

Global Warming: Effects and Solutions

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Abstract- Global Warming has become one of the burning problems of the day. Every year, the average temperature of the Earth is being increased. Such problem is called Global Warming. This problem has started long ago. In the last 50 years, the situation has become worst. There are many causes of Global Warming. Firstly, the trees are being destroyed in good number. As a result, there is no perfect balance in the ratio of CO₂ and O₂. Secondly, the excessive fuel consumption is another direct cause of Global Warming. Thirdly, the excessive use of CFC has made the situation alarming. The direct impact of Global Warming is that the condensed ice of the pole regions has begun to be melted. Gradually, the sea level rises. Shortly, the coastal countries of the world will be washed away. Besides, owing to Global Warming, the holes have been created in the O₃ layer. As a result, the harmful rays of the sun enter the surface of the Earth. Some measures may be taken to solve the problem of Global Warming. Firstly, trees should be planted in good number. Secondly, the excessive use of CFC should be banned. Above all, public awareness should be created among the masses against the terrible consequence of the Global Warming.

Keywords: Global Warming, Temperature, Greenhouse Gases, Climate Change.

Introduction

Global warming is the phenomenon of a gradual increase in the temperature close to the earth's surface. Global warming is the long-term rise in the average temperature of the Earth's climate system. It is a major aspect of climate change, and has been demonstrated by direct temperature measurements and by measurements of various effects of the warming. Global warming and climate change are often used interchangeably. Troposphere, the lowermost layer of the atmosphere, traps heat by a natural process due to the presence of certain gases. This effect is called Green House Effect as it is similar to the warming effect observed in the horticultural green house made of glass. The amount of heat trapped in the atmosphere depends mostly on the concentrations of heat trapping or green house gases and the length of time they stay in the atmosphere. The major green house gases are carbon dioxide, ozone, methane, nitrous oxide, chlorofluorocarbons (CFCs) and water vapours. The average global temperature is 15⁰C. In the absence of green house gases this temperature would have been -18⁰C. Therefore, Green House Effect contributes a temperature rise to the tune of 33⁰C. Heat trapped by green house gases in the atmosphere keeps the planet warm enough to allow us and other species to exist. The two predominant green house gases are water vapours, which are controlled by hydrological cycle, and carbon dioxide, which is controlled mostly by the global carbon cycle. While the levels of water vapour in the troposphere have relatively remained constant, the levels of carbon dioxide have increased. Other gases whose levels have increased due to human activities are methane, nitrous oxide and chlorofluorocarbons. Deforestation has further resulted in elevated levels of carbon dioxide due to non-removal of carbon dioxide by plants through photosynthesis. Warming or cooling by more than 2⁰C over the past few decades may prove to be disastrous for various ecosystems on the earth including humans, as it would alter the conditions faster than

some species could adapt or migrate. Some areas will become inhabitable because of drought or floods following a rise in average sea level.

Greenhouse Gases

The phenomenon that worries the environmental scientists is that due to anthropogenic activities there is an increase in the concentration of the greenhouse gases in the air that absorb infra-red light containing heat and results in the re-radiation of even more of the outgoing thermal infra-red energy, thereby increasing the average surface temperature beyond 15° C. The phenomenon is referred to as the enhanced greenhouse effect to distinguish its effect from the one that has been operating naturally for millennia.

The greenhouse gases present in the troposphere and resulting in an increase in the temperature of air and the earth are discussed here:

Carbon dioxide(CO_2):

It contributes about 55% to global warming from greenhouse gases produced by human activity. Industrial countries account for about 76% of annual emissions. The main sources are fossil fuel burning (67%) and deforestation, other forms of land clearing and burning (33%). CO_2 stays in the atmosphere for about 500 years. CO_2 concentration in the atmosphere was 355 ppm in 1990 that is increasing at a rate of 1.5 ppm every year.

Chlorofluorocarbons (CFCs):

These are believed to be responsible for 24% of the human contribution to greenhouse gases. They also deplete ozone in the stratosphere. The main sources of CFCs include leaking air conditioners and refrigerators, evaporation of industrial solvents, production of plastic foams, aerosols, propellants etc. CFCs take 10-15 years to reach the stratosphere and generally trap 1500 to 7000 times more heat per molecule than CO_2 while they are in the troposphere. This heating effect in the troposphere may be partially offset by the cooling caused when CFCs deplete ozone during their 65 to 110 years stay in the stratosphere. Atmospheric concentration of CFC is 0.00225 ppm that is increasing at a rate of 0.5% annually.

Methane (CH_4):

It accounts for 18% of the increased greenhouse gases. Methane is produced when bacteria break down dead organic matter in moist places that lack oxygen such as swamps, natural wetlands, paddy fields, landfills and digestive tracts of cattle, sheep and termites. Production and use of oil and natural gas and incomplete burning of organic material are also significant sources of methane. Methane stays in the atmosphere for 7-10 years. Each methane molecule traps about 25 times as much heat as a CO_2 molecule. Atmospheric concentration of methane is 1.675 ppm and it is increasing at a rate of 1% annually.

Nitrous Oxide (N_2O):

It is responsible for 6% of the human input of greenhouse gases. Besides trapping heat in the troposphere it also depletes ozone in the stratosphere. It is released from nylon products, from burning of biomass and nitrogen rich fuels (especially coal) and from the break down of nitrogen fertilizers in soil, livestock wastes and nitrate contaminated ground water. Its life span in the troposphere is 140-190 years and it traps about 230

times as much heat per molecule as CO₂. The atmospheric concentration of N₂O is 0.3 ppm and is increasing at a rate of 0.2% annually.

Effects of Global Warming

The effects of global warming can be seen and felt across the planet. The enhanced greenhouse effect will not only cause global warming but will also affect various other climate and natural process.

1) Climate Effect:

Climate change will have important effect on agriculture potential . There is also a scientific concern about the effects of global change like-

- i) Warming of the earth's surface and lower atmosphere while cooling of stratosphere.
- ii) Warming on earth's surface lead to warming in tropics is smaller than the global mean by about 2-3⁰ C depending on seasonal changes ,which in other latitudes the average warming might account for 5-10⁰ C increase in temperature.
- iii) Precipitation pattern will change some areas will become wetter and some areas drier.
- iv) Seasonal pattern will change due to the change of temperature and precipitation patterns.
- v) Soil moisture regimes will be changed due to change in evaporation and precipitation.

2) Rise in Sea Level:

With the increase in global temperature seawater 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 3⁰ C would raise the average global sea level by 0.2-1.5 meters over the next 50-100 years.

One meter rise in sea level will inundate low lying areas of cities like Shanghai, Cairo, Bangkok, Sydney, Hamburg and Venice as well as agricultural lowlands and deltas in Egypt, Bangladesh, India, China and will affect rice productivity. This will also disturb many commercially important spawning grounds, and would probably increase the frequency of storm damage to lagoons, estuaries and coral reefs.

In India, the Lakshadweep Islands with a maximum height of 4 meters above the level may be vulnerable. Some of the most beautiful cities like Mumbai may be saved by heavy investment on embankment to prevent inundation.

Life of millions of people will be affected, by the sea level rise who have built homes in the deltas of the Ganges, the Nile, the Mekong, the Yangtze and the Mississippi rivers.

3) Effects on Human Health:

The global warming will lead to changes in the rainfall pattern in many areas, thereby affecting the distribution of vector-borne diseases like malaria, filariasis, elephantiasis etc.

Areas which are presently free from diseases like malaria, schistosomiasis etc. may become the breeding grounds for the vectors of such diseases. The areas likely to be affected in this manner are Ethiopia, Kenya and Indonesia. Warmer temperature and more water stagnation would favour the breeding of mosquitoes, snails and some insects, which are the vectors of such diseases.

Higher temperature and humidity will increase/aggravate respiratory and skin diseases.

4) Effects on Agriculture:

There are different views regarding the effect of global warming on agriculture. It may show positive or negative effects on various types of crops in different regions of the world. Tropical and subtropical regions will be more affected since the average temperature in these regions is already on the higher side. Even a rise of 2°C may be quite harmful to crops. Soil moisture will decrease and evapo-transpiration 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. Pests will adapt to such changes better than the crops.

To cope up with the changing situation drought resistant, heat resistant and pest resistant varieties of crops have to be developed.

Solutions to control global warming

To slow down enhanced global warming the following steps will be important:

1. Plant maximum number of trees as they release oxygen and absorb CO₂ present in atmosphere. In this way a tree balances the temperature of air and reduces the amount of CO₂ present in air. A single tree will absorb one ton of carbon dioxide over its lifetime.
2. Vehicles release many harmful gases in the air. Hence try to drive those cars which run on gas or electricity. If possible minimize the use of personal vehicle and travel by public transport. This way we can also control the problem of pollution.
3. Use fans more than air conditioners to use less energy. Hot air released from air conditioner is one of the major factors behind global warming.
4. Avoid to use water heater or use that on temperature lesser than 120° F.
5. Instead of dryers take an advantage of sun light to dry wet cloths.
6. Unplug all the electrical appliances if they are not in use.
7. For less amount of carbon emission we can also use renewable energy like wind power which generate negligible amount of harmful gases.
8. Use recyclable materials instead of disposable materials. This is good to control on waste.
9. We can save 2,400 pounds of carbon dioxide per year by recycling just half of our household waste.

Conclusion

Global warming presents one of the most significant challenges facing humanity in the 21st century. Global warming is a phenomenon related to nature. Global warming could not be solved easily if people are not very practice in lowering carbon emission, law and regulation's implementation and effective forests and agriculture management. The solutions for this issue will be more effective when individuals change their lifestyles. Individuals can contribute to reduce the changes in the global climate through changing their habits. We must try our best to solve the problem and strive as much as possible to reinstate our earth for sake of future generation.

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