



Original Article

Global Warming: The Invisible Crisis Fueling Planetary Collapse

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Abstract:

The rise in Earth's average temperature over recent decades—and the projected increase in the future—highlights the link between global warming and human activities. From 1905 to 2016, the global average temperature rose by 0.80°C. This temperature balance depends on the thermal energy received from the Sun and the energy emitted by Earth. However, in recent years, both natural factors and growing human consumption—through transportation, industrial activity, and factory operations—have led to increased emissions of greenhouse gases. These include carbon dioxide (CO₂), nitrogen dioxide (NO₂), methane (CH₄), water vapour, CFCs, and others, which trap heat by absorbing infrared radiation. In the last two to three decades, their concentration has significantly increased, causing a sharp rise in global temperatures. If this trend continues, it may trigger major environmental crises such as disrupted ocean currents, widespread disease, declining crop yields, stronger cyclones, and other large-scale impacts. Global warming, therefore, poses a serious threat to ecological and human systems alike.

"The increase in the average temperature of the Earth's surface and ocean water due to various natural and human activities, which leads to the destruction of all living organisms, is called global warming."

Global warming is nothing but it is a greatest start of atmospheric changes which directly affects human lifestyles as well as every living thing and the name carbon dioxide will destroy earth without taking space or any sympathy with living hood.

Keywords: Temperature rise, greenhouse gases, sources of gas emissions, impacts and solutions, global warming, climate change.

Introduction:

Earth's temperature is determined by the balance between solar energy received and heat emitted. In recent decades, this balance has been disrupted due to rising greenhouse gas emissions, largely caused by human activities such as industrialization, transportation, and excessive energy consumption. Gases like carbon dioxide (CO₂), methane (CH₄), nitrogen dioxide (NO₂), and CFCs trap infrared radiation, resulting in increased heat retention within the atmosphere. Over the past 2–3 decades, the concentration of these gases has significantly grown, raising the average global temperature by approximately 0.8°C. Although this rise may seem minor, it is unprecedented in Earth's recent history, where similar increases previously took thousands of years. Now, such changes have occurred within just 125 years—coinciding with the era of rapid human development.

This warming trend has led to alarming climatic shifts: altered rainfall patterns, rising sea levels, extreme heatwaves, and frequent natural disasters. Real-world examples include the 2003 Andhra Pradesh heatwave, the record rainfall in Mumbai in 2005, Cyclone Gonu in 2007, persistent droughts in Australia and Africa, and Cyclone Ockhi in 2017. These events illustrate that Earth's life-support systems are nearing dangerous thresholds. The accelerating pace of global warming highlights a direct link between human activity and climate change. Immediate action is essential to prevent further harm and secure a sustainable future.

Objectives:

1. To understand the greenhouse gases that contribute to temperature rise.
2. To study the role of greenhouse gases in global warming.
3. To study the effects of global temperature rise.
4. To suggest remedial measures.

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Research Methodology:

Secondary sources have been used for this article. For collecting information, government and non-government reference books, magazines, statistical reports, national and local newspapers, and various internet websites have been used.

Result & Discussion:

Global Warming:

Earth's temperature depends on the balance between solar energy received and heat emitted. Greenhouse gases like water vapour, carbon dioxide, and methane trap some of this energy, keeping the planet warm. However, modern human activities, especially industrialization and urbanization, have increased these gas emissions, trapping more heat than before. As a result, Earth's average temperature is rising, intensifying the greenhouse effect and contributing to global warming.

The contribution of these greenhouse gases to temperature rise is as follows: Water vapour – 20.60°C, Carbon dioxide (CO₂) – 7.20°C, Ozone (O₃) – 2.40°C, Nitrogen oxide (N₂O) – 1.40°C, totaling approximately 330°C. This clearly shows that greenhouse gases are responsible for global warming (Reference: Wikipedia). In short, "The increase in the average temperature of land and ocean waters due to various natural and human activities, which leads to the destruction of living beings, is called global warming."

What are Greenhouse Gases?

Following the Copenhagen Summit, the term "greenhouse gases" has gained global attention due to their harmful impact on Earth's environment. These gases in the atmosphere absorb and emit infrared radiation, trapping heat and warming the planet's surface. Major greenhouse gases include water vapour, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃). Since the Industrial Revolution in 1750, human activities have significantly increased their concentration. Each gas affects the atmosphere differently. For example, methane is about eight times more potent than CO₂ in trapping heat, though less concentrated.

Their approximate contributions to the greenhouse effect are: water vapour (36–72%), CO₂ (9.26%), methane (4–9%), and ozone (3–7%). Other human-made gases, such as sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons, also play a role, though present in smaller amounts. Nitrogen trifluoride, despite its high warming potential, has minimal atmospheric presence. These gases trap heat through a process involving infrared waves. During the day, solar energy is absorbed by Earth's surface. At night, this energy is radiated back into space, but greenhouse gases reflect some of it back to Earth, maintaining warmth. This natural effect is now intensified by human-induced emissions, contributing to global warming.

Greenhouse Gases:

1. **Water vapour:** Earth has a vast amount of water, so the amount of vapour in the atmosphere is also high, making water vapour a major component of the greenhouse effect. However, the amount of vapour is naturally regulated by the environment. The Sun creates vapour from seawater, which later returns as rainfall — this is a continuous natural cycle. Therefore, vapour content remains fairly constant and has a relatively low greenhouse effect compared to other gases. Thus, water vapour is not considered a major contributor to the current global warming.
2. **Carbon dioxide (CO₂):** This is the second most important greenhouse gas. The first industrial revolution began in Europe in 1750, and since then, developed countries have been using large amounts of coal and fossil fuels, leading to excessive CO₂ emissions. At the start of the industrial revolution, CO₂ levels were 260 PPM; in 1998 they reached 365 PPM, in 2009 about 400 PPM, and today they are even higher. No one but humans are responsible for this increase. Over the past 100 years, coal and petroleum have been extracted from the earth and burned, releasing CO₂ into the atmosphere. This increase in CO₂ levels is directly responsible for the rise in Earth's average temperature.
3. **Methane (CH₄):** Humans are also responsible for the increase in methane. In 1860, its atmospheric level was 0.7 PPM; today it is around 2 PPM. Methane is 21 times more potent than CO₂. Though its quantity is less, its impact is much higher. It is emitted from decaying plants in wetlands and decomposing organic matter.
4. **CFCs (Chlorofluorocarbons):** CFCs are human-made greenhouse gases introduced around the 1940s. They are used in refrigeration, aerosol sprays, and electronics industries. CFCs contribute about 25% to the greenhouse effect. Although their use is now banned, they still enter the upper atmosphere and damage the ozone layer, allowing more ultraviolet rays to reach Earth and increasing the temperature.
5. **Ozone (O₃):** Ozone acts as Earth's protective layer and guards against ultraviolet radiation from the sun. These rays increase atmospheric temperature and lead to diseases such as skin cancer.

Other Causes:

1. Growing global population increases carbon dioxide emissions.
2. Increasing livestock population contributes to CO₂ and methane through respiration and waste.
3. Increased intensity of solar radiation may also contribute to global warming.
4. Volcanic eruptions may alter temperatures due to increased atmospheric dust, which can absorb ultraviolet radiation.
5. The El Niño phenomenon off the coast of Peru and Chile can alter weather patterns and contribute to global warming.

Effects of Global Warming:

1. **Natural Disasters:** The most concerning impact is the change in weather patterns. The weather depends on many factors; ocean temperatures are crucial among them. Ocean currents regulate rainfall and temperature across continents. Due to global warming, ocean temperatures have increased, which raises evaporation and causes more rainfall and cyclones.

2. In 2005, Hurricane Katrina in the U.S. caused massive destruction. On July 26, 2005, Mumbai experienced unprecedented rainfall. Europe and America have seen more rain but less snow, and cold spells have declined. Some regions experience heavy rains and floods, while others suffer droughts. Western Africa and Northeast India are witnessing declining rainfall.
3. **Melting Glaciers:** Glaciers are melting rapidly due to global warming. Mount Kilimanjaro in Africa had abundant ice till 1960; now it's nearly gone. These glaciers are vital water sources, and their disappearance will lead to water scarcity for dependent regions.
4. **Desertification:** Countries like Italy and regions in Western Europe, France, and Germany are witnessing warmer and drier climates due to rising temperatures. Cold regions may now experience climates typical of warm Mediterranean zones.
5. **Rising Ocean Temperatures:** Changing Ocean temperatures may alter massive ocean currents. A change in currents like the Gulf Stream or North Atlantic Drift may lead to sudden temperature shifts in Europe and North America, possibly triggering another Ice Age. This possibility has even inspired the Hollywood film "The Day After Tomorrow."
6. **Agriculture:** Global warming greatly affects crop production. The Northern Hemisphere is largely landmass and warms faster due to lower ocean coverage. This affects crops and agriculture in many countries.
7. **Disease Spread:** As northern regions warm up, disease-carrying organisms may migrate there, spreading illnesses.

Effects in India: People from coastal regions may migrate inland, causing economic and social instability. Changes in maximum and minimum temperatures will affect agriculture, industry, and trade. Monsoon irregularities may lead to floods and droughts. Mumbai and other coastal cities may submerge. Some regions may witness heavy floods, others severe water scarcity. Heatwaves and cyclones may rise. Kashmir's beauty may vanish. Desert areas will expand. Massive loss of life and property may occur. Major rivers may dry up. Food prices will skyrocket. Many such problems may arise.

Suggestions: In today's world, no country will willingly reduce its energy usage at the cost of its progress. Developed nations consume much more energy than developing ones, though their consumption is now stable. The main challenge is how to reduce energy usage and thus reduce greenhouse gas emissions. Though per capita energy usage in India and China is low, the overall usage is rising significantly every year. Given their large populations, these countries may soon surpass others in greenhouse gas emissions. The same applies to other developing nations. Hence, it is difficult to reduce energy use and curb global warming. Experts believe that immediate steps must be taken to stop carbon dioxide emissions. Scientists are trying to develop combustion processes that do not emit CO₂. Medium-term solutions include developing alternative fuels for vehicles and industries. Long-term solutions involve creating technologies that reduce dependency on fossil and natural resources — a goal that must be achieved.

1. **Carbon Dioxide Capture and Storage:** Coal and fossil fuels remain the primary sources of energy for industrial processes, electricity, and transportation. However, their combustion releases large quantities of carbon dioxide, a major greenhouse gas. To mitigate this, scientists are developing advanced combustion methods that prevent CO₂ from entering the atmosphere. One such technique involves capturing CO₂ after coal combustion and storing it in deep underground mines. Another method, known as oxy-fuel firing, uses pure oxygen instead of air during combustion. This results in a cleaner process, producing only CO₂, which can be efficiently captured and stored.
2. **Chemical Looping Combustion:** Carbon dioxide dissolves in various amine liquids. If the smoke produced after combustion is passed through an amine solution, the CO₂ separates from it. Later, by heating the amine, it becomes easier to extract the CO₂. This process is called amine scrubbing. Although this method is currently practiced at the industrial level, it is not economically feasible.
3. **New Types of Fuels:** Capturing CO₂ is more feasible in power plants, which account for about 40% of emissions, due to their centralized nature. In contrast, vehicles contribute 33–37% of CO₂ emissions, but decentralized sources make capture challenging. A better approach is developing fuels that don't emit CO₂. Hydrogen is a promising option, as it produces only water when burned and can be derived from water, petroleum, or organic matter.
4. **Biofuels:** Fuels produced in agriculture are known as biofuels. These are mainly derived from photosynthesis, and by using them instead of coal or petroleum, CO₂ emissions can be avoided. Such fuels are considered CO₂-neutral. Examples include rice husk, sugarcane bagasse, etc.
5. **Non-Conventional Energy Sources:** Many countries are currently emphasizing the development of non-conventional energy sources—those that do not rely on mineral resources. These include hydropower, solar energy, wind energy, geothermal energy, biogas production, gasification of agricultural waste, tidal power, etc. If potential risks are to be avoided, greater use of non-conventional energy sources is essential.

Economic, Social, and Legal Measures:

- 1) **Emission Tax:** Imposing a tax on excessive greenhouse gas emissions is an effective measure. This tax can be levied directly on fuels or based on how much greenhouse gas a particular industry emits after fuel consumption. Higher taxes may result in reduced fuel consumption and motivate industries to invest in alternative fuels. However, some argue that higher taxes could slow down economic growth.
- 2) **Imposing Restrictions:** Economic sanctions can be applied to countries or industries that do not care about greenhouse gas emissions, compelling them to take action to reduce such emissions.
- 3) **Carbon Credits:** The Kyoto Protocol requires developed countries to reduce greenhouse gas emissions. However, such changes can be economically challenging for developing nations. To address this, the Clean Development Mechanism (CDM) was introduced, allowing developed countries to earn carbon credits by supporting sustainable projects in developing nations. For instance, if France installs wind turbines in Africa, the emissions reduced there are credited to France. Additionally, companies or countries can buy unused emission rights from defunct industries, as seen in Eastern Europe after the Soviet

Union's collapse. This process, known as carbon credit trading, has drawn criticism for potentially allowing wealthy nations to avoid direct responsibility while commercializing a serious environmental issue.

Conclusion:

The steady rise in Earth's temperature, primarily due to human-driven greenhouse gas emissions, poses a serious threat to life on the planet. From melting glaciers and unpredictable weather to rising sea levels and food insecurity, the consequences are far-reaching. Tackling this issue requires more than awareness—it demands immediate and unified action. Transitioning to clean energy, adopting sustainable practices, and enforcing environmental policies are essential steps. Every individual, community, and nation must take responsibility. If we act now with urgency and commitment, we can still slow the damage and preserve Earth's climate for future generations. The time to act is now.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

References:

1. Environmental Science – Prof. Ahirrao / Prof. Alizad / Prof. Varat and others, 3rd Edition, September 1995
2. Y.C.M.O.U. Nashik: SOC 291 – Environment and Society
3. Climate and Oceanography – Prof. S.T. Shete
4. NOAA Global Warming Impact Report
5. Global Warming and Our Responsibility – Ramesh Balbadd, Vidyabharati Prakashan, Latur, 1st Edition, January 1, 2010
6. Geography Research – Editors: Dr. Sakharan Waghmare, Dr. Vinakar Vijay, Issue 1, Year 1, January 2016

<http://m.marathi.webdunia.com/article/copenhagen-15India>