Palm O' Journal

paspi
Palm oil Agribusiness Strategic Policy Institute

Analysis of Palm Oil Strategic Issues **Vol. I, No. 06/04/2020**

OIL PALM PLANTATION IS CONSIDERED AS A CAUSE OF GLOBAL WARMING AND CLIMATE CHANGE, ISN'T RIGHT ?

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RESUME

One of the black campaign themes that is currently used by anti-palm oil NGOs and western countries in order to inhibit the rate of palm oil on the world market is by accusing oil palm plantation as a major contributor in increasing Greenhouse Gas (GHG) emissions which cause global warming and global climate change. Although the issue has become the focus of the world community, there is still a lot of information about emissions and climate change that is not in accordance with the data and empirical facts, and also cornered oil palm plantations as the main cause of the phenomenon.

Global climate change which has been widely felt by the global community such as increased rainfall, storms, drought and fires and climate anomalies, are a result of global warming. Global warming is caused by the increasing intensity and concentration of the effect of greenhouse gasses on the earth's atmosphere so that the radiation/heat of the sun that trapped in the earth's atmosphere becomes larger so that it warms the temperature of the earth's. This happens because of an increase in the concentration of GHG emissions above its natural concentration. Increased activities of human life on earth and the emergence of man-made gases are the cause of the increased concentration of GHG emissions.

According to Olivier et al. (2020), GHG emissions increased from 33 Gt CO2 eq in 1990 to 51.8 Gt CO2 eq in 2018. The largest global GHG emission concentrations were CO2 emissions (71 percent), CH4 (20 percent), NO2 (6 percent) and F- gas (3 percent). CO2 emissions was major contributor of global GHG emissions and it's origin from fossil fuel (coal, gas and fuel) consumption and deforestation. Another GHG emissions is CFC or F-gasses emissions resulted from industry sector and household products. Although the concentration of CFC or F-gases emissions lower than other, but they relatively more dangerous because causes depleting ozon layer. Threfore, the allegation by anti-palm oil NGOs that associated and blamed oil palm plantations as cause of global warming and climate change is incorect and incompatible with empirical facts.

In order to reduce emission, the global community has to be willing reduce fossil fuel consumption or replace them with low emission energy sources and reduce using household product which contain CFC-gasses. Although the choices seems to reduce comfort, it must be done by the global community as an effort to mitigate global warming and climate change. The solution more meaningful than to blame or "scapegoating" oil palm plantations as a cause of global warming and climate change.

INTRODUCTION

In the past decade, the Indonesian palm oil industry has continued to face black campaign attacks from various international NGOs and its affiliates in Indonesia. In addition, pressure on the Indonesian palm oil industry also came from developed country governments (Europe and the United States). The black campaign theme that is currently used by anti-palm oil NGOs is the assosiated of oil palm plantations with global environmental problems. Besides being accused of being the main driver of global deforestation and threatening biodiversity wealth, oil palm plantations are also considered as a major contributor in increasing Greenhouse Gas (GHG) emissions.

The issue of GHG emissions is currently a concern of all people in the world because of its impact that causes global warming and global climate change that can threaten the sustainability of the life of living things on Earth. It means the global warming and global climate change issue has clearly become a very serious problem and need a fundamental, holistic and global solutions. For that, they neeed the same, equal and objective understanding about the causes of the global warming and global climate change problem so that its solution can be found objectively as well.

On the other hand, behaving and thinking in terms of a search for a "scapegoat", building myths or shifting the problem to another sector, without any empirical facts that can be accounted for, it's not part of solution but part of the problem, being a problem maker and creates new problem. Such as did the anti-palm oil NGOs by "scapegoating" oil palm plantations as a cause of global climate change. This was done only to attract sympathy from global consumers to boycott palm oil products.

To correct negative perceptions that have already formed in global communities related to oil palm plantations as a cause of global warming, this paper aims to present data and empirical facts to counter these negative campaigns.

CAUSES OF GLOBAL WARMING AND CLIMATE CHANGE

Global climate change is an effect of global warming (IPCC, 1991; Soemarwoto, 1992; IEA, 2014). The rising amount of solar energy trapped in the Earth's atmosphere leads to changes in global climate (Figure 1) such as: (1) rising evaporation; (2) warming/rising sea/ocean water temperature; (3) changes in the conditions of plants and animals; and (4) melting snow and ice. Combinations of the above-mentioned changes leads to various forms of global climate changes, such as the increasing rainfall, storms, droughts and fires, as well as climate anomalies.

Figure 1. Global warming impact mechanisms on global climate change (modified from http://www3.epa.gov)

Global warming is not caused by the expansion of oil palm plantations but is due to increases in the intensity of GHG emissions affecting the earth's atmosphere. Naturally the earth's atmosphere is filled with GHGs especially water vapor (H2O), carbon dioxide (CO2), methane (CH4) and nitrogen (N2) in certain natural concentrations. Their function forms the mechanism of the natural greenhouse effect. Through the mechanism of the natural GHG effect, a part of the sun's energy is trapped in the earth's atmosphere with the other part being reflected into outer space. Without the natural greenhouse effect, all solar energy would be reflected into outer space so that the temperature of the earth's atmosphere would be very low and not compatible for human, animals, vegetation to live in earth (Figure 2).

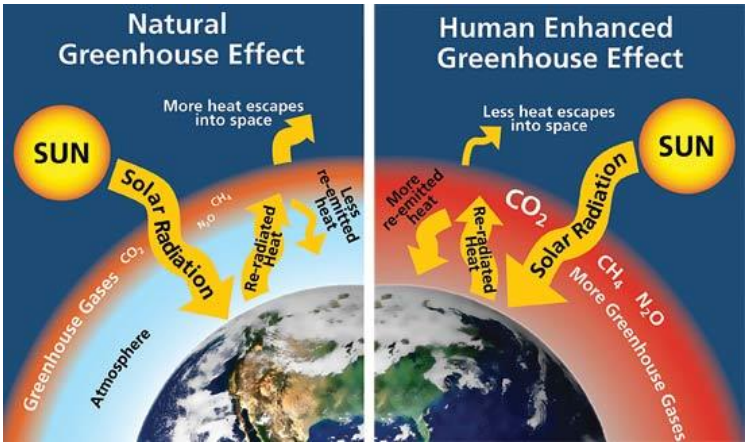

Figure 2. Mechanism of greenhouse gas effect (modified from http://i.livescience.com)

However, along with human activities on the earth and the emergence of man-made gases such as chlorofluorocarbons (CFCs) and halogen creating a human-enhanced greenhouse effect, this is caused by rising CHG emissions in the atmosphere above its natural concentration. With the rising intensity of the greenhouse effect, the amount of radiation/solar energy that is trapped in the earth's atmosphere also rises (Soemarwoto, 1992), thereby making the earth's temperature hotter. The increase in the temperature of the earth's atmosphere, which we know as global warming is caused by the rising intensity of the greenhouse effect on the earth's atmosphere.

SOURCES OF GREENHOUSE GAS EMISSIONS

The mechanism of the greenhouse effect have functions to protect by reflecting the sun's radiation from the earth's surface so the temperature of the earth's atmosphere to be compatible with life. However, if the intensities and consentrations of GHGs above it's natural concentration causes greenhouse effect become stronger, as is happening now. On global level, the year 2018 was among the five warmest year (2014-2018) since record began in 1880 (Olivier et al., 2020). This showed, the global warming more real and tangible, along with the concentration of greenhouse emission in atmosphere was increased.

According to the Intergovernmental Panel on Climate Change (IPCC) in 1991, in the pre-industrial period up to the year 1990, CO_2 in the earth's atmosphere increased from 280 to 353 parts per million volume (ppmv). Meanwhile CH_4 increased from 0.8 to 1.72 ppmv; N_2O rose from 288 to 310 parts per billion volume (ppbv) and the CFC concentration increased from zero to 280-484 parts per trillion volume (pptv).

Olivier *et al.,* (2020) revealed, GHG emission increased from 33 Gt CO2 eq in 1990 to 51.8 Gt CO2 eq in 2018. In the study also revealed the sources of global GHG emissions was divided into four gasses and the largest consentration was CO_2 emissions (71 percent), then followed by CH_4 emissions (20 percent), NO_2 emissions (6 percent) dan F-gas emissions (3 percent). During the period, global CO_2 emissions increased from 22.67 Gt CO_2 to 37.07 Gt CO_2. An increased

consentration also occured in CH_4 emissions from 64 Gt CO_2 eq to 9.27 Gt CO_2 eq and NO_2 emissions from 2.27 Gt CO_2 eq menjadi 2.97 Gt CO_2 eq. Man-made gases such as chlorofluorocarbons (CFCs) or F-gasses emissions also increased from 0.34 Gt CO_2 eq to 1.56 Gt CO_2 eq (Figure 3).

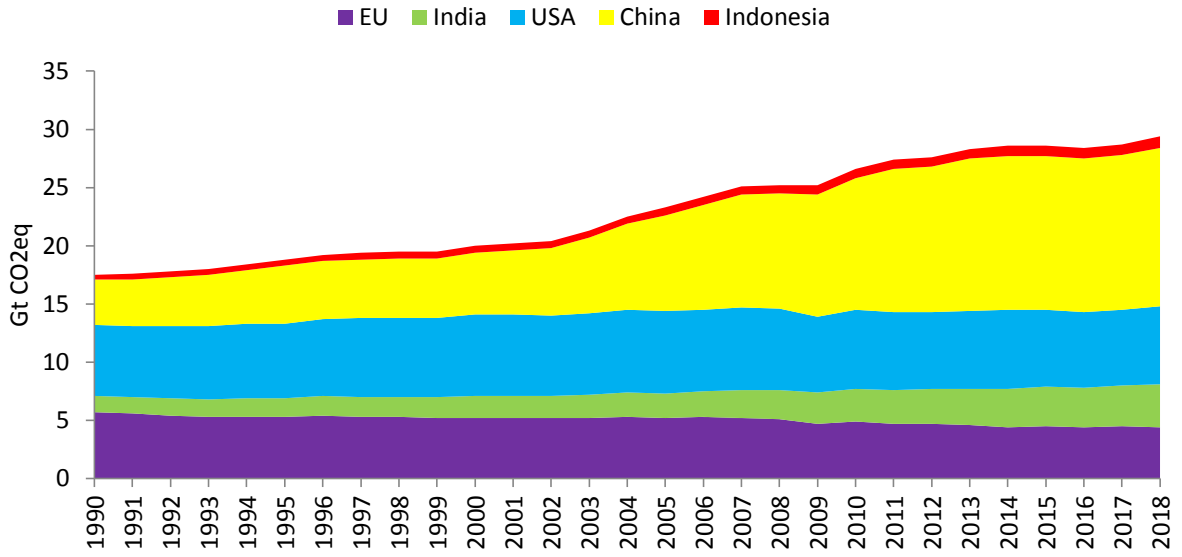

Figure 3. Increased Global Greenhouse Gas Emissions (Source: Oilivier *et al.,* 2020)

Based on that study showed CO_2 emissions was major contributor of global GHG emissions by the rates increased significantly. Carbon dioxide (CO_2) released into the atmosphere through human and animal respiration, but fossil fuel burning for industry, transportation, electricity and deforestation effectively released the CO_2 emissions more rapidly so it's concentration in atmosphere has increased (Matawal and Maton, 2013). This argument also confirmed by IEA (2016), showed global fossil energy sector (coal, gas and fuel) from production process untiil consumption process has produces CO_2 emissions, and was contribution about 68 percent of total GHG emissions.

Matawal and Maton' study (2013) also mentioned deforestation as a driver that increased of concentration of global CO_2 emissions. If anti-palm oil NGOs associated oil palm plantations as cause of global warming and climate change because its also considered a cause of global deforestation, this accusation is incorect and incompatible with empirical facts. The share of oil palm plantation expantion towards global deforestation was very small (PASPI, 2020[a]), even the development of oil palm plantation in Indonesia is reforestation to saving carbon stocks especially in ex-logging area (PASPI, 2020[b]).

Although the concentration of CFC or F-gases emissions in the earth's athmosphere wasnt as large as CO_2 emissions, but it's concentration was increased significantly because this gasses used in the industrial sector and household products (air conditioners, refrigators). The increasing of F-gases relatively more dangerous because they are slowly but surely creating holes on this layer so causes depleting ozon layer. It's caused harmful ultraviolet radiation from sun can direct penetration without restrictin to earth's atmosphere. The impact is in addition to further make worse global warming, but it also endangers human health such as skin cancer and cataracts.

Therefore it's very clear that the largest GHG emissions contibutor is burning energy fossil fuel. In order to reduce emission, the global community has to be willing reduce fossil fuel consumption or replace them with low emission energy sources. In addition, global community also reduce luxuries lifestyles by used household product which contain CFC-gasses to reduce depleting ozon layer. Although the choices seems to reduce comfort, it must be done by the global community as an effort to mitigate global

warming and climate change. The solution more meaningful than to blame or "scapegoating" oil palm plantations as a cause of global warming and climate change.

CONCLUSION

Global climate change which has been widely felt by the global community such as increased rainfall, storms, drought and fires and climate anomalies, are a result of global warming. Global warming is caused by the increasing intensity and concentration of the effect of greenhouse gases on the Earth's atmosphere so that the radiation/heat of the sun that trapped in the Earth's atmosphere becomes larger so that it warms the temperature of the earth's air. This happens because of an increase in the concentration of GHG emissions above its natural concentration. Increased activities of human life on earth and the emergence of man-made gases are the cause of the increased concentration of GHG emissions.

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