ENVIRONMENTAL SCIENCE

Title:
Global Warming: Causes, Impacts, and Solutions

Author: TANISHK PARASHAR

Email: tanishk7711@gmail.com

Abstract
Global warming, one of the most critical environmental issues, refers to the long-term increase in Earth's average surface temperature due to human activities, particularly the emission of greenhouse gases. This paper examines the causes of global warming, its impacts on natural systems and human society, and potential solutions to mitigate its effects.

---

1. Introduction

- **Definition of Global Warming**: Explanation of global warming as the rise in Earth's average temperature due to increased greenhouse gas emissions.
- **Historical Perspective**: Overview of temperature records and studies showing long-term warming trends.
- **Thesis Statement**: The paper will discuss the causes of global warming, its environmental and social impacts, and possible strategies to mitigate it.

---

2. Causes of Global Warming

- **Greenhouse Gases (GHGs)**:
    - *Carbon Dioxide (CO2)*: Released from burning fossil fuels (coal, oil, gas), deforestation, and industrial processes.
    - *Methane (CH4)*: Emissions from agriculture (rice production, livestock), waste management, and energy production.
    - *Nitrous Oxide (N2O)*: From agricultural and industrial activities, fossil fuel combustion, and biomass burning.
    - *Fluorinated Gases*: Industrial gases used in refrigeration and manufacturing.
- **Human Activities**:
    - **Industrialization**: The role of industrial revolutions and energy production.
    - **Deforestation**: Loss of forests and its impact on CO2 absorption.

    - **Agriculture**: Contribution of farming practices, livestock, and land use.
    - **Transportation**: The impact of vehicles powered by fossil fuels.
- **Natural Factors**:
    - **Solar Radiation**: Variations in the sun's energy output.
    - **Volcanic Activity**: Short-term cooling followed by long-term warming due to aerosols.

---

3. Impacts of Global Warming

- **Environmental Effects**:
    - **Rising Temperatures**: Increases in global and regional temperatures.
    - **Melting Ice and Glaciers**: Polar ice caps and glaciers shrinking.
    - **Sea Level Rise**: Expansion of seawater and melting of ice contributing to coastal flooding.
    - **Weather Patterns**: Increased frequency of heatwaves, hurricanes, and droughts.
    - **Loss of Biodiversity**: Habitat destruction and species extinction.
- **Social and Economic Impacts**:
    - **Agriculture**: Reduced crop yields due to changing precipitation patterns and extreme weather.
    - **Human Health**: Spread of diseases, heat-related illnesses, and air quality degradation.
    - **Migration**: Climate refugees due to rising sea levels and extreme weather events.
    - **Economics**: Damage to infrastructure, economic losses in agriculture, and increased disaster recovery costs.

---

4. Solutions to Mitigate Global Warming

- **Renewable Energy**:
    - Transitioning from fossil fuels to solar, wind, geothermal, and hydroelectric power.
- **Energy Efficiency**:
    - Adoption of energy-efficient technologies in industries, buildings, and transportation.
- **Afforestation and Reforestation**:
    - Increasing forest cover to act as carbon sinks.
- **Carbon Capture and Storage (CCS)**:

    - Technologies to capture CO_2 emissions from power plants and industries and store it underground.

- **Policy Measures**:
    - **Paris Agreement**: International commitment to limit global warming below 2°C.
    - **Carbon Pricing**: Implementing carbon taxes or cap-and-trade systems to reduce emissions.
- **Behavioural Changes**:
    - Public awareness, lifestyle changes (e.g., reducing meat consumption, using public transportation).

---

5. Global Efforts and Challenges

- **International Agreements**: Overview of international efforts such as the Kyoto Protocol and the Paris Agreement.
- **Challenges in Implementation**: Economic interests, political will, and disparities between developed and developing nations.

---

6. Conclusion

- **Summary of Key Points**: Recap of the causes, impacts, and solutions for global warming.
- **Future Outlook**: Need for immediate action and global cooperation to avoid catastrophic impacts.
- **Call to Action**: Encouragement for further research, stronger policies, and individual action.