IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

"CLIMATE CHANGE: THREAT TO THE VERY EXISTENCE OF BIODIVERSITY" (CHANGE IS THE LAW OF NATURE)

Dr.Pushpa[1], Anusha.C.Hiremath[2]

[1]Assistant Professor, Department of Chemistry, Government Degree College Sindhanur,584128,Raichur(Dist),Karnataka

[2]J.S.S. Ayurvedic Medical College, Mysore, Karnataka.

Abstract

Climate change is any significant long term change in expected patterns of average weather of a region over a significant period of time. It is about abnormal variations to the climate and the effects of these variations on other parts of earth. There are many natural and anthropogenic factors that contribute to climate change. Climate change caused by the global increase in temperatures triggers multiple negative effects on the planet. Climate change is one of the most important global environmental challenges facing humanity with implications for food production, natural ecosystems, freshwater supply, health, etc The climate change issue is part of the larger challenge of sustainable development. As a result, climate policies can be more effective when consistently embedded within broader strategies designed to make national and regional development paths more sustainable. The landmark 2015 Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) commits all countries to keep global mean temperature increase well below 2 degrees Celsius. Therefore Clean air, Clean Energy and Clean power balanced with growing were the priorities of India in its mission in its negotiation to combat the climate change.

Key Words: Impacts of Climate change, Paris agreement, Sustainable Development.

Introduction

Climate change is reality. It has changed in Past, is changing in Present and will change in Future also. Atmosphere is always in a state of turmoil and instability leading to variation in water and climatic conditions. Thus the variation and shift in weather conditions over space and time of different scales and magnitude resulting into change of climatic type is defined climate change. For example, from warm and moist climate to warm and dry climate. Therefore climate change is any significant long term change in expected patterns of average weather of a region over a significant period of time. It is about abnormal variations to the climate and the effects of these variations on other parts of earth.

The rate of climatic change depends on the nature of casual factor. This may be gradually or rapidly , partly or drastically, short term or long term, local, regional, or global scale. The climate change which occurred during Jurassic period leading to mass extinction of Dinosaurs due to sudden onset of cold climate was rapid and instant.

Factors affecting climate change

There are many natural and anthropogenic factors that contribute to climate change. Climate has always happened on earth, which is clearly seen in geographical record; it is the rapid rate and the magnitude of climate change occurring now that is of great concern worldwide. Green house gases in the atmosphere absorb heat radiation. Human activity has increased green house gases in the atmosphere since the industrial revolution, leading to more heat retention and increase in surface temperatures. Atmospheric aerosols alter climate by scattering and absorbing solar and infrared radiation and they may also change the microphysical and chemical properties of clouds.

Climate change is also caused by factors that include oceanic processes (such as oceanic circulation), biotic processes (e.g., plants), variations in solar radiation received by Earth, plate tectonics and volcanic eruptions, and human-induced alterations of the natural world primarily as a result of human activities. The other geographical factors include

- Latitude. Depends on how close or how far it is to the equator.
- Ocean currents. Certain ocean currents have different temperatures. Warm ocean currents warm the air above it, which warms the coast. Cold ocean currents cool the air above it, which cools the coast. This helps keep the coast at a consistent temperature.
- Wind and air masses. Heated ground causes air to rise which results in lower air pressure. As it rises it cools and descends to the ground resulting in high air pressure. This cycle repeats, creating wind. These air masses absorb the climate of the air below it.
- Elevation. The higher up you are, the colder and drier it will be. When air rises it expands due to low air pressure which causes it to cool.
- Relief. The differences in the elevation in land. As air is forced to rise over a piece of land (e.g. a mountain) the temperature decreases and condensation increases. As it condensates water droplets get bigger and heavier and are forced to fall. Once the air mass goes over the mountain the temperature and evaporation increases but condensation decreases, resulting in a halt in precipitation and rain shadows.
- Increase in the level of green house gases.
- Nearness to water. Water heats up and cools down slower than land does, having a moderating effect. On colder days, the water heats up the land, whereas on hotter days, the land is cooled down by the water. These areas also experience more precipitation

Impact of climate Change

Climate change is one of the greatest threats to global security. Climate change knows no borders and it presents an existential challenge to us all. Three main levels of climate change impact the global increase in temperatures and influence the physical, biological and human systems.

First, variations in the physical systems of the planet can be observed in the melting of the poles, which at the same time cause glacial regression, snow melting, warming and thawing of permafrost, flooding in rivers and lakes, droughts in rivers and lakes, coastal erosion, sea level rise and extreme natural phenomena. This affects the infrastructures of towns and cities, access to drinking water and other resources to support daily life.

Second In the biological systems, there is death of flora and fauna in terrestrial and marine ecosystems, wildfires and flora and fauna displacement searching for better life conditions.

Third In human systems, climate change affects and destroys crops and food production, causes disease and death, destruction and loss of economic livelihoods and migrations of climate refugees. Interrelationships between the effects of climate change in addition, these negative consequences feed each other back and increase their magnitudes; for example: - Droughts frequently cause wildfires, which then destroy crops. - The melting of glaciers, snow and ice causes sea level rise, which erodes the coast and involves the destruction of many economic means of subsistence. Droughts, rising sea levels, extreme natural phenomena and floods cause climate refugees. It also drives the displacement of populations and since 2008, an average of 26.4 million people per year have been displaced from their homes by disasters brought on by natural hazards. 85 % of that weather related. This is equivalent to approximately one person displaced every second.

According to the latest scientific assessment, the earth's climate system has demonstrably changed on both global and regional scales since the preindustrial era. Further evidence shows that most of the warming (of 0.1°C per decade) observed over the last 50 years, is attributable to human activities. The Intergovernmental Panel on Climate Change (IPCC) projects that the global mean temperature may increase between 1.4 and 5.8 degrees Celsius (C) by 2100. This unprecedented increase is expected to have severe impacts on the global hydrological system, ecosystems, sea level, crop production and related processes. The impact would be particularly severe in the tropical areas, which mainly consist of developing countries, including India.

Developing countries are faced with immediate concerns that relate to forest and land degradation, freshwater shortage, food security and air and water pollution. Climate change will exacerbate the impacts of deforestation and other economic pressures, leading to further water shortages, land degradation and desertification. Increasing global temperatures will result in rising sea levels. Populations that inhabit small islands and/or low-lying coastal areas are at particular risk of severe social and economic disruptions from sea-level rise and storm surges that could destroy cities and disrupt large coastal livelihoods. The widespread retreat of glaciers and icecaps in the 21st century will also lead to higher surface temperatures on land and increasing water stress. By 2025, as much as two-thirds of the world population, much of it in the developing world, may be subjected to moderate to high water stress. Estimates of the effects of climate change on crop yields are predominantly negative for the tropics, even when adaptation and direct effects of CO_2 on plant processes are taken into consideration. Ecological productivity and biodiversity will be altered by climate change and sea-level rise, with an increased risk of extinction of some vulnerable species. Even though the ability to project regional differences in impact is still emerging, the consequences of climate change are projected to be more drastic in the tropical regions. This is true for all sectors that are likely to bear the brunt of climate change – sea level, water resources, ecosystems, crop production, fisheries, and human health. The populations of the developing world are more vulnerable as their infrastructure is not strong and extensive enough to withstand a deleterious impact.

India´s concern about climate change

India is a large developing country with nearly 700 million rural population directly depending on climate-sensitive sectors (agriculture, forests and fisheries) and natural resources (such as water, biodiversity, mangroves, coastal zones, grasslands) for their subsistence and livelihoods. Further, the adaptive capacity of dry land farmers, forest dwellers, fisher folk and nomadic shepherds is very low. Climate change is likely to impact all the natural ecosystems as well as socio-economic systems as shown by the National Communications Report of India to the UNFCCC. The latest high resolution climate change scenarios and projections for India, based on Regional Climate Modeling (RCM) system, known as PRECIS(Providing Regional climates for Impact Studies) developed by Hadley Center and applied for India using IPCC(Intergovernmental Panel on Climate Change) scenarios shows the following:

• An annual mean surface temperature rise by the end of century, ranging from 3 to 5°C, with warming more pronounced in the northern parts of India.

• A 20% rise in all India summer monsoon rainfall and further rise in rainfall is projected over all states except Punjab, Rajasthan and Tamil Nadu, which show a slight decrease.

• Extremes in maximum and minimum temperatures are also expected to increase and similarly extreme precipitation also shows substantial increases, particularly over the west coast of India and west central India.

Some of the projected impacts of climate change in India are as follows:

Water resources

The hydrological cycle is likely to be altered and the severity of droughts and intensity of floods in various parts of India is likely to increase. Further, a general reduction in the quantity of available run-off is predicted.

Agriculture

Simulations using dynamic crop models indicate a decrease in yield of crops as temperature increases in different parts of India. However, this is offset by an increase in CO_2 at moderate rise in temperature and at higher warming; negative impact on crop productivity is projected due to reduced crop durations.

Coastal zone

Simulation models show an increase in frequencies of tropical cyclones in the Bay of Bengal; particularly intense events are projected during the post-monsoon period. Sea level rise is projected to displace populations in coastal zones, increase flooding in low-lying coastal areas, loss of crop yields from inundation and salinization.

Human Health

Malaria is likely to persist in many states and new regions may become malaria-prone and the duration of the malaria transmission windows is likely to widen in northern and western states and shorten in southern states.

Desertification

Climate change leading to warming and water stress could further exacerbate land degradation, leading to desertification. The United Nations Convention to Combat Desertification (UNCCD) aims to address the problem of land degradation, which is linked to climate change. It is important to note that the climate-sensitive sectors (forests, agriculture, coastal zones) and the natural resources (groundwater, soil, biodiversity, etc.) are already under stress due to socio-economic pressures. Climate change is likely to exacerbate the degradation of resources and socio-economic pressures. Thus, countries such as India with a large population dependent on climate-sensitive sectors and low adaptive capacity have to develop and implement adaptation strategies.

Paris Agreement on climate change

The climate change issue is part of the larger challenge of sustainable development. As a result, climate policies can be more effective when consistently embedded within broader strategies designed to make national and regional development paths more sustainable. The impact of climate variability and change, climate policy responses, and associated socio-economic development will affect the ability of countries to achieve sustainable development goals. The pursuit of these goals will in turn affect the opportunities for, and success of, climate policies. In particular, the socio-economic and technological characteristics of different development paths will strongly affect emissions, the rate and magnitude of climate change, climate change impacts, the capability to adapt, and the capacity to mitigate

The landmark 2015 Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) commits all countries to keep global mean temperature increase well below 2 degrees Celsius from pre-industrial levels by the end of the century and to make efforts to limit the temperature rise to below 1.5 degrees Celsius. For the first time all countries recognize the need to peak global greenhouse gas emissions "as soon as possible" and to fully decarbonize their economies during this century to achieve net-zero global greenhouse gas emissions. In Paris, negotiators achieved what can be reasonably be expected from a global climate agreement. Now scientists, engineers, businessmen, policymakers, politicians, and civil society must make the transformation to low-emission societies a reality.

Critically, the agreement asks all countries to prepare by 2020 low-emission development strategies that chart out how emissions will fall through to 2020. Such strategies had been proposed in the September Joint Presidential Statement by China and the United States and by over 40 heads of state convening at the United Nations. SDSN(Sustainable Development Solutions Network) has played an instrumental role in developing and popularizing the concept of long-term pathways through the Deep Decarbonization Pathways Project (DDPP).

The Paris Agreement also emphasizes the central role of advances in low-emission technologies and their diffusion. The Low-Emission Technology Partnership initiative (LCTPi) spearheaded by the World Business Council for Sustainable Development (WBCSD) and launched with support from the SDSN aims to advance the pace of development for key technologies.

The Paris Agreement builds on the UN Framework Convention on Climate Change, bringing all nations into a common cause to reduce greenhouse gas emissions rapidly and to strengthen the ability of countries to build resilience and adapt to the impacts of climate change, including through ensuring adequate support for developing countries.

India to achieve climate goals before schedule:

India is set to surpass its commitment to increase the share of renewable in its energy generation basket and reduce the amount of carbon dioxide pollution produced for every dollar of GDP by 33 to 35% ahead of 2030. India's national climate action plans, known in UN parlance as nationally determined contributions (NDCs), under the Paris Agreement set three major goals—increase the share of non-fossil fuels to 40% of the total electricity generation capacity, to reduce the emission intensity of the economy by 33 to 35% by 2030 from 2005 level, and to create additional carbon sink of 2.5 -3 billion tonnes of CO2 equivalent through additional forest and tree cover.

Independent assessments show that India's commitments are keeping with the Paris Agreement goal of keeping temperature increase to well below 2 degrees Celsius. More recent independent assessments find that India is likely to meet its goals, particularly on increasing non-fossil generation capacity and reducing emissions intensity, ahead of the deadline set by India in its Paris climate pledges.

An analysis by Australia-based think tank Institute for Energy Economics and Financial Analysis (IEEFA) finds that India is likely to achieve its energy capacity and emissions intensity goals by 2020, that is a decade before the deadline of 2030 it set in its NDC.

However, as regards the forestry goal, India's achievements are not as robust. "Our commitment is to create additional carbon sink of 2.5 -3 billion tonnes of CO_2 equivalent, given our present pace it may be a little difficult to achieve this target," said Harshvardhana Mishra, the then Environment minister. But the situation is being addressed. "We are conscious of this, so a new strategy has been formulated, and put in place by which between now and 2030 this pace is going to almost be doubled. This should help meet the goal."

There has been a rising demand that countries increase their efforts to tackle climate change and reduce greenhouse gas emissions. India has made it clear that it is aware of that the world needs to do more and neither did it shy away from the idea of stepping up its own efforts.

Climate change and Sustainable development

Sustainable development has become part of all climate change policy discussions at the global level. The generally accepted and used definition is 'Development that meets the needs of the present without compromising the ability of future **g**enerations to meet their own needs'

Sustainable development has become an integrating concept embracing economic, social and environmental issues. Sustainable development does not preclude the use of exhaustible natural resources but requires that any use be appropriately offset. Policy makers in developing countries often perceive a tradeoff between economic growth and environmental sustainability. **However, there is a growing evidence to show that environmental conservation for sustainability of natural resources is not a luxury but a necessity when considering long-term economic growth and development, particularly in the least developed countries.** The decline and degradation of natural resources such as land, soil, forests, biodiversity and groundwater, resulting from current unsustainable use patterns are likely to be aggravated due to climate change in the next 25 to 50 years. . There are many ways to pursue sustainable development strategies that contribute to mitigation of climate change. A few examples are presented below.

• Adoption of cost-effective energy-efficient technologies in electricity generation, transmission distribution, and end-use can reduce costs and local pollution in addition to reduction of greenhouse gas emissions.

• Shift to renewables, some of which are already cost-effective, can enhance sustainable energy supply, can reduce local pollution and greenhouse gas emissions.

• Adoption of forest conservation, reforestation, afforestation and sustainable forest management practices can contribute to conservation of biodiversity, watershed protection, rural employment generation, increased incomes to forest dwellers and carbon sink enhancement.

• Efficient, fast and reliable public transport systems such as metro-railways can reduce urban congestion, local pollution and greenhouse gas emissions.

• Adoption of participatory approach to forest management, rural energy, irrigation water management and rural development in general can promote sustained development activities and ensure long-term greenhouse gas emission reduction or carbon sink enhancement.

• Rational energy pricing based on long-run-marginal cost principle can level the playing field for renewables, increase the spread of energy-efficient and renewable energy technologies, and the economic viability of utility companies, ultimately leading to greenhouse gas emission reduction.

• Improved understanding of the exposure, sensitivity, adaptability and vulnerability of physical, ecological and social systems to climate change at regional and local level
• To develop sustainable and equitable international protocols, mechanisms and financial arrangements to promote mitigation and adaptation to achieve the goals of Article 2 of the UNFCCC.

Conclusion

Therefore the threat of global climate change poses an unprecedented challenge to humanity. While climate change is important in the long run, it is crucial to recognise that (especially for the developing countries) there are a number of other development issues that affect human welfare more immediately – such as hunger and malnutrition, poverty, health, and pressing local environmental issues. Climate change and sustainable development interact in a circular fashion. Climate change will have an impact on prospects for sustainable development, and in turn, alternative development paths will certainly affect future climate change. Seen from the development viewpoint, climate change vulnerability, impacts and adaptation are the main elements of concern.Clean air, Clean Energy and Clean power balanced with growing were the priorities of india in its mission in its negotitation to combat the climate change.The Government had pursued voluntarily set targets with commitment, conviction and followed-up action and played an active and positive role in tackling climate change.

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