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CASE STUDY ANALYSIS OF SUCCESS MDGs per capita INDONESIAN NATIONAL INCOME TOWARD CO^2 EMISSIONS USING ENVIRONMENTAL Kuznets CURVE

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Abstract *: The Indonesian government has mainstreamed the MDGs in the National Long Term Development plan (RPJPN 2005-2025), National Medium Term Development Plan (RPJMN 2004-2009 and 2010-2014), the Program Annual Work Plan (RKP) and document the State Budget (APBN) more specifically on the 7 th goal is to preserve the environment. This study aimed to determine the effect of economic growth on emissions of CO^2 in Indonesia. This analysis uses Kuznets curve describes the relationship between economic growth as measured by per capita income to the level of environmental degradation and will result in a curve with an inverted U shape (Inverted U Curve) with the type of data used is secondary data in the form of time series data of national income and emissions of CO^2 in Indonesia in 1960 until 2010 it was assumed that vulnerable between the time constant. The variables in the study are divided into two independent variables national income per capita of Indonesia and the dependent variable CO^2 gas emissions, Based on these results CO^2 emission levels the forest area in Indonesia in the descriptive analysis of consecutive increase and the damage / deficiency in the period 1960-2010. This study shows that the Enviroment Kuznets Curve (EKC) is not applicable in Indonesia in the case of CO^2 emissions with national income per capita, shown in the regression line which tends to rise. The researchers concluded that Indonesia is still in the phase 1 where the higher national income per capita higher the emissions of CO^2.*

Keywords *: MDGs, CO^2 gas emissions, Kuznets curve, success of the MDGs, RPJPN*

INTRODUCTION

A. Background

MDGs declared in the month of September 2000, it was agreed by 189 nations and signed by 147 heads of government and heads of state in the Summit (Summit) The Millennium United Nations (UN) in New York, United States. In the summit all the representatives of countries present agreed to reduce the proportion of people whose income is less than US $ 1 a day to half between the period 1990 to 2015, found a solution for: fighting hunger, malnutrition and disease, promoting gender equality and women's empowerment, ensure basic education for everyone and supports the principles of Agenda 21 on sustainable development as well as direct support from developed countries to developing countries in the form of aid, trade, debt relief and investment.

The main focus in the MDGs is human development, laying the groundwork on a global partnership for development. It is hoped that countries that richer can support poor countries and developing in carrying out their development tasks. Secretariat and some development agencies of the UN, with representatives of various international institutions such as the IMF, World Bank and OECD as well as experts other international development set eight millennium development goals with one or more targets for each goal (a total of 18 targets), as well as 48 indicators to monitor and measure progress targets and goals set forth, between the period of 1990-2015.

The millennium development goals is the commitment of the international community towards the development of a vision of development that promotes human development as the key to achieving social and economic development sustainable by creating and developing cooperation and global partnerships. 8 (eight) millennium development goals are as follows: 1) Eradicate extreme poverty and hunger; 2) Achieve universal primary education; 3) Promote

gender equality and empower women; 4) Reduce child mortality; 5) Improve maternal health; 6) Combat HIV / AIDS, malaria and other diseases; 7) Ensure environmental sustainability; and 8) Develop a global partnership for development. The eighth goal of the MDGs is generally a large topics related to poverty,

The Indonesian government has mainstreamed the MDGs in the National Long Term Development plan (RPJPN 2005-2025), National Medium Term Development Plan (RPJMN 2004-2009 and 2010-2014), the Program Annual Work Plan (RKP) and document the State Budget (APBN).

Mainstreaming MDGs in RPJMN 2010-2014 to accelerate the achievement of MDG targets embodied in the policies and strategies that include:

1. Policies and strategies for reduction of poverty and hunger;
2. Policies and strategies to achieve basic education for all;
3. Policy promotion of gender equality and empowerment of women;
4. Policies and strategies for reduction of child mortality;
5. Policies and strategies to improve maternal health;
6. Policies and strategies for infectious disease control; and
7. Policies and strategies to ensure environmental sustainability.

More specifically, the MDGs (Millennium Development Goals / MDGs) 7th are:

1. Ensuring environmental sustainability.
2. Reducing by half the proportion of people worldwide do not have access to safe drinking water and good health.
3. Reducing the impact of further loss of biological diversity (biodiversity).

The issue of what exactly we are dealing with so we need to pay attention that the planet Earth, Consider some of the following issues:

1. The decline in the proportion of forest area to total land area.
2. The small ratio of protected areas.
3. The more inefficient energy consumption.
4. CO2 emissions per capita nationwide.
5. Lack of control for the consumption of substances that harm the ozone (ozone depleted substance or ODS).
6. The decline in the proportion of the population using biomass.

B. Formulation of the problem

How does the influence of economic growth on CO^2 emissions in Indonesia

C. Aim

Knowing the influence of economic growth on CO^2 emissions in Indonesia

LITERATURE REVIEW

A. Theory of Economic Relations and the Environment

There interlocking relationship between economic development and the environment. One theory in economics, namely the Environmental Kuznets Curve (EKC) or environmental Kuznets curve. This curve is often used to describe the relationship between economic development and environmental quality. This refers to the hypothesis of an inverse relationship shaped "U"

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between the economic output per capita and some measure of environmental quality (Everett et al, 2010).

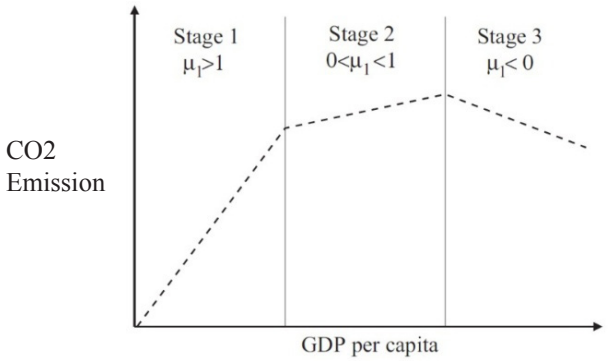

Figure 1. Environment Cuznet Curve

The shape of the curve is explained as follows. GDP per capita in this case is shown by the horizontal line, while the damage to the environment in this case indicated by a vertical line, has three conditions:

- The first condition, at the time of low income, measures to reduce the environmental damage is not done by humans, for better use of their limited income to meet the basic needs of consumption;
- The second condition, at a certain level of income has been reached, people began to consider the trade-off between quality and consumption environment. In this condition the extent of environmental damage began to slow down, and
- The third condition, after a certain point, the expenditure for the reduction of environmental damage dominates individuals to prefer to environmental improvements compared to subsequent consumption. In the end the quality of the environment started to improve along with economic growth. Environmental Kuznets curve we can understand as processes that occur at the following explanation:
  a. Due to advances in technology: the company initially concentrated on expanding production as quickly as possible, but as technology develops production processes cleaner and more efficient power source;
  b. Due to changes in behavior: people initially interested in a higher level of consumption, regardless of the ways is reached, but after a certain point greater consideration given to other factors that affect the quality of life, including the environment;
  c. Because Lewis growth model: the pattern of any economic development characterized by changing patterns of economic activity. Phase 1, community concentrating primary resource sectors (ie agriculture) to meet the required consumption; Phase 2, the resource switches to the secondary sector (ie manufacturing) as basic needs are met and further consumption is concentrated in consumer goods, and Phase 3, people moving from the secondary to the tertiary sector (ie services) is characterized by the degree of environmental damage is much more low.

B. Economic growth

Economic growth is defined as growth in economic activity that led to the goods and services produced within the community to grow and increase the prosperity of society (Sukirno 2000). So economic growth measures the achievement of the development of a more keperiode perekonomian.Dari a period of a country's ability to produce goods and services

will increase. This increased capability is caused by the increase of production factors in both quantity and quality. The investment will add capital goods and technology used also growing. Besides, labor increases as a result of population growth with increasing education and skill us. Economists define growth or economic development as the increase in GDP / GNP. In a broad sense, economic growth is used to indicate the development in developed countries. While economic development to declare progress in Developing Countries (Arsyad 1992).

Economic growth is one of the important indicators to analyze the economic development that a country. "Growth" (growth) is not synonymous with "development" (development) Economic growth is one of the requirements of the many requirements needed in the development process (Meier 1989). Economic growth is only recorded an increase in the production of goods and services nationwide, while the development dimension lebihluas. One of the goals of regional economic development is to increase regional economic growth.

C. Indonesian forest

The ratio of forest cover based on satellite imagery captured and aerial photographic surveys of the land area recorded 52.43 per cent in 2008, down significantly when compared to the baseline year of 1990 when forest cover reached 59.97 percent. Nevertheless, since 2002 new policies and programs started to reverse the trend of forest degradation, which began the decade of the 90s. Indonesian forest degradation and the decline of biodiversity occurs on a large scale before 2002 as a result of the practice of sustainable forest management, illegal logging, forest fires and forest conversion to other uses. The conservation and forest restoration have increased since 2002.

As we all know, that the forests are the lungs of the earth where a variety of live animals, trees, mining and various other resources that we can get from the forest invaluable to humans. Forest is also a natural resource that provides substantial benefits for human well-being, both tangible benefits are felt directly, or intangible perceived indirectly. The immediate benefits such as the provision of timber, wildlife, and mining. While the indirect benefits such as recreation benefits, protection and water regulation, pencegahanerosi.

The forest, in this case the carrying capacity of forests to all aspects of human life, animals and plants is determined at the level of human consciousness of the importance of forests in forest use and management. Forests serve as media reciprocal relationship between humans and other living things by natural factors that consists of ecological processes and is a unity that can support life cycle (Reksohadiprojo 2000).

Given the importance of forests to society, the role and functions of forests need to be explored further. Utilization of forest resources, if done in accordance with the functions contained in it, such as the protection function, the function of reserves, production function, the function of the ability of travel to support human resource development, science and technology, will be in accordance with the results ingin dicapai.

1. Forests as part of natural resources
   In general classification of natural resources are divided into form (Zain, 1997):
   a. Land farm
   b. forest with various yield
   c. natural lands for beauty, recreation or for Scientific research
   d. inland fisheries danlaut
   e. mineral resources of fuel and non-fuel
   f. non-mineral energy sources such as geothermal, solar, wind, water power source, a tidal wave.

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Natural resources can be divided into a resource that can be renewed or can be refilled or not will be depleted and the resources that can not be renewed or restored as the original state. We usually classified as renewable resources, such as forests, fisheries, agricultural and non-renewable resources, such as ores, fossil fuels and so forth.

Forests as part of the national natural resources has a meaning and an important role in various aspects of social life, the development environment. It has been accepted as an international agreement that forests that serve important for the life of the world, must be nurtured and protected from actions that undermine ekosistemdunia.

Forests have a variety of benefits for life. The forest benefits obtained if the forest is guaranteed its existence so that it can function optimally. The functions of the ecological, economic and social of the forest will provide a real role when managing natural resources such as forest conservation efforts in order to achieve sustainable development.

2. Forest functions in development

In the general pattern of long-term development both placed on the economics of which put emphasis on economic development which manages the wealth of the Earth Indonesia. Such as forestry and mining have to keep in mind that the management of natural resources, in addition to the benefit of the present, must also guarantee the life time of renewable natural depan.Sumberdaya must be managed in such a way that its function can always be maintained throughout masa.Oleh therefore, natural resources must be maintained so its ability to renew itself is always maintained. Non-renewable natural resources must be used economically as possible and this will be the outcome as long as possible. Forestry development should be increasingly directed for improve the utilization of forests for the domestic industry so that it can menghasilkannilaitambah and create jobs as much as possible.

General policy for forestry development in Pelita VI set forth in the 1993 Guidelines as follows:

a. forestry development is directed to provide benefits to the overall prosperity of the people while preserving the remaining forests, and by giving priority to the preservation of natural resources and environmental functions, maintain the water system, as well as to expand business opportunities and employment, improve resources and state revenue, foreign exchange and refers pembangunandaerah.
b. Development of production of timber and non timber held by improving utilization of production forests, community forests, forest plantation and natural forest productivity improvement efforts are supported by the provision of forest plant seeds of superior forest and forestry cultivation yangtangguh.
c. As one of the determinants of forest ecosystems, improved management of integrated and environmentally to keep and maintain the function of soil, water, air, climate and environment and provide maximum benefit to the community.
d. Forest rehabilitation and critical land, soil conservation, rehabilitation of rivers, wetlands, preservation of natural caves, coral reefs, flora and fauna as well as the development of improved watershed functions and makindisempurnakan.
e. In forestry development, participation of the public in the surrounding forest areas including forestry transmigration society need to be given the opportunity danditingkatkan.
f. Exploitation of forest products tailored to dayadukung natural resources in order to secure sustainability of forest resources and environmental destruction dapatdicegah.
g. Forestry development should be supported with extension activities, education and training, legislation, and research and development of information provision.

At the discretion of the coaching core forest area, there are steps to implement the following:

a. acceleration stabilization of the region
b. Improving quality and productivity of forests and community forest
c. Increased efficiency and productivity of forest management and management of forest products
d. Community participation, poverty alleviation and income generation daerahtertiunggal.
e. Increasing the participation of cooperatives, medium, small dantradisional
f. The increase in carrying capacity of land through reforestation and land rehabilitation and quality improvement Environmentalists
g. Quality improvement function conservation areas hutanlindung
h. Preservation of natural resources danekosistemnya
i. Increasing the role of local governments in the implementation of forestry development
j. Improved forestry extension, the role of youth and women in forestry development
k. Forest protection, forest products and other natural resources.
l. Enhancing the role of research and development in forestry development
m. Developing human resources are developed and independent and have the motivation tall one.
n. Improving institutional, statutory and forestry management information systems.

D. Carbon dioxide (CO2) as the Greenhouse Gases

As one of the greenhouse gas, CO2 distinctive characteristics is not able to be penetrated by terrestrial wave / long wave / long wave radiation (LWR) derived from the earth's surface. Together with the water vapor absorbs CO2 from the earth more than 90% LWR (Trewartha and Lyle, 1995). However, CO2 is still drivable short-wave radiation (wavelength spectrum of 0.3 to 4μm) from the sun. Long wave is a wave radiated by a black body (an object with a temperature above 273 K) with a wavelength spectrum range 4-120μm (Santosa 2002).

CO2 in the atmosphere as if it acts as a trap LWR. The greater the amount of CO2 (carbon atmosphere), the more LWR trapped. This phenomenon will be followed by an increase in the proportion of the thermal wave (thermal energy) that can be absorbed by atmospheric particles. Such improvements will further increase the temperature (degree heat) which is an expression of the kinetic energy (motion) atmospheric particles.

In addition there are several types of CO2 other gases that are greenhouse gasses methane (CH4), nitros oxide (NO2), water vapor (H2O), and ozone (O3). Each of GHG will have different abilities to absorb LWR spectrum. LWR is able to absorb CO2 in the range of 7 μm wavelength spectrum upward, CH4 and NO2 at wavelengths of 3-7 μm, and H2O absorb wavelengths of 3-20 μm (Santosa 2002).

Each of the gas will also determine the behavior of air heating, but CO2 is regarded as the main GHG and as these sectors are instrumental in increasing the air temperature.

1. The high rate of growth (Enhanced Emission) CO2
   There is a tendency to an increase in CO2 emissions high enough from year to year. Gribbin (1980) in Santosa (2002) reported that the amount of CO2 emitted in 1860 was still below 2,000 metric tons, increasing rather slowly until 1940 which is around 6,000 metric tons of dansetelahitu increase markedly, especially after 1960; and by 1970 had reached 20,000 metric tons. In Indonesia is based on a study conducted Algas, in 1990 the contribution of CO2 occupies the top spot in GHG emissions of around 438,609.64 Ggram followed by CH4 and N2O (Table 1).

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Table 1. GHG emissions in Indonesia in 1990 (The GHG emission of Indonesia in 1990)

Gas (Gases)	Equivalent CO2 emissions (Gg) (CO2 emission equivalent)	Percentage emissions (%) (Emission percentage)
CO2	438,609.64	59.1
CH4	142,042.81	19.1
N2O	31113.21	4.2
other gas	130,809.21	17.6
Total	724,575.26	100

Source (Source): Algas National Workshop (1997) in Santosa (2002)

Murdiyarso (2003) reported that compared to other greenhouse gases in recent decades CO2 emissions have increased by more than double dari1.400 million tons / year to 2.900 million tons / year. Meanwhile, in the same decade CH4 and N2O emissions actually decreased. CH4 emissions fell from 37 million tons / year to 22 million tons / year, while N2O emissions down slightly from 3.9 million tons / year to 3.8 million tons / year.

2. Source Emissions
Compared with other GHG emission sources, source of CO2 emissions come from sectors that are difficult to stop the pace of growth in carbon emissions. CO2 from combustion of biomass generated largely through the activities of the forestry sector over the function of land use for various purposes. This activity is expected to continue Me- Me- nunjukkan ningkat trend continues with increasing population. While CO2 from combustion of BBF resulting from energy consumption by industry, transportation, and households are closely related to development activities. The presumption has been shown that reducing the consumption of BBF which means a decrease in CO2 emissions will degrade the performance of the construction considered that some parties (countries) are reluctant to implement them.

E. Ocean Resource Potential and Excellence Indonesia

1. The potential of biological resources
Indonesia as a tropical country, rich in biological resources, expressed by level of biological diversity tinggi.Dari keaneka- 7000 species of fish in the world, of which there are 2,000 species in Indonesia. The potential for sustainable Indonesian marine fisheries resources of approximately 6.4 million tons per year, consisting of: large pelagic fish (1.16 million tonnes), small pelagic (3.6 million tons), demersal (1.36 million tons), shrimp penaeid (0.094 million tons), lobster (0.004 million tons), squid (0.028 million tons), and reef fish consumption (0.14 million tonnes). The potential number of allowable catches (JTB) as much as 5.12 million tons per year, or about 80% of the sustainable potential. This fish resource potential spread di9 (nine) Fisheries Management region of Indonesia.

Potential mariculture, consisting of fish farming potential (snapper, grouper, gobia); shrimp, mollusks (kerang- shellfish, pearl, sea cucumbers); and seaweed, its potential budidaya- area of 2 million hectares (20% of the total land potential of coastal and marine waters within 5 km of the coastline) with a volume of 46.73 million tons per year. While the potential of brackish aquaculture (ponds) reached 913 000 ha. For marine biotechnology potential is still great chances was developed, such as raw materials for the food industry, natural food ingredients industry, and juvenile fish and shrimp.

Indo-Pacific waters, which are located in part waters Indonesia it is the center of coral diversity, with more than 400 species. Also various types of seaweed scattered in various

parts of the coast. Our marine biological resources, in addition to having a high biodiversity also has a large habitat area, namely: 2.4 million ha of mangrove forests and 8.5 million hectares of coral reefs. In biology, coastal and marine region Indonesia also has a global value, because waters Indonesia is a place of migratory fish (highly migratory species) such as tuna, dolphins and various species of whales and turtles.

Potential of marine fisheries above, in order to encourage economic growth is estimated to have the potential economic value of each: fisheries US $ 15.1 billion per year; mariculture US $ 46.7 billion per year; aquaculture US $ 10 billion per year and marine biotechnology amounted to US $ 4 billion per year.

2. Potential industrial and maritime services
   In connection with Indonesia is an archipelago with well wila- extensive coastal and marine, maritime industries and services so that potential to be developed are: a) Shipyard (manufacture) ships and dock- yard; b) Industrial machinery and equipment of ships; c) Industrial fishing tools (fishing gears), such as nets, fishing rods, fish finders, rope, etc; d) Industrial water mill pond (pedal wheel), water pumps, etc; e) Offshore engineering and structures; f) Coastal engineering andstructures; g) submarine cable and fiber optics; h) Remote sensing, GPS, GIS, and ICT other things.

F. Previous Research

Research on the EKC relationship with the environment variables have been conveyed by Andrés (2014), he examines the relationship the amount of carbon dioxide gas emissions by income per capita in various countries by using Vector Error Correction Model. Another case with Chen (2007), using panel data for analysis. He also said the other curve forms of environmental damage relations with income per capita, such as N inverted curve shape, curve N, Chen U. curve using Fixed Effect Model because only models that can estimate the relationship FEM consistently. Later this study will refer to Chen by using data of each of each country selected using the FEM, which assumes KIS provides fixed effects and correlated with the explanatory variables.

RESEARCH METHODOLOGY

A. Method of collecting data

1. methods documentation
   Collecting data in this study, using the documentation that is by collecting data from selected reports relevant to the topic of research problems. Collecting data in this study aims to obtain materials that are relevant and accurate. The document in the form of books, journals, and related literature. The collected data is secondary data issued by the United Nations and related journals.

B. Analysis method

Data was analyzed using analysis techniques to achieve the research objectives. In reviewing the factors that influence the level of income, used two tools of analysis as follows:

1. Descriptive statistics
   Descriptive statistics are statistics used to analyze data in ways that describe or depict the data that has been collected as it is without the intention of making conclusions apply to the public (Sugiyono, 2004: 142).

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2. Regression analysis

Regression analysis is a method used to analyze the relationship between variables. The relationship is shown in equation linking the dependent variable (Y) with one independent variable, X1. In regression analysis, the pattern of the relationship between variables is shown in the alleged regression equation based on the data samples. This study uses regression analysis of non-linear quadratic approach Ordinary Least Squares (OLS) on the time series data format.

Bartz and Kelly (2004); Stern (2004); Susandi (2004); and Hung and Shaw (2005); who studies the relationship between prosperity with environmental degradation and concludes that environmental degradation affects the welfare of the pattern as shown by Enviroment Kuznets Curve (EKC). This curve describes the relationship between economic growth as measured by per capita income to the level of environmental degradation and will result in a curve with an inverted U-shape (inverted U-Curve).

EKC shows that environmental degradation will increase with the increase in income per capita, but once it reaches a certain point (the turning point) environmental degradation will decrease even though incomes rose. This condition will be achieved if the population has sufficient income, so most of the revenue is used to improve the environment. From the form proposed by Kuznets curve shows that the relationship between the level of welfare to environmental degradation satisfy the equation squared (quadratic), namely:

$$Y = b_0 + b_1 X + b_2 X^2 \quad \text{..... (1)}$$

When using regression analysis model non-linear quadratic not meet the assumptions that are based on Environment Kuznets Curve (EKC), the analysis is continued using logarithm-linear analysis model, follow Jaunky (20 ..) to examine the relationship of CO2 emissions to GDP, namely:

$$LCO_2 = b_0 + b_1 LGDP_t + e_t$$

When b1> 1 then the country is still in a phase 1 according to EKC, where GDP per capita growth also affects the growth of higher CO2 emissions. When $0 \leq b1 \leq 1$ state is entered phase 2 by EKC, where GDP per capita growth followed by an increase in lower CO2 emissions. When $b1 \leq 0$ the country entered a phase 3 by EKC, where GDP per capita growth will reduce CO2 emissions.

3. Classic assumption test

Classic assumption test is a series of tests used to determine whether the results of regression estimation is done completely free of any symptoms of multicollinearity, autocorrelation, and heteroscedasticity. The regression model will be used as a tool that is not biased estimation if it meets the requirements of BUE (Best Unbiased Estimator) that is free from mulitkolinearitas, heteroscedasticity, and autocorrelation.

C. Data Types

Data used is secondary data in the form of time series data of national income and CO2 emissions in Indonesia in 1960 until 2010 it was assumed that vulnerable between the time constant.

1. Variables Research and Operational Definitions

   a. Research variable

   The research variables are objects to be studied that have a variety of values. In this study consisted of dependent and independent variables.

b. Operational Definition of Variables
- Independent variables
  - National income per capita Indonesia
    National Income per capita (GDP / capita) is income divided by the population of a country in a given period is one year in units of dollars.

Table 2. Relationship GDP per capita Indonesia with forest area and CO2 emissions

Year	GDP per capita (US Dollar)	Forest (103 km)	CO2 emissions (105 tons)
1990	840.2205453	1185.45	1495.659
1991	899.358963	1166.314	1797.307
1992	947.9722826	1147.178	2025.761
1993	999.9621097	1128.042	2186.009
1994	1058.103376	1108.906	2214.135
1995	1129.060694	1089.77	2249.411
1996	1196.94413	1070.634	2532.907
1997	1234.702937	1051.498	2786.59
1998	1057.089074	1032.362	2102.108
1999	1050.159825	1013.226	2419.89
2000	1086.050898	994.09	2634.189
2001	1109.521783	990 986	2949.075
2002	1142.902849	987 882	3067.372
2003	1180.479734	984 778	3167.921
2004	1222.229512	981 674	3376.354
2005	1273.465176	978.57	3419.918
2006	1324.466828	971.72	3451.197
2007	1388.606391	964.87	3755.448
2008	1451.558317	958.02	4123.872
2009	1498.007243	951.17	4531.055
2010	1570.152937	944.32	4339.895

Source: World Bank (2017)

- Dependent variables
  - CO^2 emissions
    CO^2 emissions are changing levels of CO^2 in the environment of one period to the next are taken from data from the World Bank.

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ANALYSIS RESULTS AND DISCUSSION

A. Description GDP per capita forest area and CO2 Emissions

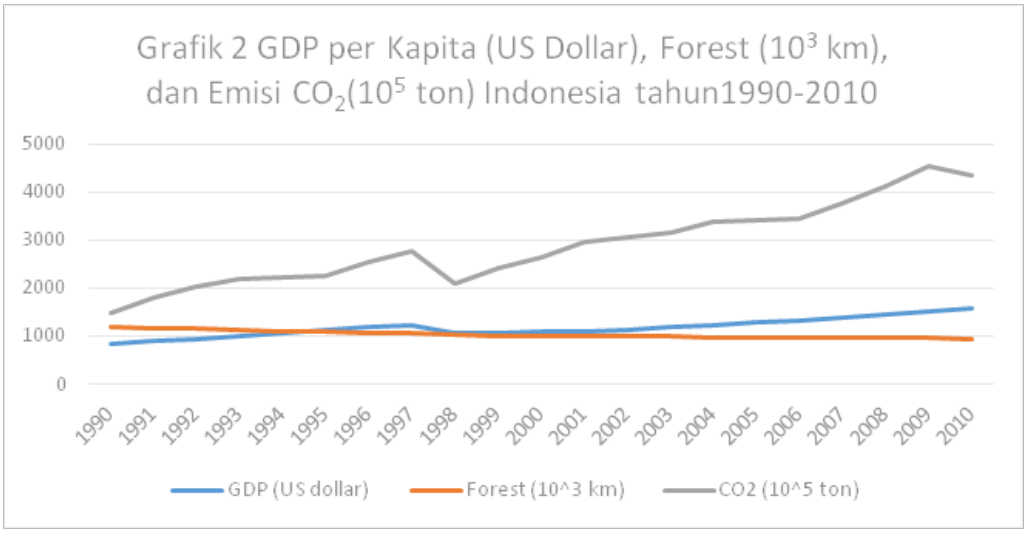

Figure 2. Graphic Relationship GDP per capita Indonesia with forest area and CO2 emissions

Source: World Bank 2017 (processed)

Based on the chart above year period 1990-2010 GDP per capita Indonesia tends to rise, so does the CO2 gas emissions. As for the Indonesian forest area from year to year tends to decrease.

B. Relations with the Economic Level of Environmental Damage

The relationship between the level of prosperity with environmental quality is evidenced by a study conducted by Bartz and Kelly (2004); Stern (2004); Susandi (2004); and Hung and Shaw (2005); who studies the relationship between prosperity with environmental degradation and concludes that environmental degradation affects the welfare of the pattern as shown by Enviroment Kuznets Curve (EKC). This curve describes the relationship between economic growth as measured by per capita income to the level of environmental degradation and will result in a curve with an inverted U-shape (inverted U-Curve).

1. Regression Kuadatrik

   EKC shows that environmental degradation will increase with the increase in income per capita, but once it reaches a certain point (the turning point) environmental degradation will decrease even though incomes rose. This condition will be achieved if the population has sufficient income, so most of the revenue is used to improve the environment. From the form proposed by Kuznets curve shows that the relationship between the level of welfare to environmental degradation satisfy the equation squared (quadratic), namely:

   $$Y = b_0 + b_1 X + b_2 X^2 \quad \text{..... (1)}$$

   In this study EKC will be proven on the relationship between per capita income with the level of environmental degradation indicated by the levels of CO^2 emissions. This study uses data per capita income and levels of CO^2 emissions in Indonesia during the period 1960 to 2010. Then the equation is as follows:

   $$CO_{2t} = b_{0t} + b_1 Y_t + b_2 Y^2{}_t + \mu_t \quad \text{..... (2)}$$

   Information:

M = concentration of CO2 emissions (kilo tons)
Y = Income per capita(US dollar)
μ = Error (interruption)
t = time period with t = 1960-2010
Results of regression using Time-series models are as follows:

$$\widehat{CO}_{2t} = -17191.312 + 124.242Y_t + 0.114Y^2{}_t + \mu_t$$

Table 3. Significance regression Kuadatrik

	Coefficient	t-statistic
C	-17191,312	
Y	124 242	3,900 *
Y2	0114	6,026 *
R2	0982	
Adj-R2	0981	
F-stat	1323.470	

* Significant at α = 5%

Visible results regression equation estimation Kuadatrik not meet the Environmental Kuznets Curve, because the constant is positive and very small compared to other variables constant. It could be said that a linear equation.

Table 4. Classical Assumption Test regression Kuadatrik

	Value
Durbin Watson	0546
VIF	27 109
Run Test (Asymp. Sig. (2-tailed))	.000

In the classical assumption test known to the estimation equation are positive autocorrelation kuadatrik for Watson durbin value smaller than the value of dL (dW <dL;0546 <1.49031). it also happens multikoleniaritas slain because VIF> 10.

2. Logarithmic Linear Regression
Because it tends to be linear, to find out at which stage the Indonesian State under Environment Kuznetz Curve then used a logarithm linear regression analysis

$$LCO_2 = b_0 + b_1 LGDP_t + e_t$$

The results of the estimation show:

$$LCO_2 = -19.781 + 1.201 LGDP_t + e_t$$

Table 6. Test Significance Linear regression Logarithmic

	Coefficient	t-statistic
C	-19 781	
Y	1,201	73 272 *
R2	0.99	
Adj-R2	0.99	
F-stat	5368.739	

* Significant at = 5%

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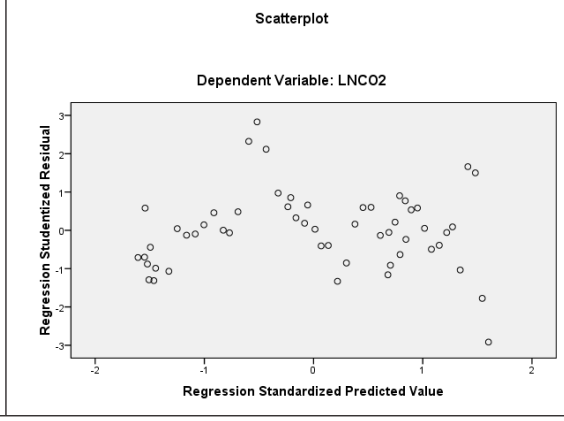
Table 7. Classical Assumption Test Linear regression Logarithmic

Durbin Watson	0758
The scatterplot	

From the Table indicate the presence of positive autocorrelation (d <dL; 0758 <1.52755) and does not occur heteroskedastisitas because scatterplot is not patterned. Because auto correlation then done TestCochrane Orcutt

3. Test Cochrane Orcutt
To eliminate the effects of autocorrelation then used the Cochrane Orcutt Test with equation

$$LagLCO_2 = b_0 + b_1 LagLGDP_t + e_t$$

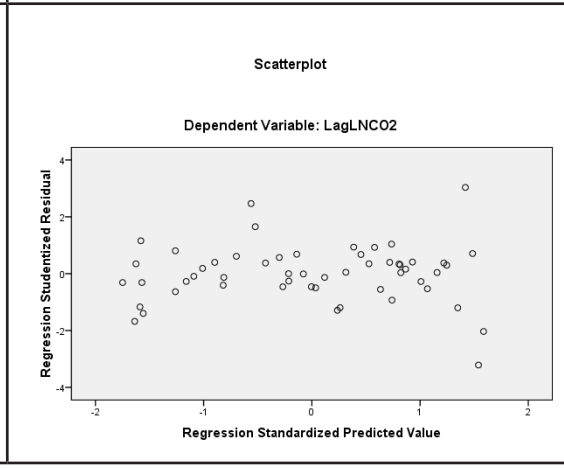
The result indicates

Table 8. Significance lag regression Logarithmic

	Coefficient	t-statistic
C	-6949	
Y	1,177	31 571 *
R2	0.95	
Adj-R2	0949	

* Significant at = 5%

Table 9. Classical Assumption Test lag regression Logarithmic

Durbin Watson	1,628 *
The scatterplot	

* 0.05 significance

After the Test Cochrane Orcutt, classic assumption test can be bypassed where no terjai autocorrelation (dW> dU; 1,628> 1,602) and free emergency scatterplot heteroskedastisitas Katen not patterned.

In the significance test the value of R2 = 0.95, meaning that GDP variable explaining variable CO^2 by 95% and the rest is explained in error. GDP variable significantly to CO2 with t> t table. The equation is formed:

$$LagLCO_2 = -6.949 + 1.177 LagLGDP_t + e_t$$

Lag logarithm of equation linear regression according to Environment Kuznets Curve Indonesia is still in the first phase, since the coefficient of GDP amounted to 1,177. This shows that b1> 1

CONCLUTION

CO^2 emission levels of the forest area in Indonesia in the descriptive analysis of consecutive increase and the damage / deficiency in the period 1960-2010. This study shows thatEnviroment Kuznets Curve (EKC)Indonesia is not applicable in the case of CO^2 emissions per capita national income is shown in the regression line which is likely to rise. The researchers concluded that Indonesia is still in the phase 1 where the higher the per capita national income the higher the levels of CO^2 emissions. Suggestion In the industrial sector reproduced again the use of environmentally-friendly technologies and the further emphasized society's more caring and protecting the environment.

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