

Climate change Current Scenario: Impact and Role of society

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Abstract

Climate change refers to long-term shifts in temperatures and weather patterns. These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas), which produces heat-trapping gasses.

The current climate change scenario is one of rising global temperatures, extreme weather events, and increased risks to human health and ecosystems.

The global mean near-surface temperature in 2023 was 1.45 ± 0.12 °C above the pre-industrial 1850–1900 average. 2023 was the warmest year in the 174-year observational record. This shattered the record of the previous warmest years, 2016 at 1.29 ± 0.12 °C above the 1850–1900 average and 2020 at 1.27 ± 0.13 °C.

Fossil fuels – coal, oil and gas – are by far the largest contributor to global climate change, accounting for over 75 per cent of global greenhouse gas emissions and nearly 90 per cent of all carbon dioxide emissions. Larger amounts of these gasses trap more heat in Earth's lower atmosphere, causing global warming.

Besides working towards developing cutting-edge technology backed platforms for addressing the challenges of climate change; we have been trying to raise awareness. This is essential to understand that community participation is now a must requirement for tackling the threats of climate change. Hence, Leads Connect team has developed platforms capable of including communities for assessing actual conditions effectively and for seamless implementation of solutions.

- Development of community participation platforms for addressing the challenges of climate change.
- User driven analytics for deciphering the complexities of climate change.
- Development of causative analytics frameworks.
- Multi-scenario analysis platform for predictive analytics on the impacts of climate change.
- Organizing sessions & seminars either on impacts of climate change or its allied aspects in different scientific platforms.

Keywords :- Climate Change, Current Scenario, Impact and Role of Society.

Introduction

India is very important for the global community. Any aberration in the context of sustainability in this region may affect the other parts of world sooner or later in different intensities. It is essential to understand that disturbance in any part of a land system will ultimately affect the entire land ecosystem. And when it is about India which is hugely populous & is very significant in the context of biodiversity; it becomes very important to be watchful. Effects of climate change in India is also evident and is concerning. In all likelihood, more than 40% of India's population will be facing water scarcity by 2050. Average temperature had already

risen by 0.7 degree Celsius during 1901-2018. It is expected that there is a possibility of an almost 4.4 degree Celsius rise in average temperature by the end of twenty first century.

Thousands of lives were killed in India and Pakistan by 2015 deadly heat waves. A phenomenon of this kind can become very frequent in this region. There is a frightening possibility of a rise in temperature by 5.3 degree Celsius in Delhi by the end of the century.

Current Scenario

Climate change is generally defined as a significant variation of average weather conditions—say, conditions becoming warmer, wetter, or drier—over several decades or more. It's the longer-term trend that differentiates climate change from natural weather variability.

Record floods. Raging storms. Deadly heat. Climate change manifests itself in myriad ways and is experienced by every living being, although not equally. Throughout the world, the economically disadvantaged and people of color—those who have contributed the very least to the root causes of climate change—are the most likely to suffer from its worst impacts. Here are the basics on what causes climate change,

Climate change in the world can be caused by various activities. When climate change occurs; temperatures can increase dramatically. When temperature rises, many different changes can occur on Earth. For example, it can result in more floods, droughts, or intense rain, as well as more frequent and severe heat waves. Oceans and glaciers have also experienced some changes: oceans are warming and becoming more acidic, glaciers are melting, and sea levels are rising. As these changes frequently occur in future decades, they will likely present challenges to our society and environment.

During the past century, human activities have released large amounts of carbon dioxide and other greenhouse gases into the atmosphere. Most of the gases come from burning fossil fuels to produce energy. Greenhouse gases are like a blanket around the Earth, trapping energy in the atmosphere and causing it to warm. This is called the greenhouse effect and it is natural and necessary to support life on earth. However, while greenhouse gasses build up, the climate changes and result in dangerous effects to human health and ecosystems. People have adapted to the stable climate we have enjoyed since the last ice age which ended several thousand years ago. A warmer climate can bring changes that can affect our water supplies, agriculture, power and transportation systems, the natural environment, and even our own health and safety. There are some climate changes that are unavoidable and nothing can be done about it. For example, carbon dioxide can stay in the atmosphere for nearly a century, so Earth will continue to warm in the future.

Global warming has really taken effect in the world over the last century. It is the unusually rapid increase in the Earth's average surface temperature over the past century primarily due to the greenhouse gasses released as people burn fossil fuels. Global warming is due to the enhancing greenhouse gasses emission and build-up in the Earth's environment. The gasses that have an influence on the atmosphere are water vapor, carbon dioxide, dinitrogen-oxide, and methane. Almost 30 percent of incoming sunlight is reflected back into space by bright surfaces like clouds and ice. In the other 70 percent, most is absorbed by the land and ocean, and the rest is absorbed by the atmosphere. The absorbed solar energy heats our planet. This absorption and radiation of heat by the atmosphere is beneficial for life on Earth. Today, the atmosphere contains more greenhouse gas molecules, so more of the infrared energy emitted by the surface ends up being absorbed by

the atmosphere. By increasing the concentration of greenhouse gasses, we are making Earth's atmosphere a more efficient greenhouse. Climate has cooled and warmed throughout Earth history for various reasons. Rapid warming like we see today is unusual in the history of our planet. Some of the factors that have an effect on climate, like volcanic eruptions and changes in the amount of solar energy, are natural. Climate can change if there is a change in the amount of solar energy that gets to the Earth.

Volcano eruptions can really affect climate, because when it erupts it spews out more than just lava and ash. Volcanoes release tiny particles made of sulfur dioxide into the atmosphere. These particles get into the stratosphere and reflect solar radiation back out to space. Snow and ice also have a great effect on climate. When snow and ice melts Earth's climate warms, less energy is reflected and this causes even more warming.

There are many different ways that plants, animals, and other life on our planet can affect climate. Some can produce greenhouse gasses that trap heat and aid global warming through the greenhouse effect. Carbon dioxide is taken out of the atmosphere by plants as they make their food by photosynthesis. During the night, plants release some carbon dioxide back into the atmosphere. Methane is made while farm animals, such as cattle and sheep digest their food. Cars and trucks can effect climate by releasing carbon dioxide when fossil fuels are burned to power them.

When wildfires occur, carbon dioxide is released into the atmosphere. However, if a forest of similar size grows again, about the same amount of carbon that was added to the atmosphere during the fire will be removed. Some effects that scientists have predicted in the past would result when global change was occurring: loss of sea ice, accelerated sea level rise, and more intense heat waves. Scientists have confidence that global temperatures will continue to rise for decades to come, largely due to greenhouse gases produced by human activities.

The Intergovernmental Panel on Climate Change (IPCC) stated that the extent climate change effects on individual regions will vary over time and with the ability of different societal and environmental systems to mitigate or adapt to change (The Intergovernmental Panel on Climate Change). This has been the warmest decade since 1880. According to the National Oceanic and Atmospheric Administration, 2010 and 2005 has been the warmest years on record. The earth could warm by an additional 7.2 degrees Fahrenheit during the 21st century if we fail to reduce emissions from burning fossil fuels (The National Oceanic and Atmospheric Administration).

The rising of temperature will have great effects on the earth's climate patterns and on all living things. Industrial activities that our modern civilization depends upon have raised atmospheric carbon dioxide from 280 parts per million to 379 parts per million in the last 150 years (The Intergovernmental Panel on Climate Change).

In conclusion, we need to take part and try to stop global warming and other threats posed by climate change. If the earth's temperatures continue to rise in the future, living things on earth would become extinct due to the high temperatures. If humans contribute to controlling global warming, this world would be cooler and the high temperatures we currently have would decrease. If everybody as one takes a stand and tries to end most of the climate changes that are occurring, this world would be a safer place to live on.

Impact of Climate Change:

Climate change impacts our society in many different ways. Drought can harm food production and human health. Flooding can lead to spread of disease, death, and damage ecosystems and infrastructure. Human health issues that result from drought, flooding, and other weather conditions increase the death rate, change food availability, and limit how much a worker can get done, and ultimately the productivity of our economy.

Climate change affects everyone, but the impacts are uneven across the country and around the world. Even within one community, climate change can affect one neighborhood or person more than another. Long-standing differences in income and opportunity, or socioeconomic inequalities, can make some groups more vulnerable. Communities that have less access to resources to protect themselves or cope with impacts are often the same communities that are also more exposed to hazards.

There is still time to lessen the impacts and severity of climate change. We already know many of the problems and solutions, and researchers continue to find new ones. Experts believe we can avoid the worst outcomes by reducing emissions to zero as quickly as possible, which will limit warming. To meet this goal, we will have to invest in new technology and infrastructure, which will spur job growth. For example, we will need to continue improving technology and facilities that capture and process renewable energy. Lowering emissions will also benefit human health, saving countless lives and billions of dollars in expenses related to health.

Rising temperatures:

The last four years have been the hottest on record, and 2023 was the warmest year ever recorded at +1.48 °C (2.66 °F). Extreme weather events:

Climate change is causing more frequent and intense extreme weather events, such as heatwaves, wildfires, floods, tropical storms, and hurricanes. Sea level rise:

Glaciers and ice sheets are melting faster than ever, causing sea levels to rise.

Health risks:

Climate change is expected to cause approximately 250,000 additional deaths per year from undernutrition, malaria, diarrhea, and heat stress between 2030 and 2050.

Food and water insecurity:

Climate change is expected to increase food and water insecurity.

Soil health:

Climate change can degrade soil quality, especially in areas where industrial farming has made soil and crops less able to withstand environmental changes. Arctic ice:

The Arctic Ocean is expected to become essentially ice-free in late summer before mid-century.

To limit global warming, the world needs to reduce greenhouse gas emissions. This can be done by:

Conserving energy

Switching to energy sources that don't produce significant carbon pollution, like wind, solar, hydro, and nuclear power

Removing carbon from the atmosphere by increasing forest cover and farming with methods that capture carbon in soil.

Role of Society Climate Change:

Climate change has a significant impact on society, and individuals and communities can play a role in addressing it:

Burning fossil fuels, cutting down forests and farming livestock are increasingly influencing the climate and the earth's temperature. This adds enormous amounts of greenhouse gases to those naturally occurring in the atmosphere, increasing the greenhouse effect and global warming.

From a science education perspective, one major thing that can be done about climate change is to support education efforts that help individuals and societies make informed decisions about climate change. Climate science must be integrated as practical knowledge into society so that understanding the complex physical and biological interconnections are relevant to decision-making in social, economic, political, cultural, and educational systems. While information alone is not enough to prepare society for the immediate and long-term challenges of human influences on climate, without a scientifically informed understanding of the causes and effects of climate change, it will be difficult or impossible to reduce vulnerabilities or enhance the resilience of communities and ecosystems affected by climate change.

The two most important strategies for addressing climate change are mitigation and adaptation. The two strategies are related and overlap to a degree, but the basic distinction is that mitigation means limiting the amount of climate change which occurs, primarily by reducing greenhouse gas concentrations, while adaptation means changing the way we as a society live in response to the changing climate.

Mitigation to reduce greenhouse gas emissions entails the reduction and conservation of oil, gas, and coal, the fossil fuels that are used in transportation, heating and cooling, agriculture, and electricity generation. Replacing carbon-intensive fuels with renewable and alternative energy sources is key to “decarbonizing” the current energy infrastructure, which will require transforming the global economy that is currently fueled primarily by carbon-based energy sources. In order for mitigation to be successful, it is necessary to understand how humans currently consume energy and how that impacts the climate, and then make appropriate decisions to minimize that impact. There are already a number of energy sources which produce electricity at costs comparable to coal and natural gas, and improving the efficiency and availability of those technologies is a major area of research. Many private homeowners and schools generate their own electricity with solar panels or wind turbines, showing students and their neighbors that these technologies are available and affordable. Simple measures to increase household energy efficiency, to drive less by biking, carpooling, and riding public transit, and to ship our food shorter distances all play important roles in averting future climate change.

Changing our own behavior can limit climate change: By switching to energy sources that don't release greenhouse gases, increasing the energy efficiency of our homes and offices, and driving less, we can reduce our effect on the climate and limit climate change.

Adapting to climate change is also crucial since, no matter how successful mitigation efforts are, the changes already occurring are predicted to increase in the years and decades to come, requiring serious planning to minimize risks, vulnerabilities, and impacts. Adaptation strategies that communities are already implementing include:

Building sea walls and moving away from vulnerable coasts in order to avoid sea level rise and storm surges.
Diversifying crops and using drip irrigation for agriculture.

Building new public works such as sewers, bridges and aqueducts to handle changes in rainfall and flooding.

Training public health professionals for increased health impacts and emerging diseases.

Developing wildlife conservation plans and new migration corridors to protect endangered species.

Designing buildings to conserve and even generate energy, and.

Demonstrating strategies and lifestyles for increased sustainability and resilience

Because there is a lag between increased greenhouse gas emissions and increased warming, even if all greenhouse gas emissions stopped today, it would take decades before temperatures, rainfall, and other effects of human-caused climate change would begin to abate. So adaptation and mitigation will inevitably proceed in parallel.

Climate change will affect every part of society. The response to climate change — through mitigation and adaptation — has to involve individuals and families at home, students and educators in schools, leaders and workers in organizations, and local, state, national and international governmental bodies. The actions we take and decisions we make can create opportunities or limit the options for the next generation. Ideally, by reducing the effects and adapting to climate change, the present generation will improve its own condition, with benefits such as a higher quality of life and public health, while helping future generations through its foresight and planning.

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Climate Change 2007: Impacts, Adaptation, and Vulnerability and Climate Change 2007: Mitigation, two major reports from the Intergovernmental Panel on Climate Change, an international organization that periodically brings together scientists to evaluate the state of climate science, reviewing the evidence of how climate change is affecting society and the natural world. The Summary for Policymakers on adaptation (PDF) and the Summary for Policymakers on mitigation are especially accessible.

Adaptation Planning: What US States and Localities are Doing, a 2009 report from the Pew Center for Climate and Energy Solutions, describing how states and cities in the United States are adapting to climate change

Climate 101: Adaptation (PDF) is a brief summary of what climate adaptation is and how various parts of the US are already adapting to climate change.

There are multiple citizen science projects that let individuals and groups help track climate change, such as Project Budburst, the National Phenology Network, Climateprediction.net, and OldWeather. You can learn more about citizen science and find more projects related to climate change at Scistarter and the Citizen Science Central climate change portal.

The Climate and Energy Awareness Network provides online educational resources and exercises exploring how humans can mitigate and adapt to climate change.

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