



CLIMATE CHANGE AND THE IMPACT OF GREENHOUSE GASSES & GLOBAL WARMING

Amar Singh Mounpria

Lecturer in Zoology, S.N.D.B. Govt. PG College, Nohar (Rajasthan) India

Received- 07.11.2018, Revised- 13.11.2018, Accepted- 19.11.2018 E-mail: asmunparia@gmail.com

Abstract: *Life on Earth, as it is, relies on the natural atmospheric greenhouse effect. This is the result of a process in which a planet's atmosphere traps the sun radiation and warms the planet's surface.*

The paper presents an overview of the various aspects of the green house effect and its potential to contribute to global warming. India experiences extreme weather with temperatures ranging from -15 to 52 degrees Celsius. In the Himalayas, snow is common during winter season, while in the Gangetic plains, summer heat often brings out the hottest temperatures. Areas such as Cherrapunji in the North-East receive around 1100mm of rainfall annually, while arid regions such as Rajasthan get less rainfall. Various aspects of the green house effect, such as the melting of ice, the rise in sea level, and the impact of climate change on human health, have been discussed.

Key Words: natural atmospheric, greenhouse, atmosphere, sun radiation, surface, presents, weather.

INTRODUCTION- Greenhouse effect occurs in the troposphere (the lower atmosphere layer), where life and weather occur. In the absence of greenhouse effect, the average temperature on Earth's surface is estimated around -19°C, instead of the current average of 14°C (Le Treut et al., 2007). Greenhouse effect is produced by greenhouse gasses. Greenhouse gasses are those gaseous constituents of the atmosphere that absorb and emit radiation in the thermal infrared range. Traces of Greenhouse gasses, both natural and anthropogenic, are present in the troposphere. The most abundant Greenhouse gasses in increasing order of importance are: water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxides (NO) and ozone (O₃) (Kiehl and Trenberth, 1997).

Life on Earth, as it is, relies on the natural atmospheric greenhouse effect. This is the result of a process in which a planet's atmosphere traps the sun radiation and warms the planet's surface.

South Asia's second-largest nation with a population of over 1.2 billion, India is located north of the equator. It shares a coast line with Bangladesh, China, Pakistan, Nepal, Burma, and Bhutan. It also has land boundaries with these countries.

Corresponding Author

Due to its size, India experiences a wide variety of temperatures. Some of these include the extremely hot temperatures in the Thar Desert and the freezing cold weather in the Himalayas. These two regions are responsible for controlling the country's weather. The Himalayas and the Thar desert contribute to this climate phenomenon by preventing cold winds from blowing in. These two regions draw in the summer monsoon winds that are responsible for the majority of India's monsoon season.

GREEN HOUSE EFFECT- Greenhouse gases are substances in the Earth's atmosphere that absorb and emit radiation. Some of these include carbon dioxide, methane, and chlorofluorocarbons. In order, the most abundant greenhouse gases in Earth's atmosphere are:

1. Water Vapor
2. Carbon dioxide
3. Chlorofluorocarbons
4. Methane
5. Nitrous oxide

the troposphere and resulting in an increase in the temperature of air and the earth are discussed here:



1. Water Vapor- Water is present in the troposphere both as vapor and clouds. Water vapor was reported by Tyndal in 1861 as the most important gaseous absorber of variations in infrared radiation (cited in Held and Souden, 2000). Further accurate calculation estimate that water vapor and clouds are responsible for 49 and 25%, respectively, of the long wave (thermal) absorption (Schmidt et al., 2010). However, atmospheric lifetime of water vapor is short (days) compared to other GREENHOUSE GASSES as CO₂ (years) (IPCC, 2014).

Water vapor concentrations are not directly influenced by anthropogenic activity and vary regionally. However, human activity increases global temperatures and water vapor formation indirectly, amplifying the warming in a process known as water vapor feedback (Soden et al., 2005).

2. Carbon dioxide- Humans contribute about 55% of the greenhouse gases that are contributing to global warming. Natural sources of CO₂ include organic decomposition, ocean release and respiration. Anthropogenic CO₂ sources are derived from activities such as cement manufacturing, deforestation, fossil fuels combustion such as coal, oil and natural gas, etc. Surprisingly, 24% of direct CO₂ emission comes from agriculture, forestry and other land use, and 21% comes from industry. The concentration of CO₂ in the atmosphere has increased by about 1.5 ppm every year since 1990.

3. Chlorofluorocarbon- CFCs contribute 24% of the greenhouse gases that humans produce. They can also deplete the ozone layer. Their main sources of emissions are leaking refrigerators and air conditioners. The atmospheric concentration of CFCs is about 0.00225 ppm.

4. Methane- Methane is a greenhouse gas that can be produced by bacteria in moist areas that lack oxygen, such as wetlands, swamps, landfills, paddy fields, and digestive tracts of livestock. The concentration of methane in the atmosphere is 1.675 parts per million.

5. Nitrous oxide- Around 6% of the

anthropogenic greenhouse gases emissions are caused by nylon products. These include the burning of biomass and coal, as well as the breakdown of fertilizers in soil, groundwater contamination, and livestock wastes. Its atmospheric concentration is currently 0.3 ppm.

Mechanism of Global Warming & Climate Change

i. The Sun's incoming radiation is mainly visible light. It ranges from 0.2 to 4.1 meters, which is equivalent to the radiative temperature of the Sun.

ii. The Earth's surface absorbs about 50% of the Sun's energy. The rest is absorbed by the atmosphere or reflected back into space.

iii. The greenhouse effect is when the absorbed heat warms the surface. In simple terms, this heat is lost as thermal radiation.

The reduction in the water vapour's concentration in the atmosphere is one of the factors that contributes to the increasing number of radiation energy losses. It is also believed that the greenhouse effect can be applied to a surface in the mid-troposphere.

Anthropogenic activity alters global climate by interfering with the flows of energy through changes in atmospheric gasses composition, more than the actual generation of heat due to energy usage. Short-term consequences of greenhouse gasses increase in plants are mainly associated with the rise in atmospheric CO₂. Plants respond directly to elevated CO₂ increasing net photosynthesis, and decreasing stomatal opening. To a lesser extent, O₃ uptake by plants may reduce photosynthesis and induce oxidative stress. In the middle and long term, prognostic consensus about climate change signal a rise in CO₂ concentration and temperature on the Earth's surface, unexpected variations in rain fall, and more recurrent and intense weather conditions, e.g., heat waves, drought and flooding events. These brief episodes bring plants beyond their capacity of adaptation; decreasing crop and tree yield.

Some of the major types of Climate zones found in India are as follows:

1. The Cold Weather Season (December-February)
2. The Hot Weather Season (March-May)
3. The Rainy Season (June-September)
4. The Season of Retreating South-west Monsoon (October-November)



Fig. 1 Map showing Climatic Zone of India

EFFECTS OF GLOBAL WARMING-

Global Temperature Increase- It is estimated that the earth's mean temperature will rise between 1.5 to 5.5°C by 2050 if input of greenhouse gases continues to rise at the present rate.

Rise in Sea Level- With the increase in global temperature sea water will expand. Heating will melt the polar ice sheets and glaciers resulting in further rise in sea level. Current models indicate that an increase in the average atmospheric temperature of 3°C would raise the average global sea level by 0.2-1.5 meters over the next 50-100 years.

Effects on Human Health- Changing rainfall patterns due to global warming could affect the transmission of various vector-borne diseases such as malaria and filariasis. Areas that are currently free of these diseases could become breeding grounds for these organisms.

Effects on Agriculture- There are varying views about how global warming will affect agriculture. It can either be positive or negative for different crops depending on the region. Subtropical and tropical regions will be the most affected due to how their average temperature will rise.

Even a rise of 2°C may be quite harmful to

crops. Soil moisture will decrease and evapotranspiration will increase, which may drastically affect wheat and maize production. Increase in temperature and humidity will increase pest growth like the growth of vectors for various diseases.

CONTROL MEASURE OF GLOBAL WARMING-

There are numerous ways to stop global warming- Plant More Trees and Stop Contributing to Deforestation- The easiest way to protect our planet from the effects of global warming is by reducing the concentration of greenhouse gases in the atmosphere.

Switch to Compact Fluorescent Light Bulbs- In addition to contributing to global warming, using inefficient light bulbs is also a contributing factor to the issue. When it comes to reducing carbon dioxide emissions, replacing old bulbs with compact fluorescent lights can help you save up to 60% on energy.

Reuse and Recycle Products- In order to help stop global warming, we should recycle and reuse various products that we use daily. For instance, by reducing the amount of paper that is produced by cutting down trees, we can help prevent greenhouse gases from being released into the atmosphere.

Unplug Appliances- Another way to address global warming is by unplugging all of your electronic devices. Doing so can help cut down on energy consumption by about 20 percent.

Avoid Keeping Electrical Appliances on Standby- An electronic appliance's continuous use on standby can contribute to global warming and loss of energy. Although one may initially believe that a single computer will not make a big difference, millions of people will actually think differently.

Promote the Use of Organic Products- One of the ways to prevent global warming is by promoting organic food production. According to estimates, by utilizing organic farming techniques, we can remove about 600 billion pounds of carbon dioxide from the atmosphere.



Use Vehicles Efficiently- Vehicles are known to release a huge amount of carbon dioxide into the atmosphere. If you want to cut down on pollution, you can try implementing some simple driving tips. These include not turning on the engine at red lights and going at a moderate speed.

Resort to Alternative Sources of Energy- One of the most important factors that people can consider when it comes to addressing global warming is switching to renewable energy sources such as wind and solar power. Doing so will help cut down on greenhouse gas emissions. We can help reduce the amount of energy that goes into production by giving up on unnecessary luxuries.

CONCLUSION- The goal of this study was to examine the effects of greenhouse gases on the global temperature and human health. It also analyzed how these gases affect agriculture and human development. It is believed that the rise of greenhouse gases is the main cause of global warming. It was concluded that by recycling paper, the large-scale felling of trees can be stopped, and these trees can absorb carbon dioxide and help reduce global warming.

REFERENCES

1. Abdelgawad, H., Farfan-Vignolo, E. R., de Vos, D., and Asard, H. (2015). Elevated CO₂ mitigates drought and temperature-induced oxidative stress differently in grasses and legumes. *Plant Sci.* 231, 1-10. doi: 10.1016/j.plantsci.2014.11.001
2. Choudhury, F. K., Rivero, R. M., Blumwald, E., and Mittler, R. (2017). Reactive oxygen species, abiotic stress and stress combination. *Plant J.* 90, 856-867. doi: 10.1111/tbj.13299
3. Global warming and its impacts on the climate of India by Theodore C. Sorensen.
4. Global warming: mechanism, effects and control of Global warming by Puja Mondal.
5. Gupta, K.J., and Igamberdiev, A.U. (2016). Reactive nitrogen species in mitochondria and their implications in plant energy status and hypoxic stress tolerance. *Front. Plant Sci.* 7:369. doi: 10.3389/fpls.2016.00369
6. <http://www.thefreedictionary.com>
7. Wikipedia- the free encyclopaedia.
