

“GLOBAL WARMING AND ITS EFFECTS ON ENVIRONMENT”

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Abstract

Global Warming is a phrase that refers to the effect on the climate of human activities, in particular the burning of fossil fuels (coal, oil, and gas) and large- scale deforestation, which cause emission to the atmosphere of large amounts of ‘green house gases’ of which the most important is carbon dioxide. Such gases absorb infrared radiation emitted by the Earth’s surface and act as blankets over the surface keeping it warmer than it would otherwise be. Associated with this warming are changes of climate. Many of the likely characteristics of the resulting changes in climate (such as more frequent heat waves, increases in rainfall, increase in frequency and intensity of many extreme climate events) can be identified. Because of its negative impacts on human communities (including for instance substantial sea-level rise, effects on weather, social system, and regional effects) and on ecosystem, global warming is the most important environmental problem the world faces. Adaptation to the inevitable impacts and mitigation to reduce their magnitude are both necessary. International action is being taken by the world’s scientific and political communities. Because of the need for urgent action, the greatest challenge is to move rapidly to much increased energy efficiency and to non-fossil fuel energy sources.

Key Words: Global warming, environment

Introduction:

‘Global warming is defined as an increase in the average temperature of the Earth's atmosphere, especially a sustained increase great enough to cause changes in the global climate’. The term global warming is synonymous with Enhanced greenhouse effect, implying an increase in the amount of greenhouse gases in the earth’s atmosphere, leading to entrapment of more and more solar radiations, and thus increasing the overall temperature of the earth (Wikipedia).

Global warming refers to the change in the earth’s global average surface temperature. Earth’s mean surface temperature has increased by about **0.78° c (1.4°F)** between the years 1900 and 2005. Intergovernmental panel on climate change (IPCC) indicated that during 21st century the global surface temperature is likely to rise a further 1.1 to 2.9°C (2 to 5.2°F) for their lowest emission scenario and 2.4 to 6.4°C (4.3to11.5°F) for their highest.

The amount of greenhouses gases (GHG) in atmosphere has increased with an increased in use of fossil fuel. The greenhouse effect is the process by which absorption and emission of infrared radiation by gases in the atmosphere warm a planet’s lower atmosphere and surface it was proposed by **Joseph Fourier in 1824** and was first investigated quantitatively by **Svante Arrhenius in 1896**. The GHG acts like a blanket, insulating the earth but allowing the heat to escape, eventually. Our Global climate is dependent on the concentration of GHG. If these concentrations increase or decrease, our climate will change accordingly.

Human activity since the industrial revolution has increased the amount of GHG in atmosphere leading to increased radioactive forcing from **CO₂, Methane, Tropospheric Ozone, CFCs and nitrous Oxide, water vapors**. The concentration of CO₂ and CH₄ has increased by 36% to 148% respectively since 1750. Research into the global warming phenomena reveals only one thing for certain that climate is warming and amount of CO₂ in atmosphere has increase by 30%. Since the beginning of the industrial revolution form the last decade of the twentieth century.

What Is Causing Global Warming?

1. CO₂ emissions from Fossil Fuel burning Power plants.

40% of U. S CO₂ emissions come from electricity production and burning coal accounts for 93% of emissions from the electric utility industry. we are highly dependent on burning coal for our personal and commercial electrical supply.

2. CO₂ emissions from burning gasoline for transportation.

Our modern car culture and appetite for globally sourced goods is responsible for about 33% of emissions in the U.S. with our population growing at an alarming rate, the demand for more cars and consumer goods means that we are increasing the use of fossil fuels for transportation and manufacturing.

3. Methane emissions from animals, agriculture such as rice paddies, and form arctic sea beds.

Methane is another extremely potent GHG ranking right behind Co₂ when organic matter is broken down by bacteria under oxygen- starved condition (**anaerobic decomposition**) as in rice paddies, methane is produced. The process also takes place in the intestines of herbivorous animals, and with the increase in the amount of concentrated livestock production, the levels of methane released into the atmosphere are increasing. Another source of methane is methane clathrate, a compound containing large amours of methane trapped in the crystal structure of ice. As Methane escapes from the arctic seabed's, the rate of global warming increases significantly.

4. Deforestation, especially tropical forest for wood, pulp, and farmland.

Forest removes and store Co₂ from the atmosphere and this deforestation releases large amounts of carbon a well as reducing the amount of carbon capture on the planet.

5. Increase in usage of chemical fertilizers on croplands.

In the last half of the 20th century, the use of chemical fertilizers has risen dramatically. The high rate of application of nitrogen rich fertilizers has effect on the heat storage of cropland (**nitrogen oxides have 300 times more heat-trapping capacity per unit of volume than CO₂**) and the run-off of excess fertilizers creates dead-zone in our oceans. In addition to these effects, high nitrate levels in ground water due to over –fertilization are cause for concern for human health.

Global Warming Effects: -

(1.) Effect on weather and climate: -

(i) *The Global mean Temperature of earth has increase by approximately 0.6°C in the 20th century.*

- Temperature of earth may increase by 1.4°C – 5.8°C by the year 2100 from what it was in 1990.
- The Temperature changes will be most marked at the middle and high latitudes (at poles) than at the equators.
- The Northern Hemisphere will warm more than the southern hemisphere Northern hemisphere has more land and lands heat more quickly than water.

(ii) **Warming of atmosphere will increase the moisture carrying capacity of air.** While the troposphere warms up, the stratosphere will cool down. This would cause changes in the precipitation patterns, due to changes in air mass movements.

- It will lead to increased precipitation at higher latitude and lower ppt. at lower altitudes in winter.
- Extreme weather changes observed from last 20th century. eg-Heat waves.

(iii) **Regional effects of global warming** (melting or forming ice, changing the hydrological cycle of evaporation, precipitation, currents in the oceans & air flows in the atmosphere, leafing of trees and plants over many regions, movement of species to higher latitudes & altitudes in the Northern hemisphere; changes in birds' migrations in Europe, North America & Australia also shifting of the oceans plankton and fish from cold to warm adopted communities.)

- An increase in the area affected by drought, floods, cyclones earthquake & volcanoes (due to reduction in ice cover reduces the confining pressure exerted on the volcano increasing deviator stresses and potentially causing the volcano to erupt.)

(2.) Effects in sea levels

Melting of two massive ice sheets in Antarctica and Greenland especially in east coast of the US.

- Thermal expansion of ocean water.
- Melting of Antarctica and Greenland ice sheets

Implications of Sea Level Rise: -

The US National Research Council described the projections for the end of 21st century of between 0.56 and 2m relative to sea levels at the end possible sea level rise by of the 20th century.

- A rise of even half a meter (0.5m) of sea level would bring world's important cities and coastal areas under the threat of floods (Maldives is already looking for a new home)
- Since 1/3 of human population lives within the coastal line it would affect the human tremendously.
- Coastal salt marshes and estuaries may disappear, and along with them the breeding grounds of several birds and fishes, leading to their extinction.
- Sea level rise has negative impacts on freshwater availability for human consumption, agriculture, and energy production.
- Ocean temperature rise (1961 to 2003 by 0.10C from the surface to a depth of 700m) affect the ecosystem (melting sea ice, affecting algae that grow on its underside)
- Ocean acidification (ocean serve as a sink for CO₂, taking up much that would otherwise remain in atmosphere, but increased levels of CO₂ have led to ocean acidification).

(3) Effect on species distribution:

According to research published in *NATURE* by 2050, rising temperature could lead to the extinction of more than a million species (coral reefs population will collapse by 2100 due to increased temperature and ocean acidification and other species, rely on coral reefs for their survival (report on coral reef by WWF).

- As both plant and animal species occur within the range of temperature, any temperature change would affect their distribution pattern attitudinally as well as latitudinally.
- Global warming may lead to the extinction of many plant and animal species.

(4) Effect on food production & health:

The increase in global temperature would bring about several changes in plants affecting food production like:

- Explosive growth of weeds.
- Eruption of several plant diseases and pests.
- Increased basal rate of respiration in plants.
- Crop productivity will be affected abruptly.
- Direct & indirect effects on health. (**Research by WHO, 2009:** shows that worldwide deaths in 2004, climate change was responsible for 3% diarrhea, 3% of malaria, and 3.8% of dengue fever deaths, Total attributable mortality was about 0.2% of deaths; of these 85% were child deaths).

Measures to Control the effects:

1. Collective thinking by all of us.
2. Teacher role in awareness programs through slogans, rallies, community centered acts etc.
3. Mass movement towards right efforts (change of emotions, feeling of people towards awareness).
4. Right use of technology (reducing use of CFC containing instruments).
5. Must be fundamental duty to protect environment.
6. Relating environmental education or issues with aesthetic and moral values.
7. Efforts at global level honestly.
8. Reduce the non-natural factors of polluting the environment.
9. Adopt group travelling culture by vehicle (leaving your car at home and using public transport or cycling or walking, especially for short trips).
10. Try to live a simple and hygienic life (healthy and hygienic lifestyle).
11. Carbon neutrality should achieve (using LPG for cooking rather wood).
12. Choosing electrical appliances that have a high energy star' rating (the more stars, less energy you consume).
13. Intelligent shopping (buying only that you need, and choosing products that are made from recyclable materials and that have minimal packaging).
14. More plantation (during celebrations days, motivate masses for more and more plantation).
15. Sensitize children towards living and non-living creatures from very beginning.
16. Avoid toilet at open places.
17. Celebrate Environment Day on 5th June every year by mass plantation.
18. Construct strong laws for the protection of environment.
19. Integrate and correlate environmental education with curriculum as fundamental subject at school level.
20. Proper sewage treatment.
21. Not burning but by burring waste material into the ground.
22. Increase the transparency of countries' actions so that overall progress towards reducing global emissions can be tracked effectively. • Establish a Green Climate Fund through which much of the financial support to developing countries may be channelled in the longer term.

23. Key EU (European Union) measures:

EU is taking to reduce greenhouse gas emissions, while also stimulating innovation and promoting growth and jobs, include:

• The EU Emissions Trading System (EU ETS) • Targets for member countries to limit or reduce their domestic greenhouse gas emissions from sectors not covered by the EU ETS, such as agriculture, transport (except aviation), buildings and waste • National targets for renewable energy to ensure the EU get at least 20% of its energy from renewable sources by 2020 • Standards to reduce CO₂ emissions from new cars and vans and measures to address emissions from heavy-duty vehicles • Action to control emissions of fluorinated industrial gases, which are powerful greenhouse gases • Standards, labeling and legislation to improve energy efficiency, including of buildings • Emissions reduction, renewable energy and energy efficiency targets for 2030 set as part of the 2030 climate and energy policy framework.

24. At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal.

- The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C.

25. Such types of action plans of conferences and seminars must be implemented honestly and strictly.

26. Last, but not the least we individually can bring change by continuously efforts by saving the environment from pollution.

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