

Impact of Climate Change and its Various Aspects in the Indian Context

Pooja*

Research Scholar, Department of Geography, IGU Meerpur, Rewari

Email: pooja20700@gmail.com

Abstract - There are several ways in which India is experiencing climate change impacts. Rising temperatures have had detrimental implications on agriculture and human health. Changes in precipitation patterns have had an impact on water availability and agricultural stability. Residents and infrastructure in coastal areas are vulnerable to the effects of sea level rise and extreme weather. Glacial melt in the Himalayas is having an impact on river flow, which has repercussions for water supply and electrical generation. Moreover, those who already face socioeconomic disadvantages are placed at even greater danger due to climate change. India's long-term development and prosperity depend on its ability to adapt to and mitigate these risks.

Keyword - climate, India

-----X-----

INTRODUCTION

Anthropogenic activities, such as the burning of fossil fuels, are thought to be influencing Earth's climate system by increasing atmospheric concentrations of trace gases like carbon dioxide (CO₂) and methane (CH₄). Warming of the climate system is now unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global sea level," the Intergovernmental Panel on Climate Change (IPCC) wrote in its fourth assessment report. A large portion of India's population relies on climate-sensitive industries like agriculture, forestry, and fishing for their livelihood, hence the country has good cause to worry about climate change. The severity of livelihood challenges in the nation has worsened as a direct consequence of the negative effects of climate change, such as a decrease in rainfall and an increase in temperature. The ecological and social systems are already under enormous strain from increasing industrialization, urbanization, and economic expansion; climate change would add to that stress.[1]

The effects of climate change on agriculture, ecosystems, water supplies, human health, etc. make it one of the most pressing environmental problems the world has ever faced. The newest scientific report concludes that there has been clear evidence of changes to the global and regional scales of Earth's climate system since the pre-industrial period. Most of the warming (0.1 °C per decade) recorded over the previous 50 years is also likely due to human activity, according to the available data (IPCC, 2001a and 2001b). According to the projections of the

Intergovernmental Panel on Climate Change, the average temperature of the Earth might rise by anywhere from 1.4% to 5.8% by the year 2100. The world's hydrological system, environment, sea level, food output, and associated activities are all predicted to be severely impacted by this unprecedented surge. The effect will be seen most strongly in the tropics, which are dominated by emerging nations like India.

Climate Change and Sustainable Growth

After the adoption of Agenda 21 and the supporting treaties at the "United Nations Conference on Environment and Development (UNCED)" in 1992, all talks about global climate change policy became more sustainable. The Brundtland Commission's widely acknowledged and commonly used definition is "development that meets current demands without jeopardizing future generations' ability to provide for one's needs ". The idea of sustainable development has expanded to include societal and ecological factors. The utilization of natural capital is not incompatible with sustainable development, but it must be balanced against other factors. This method is rejected by developing nations since it does not take into account their needs in terms of assessment and development. In addition, developing economies need robust growth to reach the point of sustainable development.[2]

Economic expansion, social justice, and environmental protection are the three pillars upon which sustainable development rests. Should we forego current economic advantages (GDP, employment) in order to save the planet? Wage

growth and environmental sustainability are generally seen as a trade-off by policymakers in emerging countries. Especially in nations where economic growth and development have been most prominent over the last few decades, evidence is growing that environmental protection is not a commodity but a duty. Climate change is predicted to accelerate the destruction of natural assets and resources such as water, soil, forests, land, animals, and groundwater over the next 25 to 50 years due to existing unsustainable practices.

Degradation of the environment and scarcity of fresh water are already serious issues in India. Sustainable development strategies are a key component of climate change mitigation plans, and they may be pursued in a variety of ways. Some instances are shown below:

- Cost savings and environmental protection may be achieved by the widespread adoption of more energy-efficient methods of producing, transmitting, and allocating electricity.
- Changing to renewable sources, which are now more affordable than ever, may enhance long-term energy supply and reduce pollution.
- Conservation of biodiversity, coastal protection, local employment, increased forest dweller incomes, and a larger carbon sink may all benefit from reforestation, afforestation, and other jungle management measures.
- Reduce traffic congestion, pollution, and greenhouse gas emissions with the use of metro rails and other efficient, quick, and reliable public transit systems.
- Greenhouse gas emissions may be minimized or carbon sinks can be expanded by the coordinated use of jungle management, local energy, and agricultural practices in a comprehensive rural development plan.
- Fair competition for renewables, accelerated adoption of efficient energy sources with renewable energy systems, and utility companies' economic sustainability can all result from energy prices based on the long-run marginal-cost concept, which in turn leads to a reduction in carbon emissions.

Climate Alteration and the Sustainable Development Goals

The goal of sustainability is to ensure that future generations may fulfil their own demands without jeopardizing those of present ones. The global SD agenda will be profoundly impacted by the success of the poorest nations in implementing the Sustainable Development Goals. The population of India makes it the second most populated developing nation. India is

afflicted by a wide range of environmental problems, such as global warming, resource depletion, e-waste, and air, water, and land pollution. Population growth, technological progress, the modern way of life, and the industrial revolution are only few of the causes of these environmental problems. There is an undeniable connection between population growth and factors like the economy and the environment. Before implementing sustainable practices in different areas, it is important to increase awareness of the topic by creating a sustainability unit in educational institutions, running awareness programs like workshops and seminars, receiving financial backing from management, and educating one's self on the benefits and risks of sustainability. Increases in evapotranspiration, groundwater depletion, water salinity, and habitat loss are only some of the consequences of rising global temperatures and sea levels for many nations. The effects of climate change are becoming more apparent in many areas, including farming, health care, and population migration. Plans for adaptation and mitigation in response to climate change need to take into account scientific, environmental, demographic, and socioeconomic factors. Global climate change has far-reaching consequences. A change in human behavior is required due to climate change in order to cope with and adapt to the changing circumstances. People who participate in sustainable conduct take responsibility for their carbon emissions and contemplate the consequences their activities will have on future generations. Mitigating climate change may be aided by adopting the Sustainable Development Goals.[3-4]

Impacts of Climate Change

Sea level rise is one of the most obvious and widespread impacts of climate change. It is caused by the expansion of water due to temperature changes and the addition of fresh water to the seas due to the melting of mountain glaciers and ice sheets. By the end of the century, sea levels are expected to increase between 50 and 100 centimeters, depending on the magnitude of warming. The waters across the globe would rise by more than 120 meters if Antarctica and Greenland, the two biggest ice sheets on Earth, melted entirely. However, due to the very long lag times involved in cryosphere-climate interactions, and especially because Antarctica is expected to expand in volume in coming decades (a warmer climate may trigger additional precipitation falling there in the form of snow, increasing its volume), a strong sea-level rise is not expected to take place in coming decades.

It's possible that the effects of rising sea levels on many low-lying beaches will be among the most significant social and economic effects of climate change. The Maldives in the Indian Ocean, the Marshall Islands in the Pacific, parts of Bangladesh in the Ganges delta, and Indonesia are just a few examples of island states where a disproportionate number of people live on or near the coast, often

within the critical metre above sea level. Altering patterns of temperature and precipitation, as well as disparate population growth patterns, will likely put increasing strain on the world's water supply. Extreme weather changes will have an impact on water availability, use, and quality. Water shortages will enhance competition for water usage for economic, social, and environmental purposes in nations already vulnerable to water stress, especially in arid and semi-arid areas. Larger populations in the future will increase the need for irrigation and maybe industrialization, frequently at the price of drinking water supplies.[5]

Projections of annual per capita water availability by the 2020s reveal a falling tendency in all regions of the globe, even those that are regarded to have sufficient water resources. The predicted decrease in water availability in many nations is attributable to more than just changing precipitation belts; fast population increase, urbanization, and economic development all exert extra demand on water supplies. Water supply per person may be more affected by population growth in certain areas than by climate change, while the opposite may be true in others. Population expansion and climate change will operate together to dramatically reduce water availability, with the worst-case scenarios occurring in some of the world's poorest nations. Climate change will undoubtedly exacerbate the rivalry and conflict that arises from the sharing of water across international borders, which is already a contentious issue in many regions (such as the Nile, the Jordan, the Tigris, and the Euphrates). Food security is also challenged by climate change, both directly by changing temperature and precipitation patterns, and indirectly via losses of agricultural land owing to sea-level rise, higher wind and water erosion, pests, and disease. Furthermore, the agricultural potential of many regions of the globe has already been decreased due to human-induced land-use change connected to deforestation and desertification.[6]

The global food system is a dynamic network of producers and consumers connected by international trade. Even while agricultural output has grown over the last century to meet the needs of a rising global population, there are still almost a billion people who are malnourished. Temperature, precipitation, soil moisture, carbon dioxide levels, and disease and pests (themselves mostly climate-dependent) are the primary regulators on agricultural output, making agriculture among the most sensitive of all human occupations to weather and climate variability. Productivity may respond in unexpected ways to even small changes in any of these regulating elements. To keep up with population shifts and changing consumption habits, agricultural output would need to almost quadruple by 2020, according to the Food and Agricultural Organization (FAO). Because of competition for land and climate change, it seems doubtful that the 'green revolution' of the twentieth century will be recreated, especially when new

technology like genetic engineering are taken into consideration.[7-8]

- Impacts of sea level rise, erosion, loss of land/coastal wetlands, and need for coastal protection;
- Effects on agriculture;
- Effects on energy use (including heating and cooling);
- Effects to human health from changes in cold related and heat related effects
- Effects to human health from the disease burden (and other secondary effects);
- Effects on water resources, water supply and water quality;
- Changes to tourism potential and destinations;
- Effects on ecosystems (loss of productivity and bio-diversity);
- Impacts from drought;
- Impacts from flooding;
- Impacts from storm damage and extreme weather (including costs to infrastructure);
- Socially contingent effects (arising from multiple stresses and leading to migration, famine, etc);
- Impacts from major events (e.g. loss of thermo-haline circulation, collapse of West-Antarctic ice sheet, methane hydrates).

There is a lot of overlap between these fields. The possibly catastrophic implications and huge climatic discontinuities highlighted will have far-reaching consequences. Future climate change policy should emphasize the risk of avoiding these big impacts as a distinct benefit, in line with the precautionary principle.[9-10]

CONCLUSION

As a result, agriculture, water resources, coastal areas, and vulnerable communities are all at risk in India due to the effects of climate change. A comprehensive strategy for mitigation and adaptation is required immediately. India's reaction should focus on protecting the most vulnerable via social safety nets and resilient agricultural techniques, water resource management, and infrastructure. To combat this common enemy and

create a better, more sustainable future for everybody, international cooperation is essential.

REFERENCES

1. Berbesi, L.A., et al. (2016)"Methane Leakage from Evolving Petroleum Systems: Masses, Rates and Inferences for Climate Feedback." *Earth and Planetary Science Letters* 387. (2014): 219- 228. ScienceDirect. Web. 9 May 2016.
2. Rishi, P. (2022). Climate Change and Sustainability Behaviour Management. In: *Managing Climate Change and Sustainability through Behavioural Transformation. Sustainable Development Goals Series.* Palgrave Macmillan, Singapore. https://doi.org/10.1007/978-981-16-8519-4_1
3. Zervaki, A. (2018). Human security and climate change mitigation: The case of ocean governance. *Marine Policy*, 98, 286-294.
4. Germa'n Poveda et al.,(2001) 'Coupling between annual and ENSO timescales in the malaria–climate association in Colombia', in *Environmental Health Perspective*, Vol. 109, No. 5, 2001, pp. 489–493.
5. Rupa K. Kumar, A.K. Sahai, K. Krishna Kumar, S.K. Patwardhan, P.K. Mishra, J.V. Revadekar, K. Kamala and G.B. Pant, (2006)"High-resolution climate change scenarios for India for the 21st century," *Current Science* 90 no. 3: Special Section: Climate Change and India
6. Baruah, P. P., & Kakati, B. (2012). Water quality and phytoplankton diversity of Gopeswar temple freshwater pond in Assam (India). *Bangladesh Journal of Botany*, 41(2), 181-185.
7. Ghosh, S., & Dutta, S. (2012). Impact of climate change on flood characteristics in Brahmaputra basin using a macro-scale distributed hydrological model. *Journal of earth system science*, 121(3), 637-657
8. Goyal, M. K., & Surampalli, R. Y. (2018). Impact of climate change on water resources in India. *Journal of Environmental Engineering*, 144(7), 04018054.
9. Dhanya, P., & Ramachandran, A. (2016). Farmers' perceptions of climate change and the proposed agriculture adaptation strategies in a semi-arid region of south India. *Journal of Integrative Environmental Sciences*, 13(1), 1-18
10. Pandve, H. T. 2009. "India's national action plan on climate change." *Indian J. Occup. Environ. Med.* 13 (1): 17. <https://doi.org/10.4103/0019-5278.50718>.

Corresponding Author

Pooja*

Research Scholar, Department of Geography, IGU Meerpur, Rewari