The Significant of Carbon Dioxide (CO2) and Ozone Depleting Substance For Sustainability Forest Area

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ABSTRACT: Carbon dioxide (CO2) is an atmospheric constituent that function to several roles in the environment. CO2 is the principal of greenhouse gas. Besides that, it is one of the most important gases for plants use it is called photosynthesis. In the earth, humans and animals are depends on plants for food, photosynthesis is necessary for the survival of life on earth. The objective of study is to determine the significant of relationship between forest area and CO2 stock. Therefore, the purpose of this study is to identify the relationship between Ozone Depleting Substances and CO2 in forest area. This study was covered 10 countries (Malaysia, Brunei, Indonesia, Cambodia, Lao PDR, Myanmar, Philippines, Singapore, Thailand and Vietnam). Data was collected by using data Website Our World in Data. A mean score for forest cover area towards CO2 and towards ozone depleting substances shows that total number of forests are influenced the amount of CO2 emissions and ozone depleting substances. A linear regression analysis found that, inverse influence between CO2 emissions and forest cover area with significant at 95% confident level.

Keywords: *Carbon Dioxide (CO2); Carbon Stock; Ozone Depleting Substance*

1. INTRODUCTION

Carbon dioxide (CO2) can be defined as atmospheric constituent that function to several roles in the environment[1]. It serves in the weathering of rocks, carbon source for plants, stored of biomass, organic matter in sediments, and in carbonate rocks like limestone. CO2 is the principal of greenhouse gas. besides that, it is one of the most important gases for plants use it is called photosynthesis. Assessment of CO2 stock is one of the important parts to sustainable land use planning in relation to low carbon emission. The change in CO2 stock with the dynamics of land use changes may result into either carbon emission or sequestration[2]. Forest carbon stock are categories based on ecosystems. They have five categories of CO2 stocks which are Aboveground biomass (15-30%), Belowground biomass (4-8%), Woody necro-mass (1%), Organic litter (0.4%) and Soil (60-80%).

To maintain the quality of environment and our earth, the amount of CO2 should be balance with forest area. Therefore, it is important to know the rate of ecosystem can absorb CO2 in specific time. For example, a young tree absorbs about 5900gram CO2 per year, while a 10-year-old tree absorbs almost 22.000 gram per year. While, it turns out that one acre of forest absorbs about 2.5 tons of CO2 per year[3].

Ozone depleting substances are related to chemicals that destroy the earth's protective ozone layer. They also can reduce the amount of harmful ultra violet radiation that reaches Earth from the sun. Much of negative effect from Ozone depleting substances. It may cause of skin cancer and cataracts, distorting plant growth and damaging the marine environment[4]. The graph shows that, world data of ozone depleting gases for which production and international trade by the Montreal Protocol, NOAA measurements show that atmospheric concentrations of nearly all were decreasing in the atmosphere from year 2010 until 2020.

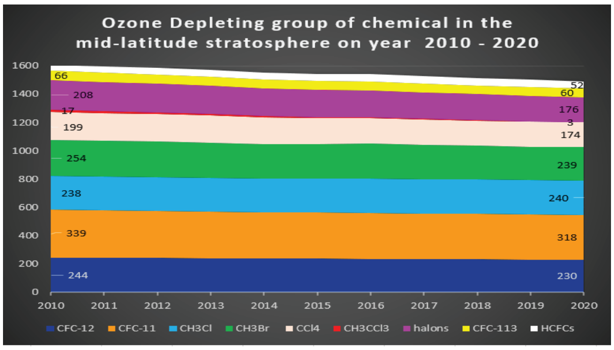

Figure 1 Group of Ozone Depleting chemical in the mid-latitude stratosphere on year 2010 to 2020

2. METHODOLOGY

2.1 Mean Score

This formula was used to determine Mean between two variables for Forest Cover Area & Carbon Dioxide (CO2); and Forest Cover Area & Ozone Depleting Substance[5]:

$$\text{Mean } (X) = \sum_{i=1}^{n} Xi \tag{1}$$

2.2 Linear Regression

A Linear regression is a statistical test applied to a data set to define and quantify the relation between the considered variables[6]. For this study, this method was used to determine the the dominating trend in forest cover and CO2 within each individual country[7]:

$$r^2 = \left(\frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{[N \sum x^2 - (\sum x)^2][N \sum y^2 - (\sum y)^2]}} \right)^2 \quad (2)$$

3. RESULT AND DISCUSSION

Figure 2 shows the amount of CO2 emission in Malaysia are not over than the total number of forest cover area compared to Cambodia, the amount of CO2 emission is highest than forest cover area. The total GHG emissions in Cambodia was dominated by emissions from the land use change and forestry (LUCF) sector, which accounted for 47.6% of the country's total emissions. Within LUCF, changes in forest land contributed 93% of emissions[8]. Figure 3 shows that, amount of ozone depleting will affect the number of forest cover area. Based on graph above, Malaysia, Singapore and Lao PDR and Indonesia have highest number of forest cover area compared to others countries.

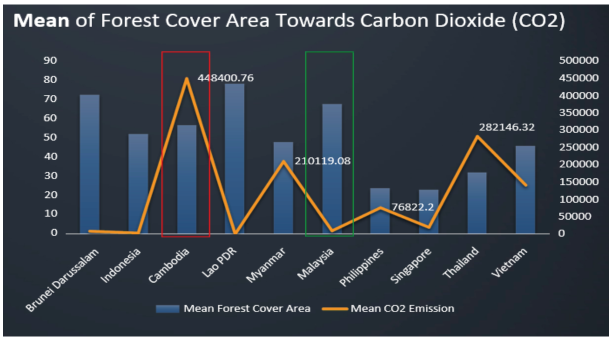

Figure 2 Mean score of forest cover area towards CO2

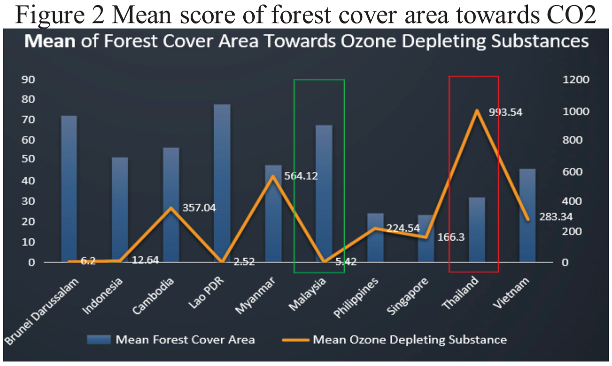

Figure 3 Mean score of forest cover area towards ozone depleting substances

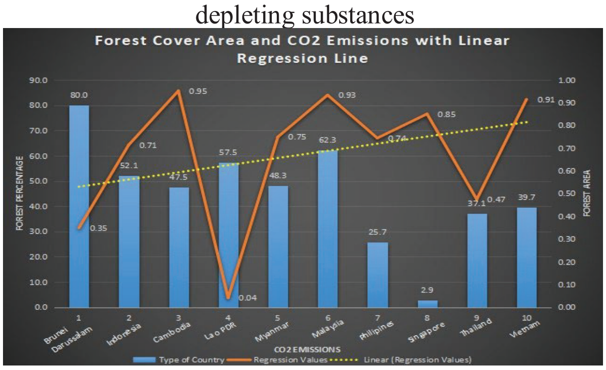

Figure 4 Linear regression analysis of forest cover area and CO2 emissions

A linear regression analysis of forest cover area and CO2 emissions found that, have inverse relationships when it came to their CO2 emissions and forest cover area within the countries, with significant at 95% confident level.

4. CONCLLUSION

The conclusion of this study is, higher concentrations of carbon dioxide can make plants more productive for photosynthesis process. But, over amount of CO2 in the atmosphere increases the greenhouse effect. They may causing the planet to become warmer and increase Earth's temperature.

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