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A Project Report

Submitted by Semester-I students (Academic Year 2021-22)

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CERTIFICATE

This is to certify that this project titled "Different aspects of Air, Soil, Water, Noise pollution" submitted by the students for the award of degree of B.A. Honours/ Program is a bonafide record of work carried out under my guidance and supervision.

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Rituparna Ghosh.
B.Sc 1st Semester.

INTRODUCTION

The greenhouse effect is a process that occurs when energy from a planet's sun goes through its atmosphere and warms the planet's surface, but the atmosphere prevents the heat from returning directly to space, resulting in a warmer planet.

History

The greenhouse effect and its impact on climate were succinctly described in this 1912 Popular Mechanics article meant for reading by the general public. The existence of the greenhouse effect, while named as such, was proposed by Joseph Fourier in 1824. The argument and the evidence were further strengthened by Claude Pouillet in 1827 and 1838. John Tyndall was the first to measure the infrared absorption and emission of various gases and vapours. From 1859 onwards, he showed that the effect was due to a very small proportion of the atmosphere, with the main gases, having no effect and was largely due to water vapour, though small percentage of hydrocarbons and carbon dioxide had a significant effect. The effect was more fully quantified by Svante Arrhenius in 1896, who made the first quantitative prediction of global warming due to a hypothetical doubling of atmospheric carbon dioxide. However the term "greenhouse" was not used to refer to this effect by any of these scientists: The term was first used in this way by Nils Gustaf Ekholm in 1901.

MECHANISM

The sun radiates solar energy on earth. The larger part of this energy (45%) is radiated back into space. Greenhouse gases in the atmosphere contribute to global warming by adsorption and reflection of atmospheric and solar energy. This natural phenomenon is what we call the greenhouse effect. It is agreed that the greenhouse effect is correlated with global temperature change. If greenhouse gases would not exist earthly temperature would be below −18°C. After the industrial revolution of the 1700's the greenhouse effect was enhanced by greenhouse gas emissions of anthropogenic nature. The main source of anthropogenic greenhouse gas emissions is fossil fuel combustion. The contribution of greenhouse gases to the green house effect. Non-governmental organization (NGO's) such as the IPCC (Intergovernmental Panel on Climate change) are attempting the predict of project the severity and consequences of global climate change caused by the green house effet. The IPCC expects that annual greenhouse gas emissions will double in the next 50-100 years. This results is cascade of environment

effects.
Example include:
- Melting of polar ice and oceanic expansion. This results in flooding of coastal area, swamps, wetlands and river deltas. Some small islands may even vanish completely consequential to flooding.
- Cold and warm gulf stream alteration caused by desalination of the Atlantic Ocean, possibly causing a new Ice Age. - Increase in number of severity of tropical and storms and cyclones
And so on.
Ironically, an increases in greenhouse gases has been predicted to cause a cooling of the stratosphere. This phenomenon would occur because most thermal infrared is absorbed at low altitudes, and little is left over to warm the stratosphere. Additionally at stratospheric temperature CO_2 emits more thermal infrared to space than it absorbs.

GREENHOUSE GASES

By their percentage contribution to the greenhouse effect on Earth the four major gases are.

- Water vapour. ~ 50% (75% including clouds)
- Carbon dioxide. , 9-26%
- Methane. , 4-9%
- Ozone, 3-7%

It is not possible to assign a specific percentage to each gas because the absorption and emission bands of the gases overlap (hence the ranges given above). Also a water molecule only stays in the atmosphere for an average of 9 to 10 days, which corresponds with high variability in the contribution from clouds and humidity at any particular time and location.

The other most important are nitrous oxide (N_2O), perfluorocarbons (PFCs), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) sulphur hexafluoride (SF_6).

CLIMATE CHANGE

Strengthening of the greenhouse effect through human activities is known as the enhanced (or anthropogenic) greenhouse effect. As well as being inferred from measurement by the CERES Satellite throughout the 21st century, this increase in radiative forcing from human activity has been observed directly, and is attributable mainly to increased atmospheric carbon dioxide levels. According to the 2014 Assessment Report from the Intergovernmental Panel on Climate Change, "atmospheric concentrations of Carbon dioxide, methane and nitrous oxide are unprecedented in at least the last 800,000 years. Their effects together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.

CO_2 is produced by fossil fuel burning and other activities such as cement production and tropical deforestation.

Measurement of CO_2 from the Mauna Loa Observatory show that concentrations have increased from about 313 parts per million (ppm) in 1960, passing the 400 ppm milestone in 2013. The current observed amount of CO_2 exceeds the geological record maxima ($\simeq$ 300 ppm) from ice core data. The effect of combustion-produced carbon dioxide on the global climate, a special case of the greenhouse effect first describe in 1896 by Svante Arrhenius, has also been called the Callender effect.

Over the past 800,000 years, ice core data shows that carbon dioxide has varied from values as low as 180 ppm to the pre-industrial level of 270 ppm Paleoclimatologists consider variations in carbon dioxide concentration to be a fundamental factor influencing climate variations over this time scale.

REAL GREENHOUSES

The "greenhouse effect of the atmosphere is named by analogy to greenhouse which become warmer in sunlight. However, a greenhouse is not primarily warmed by the greenhouse effect. "Greenhouse effect" is actually a misnomer since heating in the usual greenhouse is due to the reduction of convection. While the "greenhouse effect" works by preventing absorbed heat from leaving the structure through radiative transfer.

A greenhouse is built of any material that passes sunlight: Usually glass or plastic. The sun warms the ground and contents inside just like the outside, and these then warm the air. Outside, the warm air near the surface rises and mixes with cooler air aloft, keeping the temperature lower than inside, where the air continues to heat up because it is confined within the greenhouse. The temperature can be demonstrated.

by opening a small window near the roof of a greenhouse. The temperature will drop considerably. It was demonstrated experimentally (R.W. Wood, 1909) that a (a not-heated) "greenhouse" with a cover of rock salt (which is transparent to infrared) heats up an enclosure similarly to one with a glass cover. Thus greenhouses work primarily by preventing convective cooling.

Heated greenhouses are yet another matter as they have an internal source of heating, it is desirable to minimize the amount of heat leaking out by radiative cooling. This can be done through the use of adequate glazing.

It is possible in theory to build a greenhouse that lowers its thermal emissivity during dark hours; such a greenhouse would trap heat by two different physical mechanisms, combining multiple greenhouse effects, one of which more closely resemble the atmospheric mechanism — rendering the misnomer debate moot.

EFFECTS

Anti-greenhouse effect-

The anti greehouse effect- is a mechanism similar and Symmetrical to the greenhouse effect: in the greenhouse effect, the atmosphere lets radiation in while not letting thermal radiation out, thus warming the body surface; in the anti-greenhouse effect, the atmosphere keeps radiation out while letting thermal radiation out, which lowers the equilibrium surface temperature. Such an effect has been proposed for Saturn's moon Titan.

Runaway greenhouse effect.

A runaway greenhouse effect occurs if positive feedbacks lead to the evaporation of all greehouse gases into the atmosphere. A runaway effect - involving carbon dioxide and water vapour has long ago been hypothesized a have occured on Venus. this idea is still largely accepted.

The planet Venus experienced a runaways greenhouse effect, resulting in an atmosphere which is 96%

carbon dioxide, and a surface atmospheric pressure roughly the same as found 900 m (3,000 ft) underwater on Earth. Venus may be have had water oceans, but they would have boiled off as the mean surface temperature rose to the current 735 K (462 °C; 863 °F).

PREVENTION

- Afforestation : Afforestation on a large scale area helps in decreasing the release of carbon dioxide in the atmosphere.
- Conservation of energy :- Switching to renewable sources of energy such as solar energy, wind energy such as solar energy, wind energy, etc. will reduce the use of fossil fuels. This eventually reduces the release of carbon dioxide into the atmosphere.
- Policy intervention : When the government comes up with strict policies to maintain the overall air quality of the city.

CONCLUSION

Nevertheless, the conclusion is that natural systems around the world are being affected by regional climate changes, particularly temperature increases, and that these temperature increases are very likely to be the result of anthropogenic emissions of greenhouse gases.