

Study of the effect of Greenhouse gases on Agriculture in India

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ABSTRACT

The greenhouse effect is a natural phenomenon that contributes to the average temperature level on the earth surface with an atmosphere. Though only a small amount of the gases in Earth's atmosphere are greenhouse gases, but they have a biggest effect on climate. During this century, the amount of the greenhouse gas carbon dioxide in the atmosphere is expected to double. Other greenhouse gases like methane and nitrous oxide are increasing as well. The quantity of greenhouse gases is increasing as fossil fuels are burned, releasing the gases and other air pollutants into the atmosphere. Greenhouse gases also make their way to the atmosphere from other sources.

Global warming increase in greenhouse gases has become a major scientific issue during the last decade. That infrared radiation is trapped by greenhouse gases and particles in an atmosphere and that the atmospheric CO₂ level has increased because of fossil fuel combustion and deforestation. Greenhouse gases such as methane and chlorofluorocarbons have increased by even larger factors. Due to the Global warming global average surface temperatures will increase by some 2°C to 6°C during the next century. Sea level rises of 0.5 to 1.5 meters are typically projected for the next century.

The beginning of the industrialization the use of fossil fuels and natural gas is increased. Deforestation also contributed to increasing green gas emissions. The industry releases greenhouse gases into the atmosphere, such as sulfur hexafluoride. It is now significantly increased the natural greenhouse effect. Climate change is one of the biggest issues facing countries around the world including India. The impacts of climate change increased in agriculture and it will be challenged to meet the global demand for food. About 1 billion people are currently malnourished and the number will grow as the world population is expected to approach 9 billion by 2050.

Keywords: Green House Gas, Environment, Effect, Agriculture.

INTRODUCTION

The greenhouse effect is the mechanism which maintains the temperature of our Earth. The Earth's atmosphere acts like the glass panes on a greenhouse by trapping some of the radiation received from the sun. Incident radiation energy penetrates the atmosphere and some is reflected back from the Earth's surface to the atmosphere in the form of infrared radiation. The Earth receives a large amount of radiant energy from the sun and about 30% of this energy is reflected. The longer wave of Infrared radiation does not penetrate back through the atmosphere. The reflected heat is absorbed by water vapor and carbon dioxide and warming the Earth. This process, which is known as the greenhouse effect, occurs naturally and maintains the temperature of the earth, making it suitable for life. Earth composed of gases such as oxygen, nitrogen, carbon dioxide, and water vapor. Water vapor is mainly responsible for this effect and is not a serious environmental concern since the amount of water in the atmosphere is a constant. But, the increasing levels of other greenhouse gases lead to increases in the world's temperature. David E. Reichle (2020), due to the increased atmospheric levels of carbon dioxide (CO₂), methane (CH₄), ozone (O₃), sulfur dioxide (SO₂), chlorofluorocarbon (CFC), and nitrogen dioxide (NO₂), collectively known as greenhouse gases, causing the Earth to grow temperature.

Sylvia et al. (2017), to conduct the survey, we used the questionnaire consisted of agricultural information. The respondents were asked to express their opinion on climate change and its relevance to the agricultural sector and to provide information about their activities related to GHG emissions and their mitigation. We have calculated Greenhouse gas emissions from agricultural production of several crops and livestock products in India. Items for analysis were chosen from the total list of consumed foods recorded in the Indian Migration Study, a regional survey that measured. Based on project we set a food items i.e., cereals, pulses, tubers, vegetables, etc. and selecting items reported to be consumed in the greatest quantity within the study.

Martina et al. (2020), to determine farmers' positions towards climate change and efforts to reduce GHG emissions, we asked participants about Climate Change and Agriculture a majority of farmers agree that climate change is the largest threat to agriculture and that its effects are already noticeable today. The Role of

Agriculture in GHG Mitigation Actions the public is blaming agriculture for GHG emissions. Many of the participating farmers see the potential to reduce GHG emissions from the agricultural sector. GHG emission reductions are not economically feasible. The risk of adopting climate-friendly management outweighs its farming benefits.

DISCUSSION

There are several different types of greenhouse gases. The major ones are carbon dioxide, water vapor, methane, and nitrous oxide. Most of the gas in the atmosphere is nitrogen and oxygen.

Carbon dioxide molecules make a small fraction of the atmosphere, but have a large effect on climate. There was about 270 ppm of carbon dioxide in the atmosphere in the middle of the 19th Century at the start of the industrial revolution. The amount is growing as burning fossil fuels releases carbon dioxide into the atmosphere. Methane is a powerful greenhouse gas, able to absorb far more heat than carbon dioxide; methane is made of one carbon and four hydrogen atoms. It is found in very small quantities in the atmosphere but is able to make a big impact on warming. Methane gas is also used as a fuel. When burned, it releases carbon dioxide greenhouse gas into the atmosphere. Methane emissions from agricultural sources are mainly a result of enteric fermentation in ruminant animals and from the anaerobic decomposition of stored manure. When organic matter in feed or manure decomposes under anaerobic conditions, a portion is released as methane. Archer and Pierrehumbert (2011) the Earth's average surface temperature is about 289 K. The dominant gases in the Earth's atmosphere are N₂ (78.084%), O₂ (20.946%), and Ar (0.934%). None of these species absorb infrared portion of the electromagnetic spectrum. On the other hand, there are some trace gases that are well mixed throughout the atmosphere such as CO₂, CH₄, and N₂O that do absorb and emit radiation. These gases are called as greenhouse gas. Ozone (O₃) is a strong greenhouse gas and it is abundant in the stratosphere. Water vapor is a strong absorber and emitter of infrared radiation. So water vapor is a greenhouse gas but it is mainly controlled by the temperature and the availability of liquid water at the local surface.

Inglezakis (2016), greenhouse effect on earth is caused by water vapor, carbon dioxide, methane, nitrous oxide,

ozone, and CFCs (chlorofluorocarbons). The contribution of each gas to the greenhouse effect is affected by the properties of the gas, its concentration, and other indirect effects it may cause. For example, methane is about 72 times stronger than the same mass of carbon dioxide, but its atmospheric concentration is much smaller, and thus its total direct effect is smaller.

Earth's greenhouse is relatively mild, currently providing 32°C of greenhouse warming and keeping the surface temperature to a life-supporting average of 15°C, critical for maintaining the Earth as a habitable planet. This natural greenhouse effect is beneficial for the earth and without it the planet would have been probably frozen and unable to support liquid water and thus life. Thus, the existence of greenhouse effect can stabilize the temperature and provide conditions for liquid water and consequently, habitable environments. Earth is oxygen rich, which allows the formation of an ozone layer and offers protection from UV radiation. Finally, the planet possesses a magnetic field, which protects the atmospheric gases from the solar wind. Water vapor forms clouds, which reflect light from the sun and have a temperature-lowering effect. Water vapor absorbs infrared radiation more strongly than carbon dioxide, influencing the greenhouse effect. Water vapor creates the greenhouse effect caused by other gases. This is caused by increased temperatures, which result in increased evaporation of water and thus increase of temperature due to its strong greenhouse effect. The potential climate impact could be significant on geologic timescales as it is estimated that the release could reach the levels of the carbon released by fossil fuel combustion.

Agricultural activities result in multiple greenhouse gas emissions. Nitrous oxide emissions can originate directly from field-applied organic and inorganic fertilizers, crop residue decomposition, cultivation of organic soils, and from the storage of manure.

Nykanenet et al. (1995), found that agricultural soils can either emit or absorb carbon dioxide. The difference is determined by the net effect of carbon dioxide absorption from the atmosphere by growing crops, and subsequent storage in the soil in the form of crop residues and soil organic matter, and emissions to the atmosphere via decomposition of crop residue and soil organic matter. Agriculture emits all three greenhouse gases: carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). These gases differ, though, in their ability to

trap heat, agriculture also removes CO₂ from the atmosphere. Croplands and grazing lands can be managed to remove and store large amounts of CO₂ as soil organic carbon.

The greenhouse effect causes trouble in the atmosphere, absorbed and released by greenhouse gases. Due to the heat passing through atmosphere the soil moisture get decrease. If a soil moisture decrease, then it would disturb agriculture in the India. Present farming practices and cropping patterns would have to change. It has been suggested that if soil moisture change, then there is loss in agricultural products on the world market. Projected climate changes into the next century could have major impacts on water resources, sea level, agriculture, forests, biological diversity, air quality, human health, urban infrastructure, and electricity demand.

Climate changes resulting from greenhouse gas also significantly affect water supply and demand. In addition, irrigation demand may increase substantially if temperatures increase. A number of climate models suggest that temperatures could increase and precipitation decrease simultaneously in several areas. Kroeze (1994), Agriculture is one of the major sources of greenhouse gas emission. Even though, agriculture can also minimize emissions through the reduction in N₂O and CH₄ emissions, as well as through carbon sequestration. inclusion of agriculture in the climate change policy and emissions agricultural mitigation projects need to demonstrate the real and additional reductions in greenhouse gas emissions of carbon sequestration by complying with the established methodologies.

Kalogirou (2012), Humans contribute, through economic and other activities, to the increase of the atmospheric concentrations of various greenhouse gasses. For example, CO₂ releases from fossil fuel combustion, methane emissions from increased human activity, and CFC releases all contribute to the greenhouse effect. Predictions show that if atmospheric concentrations of greenhouse gasses, mainly due to fossil fuels combustion, continue to increase at the present rates, the earth's temperature may increase by another 2–4 °C in the next century. If this prediction proves correct, the sea level could rise by between 30 and 60 cm before the end of this century. The impacts of such sea level increase could easily be understood and include flooding of coastal settlements, decrease the

availability of fresh water for irrigation and other essential uses, and displacement of fertile zones for agriculture toward higher latitudes. Thus, such consequences could put in danger the survival of entire populations.

CONCLUSION

The basic agricultural needs of a society, is to meet the food requirements of the increasing population, productivity has to increase several times more than the present yield. Agriculture is a field, which is not generally preferred due to the adverse climatic conditions. For this reason, agriculture should become more profitable and associated hard work should be minimized. In many developing countries, agriculture has been a sustainable foreign exchange earner, which is necessary for national development. Enhancement of production of fresh fruits, vegetables, flowers for domestic as well as for export, therefore, becomes relevant. Export of agricultural produce requires high quality standards and assured availability. However, the use of efficient inputs must be improved and the latest technological developments should be incorporated as well in order to achieve the domestic as well as export food and nutritional targets.

Indian agricultural production systems to be viable in the future, there is a need to identify soil management systems and Changes in land-use management. Policies and incentives should be evolved that would encourage

the farmers to adopt mitigation options, improve soil health and use water and energy more efficiently.

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