

Impact of Climate Change on India

Naseeb Singh

M.A GEOGRAPHY, NET

M.D.U ROHTAK

ABSTRACT-

Climate change is one of the complex problems facing mankind today. The overriding complexity of the problem is attributed to its deeper global ramifications on a vast range of issues impacting the very survival of life on Earth. Understanding such a complex issue with vast and varied dimensions and implications, assumes greater significance for all stakeholders, especially for our policy makers. There are varieties of perceptions regarding the exact size and consequences of climate change. Yet, it is no secret that risks emanating from climate change are indeed profound, which call for urgent mitigation. There is now strong evidence that climate change is a reality. Today, it has been scientifically established that significant global warming is occurring. Warming of the climate system is 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 average sea level. There is no denying the fact that the problem exists and it is assuming alarming proportions, each passing day. Therefore, there is an imperative need to take urgent and strong measures in the interest of calibrating an appropriate response to meet the emerging challenges of climate change. Present paper focus on the impact of climate change on the Indian agriculture, health, Ecosystems, sea level, food and safety, etc. in India.

KEYWORDS-

Climate change, Global Warming, Ecosystem

INTRODUCTION-

Climate change refers to the variation in the Earth's global climate or in regional climates over time. It describes changes in the state of the atmosphere over time scales

ranging from decades to millions of years. Climate change has been defined by many in many ways. While some define it as an offshoot of Earth's natural processes, others define it as a result of human activities. Striking a balance between these two varying perspectives, climate change is defined as "a change which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". Truly, the present changes in the Earth's climate cannot be explained alone by the natural processes that explain Earth's previous warm periods. There is a broad scientific consensus that most of the warming in the recent decades can be attributed to human activities.⁴ If humanity is, in large part, responsible for this change, then whatever choices we make today, will have a significant bearing on the climate of the future. This makes climate change a formidable concern.

India is both a major greenhouse gas emitter and one of the most vulnerable countries in the world to projected climate change. The country is already experiencing changes in climate and the impacts of climate change,

including water stress, heat waves and drought, severe storms and flooding, and associated negative consequences on health and livelihoods. With a 1.2 billion but growing population and dependence on agriculture, India probably will be severely impacted by continuing climate change. Global climate projections, given inherent uncertainties, indicate several changes in India's future climate:

- Global observations of melting glaciers suggest that climate change is well under way in the region, with glaciers receding at an average rate of 10–15 meters per year. If the rate increases, flooding is likely in river valleys fed by these glaciers, followed by diminished flows, resulting in water scarcity for drinking and irrigation.
- All models show a trend of general warming in mean annual temperature as well as decreased range of diurnal temperature and enhanced precipitation over the Indian subcontinent. A warming of 0.5o C is likely over all India by the year 2030 (approximately equal to the warming over the 20th century) and a warming of 2-4o C by the end of this century, with the maximum increase over northern India. Increased warming is likely to lead to higher

levels of tropospheric ozone pollution and other air pollution in the major cities.

- Increased precipitation— including monsoonal rains is likely to come in the form of fewer rainy days but more days of extreme rainfall events, with increasing amounts of rain in each event, leading to significant flooding. Drizzle-type precipitation that replenishes soil moisture is likely to decrease. Most global models suggest that the Indian summer monsoons will intensify. The timing may also shift, causing a drying during the late summer growing season. Climate models also predict an earlier snowmelt, which could have a significant adverse effect on agricultural production. Growing emissions of aerosols from energy production and other sources may suppress rainfall, leading to drier conditions with more dust and smoke from the burning of drier vegetation, affecting both regional and global hydrological cycles and agricultural production.

Uncertainties about monsoonal changes will affect farmers' choices about which crops to plant and the timing of planting, reducing productivities. In addition, earlier seasonal snowmelt and depleting glaciers will reduce river flow needed for irrigation. The large

segment of poor people (including smallholder farmers and landless agricultural workers) may be hardest hit, requiring government relief programs on a massive scale. The most important impacts of climate change will likely include the following:

- Agriculture. High-input, high-output agriculture will be negatively affected even as demands for food and other agricultural products rise because of an increasing population and expectations for an improved standard of living. Millions of subsistence and smallholder farmers will experience hardship and hunger through being less able to predict climate conditions.¹ To a certain extent, trade may compensate for these deficits

- Water: Glacier melt may yield more runoff in the short term but less in the medium and long terms. More severe storms (especially cyclones) will cause more damage to infrastructure and livelihoods and exacerbate salt water intrusion in storm surges. Changes in the timing and amount of monsoon rains will make the production of food and other agricultural products more uncertain, so that, even in good-weather

years, farmers will be more likely to make decisions leading to lower-productivity.

- **Exacerbation of Inequality:** The welfare of those who are affected by climate change and who have limited means to adapt may act as a force that can change governments, strain public budgets, and foster unrest. About one-third of Indians are extremely poor, and 60 percent depend upon agriculture for their livelihoods.

- **Energy:** As India searches for additional sources of energy to meet rising demand, climate change mitigation efforts may constrain its use of indigenous and imported coal, oil, and gas, while development of nuclear energy will be slow at best and likely to encounter opposition. Other non-emitting technologies will require technology transfer and capacity-building.

- **Migration:** India receives immigrants from a number of countries. Under climate change conditions, it may be flooded with many more, particularly from Bangladesh. Such migration may exacerbate tension between the two countries as well as putting a strain on Indian central and state governments.

Other Impacts of Climate Change

Though climate change poses a variety of challenges, the present paper would specifically focus on the issues viz. agriculture and food security, water stress and water insecurity, rising sea levels, biodiversity and human health, which have immense relevance from the perspective of developing countries in general and India in particular.

1. **Agriculture and Food Security** Climate Change is projected to have significant impacts on conditions affecting agriculture, including temperature, precipitation and glacial run off. It affects agriculture in more ways than one. It can affect crop yield as well as the types of crops that can be grown in certain areas, by impacting agricultural inputs such as water for irrigation, amounts of solar radiation that affect plant growth, as well as the prevalence of pests.

2. **Water Stress and Water Insecurity** Lack of access to water is a perturbing issue, particularly in developing countries. At present a whopping 1.1 billion people around the world lack access to water and 2.6 billion people are without sanitation. Climate change is expected to exacerbate current stresses on water resources. By 2020, between 75 and 250 million people

are projected to be exposed to increased water stress due to climate change.

3. Impacts on water situation in India India stands to face major challenges in many fronts in so far as the impact of climate change is concerned. Water security is one of the most important threats in this regard. Water resources will come under increasing pressure in the Indian subcontinent due to the changing climate. The Himalayan glaciers are a source of fresh water for perennial rivers, in particular the Indus, Ganga, and Brahmaputra river systems. In recent decades, the Himalayan region seems to have undergone substantial changes as a result of extensive land use (e.g. deforestation, agricultural practices and urbanization), leading to frequent hydrological disasters, enhanced sedimentation and pollution of lakes.

4. Rise in Sea Levels Nearly 70 % of Earth's surface comprises of water in the form of seas and oceans. Sea level rise under warming is inevitable. Sea level rise is both due to thermal expansion as well as melting of ice sheets. Thermal expansion would continue for many centuries even after GHG concentrations have stabilized causing an eventual sea level rise much larger than

projected for the 21st century. If warming in excess of 1.9 to 4.6°C above pre-industrial level be sustained over many centuries then the final rise in sea level due to melting polar ice could be several meters, because it will be in addition to that of rise of sea level due to thermal expansion. The present scenario clearly indicates that the sea level will definitely rise.

5. Impacts on Coastal States in India The coastal states of Maharashtra, Goa and Gujarat face a grave risk from the sea level rise, which could flood land (including agricultural land) and cause damage to coastal infrastructure and other property. Goa will be the worst hit, losing a large percentage of its total land area, including many of its famous beaches and tourist infrastructure. Mumbai's northern suburbs like Versova beach and other populated areas along tidal mud flats and creeks are also vulnerable to land loss and increased flooding due to sea level rise. Flooding will displace a large number of people from the coasts putting a greater pressure on the civic amenities and rapid urbanisation. Sea water percolation due to inundations can diminish freshwater supplies making water scarcer.

The states along the coasts like Orissa will experience worse cyclones.

6. Ecosystems and Bio-diversity Climate Change has the potential to cause immense biodiversity loss, affecting both individual species and their ecosystems that support economic growth and human well being. It is difficult to predict the overall result of climate changes on animal and plant kingdom.

7. Climate Change and Health Climate change poses a host of threats to the survival of mankind. The debilitating impact of climate change has broadened the sphere of discourse much beyond the traditional concern like environment or development. The far reaching consequences of climate change has forced policymakers and planners to look at every possible aspect of human survival. Arguably, it has catastrophic effects on human health. Each year, about 800,000 people die from causes attributable to air pollution, 1.8 million from diarrhoea resulting from lack of access to clean water supply, sanitation, and poor hygiene, 3.5 million from malnutrition and approximately 60,000 in natural disasters. A warmer and more variable climate would result in higher levels of some air pollutants,

increased transmission of diseases through unclean water and through contaminated food.

On the positive side, India's democracy results in equity slightly higher than the global average. The dependency ratio (the percentage of the population dependent on the percentage of the population in the work force) is relatively high, indicating that many people are available for the work force, supporting relatively few people other than themselves. However, the poor condition of people engaged in agriculture and/or born into lower castes reduces the robustness of the overall economy. Climate change, adding to existing problems of the agricultural system, may worsen conditions for the large poor segment of the population enough to severely tax the economic and industrial resources of the central and state governments.

SUMMING UP

Climate change is the defining issue of our times. It is perhaps, the greatest challenge to sustainable development. It should be addressed by all countries with a shared perspective, free from narrow and myopic

considerations. The developed countries need to look beyond their narrow self interests and work jointly with the developing countries to evolve cooperative and collaborative strategies on the issue of climate change, which is of immense relevance for the future of mankind. However, the efforts so far in the direction of meeting the challenges of climate change have been sporadic and incoherent. We urgently need a new economic paradigm, which is global, inclusive, cooperative, environmentally sensitive and above all scientific. Sustainable development based on addressing the needs of the poor and optimal harnessing of scarce resources of water, air, energy, land, and biodiversity will have to be sustained through more cooperative endeavors. Then alone, we could make some headway in saving our lone planet from the brink of climate disasters.

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