

## **Effect of Environmental Budget on Environmental and Human Development Qualities: Empirical Evidence from Local Governments of Indonesia**

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### **ABSTRACT**

Governments are obliged to allocate sufficient budget to protect environmental and human development qualities. This study, conducted on Indonesian local governments, investigated the impact of the environmental budget on environmental and human development qualities. Using Geospatial Information System (GIS) in acquiring the number of degradation land degradation as a proxy for environmental quality, we documented positive relationships between the environmental budget and the quality of the environment. Local government that allocated more budget on the environment protection and management program tended to have better quality of the environment compared to other areas. Furthermore, there was a positive relationship between the environmental quality and human development quality. A healthy and good quality of environment could have an impact on the community's ability to access education, health, and better economic prosperity.

Finally, we found that the environmental quality affected indirectly the relationship between the environmental budget and the quality of human development. The results of this study indicate the important roles of the environmental budget to improve environmental quality and the quality of human development in Indonesia.

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## INTRODUCTION

Numerous environmental issues such as climate change, pollution, drought, and the decreasing number of biodiversity have occurred all over the world with more complicated issues. To overcome these various environmental issues and to protect the quality of the environment, the government's role is needed. Government should establish the sustainability development in line with the triple bottom line concept as a responsibility for the environment. In the context of the Indonesian government both central and local, the role has become compulsory. The government has the obligation to ascertain that all of its citizens have good environmental quality.

One of the important roles of the government in improving the quality of the environment is to provide support for institutional capacity in the form of budget allocation for environment management (Fiorino, 2011). The environmental budget is one of the instruments and mechanisms for important government policy in either the central or the local government. The policy aims to prevent, recover, and control the protection and management of the environment. Republic of Indonesia Law No.32 of 2009 on the Protection and Management of the Environment (Perindungan dan Pengelolaan Lingkungan Hidup [PPLH]) has stated strictly that both the central government and the Indonesian House of Representatives (Dewan Perwakilan Rakyat [DPR]), along with the local government and the Local House of Representatives (Dewan Perwakilan Rakyat

Daerah [DPRD]), are obligated to allocate sufficient budget through the politics and budget policy. In practice, however, the phrase "sufficient budget" contained in the Law has not been translated properly by the local government (Wahana Lingkungan Hidup [WALHI], 2015).

This study aimed to examine the influence of the environmental budget on the quality of the environment in Indonesian local government. Previous studies have investigated the impact of the environmental budget on the environmental quality at local and country level (Agthe et al., 1996; Kassinis & Vafeas, 2006; Marinoni et al., 2012; Wang, 2011). However, the findings of those studies were inconclusive, as some have found positive, negative, or even insignificant impact. In the context of Indonesian government, both central and local, there is a lack of research addressing this issue.

Besides the effect of the budget on the environmental quality, this study also aimed to analyze the effect of the environmental quality on the quality of human development and examined the role of the environmental quality in mediating the effect of the environmental budget on the quality of human development. The role of this mediation is grounded in the notion that the availability of a sufficient environmental budget is able to improve and restore the quality of the environment of an area, which leads to a better quality of human development within that particular area. Budget allocation for environment protection and management is a concrete

example of the government's effort to prioritize environmental issues within sustainable development.

The studies on the interrelation of budgeting and the quality of the environment and human development are imperative. The central and local governments in Indonesia are focusing increasingly on environmental issues in purview of the frequent ecological disasters. Indonesia has committed to reduce greenhouse gas mission by 26% by 2020 and by 41% if international aid is available (the National Medium-Term Development Plan).

This study was carried out in the local governments across all Indonesian regencies/cities having complete data on degraded land in 2014. The result of this study showed a better environmental quality in those areas with a higher budget allocation for environment protection and management by the local governments. There was a positive association between environmental quality and quality of human development. Moreover, this study also found the role of the quality of the environment in mediating the effect of the environmental budget on the quality of human development.

The novelty of this study lies in the use of Geospatial Information Systems (GIS) for spatial data on degradation of land as proxy for environmental quality in Indonesia. The use of spatial data and GIS technology in the study related to environmental aspects, such as deforestation, degraded land, flood, and potential landslide area, is highly critical as they could improve and complete the numerical data by providing field's visual images more accurately. Spatial

data and GIS have been applied in several research studies in the fields of environment, engineering, and geography, but are being applied for the first time in accounting studies. Therefore, this method might emerge as one of the alternative methods in data gathering for accounting research, particularly for environmental accounting.

The context of municipals/cities research all over Indonesia is the uniqueness of this research compared to other previous studies. There has not been a research that addresses the impact of environmental budget on environmental and human development qualities in Indonesia. Moreover, while previous studies use the total budget that is directly and indirectly related to preservation and management of environment, this study breaks down the component of environmental budget components, thus including only budget components that directly related to environmental quality in the measurement.

This paper begins with a short review of the theories for understanding the environment and human development. It proceeds to provide a review of the related literature on environmental sustainability and develop hypotheses. It then explains the sample selection, research design, and the measurement of the variables used in this study, followed by descriptive statistics, the results of hypotheses testing, and sensitivity analysis. Finally, the study provides the conclusion, limitations of the study, and directions for future research.

## **Literature Review and Hypotheses Development**

**Effect of Environmental Budget on the Quality of the Environment.** Empowering institutional capacity for environment management is one of the keys in improving the quality of the environment (Kementerian Lingkungan Hidup dan Kehutanan [KLHK], 2013). Institutional capacity is defined as the institution's ability to identify the solutions to a problem (Fiorino, 2011). In the context of the environment, a capable institutional capacity is considered able to improve the speed of problem solving for more complex environment issues (KLHK, 2013). The Ministry of Environment explains that there are five classifications of institutional capacity supports: budget availability, human resources, institutional forms, infrastructure, and regulation. Institutional capacity for environment management will serve in improving intervention of government policy in the field of environment. Environmental budget improvement as part of the central and regional environment institutional capacity will accelerate the commencement of the damage control program and the improvement of environmental quality.

In line with the concept of the Triple Bottom Line (TBL), the concept of sustainable development has to balance the aspects of economy, social, and environment. The government development program is not meant only to pursue a certain economic growth level; it is meant also to consider the effect of the development on the social and environmental conditions.

Pursuing a target of economic growth through unwise exploitation of natural resources can have a debilitating effect on the environment (WALHI, 2015). Budget allocation for environment protection and management is one of the efforts that can be done by the government to achieve sustainable development. Therefore, government intervention through sufficient budget allocation is needed to reduce the consequences borne by the community. Previous studies have examined the influence of institutional capacity with budget as one of its components on environment management (Dutt, 2009; Esty & Porter, 2005; Fiorino, 2011; Halkos & Paizanos, 2013; Janicke, 1996). Carrol (1989) contended that the amount of the government's budget allocation for the environment showed how much attention and priority the government allocated on the environment issues.

Ideally, government must allocate sufficient budget for environment protection and management. This budget can be used to not just mitigate environmental damage, but also to preserve, manage, and protect the environment. A sufficient environmental budget allocation concept has been explained explicitly in the Law Number 32 of 2009, which must be understood and implemented to improve environmental quality (Marinoni et al., 2012).

Funding for environmental need is one of the important criteria identified in the framework of Copenhagen Conference on Climate in 2009. The availability of financial resources is a determinant for effective

environment management (Lockwood, 2010) while the government serves as the primary source of finance for environmental activities (Casey, 2005). WALHI (2015) argued that sufficient environmental budget allocation was the epitome of government's commitment to bring the issue of environment in the sustainable development to the fore. It becomes also one of the forms of government's efforts to fulfill its responsibility to guarantee a good and healthy environment for all of the community as a part of their human rights. With sufficient budget allocation, the government can take several measures to maintain, protect, and preserve the environment (KLHK, 2013). If a local government has sufficient budget, then the region has the tendency to have a better quality of the environment compared to other regions. This study, therefore, proposes the following first hypothesis:

*H1: Size of the local government environmental budget has a positive effect on the quality of the environment.*

### **Effect of the Quality of the Environment on the Quality of Human Development.**

The quality of the environment significantly affects the quality of human life (Banzhaf et al., 2014). Previous studies explained that there was close relationship between environmental quality and human development quality (Brown, 2003; Pacione, 2003). Kahn (2002) contended also that the quality of the environment was the main factor for human prosperity. Human prosperity is influenced highly by the

quality of its environment (Štreimikienė & Baležentis, 2015). The impact of pollution and the quality of the environment on human health is also relatively high: therefore, environment preservation and wise utilization of natural resources are some of the important factors to maintain the human life sustainability from time to time. Humans are not the only creatures who have a value on this earth, as explained by the theory of anthropocentrism. Thus, balancing and harmonizing the relationship with other beings is also very important (ecocentrism).

The quality of the environment will influence the quality of human development through several means (Štreimikienė & Baležentis, 2015). First, a good-quality environment (water, air, soil, and waste) will improve community health. Second, the community's lifestyle and behavior will influence the quality of the environment, which in turn affects their quality of lives, such as the use of renewable energy, good waste management, and energy-saving paradigm. Lastly, service consumption provided by the environment will influence the quality of human lives.

A close relationship between the qualities of human development and the environment requires the attention of all stakeholders. The decreasing quality of the environment has threatened the sustainability of human lives and other beings; thus, environment protection and management have to be consistent and thorough (PPLH). This study, therefore, proposes the following second hypothesis:

*H2: The quality of the environment has a positive effect on the quality of human development.*

***The Indirect Effect of the Environment Management Budget on the Quality of Human Development through the Quality of the Environment.*** Environmental budget availability is one of the forms of government's responsibility on fulfilling the community's basic rights for good environment. Sufficient environmental budget allocation might improve also the quality of human development. The fund spent on the environment can be classified as environment recovery fund and environment management fund (PPLH). Both of these funds' allocation are the response to the pressure from various groups of stakeholders (Wang, 2011). Environmental budget allocation represents one of the forms of government's efforts toward sustainability development. Budget allocation for PPLH, however, is threatened by the lack of the PPLH mainstreaming in the budgeting system as well as the stakeholders' awareness on the importance of the PPLH (Haryanto & Nurkholis, 2014).

Support of institutional capacity in the form of environmental budget both directly and indirectly affects human development quality. A sufficient environment management budget can increase the community's health, improve education, and reduce the poverty level either directly or indirectly through the quality of the environment. In line with the concept of the TBL, there should be a balance among economic,

social, and environmental prosperities for preservation and improvement of ecological sustainability and quality of human life. From the perspective of anthropocentrism, ecological sustainability is important for not just humans but for other living beings as well. The impact of the quality of the environment on the quality of human development in a region depends on the sum of the environment management budget in that region. This study, therefore, proposes the following third hypothesis:

*H3: The environmental budget has an indirect and positive effect on the quality of human development through the quality of the environment.*

### **Research Model**

This study used two models. Model 1 was used to examine the effect of the environmental budget on the quality of the environment (H1).

$$ENVQUAL_{2014} = \alpha_0 + \alpha_1 ENVBUD_{2014} + \alpha_2 control + \varepsilon \quad (1)$$

Control variables of this study included economic growth, population, and dummy geographic area (Java/non-Java). Previous studies found that economic growth significantly affected the quality of the environment (Grossman & Krueger, 1995; Peng & Lin, 2009; Welsch, 2004). This study used the GDP as the proxy of economic growth. In addition, it was evidenced that population growth negatively affected the quality of the environment (Peng & Lin, 2009; Burns et al., 1994). Moreover, this study included the local government



geographic area (Java/non-Java) as one of the control variables of environmental quality.

Meanwhile, model 2 was used to examine the effect of the quality of the environment on the quality of human development (H2).

$$HDQ_{2014} = \beta_0 + \beta_1 ENVQUAL_{2014} + \beta_2 ENVBUD_{2014} + \beta_3 control + \varepsilon \quad (2)$$

Where, ENVQUAL is the quality of the environment, ENVBUD is the environmental budget, and HDQ is the Human Development Quality in both the models.

In this model, the control variables used were the percentage of budget on the health sector, the percentage of budget on the education sector, and the status of regencies/cities. Local governments that allocate more funds to health and education sector have better quality of living. Moreover, the Badan Pusat Statistik [BPS] data shows also that cities have a higher HDI than regencies.

## MATERIALS AND METHODS

### Population, Sample, and Data Source

The population in this study covered all (511) the local governments in Indonesia. The environmental and human development qualities data was from 2014 while that for environmental budget was from 2013. This study employed one-year data because of the manual data collection process for both spatial and environmental budget data. Spatial data was collected through data imaging for every polygon, and Indonesia

consisted of approximately 100,000 polygons. Therefore, the time frame of this study was only one year and 2014 was chosen because the environmental budget data from Ministry of Finance showed that the local governments started allocating budget for environmental activities in this year. The use of one-year lagged data for budget variable is based on the view that the impact of the regional government budget on the environment and human development qualities cannot be observed in the same period. Several previous studies (e.g., Agthe et al., 1996) had also used the same method to analyze the impact of budget on the quality of the environment

The method for sample selection in this research was purposive sampling. The regional governments used as samples are those with forest areas since the measurements of the quality of environment used in this research was the percentage of degraded land. Data imaging observation was used to ascertain the region's forest cover. Moreover, the local governments included as samples in this study were those with complete data related to the environmental budget and the HDI. The degraded land data used in this study were sourced from the spatial data published by NASA through their website <http://usgs.gov> and data from the Bureau of Geospatial Information (BIG).

### Measurement of Variables

This study used spatial data describing the width of degraded land as the measurement for the quality of the environment.

Degradation of land could be used as the measurement for the quality of the environment since the forestry sector was the largest contributor of carbon emission reduction. Degradation of land could be measured using GIS. Spatial analysis of land degradation was through performing overlay on several spatial data (land degradation parameter) on 2013 and 2014 to produce a new unit of mapping, which was used as the unit of analysis. This study used the percentage of degeneration of land to total land area and multiplied the degraded land variables with (-1) because the higher the percentage of degradation of land, the worse the environmental quality.

The Human Development Index (HDI) was used as the measurement of the quality of human development. The HDI was based on three basic assumptions covering longevity and health, knowledge, and proper living (BPS, 2015). Environmental budget in this study is defined as the budget spent by the local government to fund all the protection and management programs for the environment according to Law Number 32 of 2009. Chapter 45 of the Law on PPLH explains that the Government and the House of Representative are obligated to allocate sufficient budget to fund the following: a) activities on the protection and management of the environment; and b) environmentally-based development program. This law explains that the PPLH funding begins with the stage of planning, followed by utilization, controlling, preserving, monitoring, and law enforcing. Based on the Law Number 32 of 2009, this study

breaks down the components of government budget by identifying and calculating the amount of budget related to the programs for environment protection.

The environmental budget variable in this study was measured by the percentage of the total environmental budget on the total Local Government Budget (Anggaran Pendapatan dan Belanja Daerah/APBD) of the municipalities/cities. The percentage was used to improve the comparability between the amount of budget for the environment function among the municipalities/cities in Indonesia.

## RESULTS AND DISCUSSION

### Sample Selection Results

All local governments of municipalities/cities in Indonesia were the subject of this study. The local governments used as samples in this study were the municipalities/cities that had complete data related to the exposition of APBD of 2013, the HDI of 2014, and the deforestation and land degradation spatial data of 2014. Indonesia has 511 local governments, consisting of 413 municipalities and 98 cities. Table 1 describes sample selection. The final sample of this study was 370 local governments and proxy used for the measurement of the quality of the environment used was the degraded land.

### Research Results

**Descriptive Statistics.** Table 2 illustrates descriptive statistics (mean, median, standard deviation, minimum score, maximum score) of each of the variables.



Table 1

*Sample selection*

Number of regencies on 2013	413	
Number of cities on 2013	98	
Total local governments on 2013		511
	Incomplete data	Total Sample
APBD Components Breakdown (Environmental budget)	(20)	
HDI	(5)	
Degradation land	(116)	370

Table 2

*Descriptive statistics*

	Mean	Median	Stdev	Min	Max
<b><i>Environmental quality measurement: Deforestation n=368, (Percentage of degradation land, n = 370)</i></b>					
EB	0.04(0.04)	0.04 (0.03)	0.04 (0.04)	0.001(0.001)	0.36 (0.36)
DL	0.06	0.03	0.08	0.000	0.27
TP	478,994.79 (642,683)	519,887 (422,784.50)	110,743.17 (556,629.90)	123,065 (32,739)	694,614 (2,235,418)
GDP	16,917.19 (19,551.21)	9,521 (11,910.50)	18,105.86 (21,381.26)	1,758 (921)	65,274 (83,155)
EDB	0.35 (0.38)	0.34 (0.39)	0.1 (0.1)	0.18 (0.12)	0.55 (0.57)
HB	0.1 (0.11)	0.1 (0.11)	0.02 (0.03}	0.04 (0.04)	0.15 (0.19)
HDI	66.75 (68.01)	66.36 (66.64)	4.15 (5.51)	59.64 (58)	79.12 (83.78)

Notes: EB=Environmental Budget; DL=Degradation Land; TP=Total Population; GDP=Gross Domestic Product; EDB=Education Budget; HB=Healthcare Budget; HDI=Human Development Index

The table shows that the local governments in Indonesia had allocated an average budget of nearly 4% of the total regional budget for the protection and management of the environment. The Human Development Index in this research sample showed the average of the HDI for the regional government in Indonesia in 2014 is 66.75 (68.01), with the highest

(Yogyakarta city) and lowest (Nduga) being 79.12 (83.78) and 59.64 (58), respectively. On average, in 2014, Indonesia had seen 6% degradation of land of all the total area.

**The Effect of Environmental Budget on Environmental Quality.** The first hypothesis of this research states that the environmental budget has a positive effect

on the quality of the environment. The result of the H1 examination can be seen in following table (Table 3).

Table 3 shows consistency with H1 that the environmental budget has a positive effect on the quality of the environment measured by the percentage of degraded land. It shows that regions allocating higher budget for the activities of protection and management of the environment have a tendency to lesser land degradation compared to other regions.

Overall, the result of hypotheses is consistent with the previous research (Fiorino, 2011; Halkos & Paizanos, 2013; Wang, 2011) that the environmental budget has an important role in improving the quality of environment. The finding of this research is also in line with the decree of Chapter 45 on the Law Number 32 of 2009, which states that the government is

obligated to allocate sufficient budget for the activities of protection and management of the environment. Budget allocation begins with the stage of planning, utilizing, controlling, preserving, and monitoring on each of the activity of protection and management of the environment. This is one of the efforts made by the government to resolve environmental damage caused by negative external factors.

**The Effect of the Quality of Environment on the Quality of Human Development.**

The result of H2 testing that analyzed the effect of the quality of environment on the quality of human development can be seen from Table 4. It shows the examination of the effect of the quality of the environment measured by the land degradation on the Human Development Quality. This study identified that quality of the environment

Table 3  
Regression results (Model 1)

ENVQUAL <sub>2014</sub> = a <sub>0</sub> + a <sub>1</sub> ENVBUD <sub>013</sub> + a <sub>2</sub> control+ e... (1)		
Variables	Expected Sign	Coef/Prob
C		0.041
ENVBUD	H1 :+	0.1364***
STAT	-	(0.0612)***
TP	-	(0.0329)**
GDP	+/-	(0.396)
Adjusted R-squared		16.21%
Total Sample		370

Note: \* significant at p< 0.1; \*\* significant at p< 0.05; \*\*\* significant at p< 0.01; ENVBUD=Environmental Budget; DL=Degradation Land; TP=Total Population; GDP=Gross Domestic Product; EDB=Education Budget; HB=Healthcare Budget; HDI=Human Development Index; STAT = Java (0), Non Java (1)

Table 4

Regression results (Model 2)

$$HDQ_{2014} = b_0 + b_1ENVQUAL_{2014} + b_2ENVBUD_{2014} + b_3control + e... (2)$$

Panel B. ENVQUAL = (-) PERCENTAGE OF DEGRADATION LAND

Variables	Expected Sign	Coef/Prob
C		62.215***
(-)DL	H2 : (+/-)	3.128*
ENVBUD	(+)	0.2671***
EdB	+	3.8158
HB	+	0.7956
DUM	+	1.2543
Adjusted R-squared		22.64%
TOTAL SAMPLE		370

Note: \* significant at p<0.1; \*\* significant at p<0.05; \*\*\* significant at p<0.01; ENVBUD=Environmental Budget; DL=Degradation Land; TP=Total Population; GDP=Gross Domestic Product; EDB=Education Budget; HB=Healthcare Budget; HDI=Human Development Index; STAT = Java (0), Non Java (1); DUM=(0) Municipal, (1)City

had a positive and significant effect on the quality of human development. It shows that if a government had a low level of land degradation, then there was a tendency that the local government had a high HDI. The finding is consistent with Banzhaf et al. (2014) research, which found a close relationship between the quality of the environment and the quality of a community's life. A healthy and good quality of environment can have an impact on the community's ability to access education, health, and better economic prosperity.

**The Indirect Effect of the Environmental Budget on Human Development Quality through the Quality of the Environment (H3).** In addition to examining the direct effect of environmental budget on the HDI, this study examined the indirect effect through the quality of the environment. Table 5 shows the test of indirect effect. By using degraded land as the measurement for the quality of the environment, it was found that the environmental budget had an indirect effect on the quality of human development through the quality of the environment. The result is consistent with H3.

Table 5

Indirect effect

	Coef a <sub>1</sub> (Model 1)	Coef b <sub>1</sub> (Model 2)	Indirect Effect (a <sub>1</sub> x b <sub>1</sub> )
<b>H3 (Degradation Land)</b>	0.1364***	3.128*	0.4267**

This result proves the role of environmental quality mediation in explaining the effect of the environmental budget on human development quality and suggests that if there is sufficient allocation of the local government's environmental budget, then the quality of the environment can be improved, which leads to improved human development quality. This is in line with the view on the success of human life quality improvement that is highly affected by the basic dimensions of development, which are healthy life, longevity, access on education proper life standards. The fulfillment of these two basic dimensions highly requires a healthy and proper environment condition. This healthy and proper condition of the environment-requires great internal support, one of which is the budget availability for the function of the environment.

## DISCUSSION

This research argues that the environmental budget has a positive effect on the quality of the environment. If a local government allocates a larger budget for environment protection and management, then there is a tendency for the regions to have a better quality of environment compared to other regions at that particular time. This finding provides empirical evidence on the importance of the environmental budget in improving the quality of the environment.

The finding of this study supports the decree of Law Number 32 of 2009 on the management and protection of the

environment. It states explicitly that the regional government is obliged to allocate a sufficient budget for the protection and management of the environment. In the implementation, however, not many local governments are able to interpret well the meaning of a sufficient budget. This condition is proven by WALHI's data that show on average, local government environmental budget is 0.76% of the total APBD. The number is significantly smaller compared to the education budget that extends up to 20%. However, if the local government can prioritize the environment aspect through budget allocation, then it will have a direct effect on the quality of the environment such as the decrease of deforestation and the percentage of degraded land. Other than the role of the local government, in relation to the aspect of budgeting, commitment, and support from the legislatives (DPR and DPRD) to allocate sufficient, effective, and efficient environmental budget is crucial.

Previous studies have found that environmental quality and human development quality have a considerably tight relationship (Banzhaf et al., 2014; Štreimikienė & Baležentis, 2015). Consistent with the previous studies, this study shows that land degradation has an effect on human development quality.

The environmental budget has a positive effect on the human development quality through the quality of the environment. This shows that the environmental budget can improve the quality of the environment;

a healthy and good environment can be a development capital that aims to improve the quality of human development.

Previous studies have investigated the impact of environmental budget on environmental quality (Agthe et al., 1996; Kassinis & Vafeas, 2006; Marinoni et al., 2012; Wang, 2011). However, in the context of Indonesian government both central and local, there have not been a research that addresses this issue. Therefore, this study is conducted within the context of local government in Indonesia by using indicators of environmental quality namely the percentage of degradation land areas compiled from spatial data. The use of spatial data has never been used in prior studies.

### Sensitivity Analysis

**Use of the Percentage of Total Degraded Land as the Indicator of the Quality of Environment.** Land degradation can be categorized into four groups: very critical, critical, slightly critical, and potentially critical. In the primary examination, the percentage of the total of very critical, critical, and slightly critical was taken as the measurement of the quality of the environment. This study examined also the percentage of the total critical deforested area (including potentially critical) as the indicator of quality. This was tested because the potential degeneration land area was quite large and there was a possibility that it would soon be degenerated in the near future. The result shows that the environmental budget had a positive

and significant effect on the quality of the environment. This is consistent with results of the main study.

### CONCLUSION

This study aims to examine the effect of the environmental budget on the quality of the environment and the quality of human development. This study is conducted in local governments (municipals and cities) in Indonesia. The use of different quality of the environment indicator and the context of municipals/cities research all over Indonesia is the uniqueness of this research compared to other previous studies. In measuring the quality of the environment, this study uses the percentage of land degradation. Land degradation in this study used the spatial data and GIS. The use of spatial data and GIS technology in this study relates to the aspects of environment such as deforestation, critical deforested area, landslide, and flood potential that are highly important since they can improve and complete the numerical data by visualizing the field's condition more accurately.

This research finds that the regional government environmental budget has a positive effect on the quality of the environment. It shows that if a local government makes sufficient budget allocation toward the activities of protection and management of the environment, then there is a tendency that the region has a better quality of environment. This study finds also that good environmental quality has an impact on the quality of human development, as can be seen from

the aspects of education, health, and the community's economic prosperity.

This study has the limitation that could be used as the recommendation for future research. First, this study used the percentage of degradation land as the proxies of environmental quality. These are specifically selected to represent the natural conditions of Indonesia as the third largest tropical rain forest country in the world. The forestry aspect is the largest contributor toward the quality of the Indonesian environment. Moreover, future research might use other proxies of environmental quality such as air quality, water quality, and other measures. Second, due to data limitation, this is a cross-sectional study conducted across all local government of the regencies/cities in Indonesia only. This study employs one-year data due to the manual data collection process for both the spatial and environmental budget. Spatial data is collected for every polygon, where Indonesia consists of approximately 100,000 polygons. Therefore, there is limited generalizability. The use of data panel in the future research might present a more comprehensive description.

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