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CLIMATE CHANGE: CAUSES AND POSSIBLE SOLUTIONS



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ABSTRACT

Global climatic changes because of human activities have become a major threat to life on Earth. Changing climatic conditions are the result of man-made activities and are continuously leading to a serious deterioration in the earth's atmosphere. Basically it is leading to erratic climate and weather extremes, altered ecosystems and habitats and risks to human health and society. This problem can be solved only if some judicious steps are taken, including improvements to energy efficiency and vehicle fuel economy, increases in wind and solar power, hydrogen produced from renewable sources, biofuels (produced from crops), natural gas, and nuclear power.

Keywords:

Global warming, Earth's atmosphere, Green house gases, human health.

INTRODUCTION

The average temperature of the Earth has risen between 0.4 and 0.8 °C over the past 100 years. The increased volumes of carbon dioxide and other greenhouse gases released by the burning of fossil fuels, land clearing, agriculture, and other human activities, are believed to be the primary sources of the global warming that has occurred over the past 50 years. Scientists from the Intergovernmental Panel on Climate carrying out global warming research have recently predicted that average global temperatures could increase between 1.4 and 5.8 °C by the year 2100. Changes resulting from global warming may include rising sea levels due to the melting of the polar ice caps, as well as an increase in occurrence and severity of storms and other severe weather events. Changing climatic conditions are the result of man-made activities and are continuously leading to a serious deterioration in the earth's atmosphere. Impacts of climate change have been broadly categorized into three areas:

1. Erratic climate and weather extremes
2. Altered ecosystems and habitats
3. Risks to human health and society

1. Erratic climate and weather extremes

There has been an increase in the emission of green-house gases (heat-trapping gases) because of human activities, particularly by burning the fossil fuels. This has led to increased temperature on earth. This atmospheric heating unleashes a torrent of rapid changes to the way water systems typically function on our planet. For example, the cryosphere (the frozen water on Earth) is

melting, contributing to sea level rise and submergence of land area. The Weather of all kinds is getting more extreme. At the same time, the oceans are getting hotter, expanding, and becoming more acidic. The oceans are getting hotter, because they soak up 90% of the extra heat in the atmosphere. This causes the oceans to expand, and this also contributes to higher sea levels. Meanwhile, the increased concentration of carbon dioxide in the ocean triggers a chemistry change that makes the water more acidic. The ocean is almost 40% more acidic than it used to be.

2. Altered Ecosystems and habitats

As climatic patterns rapidly shift, habitats on land and in the sea are changing, making them inhospitable for some species, while letting others move in and take over. In some cases, entire ecosystems are at risk of collapsing.

The changes to the natural world are vast, but here are three notable and well-documented examples. For ex.

a) Coral and shellfish are suffering as they are highly sensitive to small changes in ocean temperatures. The heat stresses the algae that nourish the corals and provide their vibrant colours. The algae then leave, and the corals eventually starve, an event known as bleaching. Also, a more acidic ocean affects the normal calcium balance, meaning creatures with calcified shells, such as shellfish and coral, may not have enough calcium to grow.

b) Forests are more prone to deadly infestations: Milder winters and longer summers allow tree-killing insects to thrive. Meanwhile, trees weakened by prolonged drought have lower defense mechanisms.

c) The Arctic creatures need ice, but it's vanishing. As sea ice disappears, ice-dependent mammals like walruses and polar bears struggle to survive. In 2008, the polar bear became the first animal to be added to the Endangered Species Act list of threatened species because of global warming.

3. Risks to human health and Society

Climate change problems also affect people's health directly, as well as impacting the environment. For example, fossil fuels used by cars in heavily congested areas lead to additional pollutants harmful to human health. Tackling climate change by limiting fossil fuel use and investing heavily in alternatives has the additional benefit of improving health, and even possibly reducing traffic congestion.

Human life is thrown out of balance, too. One of the biggest impacts? Where, how and when we grow food, which is vitally connected to our climate's normal patterns. More extreme weather also means we face increased pressure on our health, infrastructure, and economy.

a) Climate change is a major threat to agriculture: The toll that climate change takes on agriculture is nearly incalculable, and as a result, our food security is at risk. All over the world, farmers are struggling to keep up with shifting weather and increasingly unpredictable water supplies. Farmers also must contend with unexpected attacks from weeds, diseases and pests, which affect yield.

b) Warmer and polluted air affects human health: A warmer atmosphere increases chemical reactions that form ground-level ozone, also known as smog. Smog is a well-known lung irritant and a major trigger of asthma attacks. Smoke from wildfires further degrade the air. Extreme summer heat will mean more deaths during heat waves, and warmer freshwater makes it easier for pathogens to grow and contaminate drinking water.

- c) Infrastructure and transportation are at risk, too: Hot weather, flooding and other extreme weather events damage infrastructure, put heavy burdens on electrical supplies, and disrupt how we travel and commute.

SOLUTIONS

The evidence that humans are causing global warming is strong, but the question of what to do about it remains controversial. Economics, sociology, and politics are all important factors in planning for the future. Even if we stopped emitting greenhouse gases (GHGs) today, the Earth would still warm by another degree Fahrenheit or so. But what we do from today forward makes a big difference. Depending on our choices, scientists predict that the Earth could eventually warm by as little as 2.5 degrees or as much as 10 degrees Fahrenheit.

A commonly cited goal is to stabilize GHG concentrations around 450-550 parts per million (ppm), or about twice pre-industrial levels. This is the point at which many believe the most damaging impacts of climate change can be avoided. Current concentrations are about 380 ppm, which means there isn't much time to lose. According to the IPCC, we'd have to reduce GHG emissions by 50% to 80% of what they're on track to be in the next century to reach this level.

There are many possible wedges, including improvements to energy efficiency and vehicle fuel economy (so less energy has to be produced), and increases in wind and solar power, hydrogen produced from renewable sources, biofuels (produced from crops), natural gas, and nuclear power. There is also the potential to capture the carbon dioxide emitted from fossil fuels and store it underground—a process called "carbon sequestration."

In addition to reducing the gases we emit to the atmosphere, we can also increase the amount of gases we take out of the atmosphere. Plants and trees absorb CO₂ as they grow, "sequestering" carbon naturally. Increasing forestlands and making changes to the way we farm could increase the amount of carbon we're storing.

Some of these technologies have drawbacks, and different communities will make different decisions about how to power their lives, but the good news is that there are a variety of options to put us on a path toward a stable climate.