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CLIMATE CHANGE AND ITS IMPACT ON EARTH

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Abstract:

The rate at which the climate is changing is accelerating. The cause of climate change is an imbalance in the atmosphere between the radiation that is coming in and the radiation that is going out. By the year 2100, the average temperature of the earth might have risen by as much as 5.4 degrees Celsius. Human activity is the primary contributor to climate change, notably in the form of rising emissions of greenhouse gases. It is widely acknowledged that climate change poses a significant risk to ecosystems, biodiversity, and human health. Alterations in the natural environment of the planet Earth are thought to be connected with this phenomenon. The effects of climate change may be felt all across the world. It has an effect on both plants and animals, and those effects can have an effect on the species' ability to survive. In humans, climate change has numerous detrimental implications. The effects of climate change include decreased access to safe drinking water and food, increasing rates of illness and death, and population displacement. Children, the elderly, native peoples, and the impoverished are some examples of vulnerable populations that are disproportionately affected. The most important issues for the society are going to be personalised adaptation to the effects of climate change as well as preventative efforts. Policymakers are obligated to put into action the required policies, particularly in groups who are vulnerable.

Keywords*: climate change, global warming, ecosystem, animal*

INTRODUCTION:

Changes in the planet's climate have always taken place, but the current rate at which they are occurring and the significant amount of those changes are quite concerning. The cause of climate change is an imbalance in the atmosphere between the radiation that is coming in and the radiation that is going out. The rate at which the planet is warming as a result of climate change is distinct from the rate at which it has warmed in the past. It is projected that there would be an increase of up to 5.4 degrees Celsius in the average temperature of the earth by the year 2100. There is an overwhelming amount of data suggesting that human activities have contributed to climate change over the past century, but fluctuations in solar activity and volcanic eruptions have only played a tiny influence in this process. Over the course of the past several decades, human activity has resulted in the widespread alteration of natural processes, which has led to an overall increase in the concentration of carbon dioxide in the atmosphere. It is widely acknowledged that climate change poses a significant risk to ecosystems, biodiversity, and human health. It is connected to changes in the physical environment of the planet Earth and has an effect on life all over the world. The society faces significant problems, the most important of which are the adaptation to the effects of climate change and the avoidance of the worsening of climate change. It is imperative that policymakers put individualised solutions into action, particularly for vulnerable demographic groups.

OBJECTIVES

- The primary purpose of this study is to investigate the factors that contribute to the onset and progression of climate change and global warming.
- The investigation into the factors that contribute to the changing climate of the earth

Climate

The term "climate," which originates from the Ancient Greek word "Klima" (which means "inclination"), refers to the weather conditions that are typical throughout extended time periods (the standard period is 30 years). The instrumental record of climate change is based on data collected from hundreds of recording stations located all around the world that monitor temperature and precipitation.

Climate change versus global warming

Although the terms "climate change" and "global warming" are sometimes used interchangeably, they really relate to separate physical processes and have distinct meanings. The phrase "global warming" refers to the gradual increase in the Earth's average surface temperature over time, whereas "climate change" encompasses both the warming itself and the side consequences of that warming (such as intense precipitation and increasing wind speeds).

Climate change causes

The cause of climate change is an imbalance in the atmosphere between the radiation that is coming in and the radiation that is going out. The average temperature of the Earth's surface is increasing as a result of the accumulation of heat-trapping greenhouse gases (such as carbon dioxide, methane, and nitrous oxide) in the atmosphere. There has never been a period in the past 800,000 years when the levels of greenhouse gases have been as high as they are right now. The higher the temperature, the greater the amount of water that evaporates from the seas and other sources of water into the atmosphere, which in turn causes the temperature to rise even further. Natural processes and human activities both contribute to the production of carbon dioxide in the atmosphere (human-induced). The majority of animals breathe out carbon dioxide as a by-product of their metabolism, making them a natural source of carbon dioxide. Since the beginning of the 20th century (the beginning of the industrial revolution), the primary drivers of anthropogenic sources of carbon dioxide have been human activities. These activities primarily involve the burning of fossil fuels (such as burning coal, oil, and natural gas), but they also include agricultural emissions and deforestation.

Climate change consequences

A domino effect of negative consequences is caused by climate change, which affects both the natural ecosystem of Earth and the species that make its surface their home All of the alterations that take place in the environment of the planet Earth have an effect on all forms of life, including plants, animals, and people. Particularly at risk from the effects of climate change are coral reefs, woodlands, and human populations located along the shore. Climate change might make people more susceptible to the negative consequences of chemical pollution. This could be one of the ways in which climate change manifests itself. Even while the majority of the affects that climate change will likely have will be negative, there may be some health

advantages that occur in some places. For instance, warmer winters could cut down on the amount of health problems and fatalities that are caused by temperature.

Physical planet Earth's environment

The core accretion theory proposes that the planet Earth came into existence roughly 4.54 billion years ago (approximately one-third the age of the universe) as a result of the accumulation of material from the solar nebula The history of our planet has been marked by recurring episodes of climatic upheaval. The present climate change is having a multitude of unfavourable effects on the environment of the physical planet Earth. It has an effect on the frequency as well as the intensity of natural catastrophes and severe occurrences.

Temperature

Since the early 18th century, temperature records have only been able to be obtained through modern thermometers that are equipped with temperature scales. Scientists are able to make inferences about temperatures in the past by analysing indirect characteristics, such as chemical and structural traces. When the universe was just 1035 seconds old, its temperature was somewhere about 1 octillion degrees. This occurred right after the Big Bang. The temperature of the universe dropped to around one billion in a little less than two minutes' time. On cycles of 100,000 years, the planet Earth has moved between ice ages, during which it faced extended cold periods known as glacial, and warm times, known as interglacial, over the course of at least the previous few million years. There is a correlation between the present climate change and a rise in the temperature of the Earth's surface (both land and upper ocean layers) . The temperature of land surfaces is rising more quickly than that of ocean surfaces. Because a warmer atmosphere is capable of holding more water vapour, the total average amount of precipitation tends to be higher. The average temperature of the Earth has risen by around 0.7 degrees Celsius during the course of the last 70 years. Since 1950, there has been a reduction in the number of cold days and nights, while there has been an increase in the number of warm days and nights. Since 1976, the rate of warming has been greater than it has ever been at any other point in the previous 1,000 years combined. There are always going to be extremely high and extremely low temperatures. The current mean temperature throughout the entire planet is at around 15.0 degrees Celsius. Temperatures at the earth's surface are now increasing at a rate of around 0.2 degrees Celsius every decade. There will be an increase in global mean temperatures of between 0.9 and 5.4 degrees Celsius by the year 2100, as forecasted by the Intergovernmental Panel on Climate Change (IPCC) and based on several scenarios regarding emissions.

Wildfires

Wildfires are becoming increasingly common as a result of climate change. The dry, hot weather has contributed to a rise in the severity of forest fires and their devastating potential in various nations Deforestation, major damage to property, exposure of large people to contaminated and toxic air for extended periods of time, which may have possible health implications (such as respiratory disorders), and death are all potential outcomes of wildfires. Wildfires can also be caused by human activity. Due to recent droughts, the Amazon has grown more flammable, making it more susceptible to forest fires. In recent years, the state of California has been ravaged by deadly autumn wildfires; more than one hundred people

lost their lives as a direct result of the most destructive and deadliest wildfires that occurred in 2014 and 2015.

Droughts

A drought is a multifaceted and complicated occurrence that is brought on by a variety of different physical and biological mechanisms. The cost of natural disasters sometimes includes drought as one of the highest categories. Desertification is being accelerated by climate change, which is responsible for an increase in both the frequency and severity of droughts (particularly in subtropical regions). This will result in human suffering, hunger, famine, and the relocation of populations.

Ocean acidity

On Earth, the majority of the environment that is conducive to life may be found in the water. Because of the high concentration of carbon dioxide in the atmosphere, the surface waters of the seas are becoming increasingly acidic. This is because part of the carbon dioxide in the air is dissolving into the water to generate carbonic acid. Damage to coral reefs, which are a source of numerous benefits for human populations, as well as fish and other aquatic species, can result from ocean acidification, which can also affect marine ecosystems.

Plants

The phenology of plants can be affected by climate change. There are a variety of factors that contribute to climate change, including the concentration of carbon dioxide in the atmosphere, temperature, sea level, rainfall, weeds, and insects or bacteria.

Animals

Because of climate change, animals are subjected to a wide range of stressors, which can have an effect on their metabolic and endocrine systems, which may have repercussions for the continued existence of species. Every year, the number of animal species that become extinct due to climate change increases. There are over 700 different kinds of animals and birds affected. The degree to which an animal is vulnerable is proportional to its kind, and different species will be impacted in various ways as a result of the threat. Species that have a limited temperature tolerance and are threatened by climate change are more likely to become extinct. Polar bears, koala bears, elephants, sea turtles, cheetahs, panda bears, and penguins are some of the creatures that are considered to be endangered or vulnerable (non-exhaustive list). Species that are negatively impacted by climate change will either need to relocate to areas that are more suited to their needs (such as higher altitudes and latitudes) or adapt to the changes that will occur where they are now located (e.g., habitat, feeding and breeding patterns). Should they be unable to, they risk dying out and going extinct.

Climate change and future of life on planet Earth

The effects of climate change pose a grave danger to our world. The number of ecosystems that are still largely untouched by human activity is gradually declining. The effects of climate change are having a devastating impact not just on the ability of many plant and animal species to survive but also on human

health. In the 21st century, climate change may become one of the primary factors that contribute to the extinction of species. Regular assessments on the state of biodiversity are published by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). These studies are prepared by hundreds of specialists originating from different parts of the world. According to the findings of the studies, the world's biodiversity is deteriorating, which poses a threat to economies, ways of life, the availability of food, and overall quality of life. The chair of the IPBES stated that "the time for action was yesterday or the day before," which may also be read as "the time for action has passed." Scientists estimate that we have around a decade left to prevent the levels of carbon dioxide in the atmosphere from reaching a catastrophic level that can create harm that cannot be reversed. If effective preventative measures are not done, it is anticipated that between 15 and 37 percent of the extant plant and animal species would become extinct by the year 2050, and by the year 2100, it is possible that 50 percent of all species may face extinction.

Effects of Climate Change

The effects of climate change may be seen in many places around our world. The weather is one component that has been significantly impacted as a result of changes in climate. For instance, the number of severe weather occurrences in Romania has increased significantly since last decade. We are increasing the quantity of heat that is in our atmosphere by raising the concentration of chemicals that contribute to global warming (greenhouse gases) (NASA). Warmer temperatures, which have mostly resulted from the release of greenhouse gases, are substantially to blame for the increased severity of hurricanes. When temperatures rise, the water in the world's oceans also begins to warm up. Hurricanes and tornadoes are both expected to be more powerful as a consequence of warming waters. According to Wobbles, a warmer atmosphere leads to an increase in the amount of energy in the atmosphere. Because of the greenhouse effect, the water in the seas is getting warmer, which means that storms have more energy. When hurricanes first begin, they typically draw their first supply of energy from the oceans. As a consequence of this, storms grow more powerful. Now, if the water were cooler, it would give storms less energy, which would make the hurricanes less fierce (phone interview). Additionally, higher temperatures result in the presence of a greater amount of water vapour in the atmosphere, which leads to more frequent and severe rains (Riebeek).

Alterations to the climate are also responsible for a significant portion of the melting of ice sheets (Riebeek). The melting of glaciers causes an increase in sea levels, which puts several islands in danger of being entirely submerged (Riebeek). NASA estimates that up to ten percent of the world's population resides in regions that are around nine metres (or thirty feet) above mean sea level (NASA). In addition to this, the ice sheets that cover Greenland and the West Antarctic are losing roughly 125 billion tonnes of ice per year (Riebeek). According to Wubbels, the melting of more ice and glaciers is a direct result of the warming of the globe. Within this century, there is the potential for a rise in sea level of up to 6 feet. (Conversation over the Phone)

Climate change cost

The effects of climate change, which include a wide range of negative repercussions, exact a disproportionately high toll on society and have a considerable bearing on economic expansion. It is estimated that Hurricane Katrina caused up to $125 billion in total direct damages. It is anticipated that by the year 2090, the cost of climate change to the economy of the United States might amount to hundreds of

billions of dollars annually. Investments of a significant monetary kind are required for both adaptive and preventative actions. To put an end to global warming and bring greenhouse gas emissions down to extremely low levels by the year 2010 will have a price tag of around fifty trillion dollars. If greenhouse gas emissions continue to rise at their current rate, the budget for limiting global warming to 1.5 degrees Celsius or less will be depleted by the year 2014.

India's Effort to Counter Climate Change

- India is the third biggest economy in the world and is the fifth greatest producer of greenhouse gases (GHG), contributing around 5% of the total global emissions. Between the years 1990 and 2005, India's emissions climbed by 65%, and it is expected that they would increase by another 70% by the year 2017.

- India's emissions are relatively low compared to those of other large economies, based on a number of different measurements. India is responsible for only 2% of the total emissions that have been caused by energy use since 1850. India's emissions are 70 percent lower than the global average and 93 percent lower than those of the United States when measured on a per capita basis.

- India is also one of the countries that is leading the charge in combating the effects of climate change. The difficulty of eradicating poverty is being made worse by changing rainfall patterns, recurrent floods, stronger cyclones, and droughts or soil degradation, all of which need the allocation of scarce national resources in order to avert the loss of human life.

- In spite of limited resources, India is taking a number of significant steps toward adapting to and mitigating the effects of climate change. These steps include a significant reduction in the energy intensity of our economic growth, an increase in energy efficiency across all industries, and an increased reliance on renewable energy sources.

- India is one of the very few nations that have increased the Clean Energy Cess on coal by doubling the amount, and the Clean Energy Fund already has more than 3 billion US dollars in it to be utilised for the promotion of clean technology.

- The target capacity of India's National Solar Mission is increasing from 20,000 megawatts to 100,000 megawatts as part of this expansion. This will result in an extra expenditure of one hundred billion dollars and a reduction of about one hundred fifty million metric tonnes of CO2 emissions annually.

METHOD

The data and sources used in this study are secondary sources of information and data. The information pertaining to climate change and global warming is mostly examined in reference to data from the latter half of the 20th century and the early part of the 21st century. This knowledge was obtained via reading study articles and publications, as well as by navigating several websites that are associated with environmental initiatives pertaining to climate change. Researchers take the raw data that they have collected and process and analyse it in order to gain a better understanding of the primary factors that contribute to global warming, its effects, and the efforts that have been made over the last century to combat the issue of global

warming. The results and conclusion are derived from the background information and technique that was shown above.

RESULT

A) **Greenhouse Gases as Major Contributor of Climate Change: -**

According to the Merriam-Webster dictionary, greenhouse gases are any of a variety of gaseous compounds (such as carbon dioxide or methane) that absorb infrared radiation, trap heat in the atmosphere, and contribute to the greenhouse effect. In other words, greenhouse gases are responsible for the greenhouse effect. The most prevalent types of greenhouse gases will be covered in this article.

1. Carbon dioxide (CO2): Carbon dioxide is one of the most frequent greenhouse gases and one of the most talked about greenhouse gases. It is responsible for both global warming and climate change. It is a very little but highly significant component of the atmosphere, and it is released into the air through natural activities like as breathing and the eruption of volcanoes. Deforestation, changes in land use, and the burning of fossil fuels are all human activities that contribute to the emission of this gas. Since the beginning of the Industrial Revolution, humans have contributed to a rise in the concentration of CO2 in the atmosphere that is greater than a third. This is the "forcing" of climate change that has the longest lasting effect.

2. Chlorofluorocarbons, sometimes known as CFCs, are a type of synthetic substance that is totally of industrial origin and is employed in a variety of applications. Leakages from air-conditioning and refrigeration systems, as well as plastic foam and industrial solvent vapours, are the primary contributors of chlorofluorocarbons. Because of their potential to contribute to the depletion of the ozone layer, CFCs are subject to significant restrictions on their manufacturing as well as their release into the atmosphere as a result of international agreements. Because it remains in the stratosphere for a length of time ranging from 65 to 110 years, the ozone layer has been significantly depleted in the most recent years.

3. Methane (CH4): This hydrocarbon gas is created both by natural sources and by the actions of humans. It is classified as a greenhouse gas. Decomposition of wastes in landfills, agricultural practises (particularly the growing of rice), and the management of manure linked with domestic cattle are all sources of its emission into the atmosphere. Methane is considered to be one of the active greenhouse gases; nevertheless, its abundance in the atmosphere is significantly lower than that of other greenhouse gases.

Impacts of Global Warming and Climate Change

A worldwide phenomena known as climate change has been having a significant impact on the natural environment of our planet in recent decades. It is now having noticeable repercussions on the surrounding environment. The experts had anticipated that global warming would result in the repercussions of climate change in the past, and now those effects are really occurring. The following is a list of some of the consequences of climate change, which have been briefly mentioned in the preceding paragraphs.

Increase in Mean Temperature of the Earth: -

According to NASA, the average temperature of the earth has increased about 1 degree Celsius in 20th century. The major reason behind the increase in average temperature of the earth is the greenhouse gases produced through natural and anthropogenic activities. The IPPC predicts that increases in global mean temperature will produce beneficial impacts in some regions and harmful ones in other regions.

Changing Weather phenomenon: -

One of the most significant phenomena occurring on the surface of the globe is the global circulation of wind patterns and ocean currents. It does this by transferring heat from the tropics to the higher latitudes, which in turn serves to maintain a consistent temperature over the whole planet. This disruptive system is occurring over extended periods of time as a direct result of climate change. As a result of climate change, often known as global warming, both the pattern of precipitation and its duration are becoming increasingly unpredictable. Cyclones like hurricanes, typhoons, and others like them are become more powerful and violent in some regions around the earth's surface. The intensity of the hydrological cycle of the planet is growing at an alarming rate in modern times. There are regions of the world that are seeing a lot of rainfall while others are seeing very little rain. The Marathwada area of Maharashtra state in India is where people are starting to see the long-term consequences of changes in the global climate. Long dry periods of monsoon in this region, during which there is little or no rainfall, tend to occur in this area once every three or four years.

Sea Level Changes: -

Since good records of changes in sea level were not kept until the 1880s, it has been noted that the worldwide sea level has increased by approximately 20 centimetres (8 inches) (NASA). The most important factor in the rise and fall of sea levels is climate change. The melting of ice caps and glaciers in the Polar Regions and Snowy Mountain peaks has resulted from an increase in the average temperature of the earth's surfaces, which has led to an increase in the water level of the sea. The issue of fluctuating sea levels is a challenge for many developing nations that are located on the coast, such as India, Bangladesh, Sri Lanka, the Maldives, and Indonesia, amongst others. The rise in sea level causes extensive and ongoing hazards to the economy and environment of their region.

Impact on Agriculture:

In recent decades, the processes of climate change and agricultural expansion have become intertwined on a continental as well as a global scale. Agriculture is impacted by global warming in a number of different ways, including changes in average temperature, rainfall, and climate extremes (such as heat waves); changes in pests and diseases; changes in atmospheric carbon dioxide and ground level ozone concentrations; and changes in water availability.

CONCLUSION

The preceding investigation devoted some attention to the issues of climate change and global warming. It is widely accepted that greenhouse gas emissions are to blame for both the warming of the planet's atmosphere and the shift in its climate. The contribution of four primary gases, namely carbon dioxide (CO2),

chlorofluorocarbons (CFCs), methane (CH4), and nitrous oxide (N2O), plays a highly effective role in both global warming and changes in climate. Both natural processes and human actions can be responsible for the emission of these gases into the atmosphere. In the latter part of the 20th century and the early 21st century, there has been evidence of the visible long-term consequences of global warming and climate change on the environment. The common effects of global warming and climate change on our planet include changes in sea level, an increase in the average temperature of the earth, the melting of ice caps, changing weather phenomenon, an effect on agricultural productivity, and the intensity of heat waves and drought conditions. It disrupts the lives of millions of people as well as their property, farming, and the environment. The next generation's primary focus should be on developing an understanding of the phenomena of climate change as well as the repercussions connected with it.

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