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Greenhouse Effect: Causes, Effects, Remedies.

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Abstract:

Greenhouse effect is the phenomenon in which some gases that occurs in earth's atmosphere absorbs and traps solar heat. This keeps earth warmer than actual conditions. It is one of the most important causes which makes earth comfortable and habitable for living things. The gases responsible for this effect are oxides of carbon, CH₄, nitrogen oxides, chlorofluorocarbons (CFCs), hydrofluorocarbons as well as ozone. These are mainly present in lower layer of atmosphere. Due to increased level of air pollution and industrial pollution, the amount of greenhouse gases is increased more than permissible limit that traps more heat and increases the temperature of atmosphere, which has major adverse effects on earth's atmosphere. Present study includes sources, effects and remedies of greenhouse effect.

Key words: Greenhouse effect, heat, atmosphere, pollution, temperature.

Introduction:

We all know that earth is the most comfortable and suitable planet for living things, as the atmospheric conditions and ecosystems are made for living things. The appropriate temperature for living habitat is mainly maintained by greenhouse effect¹. This effect makes earth comfortable for life. In day time, earth absorbs heat from solar energy, that makes earth warmer. And during night time, heat is released back to the atmosphere making earth cooler than day time. But some of the gases present in atmosphere, traps this released heat and store it. Therefore, total absorbed heat is not released but some amount of heat is trapped in the surroundings. This trapped heat is responsible for earth warmer than actual². This effect resembles with mechanism of

greenhouse. Hence it is known as natural greenhouse effect. The gases like water vapors, oxides of carbon, CH₄, nitrogen oxides, chlorofluorocarbons (CFCs), and ozone etc. mainly absorbs heat and stores in earth's atmosphere. Hence these are known as greenhouse gases³.

Over the past century, worldwide population has enormously increased. Continuously growing rate of urbanization and globalization has created many serious issues that are harmful for environmental health⁴. Rapid growth of industrialization, changing standard lifestyles of society, improper use of vehicles, incomplete combustion of fossils and fuels etc. are main causes of air pollution. Due to air pollution, the amount of greenhouse gases has also increased beyond permissible limits. These greenhouse gases increase the temperature of Earth's atmosphere. Which makes earth warmer than need¹. It has increased overall temperature of earth and has very bad effects on environment. nowadays Global warming is the most serious and major concern⁴.

I Origin of Greenhouse Effect:

Burning of Fossil Fuels

Fossil fuels are very important in human life. They are used for transportation purpose as well as in electricity production. On burning they release carbon dioxide. Also, use of fossil fuels is increased as there is increase in population. Due to this more and more greenhouse gases are released in the atmosphere⁵⁻⁶.

Deforestation

All trees as well as plants absorb carbon dioxide during photosynthesis and give oxygen gas. Due to the cutting of trees i. e. deforestation, industries and buildings are increased and therefore there is increase in the level of oxides of carbon responsible for heating effect. Thus, due to release of CO and CO₂ gases in an atmosphere, automatically temperature of the earth is increasing⁵.

Agriculture

Various fertilizers containing nitrogen are used to increase the yield of crops. Now a days use of pesticides and insecticides has been also increased. Thus, number of pollutants in soil are also increased. This is again one more cause and source to increase greenhouse gases in an atmosphere⁵⁻⁶.

Industrial Wastes.

The various types of industries produce toxic gases and these waste gases are released directly in an atmosphere⁶⁻⁷.

All these greenhouse gases trap heat in an atmosphere and planet becomes warm. The most important greenhouse gases which cause greenhouse effect are as follows.

1) Carbon dioxide:

CO₂ is the most important and major greenhouse gas. Contribution of CO₂ is 55 to 57 %. The major increase in CO₂ gas is due to human activities. The major source of CO₂ is burning of fossil fuel and afforestation, complete combustion of fuel in vehicles, land clearing and burning etc⁷. In 1990, concentration of CO₂ in the atmosphere was 355 ppm but nowadays it is increases rapidly at a rate of 1.5 ppm per year.

2) Chlorofluorocarbon:

Chlorofluorocarbons are nothing but halogenated hydrocarbons that are mainly consist of carbon, hydrogen, chlorine, fluorine etc. The most common example of CFC is dichlorodifluoromethane⁸⁻⁹. It is commonly known as Freon-12. These are responsible for nearly 24 to 25 % of greenhouse effect. CFCs are mainly used as refrigerants, propellants and solvents. These are the most important cause of ozone layer depletion. The major sources of CFCs are Refrigerators, various types of sprays, fire extinguishers, air conditioners, paints etc⁷. The concentration of CFC in atmosphere is about 0.00224 ppm. and it is continuously increasing at the rate of 0.5 % per year.

3) CH₄:

Methane is commonly known as marsh gas. It is produced in natural wetlands, paddy fields, biogas plants, excretes of animals, breakdown of organic matter etc. It contributes about 18 to 20 % of greenhouse effect⁷. The atmospheric concentration of Methane is about 1.67 ppm. But nowadays it is increasing at the rate of 1% per year.

4) Nitrous oxide:

The main source of production of nitrous oxide is burning of Nitrogen containing fuel and biomass, from Nitrogen containing chemical fertilizers, industrial effluents containing nitrate wastes, various nitrogenous products etc. It contributes about 6 to 7 % of greenhouse gases⁸. The concentration of Nitrous oxide in an atmosphere is 0.3 ppm and it is increasing at a rate of 0.2% per year.

5) Water Vapor:

Water vapor is the most dominant greenhouse gas in an atmosphere. Behavior of this is very different from the other greenhouse gases⁷. “The primary role of water vapor is not as a direct agent of radiative forcing but rather as climate feedback, that is, as a response within the climate system that influences the system’s continued activity. This distinction arises because the amount of water vapor in the atmosphere cannot, in general, be directly modified by human behavior but is instead set by air temperatures”⁸. If the surface is warmer, then there is large evaporation rate of water from the surface of water bodies. Thus, due to increased evaporation there is more concentration of water vapor in

the lower atmosphere. Hence, it increases the absorption of infrared radiations and emits it back to the surface⁹.

II Effects:

Even there is only a small amount of the gases in Earth's atmosphere, they have extensive effect in surrounding. It is considered that during this century, the amount of the CO₂ in the atmosphere is expected to become twice. Other greenhouse gases like CH₄ and nitrogen oxides are increasing as well⁸. The amount of greenhouse gases is increasing due to burning of fossil fuels in atmosphere. This activity releases the various pollutants and other toxic gases into the atmosphere. Animals release methane gas when they digest food. Cement is made from limestone, so it releases carbon dioxide⁹⁻¹⁰. If more amount of greenhouse gases is there, heat will stick around and it warms the planet rapidly¹⁰.

III Remedies:

There are different ways to reduce and decrease the pollutants as well as greenhouse effects. So, following are some remedies which are discussed and these we can use to reduce temperature.

Renewable energy

We can use the various alternative sources of energy like such solar energy, wind energy, geothermal, hydro energy etc. Now a days it is very important to use such type of alternatives all over the world.

Solar energy panels

Now, our central government as well as state governments is offering residential renewable energy incentives to install solar panels on the roof as well as for small industries. Solar energy is more accessible than ever before, not to mention an excellent long-term investment¹².

Thus, here we have mentioned here a list of causes, alternatives to minimize these causes. Thus, following are some preventive measures:

Plantation: Plantation of various trees and plants on a large-scale helps to decrease the release of carbon dioxide in the atmosphere¹³.

Energy Conservation: By using variable renewable energy sources of like solar energy, wind energy as well as using public transportation will automatically minimize the use of fossil fuels and thus amount of CO₂ released in the atmosphere will also be decreased¹⁴.

Intervention of Policy: There should be strict policy of the state as well as central government for maintaining the overall quality of the air in our country¹⁵.

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