

Technological Development and Climate Change: Present scenario with special reference to J&K

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Abstract

Climate Change is the biggest challenge facing by our mother planet Earth. Scientists from Stockholm Resilience center have identified 9 Planetary boundaries that determine the self-regulatory capacity of the earth system including climate change, biodiversity loss, interference with nitrogen cycles, ozone depletion, global freshwater use, changes in land use, chemical pollution etc. as per 2015 update, 4 out of 9 Planetary boundaries viz climate change, biosphere integrity, Bio geochemical flows and land system change have already been exceeded which from planetary health perspective have devastating consequences for human health and require urgent and transformative action to protect present and future generation. No doubt the Governmental Organizations, NGOs, Environmentalists and Scientists around the world are paying attention on this issue. Technological development including industrial revolution, Urbanization, installation of mobile and various human activities towers is responsible for climate change, making world warmer, extreme weather events and disruption in the pattern of rainfall. Climate change includes major changes in temperature, precipitation, wind patterns etc. which is caused by increase in concentrations of greenhouse gases in the atmosphere. The paper highlights the alarming fluctuation in climate change due to technological development, deforestation, vehicular pollution, urbanization in India with special reference to J&K.

Keywords: technology, development, climate change, planetary boundaries, greenhouse gases

Introduction

Today a major challenge our planet mother Earth is facing is Climate Change due to technological development and its Impact on environment. This is an all-inclusive threat posing to human health, environment, economic, social and political challenges for years and obviously likely to affect adversely the poor society at large who have no contribution in major causes responsible for climate change. Likewise, without addressing climate change issues, much development policies and practice will be failed. Recently Covid -19 pandemic depicts the inter- connectedness between the planetary health and climate change due to anthropogenic activities. We can see that long-term threats to climate change and environment are a result of degradation of environment, deforestation, destruction of nature just to satisfy the human greed towards development. Scientists from Stockholm Resilience center have identified 9 Planetary

boundaries that determine the self-regulatory capacity of the earth system including climate change, biodiversity loss, interference with nitrogen cycles, ozone depletion, global freshwater use, changes in land use, chemical pollution etc. as per 2015 update, 4 out of 9 Planetary boundaries viz climate change, biosphere integrity, Bio geochemical flows and land system change have already been exceeded which from planetary health perspective have devastating consequences for human health and require urgent and transformative action to protect present and future generation. Climate change means change in climate which includes major changes in temperature, precipitation and wind patterns. Global warming is responsible for change in climate pattern. Global warming means current rise in temperature of earth's surface as well as its atmosphere. The natural greenhouse effects maintain the earth's temperature at a safe level making it possible for humans and many other life forms to exist. The greenhouse gases like carbon

dioxide, methane and nitrous oxide are playing hazards in the present times by trapping heat in earth's atmosphere and thus result in increasing the temperature of earth. On the other hand, Technology means application of scientific knowledge for practical purposes which results in developed machinery and devices. Currently we are living in an era of rapid change where such technological developments are transforming our life style leading us into the hands of catastrophe in the form of climate change. No doubt, The Industrial Revolution brought forth exceptional gains in financial prosperity. But at the same time rapid industrialization left in its wake darkened skies even at noontimes, noisy and unsafe machinery, water pollution, air pollution, noise pollution and severely compromised living conditions. Technology development should be there as every nation has right to prosper, but not at the cost of environment and human health. Therefore, technology having side effects which may lead to climate change cannot be a solution particularly in power generation, because these fuel technologies carbon dioxide and greenhouse gases resulting in climate change.

The alarming hooter of climate change have already been heard in every corner of planet earth. Climate change poses an alarming threat to the biodiversity, habitats, wildlife, fisheries, forests and water resources in the region. Testament of traditional knowledge of ethnic local communities, data related to climate change and policies as well as strategies proposed by JKSAPCC need to be made available to the concerned agencies so that the same can be implemented.

Indication of Climate Change

NASA provide us with the accurate data about changing climate of earth from time to time. We can see the following evidences of climate change:

1. Sea Level Rise:

Sea level rose about 7-8 inches Globally in the last century and the rate in last year decade is almost double that of the last century. Due to rise in temperature, oceans have warmed, glaciers have melted, the quantity of snow and ice have diminished and resulted in rise in sea level. In every successive decade since 1979, the Arctic's Sea ice extent has shrunk with almost 1.07 km sq of ice loss every year.

2. Erratic Precipitation:

There is an increased variation of precipitation globally. The already wet areas become wetter and dry areas become more so. One can notice the increased precipitation in high altitudes, for example in Northern Hemisphere, and decreased precipitation in countries like China, Australia and small island states in the Pacific and increased in equatorial regions.

3. Rise in Global Temperature:

All three major Global surface temperature reconstructions show that earth has warmed since 1880. Most of the warming has occurred since 1970's with the 20 warmest years having occurred since 1981 and with all the 10 warmest years occurring in the past 12 years. From 1880 to 2012, average global temperature increased by 0.85%.

4. Extreme Events:

Increase in number of extreme events and its frequency has been witnessed by us globally and locally. Rise in temperature, extreme cold temperature, hailstorms, snowstorms, windstorms, cloudbursts, flash floods, droughts, landslides are glaring indications of climate change. Even India, in recent years has witnessed extreme events due to change in climate e.g. holy cloud bursts near Holy Amarnath shrine in J & K, Kishtwar, Uttarakhand etc.

5. Ocean Acidification:

About 30% acidity of surface ocean waters has increased which is the result of human emitting more carbon dioxide into the atmosphere and hence more being absorbed into oceans. About 2 million tons amount of carbon dioxide is absorbed by the upper layer of oceans per year and amount is increasing every year.

Grain yields decline by about 5% for each 1 degree increase in the temperature. Maize, wheat and other major crops have experienced significant reductions in yield at global as well as local level between 1981 to 1990 because of climate change. Emission of carbon dioxide have increased globally by almost 50% since 1990. Emissions grew at rapid rate between 2000 to 2020 than the previous decades. These current concentrations and non-stop emission of greenhouse gases will

increase the temperature 1.5 degree Celsius compared to 1850 to 1900 and as a result oceans will warm, melting of ice will continue, average sea level will rise because of which climate change will persist for many centuries even if emissions are stopped.

Technology and Climate Change

Most of the Scientists working on climate change agree the main cause behind drastic climate change is anthropogenic activities which expands the greenhouse effect. Human activities on earth on earth changing the natural greenhouse effect. Concentration of carbon dioxide has increased in the atmosphere by burning fossil fuels and oil. Deforestation for industries and power plants have increased the concentration of greenhouses gases in the atmosphere. Due to industrial activities, vehicular movements and modern civilization, level of atmospheric carbon dioxide has raised every year. Due to advanced technology, the number of tech gadgets has increased in number which increases energy consumption and leading to more burned fossil fuels. Modern days planes, cars, trains, ships have made possible for all of us to travel all around the world with in few hours. But at the same time the technological developments have led to more emissions of carbon. According to the Centre for Biological Diversity, Transportation sector of U.S. is responsible for third of our country's climate changing emissions.

Many new technologies operated by engines and electricity which is convenient and more comfortable for human beings. But people may not realize that technology could destroy their existence. As such technology emits huge amount of carbon dioxide generating climate change.

Technology and Climate Change in J & K

As we know that climate change is a harsh reality and there are lots of scientific evidences to warn human beings of present as well as future climate related catastrophes. Unfortunately, the abilities to adapt changing climate varies from region to region, sectors, and communities depending upon their economic, geographical and cultural conditions. The natives of Himalayan region especially people of J & K, are highly prone to climatic extremes due to limited adaptive capability towards climate linked changes. On the technical front, the increase in

atmospheric greenhouse gases including carbon dioxide, methane, nitrous oxide is responsible for climate change. We can notice a huge increment in atmospheric carbon dioxide from its pre industrial level 280 ppm to 420ppm at present.

Intergovernmental Panel on Climate Change (IPCC) evaluated that the global net anthropogenic greenhouse gases emissions were 59+6.6 Gt carbon dioxide, almost 12 % higher than in 2010 and 54% higher than in 1990. Sector-wise, the energy sector contributes to an overwhelming 34% of total net anthropogenic greenhouse emissions, contribution from industries is 24% following 155 from transport and 65 from buildings.

Extreme events are occurrences due to drastic climate change that can cause destructive impacts on people, agriculture and natural resources. No doubt that weather related extreme events are short – lived including heat waves, cold weather, heat downpours, cloud bursts and flash floods, but its post impact on communities as well as on environment is irreparable. Resource depletion is another impact of technology. Major issues include reduced availability of water for irrigation which is affected by erratic rainfall, loss of soil moisture, degraded soil quality resulting into failure of crop germination and fruit set. Decline in crop yield, frequent insect-pest attack, deforestation, increased frequency of natural disaster, diminishing snow precipitation, bad health conditions are other issues. The Kashmir Monitor reveals that Jammu and Kashmir has recorded 9 adverse events including flashfloods and cloudbursts in May, June and July this year which includes flashflood in Amarnath on 8th July led to death of 16 people and injuries to more than 20 others, cloudburst in kahra and jai areas of Doda district on 20 July where a school building and other 14 structures were washed away. For the past few years, flash floods are witnessed resulting in soil infertility and affected grasslands and plant diversity.

Policies by Jammu and Kashmir State Action Plan to Mitigate Climate Change

The Jammu and Kashmir State Action Plan on Climate Change (SAPCC) drafts various policies to mitigate climate change. Keeping in view the vulnerabilities of locals, the plan outlines the Eleven National Missions instead of Eight Missions at National level in order to promote development and side by side addressing issues on climate change.

The Eleven National Missions under the plan are:

1. Sustainable Energy Mission:

Under Sustainable Energy Mission, following priorities are proposed:

- a. Promotion of solar city project and its implementation as soon as possible
- b. Promotion of Green buildings that would help in promoting the use of solar water heating as well as lighting system
- c. In remote areas enhance State's own power generation capacity by undertaking micro and mini hydro projects in order to meet demands of locals
- d. Utilization of renewable energy potential of the state to generate power.

2. National Mission for enhanced energy efficiency:

In the State, the power generation is mostly governed by hydro power with a little share of fossil-fuel based grid interactive power plant. The key priorities under this mission are:

- a. Promotion of Energy Efficiency in small and medium enterprises
- b. Reduction in transmission and distribution losses
- c. In agriculture sector, promotion of energy efficient pumps
- d. Conversion of convention street lights into solar LED/CFL streetlights
- e. Utilization of biomass potential
- f. In industries, encouraging the use of solar power/lights and gadgets

3. National Mission on sustainable habitat:

The impacts of climate change are faced by Urban areas. Under this mission following priorities proposed in order to face the present challenges:

- a. In tourists' areas, instead of electric batteries promote and use the batteries charged by solar power for transports. Replacement of battery driven boats by diesel engine boats in lakes
- b. Greenhouse gases accounting study on emission by transport vehicles
- c. Establishment of intelligent transport system

- d. Promotion of public, mass and water transport
- e. Establishment of end-to-end solid waste management
- f. Establishment of segregation mechanism of biomedical waste in urban hospitals as well as rural PHCs

4. Green India Mission:

The Ministry Environment and Forests, Government of India, has implemented this Mission and analyzes the fact that climate change will affect natural resources of the country and associated livelihoods of people. The main objectives of this mission are:

- a. Development of Gene banks for climate adaptation species.
- b. Climate oriented eco-restoration by afforestation
- c. Study on per capita fuel wood consumption and alternative livelihood
- d. Climate impact study in undistributed/protected forests area
- e. E-green portal with geo-reference
- f. Development of nurseries for climate adaptable species.

5. National Water Mission (Jal Jeevan Mission):

National water mission is a campaign launched by Ministry of Jal Shakti with a goal of conservation of water, minimizing wastage of water, ensuring its equitable distribution both across and within States via integrated water resource development and management. Climate change is projected to influence the hydrological cycle of water bodies, water supply system and water requirements in different regions. The priorities proposed under this mission to reduce the impact of climate change and to enhance the sustainability of the sectors as follows:

- a. Promoting and implementing water use efficiency measures.
- b. Monitoring the flow of rivers and mapping of flood and drought areas
- c. Prepare rejuvenation plans for Dal Lake, Mansar Lake, Mansabal Lake, Pangong lake etc.
- d. Budgeting the water in lieu of present and future demands from domestic, irrigation, industry and other sectors

- e. Harvesting of rain water and artificial recharging of ground water
- f. Dealing with floods according to present climate change scenario
- g. Reducing impact of increased erosion
- h. Creation of storage facilities on various distributaries of river like Jhelum and Chenab according to Indus water Treaty.

6. National Mission for Sustaining the Himalayan Ecosystem:

When we talk about Jammu and Kashmir, the main causes for increased vulnerabilities to the ecology of Himalayas are changing socio economic profile, unplanned construction, unplanned urban growth, over exploitation of natural resources and conflicts. In order to combat with the impacts of climate change, following priorities are purposed by under this mission:

- a. Study on sensitivity of mountain ecology
- b. Capacity building as well as awareness for all stakeholders
- c. Identification of climate grids and its effect on natural resources
- d. Study on anthropogenic interference with ecological resources
- e. Study of climate change impact on migrated words and their visiting time
- f. Identification of current position of Himalayan ecology.

7. National Mission for Sustainable Agriculture:

Variability in weather conditions resulting from climate change could have direct and indirect effects on production of crops, soils, livestock and pests. The key priorities suggested by this mission to decrease the impact of climate change both through adaptation and mitigation measures and to enhance the sustainability of the sectors are given below:

- a. Planning of cropping system and crop varieties through crop diversification, drought tolerant crops and water saving crops
- b. Promoting zero tillage
- c. Integrated nutrient management
- d. Introducing trash mulching in agriculture

- e. Combating climate related risk through micro irrigation program
- f. Insurance of crops on the basis of weather
- g. Conservation of pollinators, pollination and plant phenology mismatch
- h. Grass land management and fodder production

8. Disaster Management Mission:

Jammu and Kashmir is multi hazard prone region with natural disasters floods, earthquakes, avalanches, landslides and high velocity winds and storms. Such incidents frequently occur thereby disturbing the ecological balance. To undermine the impact of climate extremes, following key priorities are suggested under the mission:

- a. Mapping of hazard risk by using GIS and remote sensing
- b. Strengthening communication network
- c. Strengthening disaster management facilities
- d. Promoting the concept of Climate Smart Disaster Risk Management
- e. Training regarding disaster response at community level
- f. Human resources for medical emergencies
- g. To manage mass casualties during extreme events

9. National Mission on strategic knowledge for Climate Change:

The State mission on strategic knowledge for climate change intends to create a knowledge system that would help to implement actions to reduce vulnerabilities as well as take advantage of the mitigation opportunities the proposed key priorities are:

- a. Compile currently available information for assessment frameworks, methods and tools for climate impacts, decision support tools
- b. Establishment of weather and climate data and its easy access
- c. Promote researchers and end users of vulnerable community
- d. Establish and maintain online portal regarding climate change

- e. Organize seminars, workshops annually and provide knowledge-based product

10. Tourism:

The unplanned and unparallel growth of tourism industry in the State has resulted in serious and dangerous impact on the local environment. The key priorities suggested under the mission are:

- a. Construction of bio-toilet
- b. Implementation of solid and liquid waste facility
- c. Improve climate change related knowledge base of tour operators

11. Health:

The impact of climate change over human health is likely to be multi-faceted involving increased incidence of vector water food borne disease, malnutrition and under nourishment, injuries and death caused by extreme hot and extreme cold weather conditions. The key priorities suggested under the mission are:

- a. District wise registry on water born and vector borne diseases according to weather changing conditions.
- b. Modernization of hospitals and PHCs
- c. Research and study on impact of climate change on human health
- d. Increase in disease surveillance

- e. Scrutiny system to understand changes in pattern of diseases to deal with new diseases from emigrants like H1N1 & H7N9

Conclusion

Environmental issues are global issues and represented by individual, groups and organizations from enterprises to grassroot. There should be proper management of natural resources by adopting just and sustainable ways to mitigate the issues regarding climate change. At the same time technology development should be there but not at the cost of environment and vice versa. In case of confliction between the technology and environment protection, later shall prevail, and we have lots of judgements by The Supreme Court of India regarding this point. There is a global consensus now that climate mitigation must be dealt with on a broader scale involving nations and states, but for adaptation, actions are required at the local as well as regional levels which must include the role of municipalities, panchayats, businesses, NGOs, cooperatives and voluntary groups for welfare activities. Public awareness and awareness by media can motivate citizens to adopt healthy environment. The participation of indigenous peoples and locals in governance of environment at the local levels and drawing from their knowledge not only enhances their quality of life but also strengthens conservation efforts.

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