

An Overview on Global Warming

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ABSTRACT: Several greenhouse gases have risen in concentration throughout time. Human activity mainly contributes to the greenhouse gas impact by releasing carbon dioxide, but human effects on other greenhouse gases are equally significant. Global warming is being exacerbated by the buildup of greenhouse gases. According to the IPCC (Intergovernmental Panel on Climate Change) report from 2007, global average air temperature near Earth's surface rose 0.740.18°C in the last century, with the report concluding that "the majority of the observed increase in globally averaged temperatures since the mid-twentieth century is very likely due to the observed increase in the concentration of anthropogenic greenhouse gases." Global warming has an impact on many aspects of life on the planet. Agricultural yields will alter as a result of global warming, glaciers will continue to melt, and species will go extinct. New issues were progressively added to the list, ranging from ecological deterioration to human health concerns. Experts in a variety of disciplines, including forestry, economics, and even national security, weighed in to evaluate the spectrum of potential outcomes. Regrettably, forecasting the effects of global warming is notoriously difficult. It draws together a wide variety of scientific disciplines, including oceanography, meteorology, and geology, although no one can agree on the precise consequences for particular areas of the globe. Global warming, according to all experts, will have many detrimental consequences for our planet and way of life. Climate change will have a negative impact on climatic conditions and water supplies.

KEYWORDS: Global Warming, Climate Change, IPCC, Temperature, Water Resources.

1. INTRODUCTION

Since the mid-twentieth century, the average temperature of Earth's near-surface air and seas has risen. According to the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report from 2007, global surface temperature rose by 0.74 ± 0.18 °C (1.33 ± 0.32 °F) over the twentieth century. Increasing concentrations of greenhouse gases, which come from human activities such as the burning of fossil fuels and deforestation, have been the cause of temperature rise since the middle of the twentieth century. According to the latest IPCC assessment, global surface temperatures are expected to increase another 1.1 to 6.4 degrees Celsius (2.0 to 11.5 degrees Fahrenheit) over the twenty-first century. Sea levels will increase as the global temperature rises, changing the quantity and pattern of precipitation..

The Arctic is projected to see the most warming, which will be accompanied by the continued loss of glaciers, permafrost, and sea ice. The Kyoto Protocol aims to keep greenhouse gas concentrations stable in order to avoid "dangerous anthropogenic influence." The treaty has been signed and approved by 187 countries as of November 2009[1]–[3].

Since 1900, the average global air temperature has increased by more than 1 degree Fahrenheit, and the rate of warming has been almost three times the century-long norm since 1970. Global

warming refers to a rise in the earth's average temperature. Almost all experts examining the earth's climate record now agree that human activities, particularly the release of greenhouse gases from smokestacks, automobiles, and burning forests, are probably the most powerful force driving the trend.

1.1 Causes:

a. Temperature Variations:

Increases in global average air and ocean temperatures, widespread melting of snow and ice, and increasing global average sea level are all signs of climate change. 2005 was the hottest year since accurate, widespread observational data were available in the late 19th century, according to NASA's Goddard Institute for Space Studies (GISS) and the National Climatic Data Centre, surpassing the previous record set in 1998 by a few hundredths of a degree. Changes in solar forcing have had a modest but significant impact in recent decades, with some studies indicating a minor cooling effect and others indicating a slight warming effect. Temperatures are affected in various ways by greenhouse gases and solar forces. While both higher solar activity and increasing greenhouse gas emissions are anticipated to warm the troposphere, greater solar activity is expected to warm the stratosphere while increased greenhouse gas emissions are expected to cool it[4]–[6]. Annual greenhouse gas emissions by different industries are shown in Figure 1.

Annual Greenhouse Gas Emissions by Sector

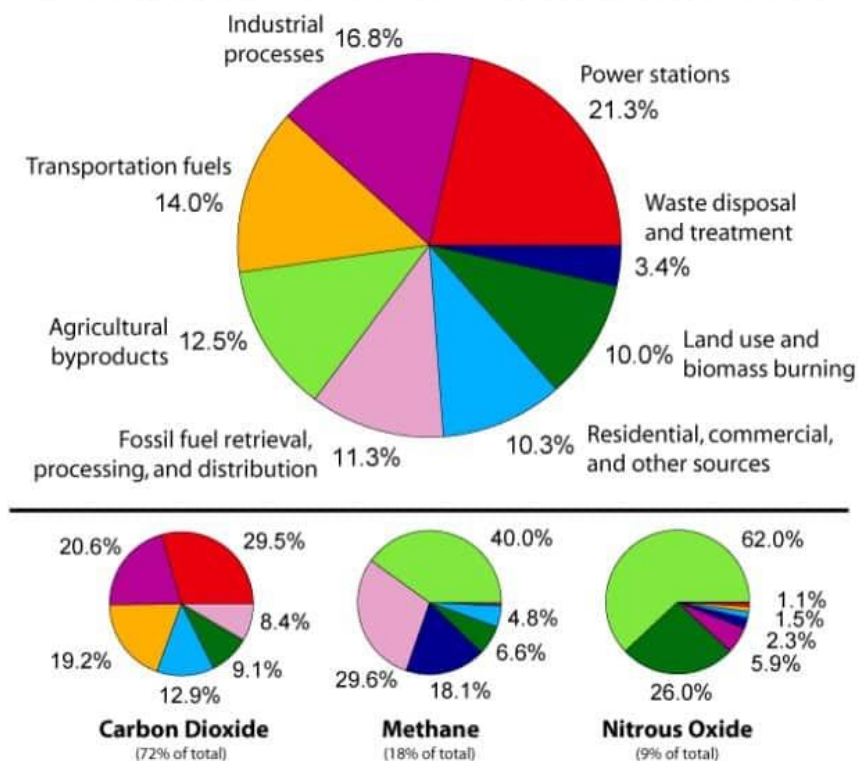


Figure 1: Illustrates the Annual greenhouse gas emission by various sectors[7]

b. Climate Change:

Most areas will have more hot days and fewer cold days as a consequence of global warming, with land experiencing the most heat. Heat waves that last longer and are more severe will become more frequent. As precipitation patterns change, storms, floods, and droughts will become more severe. Warmer ocean surface temperatures may cause hurricanes to intensify.

Apart from raising temperatures, global warming is expected to result in larger, more destructive storms, resulting in an increase in precipitation overall. With a few exceptions, as the globe heats, the tropics will likely get less rain (orange), while the Polar Regions will receive more precipitation (green). Less than two-thirds of climate models agree on how precipitation will change, as shown by white regions.

c. Rising Sea Levels:

Rising sea levels will erode coastlines and create more frequent coastal flooding, which will be exacerbated by global warming. Some island countries will vanish. Because up to 10% of the world's population lives in susceptible regions fewer than 10 meters (approximately 30 feet) above sea level, the issue is severe. Between 1870 and 2000, the average annual rise in sea level was 1.7 millimeters, for a total rise of 221 millimeters (0.7 feet or 8.7 inches). The pace of sea level rise is also quickening. NASA satellites have revealed that sea levels have been increasing at a faster rate since 1993, approximately 3 millimeters per year, for a total increase of 48 millimeters (0.16 feet or 1.89 inches) between 1993 and 2009. Figure 2 depicts the year-by-year change in sea level.



Figure 2: Illustrates the year wise change in sea level[8].

d. Disappearing Islands:

With a 20-inch (0.5m) increase in sea level, the Majuro Atoll in the Pacific Marshall Islands is expected to lose 80% of its land. Many of the islands will just vanish as the oceans rise. Other islands in the South Pacific and Indian Oceans, including those in the Maldives and French Polynesia, are facing a same destiny. Many of these islands' coral reefs will be inundated, exposing local residents to increased storm surges and altered coastal ecosystems. Tourism and agriculture in the area will be badly harmed.

e. Disappearing Ice Packs:

Warmer temperatures will have a significant impact on arctic wildlife when the ocean ice cover melts. Polar bears hunt seals on sea ice, which also serves as a nursery for their young. These

animals, as well as walrus, are hunted on the ice by the indigenous peoples. Walrus observations from 1996 to 1999 revealed that they were underweight and in poor health, owing in part to decreasing sea ice.

f. Health and Disease:

Infectious organisms and carrier species, such as mosquitoes, are killed by the cold winter weather, which limits the transmission of infectious illnesses. The spread of malaria, dengue fever, and yellow fever may be aided by warmer, wetter weather. Increased floods, as well as damage to water and sewage systems, may exacerbate the spread of illness.

g. Increased Air Pollution:

Three out of every four of the world's most densely populated cities are located in fast growing nations with significant levels of automobile pollution. Each year, air pollution causes 21,000 fatalities in Central Europe alone. Warmer temperatures tend to increase the concentration of photochemical pollutants like ozone. Ozone destroys lung tissue, which is particularly dangerous for individuals who have asthma or other lung diseases.

h. Impacting Ecosystems:

Perhaps more significantly, global warming is already placing strain on ecosystems, or the plants and animals that coexist in a certain climatic zone, both on land and in the sea. In many areas of the world, warmer temperatures have already altered the growth season. In the second half of the twentieth century, the growing season in areas of the Northern Hemisphere was extended by two weeks. In both hemispheres, spring is arriving sooner. This shift in the growth season has an impact on the ecosystem as a whole. Migrating animals must begin their search for food sources early. Pollinator lifecycles, such as bees, may already be out of rhythm with blooming plants and trees due to the change in seasons.

i. Impacting People:

Weather and ecological changes will have a greater impact on humans. Those who live in low-lying coastal regions and inhabitants of impoverished nations, who lack the means to adjust to changes in temperature extremes and water supplies, would be the most affected. Some infectious illnesses, like as malaria, will extend their range as tropical temperature zones grow. Increased rainfall and storms, as well as increasing sea levels, will result in more catastrophic floods and the possible loss of property and lives.

1.2 Effects of Global Warming on Water Resources:

The issue of global warming has a negative impact on both the environment and human life. Global warming has a wide range of consequences. Several studies performed by several groups have all concluded that global warming is accelerating at an alarming pace.

a. Water Resources impact:

Global warming has far-reaching consequences that affect every aspect of one's life. Global warming is having an adverse impact on both environment and living things. Our planet may cease to exist someday if we do not address the alarming pace of increasing global warming. The global

warming phenomenon has had a significant impact on water supplies. Sea levels have increased, glaciers are retreating more often, and the Arctic Circle is decreasing, which is the most dangerous effect[9].

This phenomena has raised worries across the board, and geo-engineering is being explored as a possible solution. Simply stated, water bodies will be impacted during the long and hot summers since the rate of evaporation will increase as the temperature rises. The water cycle is critical for any kind of human activity, and global warming would have a negative impact on this cycle as well as climatic changes. Flooding may be a result of global warming. Excessive evaporation would lead water levels to drop in many areas, resulting in heavy downpours and an increased risk of inundation.

2. LITERATURE REVIEW

R. An et al. discussed a review on Global warming and the obesity[2]. The obesity epidemic and global warming are two unique problems that humanity confronts today. A search of PubMed, Web of Science, EBSCO, and Scopus for papers published between July 2017 and July 2018 that presented results on the connection between global warming and the obesity pandemic was performed. There were fifty studies found. Articles were grouped into four categories based on their topics: global warming and the obesity epidemic are linked ($n = 21$); global warming influences the obesity epidemic ($n = 13$); the obesity epidemic influences global warming ($n = 13$); and global warming and the obesity epidemic influence each other ($n = 3$). We created a conceptual model that connected global warming to the obesity pandemic – Land use and urbanization, motorized transportation, and agricultural productivity are all influenced by the fossil fuel economy, population growth, and industrialization, which influences global warming by excess greenhouse gas emissions and the obesity epidemic by nutrition transition and physical inactivity; global warming also directly impacts obesity by food supply/price shock and adaptive thermogene. Policies that encourage the deployment of clean and sustainable energy sources, as well as urban designs that encourage active lives, are likely to reduce the social burden of obesity and global warming.

F. Giorgi et al. discussed a review on Global Warming[10]. Natural and human systems are very vulnerable to changes in the hydrologic cycle due to their reliance on water. The authors propose a new metric of hydroclimatic intensity (HY-INT) that combines measures of precipitation intensity and dry spell duration, seeing their responses to global warming as inextricably linked. Increasing HY-INT is a persistent and ubiquitous hallmark of twenty-first-century, greenhouse gas-induced global warming, according to a set of global and regional climate model tests. The rise in HY-INT is due to an increase in precipitation intensity, dry period duration, or both, depending on the area. The overwhelming positive HY-INT trends in late twentieth-century data also provide a hydro climatic signal of late twentieth-century warming. According to the scientists, rising HY-INT is physically compatible with both precipitation intensity and dry spell duration responding to global warming. Because of the enhanced atmospheric water storage capacity, precipitation intensity rises. Increases in mean precipitation, on the other hand, are linked to higher rates of surface evaporation, which are lower than those for atmospheric moisture. As a result, the frequency of rainy days decreases while the duration of dry spells increases. Increasing hydro

climatic intensity is identified as a strong integrated response to global warming, indicating increased risks for systems susceptible to wet and dry extremes and offering a viable target for detection and attribution of hydro climatic changes, according to this study.

3. DISCUSSION

Global warming is the long-term warming of Earth's climate system that has been seen from the pre-industrial era (between 1850 and 1900) as a result of human activity, mainly fossil fuel combustion, which raises heat-trapping greenhouse gas levels in the atmosphere. Temperature increases, water shortages, increasing fire risks, drought, plant and insect invasions, severe storm damage, and salt invasion are all effects of global warming. Flooding of lowlands occurs when sea levels rise. Water engulfs islands and coasts, resulting in mortality and illness as a result of floods. The destruction of coral reefs is caused by the acidity of rising seas. Increased melting of glaciers and ice sheets is a result of warmer ocean waves. The most effective approach to combat global warming is to remove fossil fuels from contemporary civilization as much as feasible. This entails switching to carbon-free and renewable energy sources like solar, wind, and hydro, which emit less than 3% of the greenhouse gases produced by fossil fuel energy sources..

4. CONCLUSION

Global warming is a kind of climate change that refers to the increase in global temperatures over time. Increased levels of greenhouse gases in the atmosphere, mostly from human activities such as burning fossil fuels and farming, are to blame. Global warming's effects are already being felt all across the globe. Despite some nations' attempts to decrease greenhouse gas emissions, such as the Kyoto Treaty, the world as a whole is emitting more and more carbon dioxide every year. Countries like Norway and Holland are on track to achieve their emissions reduction targets, but this is little compared to China and India, who are putting out more and more each year. Our personal living area will be more sustainable if we reduce our carbon and greenhouse gas emissions. We humans have the power to destroy the world, but we also have the capacity to preserve and maintain it.

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