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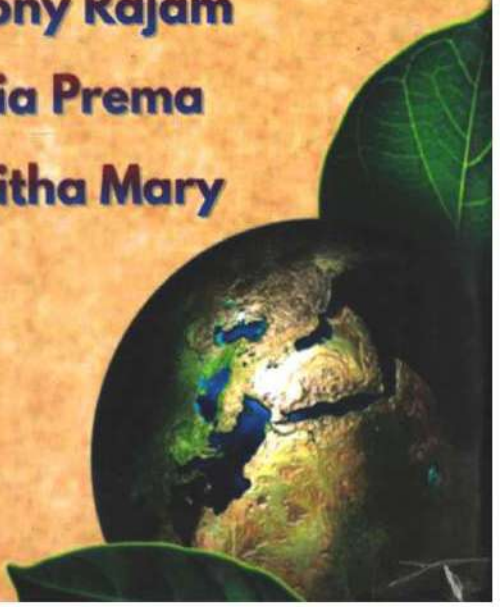

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IMPACT OF CLIMATE CHANGE ON ENVIRONME

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Introduction

The existence of life on earth is because of appropriate climatic condition in the environment. unwanted abrupt change in the climate may hinder the phy and chemical environment for life. The quality of li affected directly or indirectly by both the influence of Hu induced change in the climate and the global environm issues. The loss of biological diversity and the ozone depl disturbs the basic human needs. Air, water, food and en cannot be replaced by any means; hence the basic needs m be available in pure and safer way. Therefore the chang climate must be controlled to protect the life of human bei animals, plants and our planet from extinction.

Each year 15million babies are born premature, leading cause of death among children under five is wor exposure to high temperatures and heat waves dur pregnancy . This likely increase with global warmi especially during more frequent and intense heat wav

Global warming has seen Earth's average temperature rise by 1degree Celsius over the last century, with greater increases over large land masses. According to the UN's climate science advisory panel the number of exceptionally hot days are expected to increase most in the tropics. The new study also found that still births are also associated with the prevailing climate change.

The current trend of catastrophic climate events results from a mere 0.6 degree Celsius temperature rise in the last 100 years. India is already the fifth most vulnerable country globally in terms of extreme climate events and it is all set to become the world's flood capital. In the last 50 years, the frequency of flood events increased almost eight times. Further, events associated with floods such as landslides, heavy rainfall, hailstorms, thunderstorms, and cloudbursts increased by over 20times. The frequency of floods surged significantly in the last two decades. Between 1970 and 2004, three extreme flood events occurred over year on average. However after 2005, the yearly average rose to 11. Also, the yearly average for districts affected until 2005 was 19, but after 2005, it jumped to 55. In 2019, India witnessed 16 extreme flood events, which affected 151 districts.

Over 75 percent of Indian districts, which are home to more than 638million people are hotspots extreme climate events such as cyclones, floods, droughts,and cold waves. The study by the Council on Energy Environment and Water (CEEW) said that the frequency, intensity and unpredictability

of these extreme events have also risen in recent de
While the country witnessed 250 extreme climate
between 1970 and 2005. It recorded 310 extreme
events post 2005 alone. The study also found a shift
pattern of extreme climate events such as flood prone
becoming drought prone and vice-versa in over 40% of
Districts. Over 97 million people were currently being ex
to extreme floods in India. After 2000, there has been a
urban floods due to flawed urban planning, encroachme
wetlands and deforestation.

The Copernicus Climate Change service (C3S) an
of surface and air temperature found that November 202
0.8degree warmer than the 30 year average of 1981-201
than 0.1 degree C hotter than the previous record. For
autumn (September-November) temperatures in Europe
1.9 degree Celsius above the standard reference period
degree higher than the average temperature in 2006, which
the previous warmest. C3S directors says –These record
consistent with the long term warming trend of the
climate". All policy makers who prioritize mitigating cli
risks should see these records as alarm bells and consider
seriously than ever how to best comply with the internat
commitments set out in the 2015 –Paris Agreement".

The United Nations World Meteorolo
Organization said 2020 was on course to be among the
hottest years recorded. With just over 1 degree of warming
far, Earth is already dealing with the devastation caused

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more frequent and stronger extreme weather events such as wildfires and tropical storms. Satellite images analysed by C3S also showed that Artic sea ice extent was the second lowest for the November in the database which began in 1979. The largest negative sea ice concentration anomalies were in the Kara Sea, while there was below average cover in the eastern Canadian archipelago and Baffin Bay. This trend is concerning and highlights the importance of comprehensive monitoring of the Artic , as it is warming faster than the rest of the world. Temperatures were sustainably higher than normal across the Artic and much of Siberia last month and higher than average across the United States, South America, South Africa, Eastern Antarctica and most of Australia.

The Global Carbon Project an authoritative group of dozens of International scientists who track emissions calculated that the world will have put 37 billion US tons of carbon di- oxide in the air in 2020. That's down from 40.1 billion US tons in 2019. Scientists found that this drop is chiefly because people are staying home, travelling less by car and plane because of the pandemic Covid-19. The calculations based on reports detailing energy use, industrial production and daily mobility counts-were praised as accurate by outside scientists. Even with the drop in 2020, the world on average put 1,185 tons (1,075 metric tons) of carbon dioxide into the air every second.

The climatic change has made the massive Green land ice sheet in London facing a point of no return, beyond which

it may no longer fully re-grow, permanently changing sea levels around the world. The effects of Greenland ice sheets melting under a range of possible temperature rises, ranging from minimal warming to worst-case scenarios. At current rates of melting the ice sheets contributes almost one millimeter to sea level per year, accounting for around a quarter of the total increase. Once the ice sheet retreats from the Northern part of the island the area would remain ice-free.

Rising temperature worldwide is expected to adversely affect the global water cycle in major river basins including the Ganga and Brahmaputra. Researchers from India's IISc and Australia's University of New South Wales used satellite-derived estimates of total annual recharge to investigate the effect of rise in temperature for areas drained by 31 major rivers around the world. These includes the Amazon, Ganga, Brahmaputra, Indus, Nile, Tigris-Euphrates, Mekong and Mississippi, alongside which most of the global population resides.

The area drained by 23 out of these 31 rivers showed reduced recharge with increase in temperature, vegetation growth in these areas also reduced, owing to decline in the annual water recharge. This is the result of just 0.9 degree C rise in global temperature; the impact of the 3.5 degree C by the end of this century that is expected is a major concern.

The study based on Gravity Recovery and Climate Experiment (GRACE) satellite observations are the first of their kind and in line with future projections from

mathematical models. In a future warmer climate, even an unchanged precipitation expected to exacerbate it further. Subsequently availability of water is expected to be reduced in many parts of the world just due to rising global temperatures. These changes could threaten the water and food security of human beings as well as the flora and fauna around us, jeopardizing human life and ecosystems alike.

Climate change continued it's relentless in March 2020, with the year on course to be one of the three warmest ever recorded. The past 6 years, 2015 to 2020 are set to make up all six of the hottest years according to the World Meteorological Organization (WMO). More than 80% of global ocean experienced a marine heat wave at some time in 2020, with widespread repercussions for marine ecosystems that are already threatened by acidic waters due to carbon di-oxide absorption, the WMO said in its provisional 2020state of the Global Climate Report.

The report which is based on contributions of dozens of international organizations and experts, shows how high impact events including extreme heat, wildfires and floods, as well as the record breaking Atlantic hurricane season, affected millions of people, compounding threats to human health and security and economic stability posed by the Covid -19 pandemic.

Despite the Covid-19 lockdown, atmosphere concentrations of greenhouse gases continued to rise, pushing

the planet to further warming for many generations to come because of the long lifetime of CO2 in the atmosphere.

The average global temperature in 2020 is set to be about 1.2 degree C above the pre-industrial (1850-1900) level. There is at least a one in five chance of it temporarily exceeding 1.5degree C by 2024. Records warns years have usually coincided with a strong El Nino event, as was the case in 2016. 2020 saw new extreme temperatures on land ,sea and especially in the Arctic. Wildfires consumed vast areas in Australia, Siberia, the US West Coast and South America. Flooding in parts of Africa and South East led to massive population displacement and undermined food security for millions.

Populations aged 65years and older are particularly vulnerable to the health effects of climate change and extreme heat. In 2019, about 77.5 crore people were impacted by heat exposure in India with 31,000 deaths. New evidence from the countdown reports shows that the last two decades have seen a 54 per cent increase in heat related deaths among the elderly, with a record 2.9billion additional days of heat wave exposure affecting those over 65s in 2019. The period saw growing levels of heat-related mortality among vulnerable people in all parts of the world, with 2,96,000 deaths in 2018.

In 2019, India saw a record number of above base-line days of heat wave exposure affecting its elderly population, at almost 775 million. Eight of the 10 highest ranking years of heat wave exposure in India have occurred since 2010.

Meanwhile, heat related deaths in the over 65years have more than doubled since the early 2000s to more than 31,000 in 2018.

Heat and drought are also driving sharp increases in exposure to wildfires, resulting in burns, heat and lung damage from smoke and the displacement of communities. India per capita spend on health adaptation is just $0.80 rising from $0.60 in 2015-16. Livelihoods are also at risks as heat is increasingly affecting people's ability to work out-doors in developing regions.

Most people know that land-dwelling dinosaurs were wiped out some 66million years ago when an asteroid roughly twice the diameter of Paris crashed into Earth. But more than 100million years ago, another climate change cataclysm devasted a different set of dinosaur species with many going extinct. It was global warming rather than global cooling that did them in with the planet heating up more quickly than the dinos capacity to adopt. Scientists have found evidence of this traumatic event some 179 million years ago in plant fossils in argentine Patagonia. They also discovered a previously unknown dinosaur. The species, called Bagualia Alba, is in the family of massive, long-necked sauropods, the largest animals to walk the Earth.

Before the global warming event, sauropods were only one branch of the Sauropodomorpha lineage. Other dinosaurs in the same group were smaller and lightly built , with some no bigger than a goat. Smaller Sauropodomorpha dinosaurs were

unable to cope with the change, but larger sauropods like the Bagualia Alba thrived.

Change in climate can increase infectious disease risk in animals, with the possibility that these disease could spread to humans. This is based on the phenomenon known as ‗thermal mismatch hypothesis' which is the idea that the greatest risk for infectious disease in cold climate-adapted animals such as polar bears occurs as temperature rises. The hypothesis proposes that smaller organisms like pathogens function across a wider range of temperatures than larger organisms such as hosts or animals.

Understanding how the spread, severity and distribution of animals infectious diseases could change in the future has reached a new level of importance as a result of the global pandemic caused by SARS-CoV-2 a pathogen which appears to have originated from wildlife. The majority of emerging infectious disease events has a wildlife origin, this is yet another reason to implement mitigation strategies to reduce climate change.

The research team collected data from more than 7000 surveys of different animal host-parasite systems across all seven continents to provide a diverse representation of animals and their pathogens in both aquatic and terrestrial environments. Pathogens found at warm locations outperform their animal hosts during cool weather as warm-adapted animals perform poorly. Similarly pathogens found at cool

locations thrive at warm temperatures while cold-adapted animals are less tolerant to heat.

Climate change affects the environment at its fullest; it leads to decline in salinization and organic matter. It aggravates erosion and leads to landslides, flooding and desertification. Fast melting of snow or ice and river discharges influences soil degradation. Extreme precipitation, increased droughts are climate-related events. Salt water intrusion from seaside made the saline soils to get collected in the coastal areas because of the rising sea-levels.

Climate change has leading impacts on both species and ecosystems directly or indirectly. Biodiversity is continuously responding to the climate change. Direct impacts on habitat structure phenology, habitat structure, species abundance and ecosystem processes. Indirect impact is more damaging than the direct impacts because of its speed and scope. Pollution of water, soil and air, over-exploitation and spread of invasive species are the major areas of indirect impacts which has to be looked in cautiously and must be rectified through proper methods, otherwise climate regulation, clean air, food, water and capacity to control floods or erosion will reduce the resilience of ecosystem to climate change. The over health of aquatic ecosystems is determine by the water temperature. The climate change have increased the temperature of rivers and lakes, and decreased the ice cover this will inversely affect the water quality and fresh water ecosystems.

Conclusion

Climate change may bring major changes in the environment. It will increase the chance of water scarcity and flood in many of the continent. It is of higher risk which has to be rectified at the present situation. It may affect many marine regions, natural environments and species. Changes in the temperature and ocean circulation have the potential to change the geographical distribution. Hence it is the need of the hour to pay more attention towards the climate change to save the future generation from extinction.

Reference

- Nanda VK, Environmental Education, Anmol Publications Pvt. Ltd., New Delhi, 2005.
- Annual Report 2000-01, Ministry Environmental and Forests, Government of India, New Delhi, PP 149-150
- Mahesh Chandra, (2015). Environmental Concerns in India: Problems and Solutions, *Journal of International Business and Law,* 15 (1) Article 1.
- https://www.unicef.org/*environment-and-climate-change*
- https://www.nationalgeographic.com/*environment*/global-warming/*global-warming-effects/*
- https://www.noaa.gov/education/resource-collections/climate/*climate-change-impacts*