		2.796413
Prob (F-statistic)	0.534870			

Source: processed data, E-views 9.0

Based on the result of statistical calculations as in table 1 we obtained the results of multiple linear regression for the per capita economic growth variable are as follows:
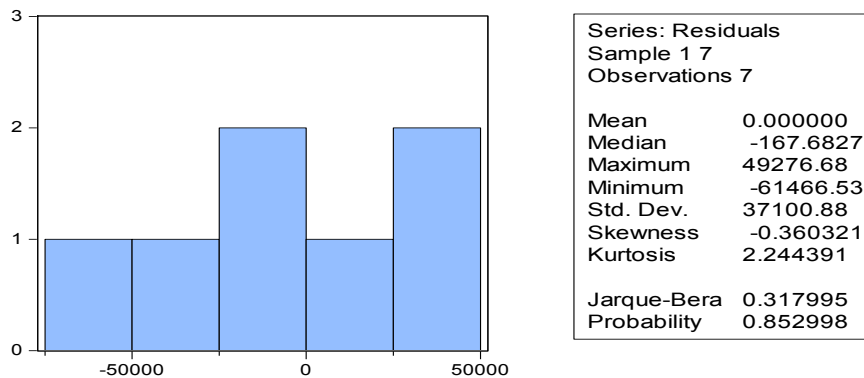
GNP = -7.2308 + 2.9608 -1.0209 + ei

The coefficient results show the efficiency value for the Quality variable air is2.9608 has a positive relationship, which means that the variable air quality increases,

then economic growth will have 2.9608 with a probability value of 0.5131> 0.05 which has a significant impact on economic growth. The coefficient results show the coefficient value for the Water Quality variable -1.0209 and has a positive relationship, which means that when the Water Quality variable increases, it will increase per capita economic growth by -1.0209with a probability value of 0.3820 <0.05 degree of error of 5% so that it is not statistically significant to economic growth.

Residual Normality Test

Figure 1. Normality Test

Series: Residuals	
Sample 1 7	
Observations 7	
Mean	0.000000
Median	-167.6827
Maximum	49276.68
Minimum	-61466.53
Std. Dev.	37100.88
Skewness	-0.360321
Kurtosis	2.244391
Jarque-Bera	0.317995
Probability	0.852998

Source: processed data, E-views 9.0

The normality test used in this study was the Jarque Bera Test. The results of the residual normality test in the attachment show that the jarque fallow value is 0.317995 with a p value of 0.852998 where> 0.05. so that H0 is not accepted, which means that the data distribution residuals are not normal.

Multicollinearity Test

Table 4. Multicollinearity Test Output

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	4.33E + 17	1.47E + 09	NA
QA	1.71E + 17	5.79E + 08	10,69596
QW	1.08E + 18	3.66E + 09	10,69596

Source: processed data, E-views 9.0

Data The above shows that the Centered VIF value of both the Air Quality and Air Quality Variables is above or greater than 10, so it can be stated that there is a multicollinearity problem in the model.

Heteroscedasticity Test (White)

Table 5. White Heteroscedasticity Test

Heteroskedasticity Test: White			
F-statistic	3.068112	Prob. F (2,4)	0.1557
Obs * R-squared	4.237630	Prob. Chi-Square (2)	0.1202
Scaled explained SS	0.860942	Prob. Chi-Square (2)	0.6502

Source: processed data, E-views 9.0

The heteroscedasticity test in this research model uses two tests, namely the Breusch-Pagan test and the White test. In the first test of heteroscedasticity, namely the Breusch-Pagan test, it can be indicated by the value of Prob. Chi square (3) at Obs * R-squared is 0.2290 or a p value of 0.2290> 0.05 then H0 is accepted or which means the regression model in the Breusch-pagan test is homocedasticity or in other words there is no problem with the assumption of non-heterocedasticity. And so on the white test, it was found that the value of Prob. Chi Square (9) on Obs * R-Squared is 0.5060, where the critical value is a = 0.05, so that H0 is accepted, and it can be said that the model does not contain heteroscedasticity problems.

Linearity Test (Ramsey Test)

Table 6. Linearity Test Output

	Value	df	Probability
t-statistic	0.043635	3	0.9679
F-statistic	0.001904	(1, 3)	0.9679
Likelihood ratio	0.004441	1	0.9469

Source: processed data, E-views 9.0

Test The linearity in this study uses the Ramsey reset test, with the p value shown in the probability column of the F-statistic row of 0.9679 where it is> 0.05 so that it can be concluded that the independent variable is linear with the dependent variable.

Determination Coefficient Test (R2)

From the results of the calculation of multiple linear regression analysis, it can be seen that the R^2 coefficient is 0.33 which is almost close to 1. This means that the per capita economic growth in Indonesia during the 2013-2019 period can be explained by about 33% by the variable air quality and water quality While the remaining 6% is explained by other variables which are not included in this research model.

F Test Statistics

The F test aims to determine the effect of all independent variables together (simultaneously) on the dependent variable.

Table 7. Output F-Statistics

F-statistic	0.734676	Durbin-Watson stat	2.796413
Prob (F-statistic)	0.000000		

Source: processed data, E-views 9.0

On The results of the table above show that the F-count value with a significance level of 5% or 0.05 of 0.734676> F-table (0.534) and the F-count Probability value of 0.000 <0.05, so it can be concluded that H1 is accepted, that the independent variable is simultaneously (together with -same) affects the dependent variable.

5. CONCLUSION

Based on the results of the above research, it can be concluded that water quality has a positive and significant effect on economic growth. Air quality variables have a negative correlation, but energy consumption has a statistically significant effect on economic growth in South Sumatra in 2013-2019.

Air and water quality is currently the most common problem in the Indonesian environment. This environmental problem can be caused by the characteristics of humans as economic beings from several things, ranging from natural factors or factors from humans themselves. Most of these problems sometimes do not have a solution to solve them. So that it causes natural and environmental damage to continue.

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