Chapter-44
Greenhouse effect and Global warming

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Abstract

Although some greenhouse gases are produced by human activity, others exist naturally in the atmosphere. Water vapor, carbon dioxide, methane, nitrous oxide, and ozone are examples of greenhouse gases that exist naturally. However, some human actions increase the concentrations of most of them of these naturally occurring gases. The greenhouse effect is one naturally occurring process that causes the Earth's surface and atmosphere to warm. It results from some atmospheric gases, such as as carbon dioxide, water vapor, and methane, having a capability to change the planet's energy balance by absorbing long-wave radiation emitted by the Earth's surface. Without the greenhouse effect, life on Earth most likely wouldn't exist because the average temperature would be a freezing -18°C rather than the current 15°C. Global temperatures have increased by roughly 0.6 °C during the 20th century, according to observations.There is now compelling evidence that human activity is responsible for the majority of the warming that has been witnessed over the past half a century

Key words- Greenhouse gases, Global warming, Methane

Introduction

some of the solar radiation is absorbed by the naturally occurring greenhouse gases in the earth's atmosphere, which act as a natural blanket to keep the atmosphere warm and the earth's temperature at about 15 degrees Celsius. Short wavelength solar radiation enters the earth's troposphere, while long wavelength infrared solar radiation is reflected back. Carbon dioxide, methane, nitrous oxide, chlorofluorocarbons (CFCs), ozone, and other gases that aid in this process are referred to as **greenhouse gases**. The phenomena of long wavelength terrestrial infrared radiation being trapped in the earth's atmosphere is known as the "**greenhouse effect."** Burning solid waste, fossil fuels (oil, natural gas, and coal), wood, and wood products emits carbon dioxide into the atmosphere. **Methane is** released during the production and transportation of coal, natural gas, and oil. Methane emissions are also caused by organic waste decomposition in municipal landfills and livestock production. Nitrous oxide emissions occur during agricultural and industrial activities, as well as the combustion of solid waste and fossil fuels. **Hydrofluorocarbons** (HFCs, PFCs, and SF6) are potent greenhouse gases created by industrial processes that do not occur naturally.

Climate change: When we hear the term "climate change," we automatically associate it with the greenhouse effect and global warming. Climate change is a long-term shift in temperature caused by natural processes and primarily human acts. Various national and international meetings, conferences, seminars, and symposiums are held to address and solve this worldwide problem. There are two primary reasons of this global problem.There are numerous greenhouse gasses that are primarily produced by human activity. The first and important item on the list is CO2. The primary source of this gas is the over use of fossil fuels such as coal and oil. Furthermore, deforestation, or the removal of trees to acquire land, emits a significant amount of carbon dioxide into the atmosphere. When calcium carbonate is heated, lime and carbon dioxide are produced, which adds to the atmosphere. The second culprit gas is methane, sometimes known as

natural gas. It is created as a result of agricultural operations such as cattle digestion, paddy rice farming, and manure application. Inadequate waste management produces methane as well.

i) **Natural causes**: Nature's periodic activities have an impact on its climate. Climate change has been a natural phenomenon since the evolution of the earth. This has been a long-standing phenomenon. Climate change is largely influenced by volcanic activity, solar radiation, and earth's inclination. Volcanoes have had a significant impact on climate, and volcanic eruptions have historically emitted massive amounts of carbon dioxide. Some powerful volcano eruptions can send particles (such as SO2) into the high atmosphere, where they can reflect enough sunlight back into space to keep the planet's surface chilly for several years.

ii**) Human activities**: such as burning fossil fuels and deforestation, have significantly contributed to climate change. Human activities have increased greenhouse gas levels, contributing to **global warming**. Converting forests to agriculture and cutting down trees to fulfill human needs has led to changes in climate. Since the industrial revolution in 1750, carbon dioxide and methane levels have increased by 35% and 148%, respectively, according to the Intergovernmental Panel on Climate Change (IPCC).The IPCC, created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), concluded that climate change is real and caused by human activity. The UN Framework Convention on Climate Change (UNFCCC) aims to maintain greenhouse gas concentrations in the atmosphere at levels that do not represent a significant harm to the environment.

Impacts of Climate Change

1.Rising Sea Levels and Coastal Flooding: As a result of melting land ice and the expansion of warmer ocean water, sea levels are rising, increasing coastal flooding, erosion, and the risk to coastal populations. This is causing land areas close to the sea to be submerged.

2.Increasing Maximum and Minimum Temperatures: Record-breaking global temperatures are driving heatwaves to occur more frequently, with greater intensity and duration, raising health concerns, and upsetting ecosystems.

3.Extreme weather events and disasters are occurring more frequently and with greater intensity. More Severe Weather Events: As a result of climate change, there is a rise in the severity of storms, hurricanes, wildfires, and periods of high precipitation, which causes more damage to infrastructure.

4.An increase in precipitations (about. 0.5 -1%) during winter and fall in northern hemisphere Increased Droughts and Water Scarcity: In certain areas, extreme droughts are being brought on by rising temperatures and changing precipitation patterns, which is reducing water supplies and ruining crops.

5.Variations in vegetation type, distribution, and covering; loss of biodiversity; and destruction of habitats: Rapid climate change is endangering ecosystems including coral reefs, woodlands, and the Arctic tundra by forcing species to relocate or risk extinction.Species migration

6.Ocean Acidification and Warming: As a result of the oceans' increased absorption of heat and CO2, the seas are becoming warmer and more acidic, which kills marine life and bleaches coral reefs. Loss of Biodiversity and Destruction of Habitat: As a result of rapid climate change, species are being forced to relocate or risk extinction, endangering ecosystems such as coral reefs, forests, and Arctic tundra.

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