

Climate change in India: Navigating Security Threats, Political Complexities and Economic Prospects

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Received: 24 Oct 2024

Accepted & Reviewed: 25 Oct 2024,

Published : 31 Oct 2024

Abstract

Currently, global warming is a serious threat to India and the world. Due to global warming climate change occurs, due to climate changes, so many problems arise, such as water scarcity and conflict, food insecurity and agricultural disruption, coastal vulnerability, sea-level rise, extreme weather events like cyclones etc. Recently the world has seen heavy landslides in mountainous regions. A few days ago Massive landslides occurred in Badrinath, Kedarnath, and Wayanad. A few days ago, a scary video on Badrinath highway was seen on social media, in which a horrific landslide was seen. A part of a mountain was visible looking down. As if the movement of white clouds was going on for a time and the visibility of that place became zero for some time. At present, India is trying to deal with the ill effects of climate change. Policies have also been made for the same, but due to pressure on resources to boost the economy. The policies do not seem to be implemented. This can be seen in the context of the Hasdev forest of Chhattisgarh. India is a federal state. Due to this political complications also arise. There is a tussle between the Center and the states. Centre government has more power and, therefore able to influence policymaking in his favour. Public awareness of the climate is necessary. Only then it is possible to prevent its bad effects. Otherwise, the bad effects of climate change will also increase the instability. But on the other hand, climate change also provides economic opportunities, because due to climate change, the understanding is developing that for sustainable development, we will move towards renewable energy sources, sustainable agriculture, and a green economy. Employment in all these sectors will also be created in the era of climate change.

Keywords- Climate change, global warming, carbon emission, federalism, and renewable energy.

Introduction

Climate change is a serious challenge in the era of industrialization. The whole world is affected by Climate change and India is also affected. "Climate change refers to long-term shifts in temperature and weather patterns." Climate change also occurs due to the activities of the sun, but that is not a matter of concern. The climate change that is being discussed here is driven by humans. After industrialization, the pace of climate change accelerated due to human activities because natural resources such as fossil fuels (coal, gas, petroleum) were used in the form of energy to increase the speed of the economy. This increases the emissions of greenhouse gases. Burning Fossil fuel generates Carbon dioxide emissions. We know that carbon dioxide (CO₂) is a greenhouse gas.¹ The sun shines in the atmosphere during the day, which causes the earth's surface to get heated. Greenhouse gases create a layer in which all the rays do not go back into the atmosphere. Due to this, the earth's temperature increases, known as global warming.² If seen in the present context, coal is the main source of electricity generation in India. More than 67% of electricity generation is based on coal and lignite, hence thermal power plants also contribute to carbon emissions.³

Fossil fuels – based energy sources, such as coal, oil and gas- are the largest contributors to the world's climate change, which is responsible for 75% of global greenhouse gas emissions.⁴ The impact of climate change is being seen in many ways in India like drought, flood, sea level rise, increases in frequency of cyclones,

increase in incidents of forest fire, Threat to biodiversity and heavy rainfall, etc.⁵ The magnitude of the recent Dana cyclone that hit India can be seen. Climate change impacts the social and economic lives of people.⁶ But challenges also lead to possibilities and force us to discover more. How to reduce the impact of climate change? Scientific research is done for that and scientific conclusions are reached. The world and India moved towards renewable energy sources to reduce the impact of climate change, although non-renewable energy sources are still used to boost the economy. The concept of a green economy came into existence in the era of climate change, which has been defined by the United Nations Environment Programme.

Green Economy as “one that results in improved human well-being and social equity, while significantly reducing environment risks and ecological scarcities.”⁷

A study on this topic is necessary because human values are being affected in the era of global warming. Research Methodology is qualitative and interdisciplinary.

Impact of climate change in India- Where the entire world is facing the brunt of climate change, India is also untouched by it. Changes are being seen in the rainfall pattern here also. In Rajasthan, there was little rainfall, But in the last few years, it has been seen that there is heavy rainfall there too. A month ago, due to heavy rains in Jodhpur, railway tracks were seen swaying and railway traffic was disrupted. Due to heavy rains in Ajmer, schools remained closed for several days. It was difficult for people to come out of their homes. Even schools remained closed in Ajmer due to heavy rains.⁸ If seen, the economic activities of the people were also affected because water had entered even the shops. Train movement was disrupted due to the railway tracks.

Heavy rains pounded in Jodhpur in Aug and the timber factory wall collapsed, and there was an accident due to the collapse of the wall. 3 people died and 10 people were injured. Thus, due to heavy rains, there was loss of life and property.⁹



Images credit: deccanherald Heavy rainfall

<https://www.deccanherald.com/india/rajasthan/flood-like-situation-in-rajasthans-jaisalmer-pali-jodhpur-after-heavy-rains-3138904>

Heavy landslides-

Just a few months ago, a massive landslide occurred in Kerala and Uttarakhand. Its magnitude can be gauged just by looking at the scene.

Rescue effort

Image framed by Author and image credit source The Hindu business line : Relief work is being carried out by the government to save the people.

<https://www.thehindubusinessline.com/news/massive-landslides-in-wayanad-kill-43-downhill-villages-devastated/article68463092.ece>

Wayanad landslide: 357 dead, over 200 still missing



Image framed by Author. This handout photograph taken on August 1, 2024, and released by Humane Society International, India, shows an aerial view of the tea plantations after landslides in Wayanad. Photo: Hemanth Byatroy/Humane Society International, India/AFP

<https://www.onmanorama.com/news/kerala/2024/08/03/wayanad-landslide-chooralmala-mundakkai-search-operation-death-toll-live.html> Image link..

We can see a horrific scene in the above image. Wayanad's region was hit by a massive landslide. This incident caused a lot of loss of life and property. More than 350 people were killed in the landslide. Many houses were washed away in this massive landslide. Some dead body rescued from the Chaliyar River.*** They did not even get a chance to come out of their homes to save their lives. Many people were injured. some people were pulled out of the mud debris by the rescue team. The disaster also hit tea plantations. The landslide in Wayanad greatly affected the social and economic condition of the people. On the one hand, this incident weakened them economically, and on the other hand, they lost their family members forever. In a situation, they faced a double blow.

Another example, due to heavy rains in the mountains, a massive landslide on the Badrinath National Highway was seen on social media. The video of the landslide was quite horrifying Some people were standing there making a video.¹⁰ Part of the mountain is seen coming down very fast and then the dust is going upwards. It looks like a white cloud.

Water scarcity- Due to global warming, the rate of melting of glaciers has increased. According to ISRO, "Glaciers melting at unprecedented rates in Indian Himalayan region" Analysis of images taken by satellite makes it clear that glaciers are melting rapidly in the Indian Himalayan regions. As a result, glacier lakes are expanding. Global research shows that glaciers around the world have been declining since the Industrial Revolution in the 18th century.¹¹

The lakes that are being formed in the Himalayan regions. After a time, when the lakes burst, it causes huge devastation. Kedarnath tragedy can be seen as an example. We know that many main rivers of India originate from the Himalayan. Such as Ganga, Yamuna, Sutlej, etc., and enter the plains. Due to many reasons, these rivers become important for the plains. Such as irrigation of crops, provides availability of water for drinking water and power generation, etc. In such a situation, these rivers are a boon for the plain areas. If the global temperature continues to rise like this, the rate of melting of Himalayan glaciers will increase and a day the region will face water cries.

Forest fire

Due to global warming, forest fires are increasing. The forests of Uttarakhand are an example. According to research, heat and drought not only increase the fire risk but also instigate the fire.¹² Fires occur in the forests of Uttarakhand during summer.

This poses a threat to the lives of species living in the forests and when wild animals run out of the forest and come to residential areas to save their lives, there is conflict with humans. Many useful plants and Trees are destroyed due to forest fire. Habitat is destroyed. In this way, biodiversity is greatly harmed.

Sea level high



The Sunderbans delta, the world's largest mangrove forest covering 26,000 sq. km in India and Bangladesh, is threatened by rising sea levels.

Representative image| Photo credit: APF

<https://www.thehindu.com/sci-tech/energy-and-environment/indians-at-high-risk-from-rising-sea-levels-pm25-pollution-and-more-suggests-new-study/article68641959.ece>

A study shows that if the temperature crosses 1.5°C , most of India's population can be exposed to high temperatures. Those areas which are close to the coast can face a deep crisis. The mangrove forests of the Sundarban Delta are also at risk from rising sea levels. There are many islands in Sundarban. That too will be at risk due to rising sea levels.¹³ The entire world is affected by climate change. But Sundarban is being affected more due to its geographical location. The surface temperature of the sea is increasing. Due to this people face storms, rains, and floods. In 2020, the Amphan Cyclone hit the Sundarban region. Many houses were demolished, innumerable trees were uprooted and the pond was filled with salt water due to which even the fishes died. Due to the rise of the salty tide, even the vegetables grown in the fields were destroyed. In a such situation, people saw their destruction with their own eyes. There are many challenges facing the people of Sundarban in the era of climate change. Increases in the frequency of cyclones, lack of employment, Migration, increasing salinity of water due to water pollution, shortage of fresh water, impact on fish reproduction, etc.. People's employment is being affected due to salt water. It is becoming difficult to get even sweet water for irrigation of crops. Due to lack of sweet water crops are getting ruined. In such a situation, the seriousness of the situation can be understood. The situation is such that people have to struggle to drink water. Indeed 50 lakh people are dependent on Sundarban. In such a situation, the economic and social life of the people here is being badly affected by climate change.¹⁴

Effect on crop productivity- Climate change also affects the productivity of crops. As a result of heat and water stress, crop productivity may decrease by 6-14% by 2050, causing the world population could face severe food insecurity. For this region, the ASEAN region and China can become food importers in 2050, which are currently food exporting countries. The report "global impacts of Heat and Water Stress on Food Production and severe food insecurity was published on June 22, 2024, in the journal Scientific Reports of the Science Weekly Nature." In which the decreasing trend of food production. If seen in the context of India, in the worst-case scenario of climate change, a decline of 16.1% in food production was estimated by 2050, the

root of which is heat and water stress.¹⁵ This will hurt the economic and social life of the people. Conflict will increase in the society. Life will become chaotic. Thus, climate change change will rise to many serious issues.

Displacement- Climate change is increasing the pace of migration of people. The vulnerability and risk assessment conducted by the SAPCC has identified three reasons, which could affected agriculture by climate change. First increase in water stress, second, an increase in flood risk and third, a change in crop yields. There is a possibility of high water stress in the Almora, Tehri Garhwal, Champawat, and Podhi Garhwal districts. Migration has been increasing in Uttarakhand. Due to this, the number of deserted villages is increasing, which are known as ghost villages. Data shows that since 2011, 734 villages in 13 districts have become deserted.¹⁶ If we look at it, migration has become a problem. I went to Joshimath in 2022. I met some residents there. When I asked them about Raini village, they said that the disaster of Feb 2021 has caused huge devastation. Rishi Ganga Hydro Project and NTPC Hydro Project were hit by Delude, due to many people died. Now even if it rains a little, one feels scared. Landslides are also a problem, due to which even cracks have developed in the houses. Life is under the shadow of fear.

Raini village is the cradle of the Chipko movement. Today its existence is in danger due to environmental problems. The way development has taken place in the past years by ignoring the environment, its impact is visible and the biggest thing is that hydropower projects in the Himalayan areas are also in the grip.

Political complexity- Certainly, climate change is a challenge for India and there are political complications too. The Forest and Climate Change Minister of Chhattisgarh had defended the coal mining and other developmental projects in the state. “According to him, for how long will the people of Chhattisgarh remain poor? These are essential for improving the living standards of the people.”¹⁷ Central government allocated coal mines in Hasdev dense forest to extract coal. Coal is a non-renewable source of energy. Lakhs of trees have been cut to extract coal and the people there are strongly opposing the cutting of trees. According to the people, this is a dense forest, which is an area of rich biodiversity. Traditional people fulfill their needs with forest products. Apart from this, it is home to the local residents. In such a situation, people are also afraid of being displaced. There was a lot of anger among the local residents regarding the coal mines allocated by the central government in the Hasdev forest of Chhattisgarh. People started protesting against it. The Congress government of Chhattisgarh unanimously passed a resolution from the Chhattisgarh Legislative Assembly on 27 July 2022, to cancel the coal mines by the Central government. Five blocks in this region as, Parsa, Parsa East Kete Basan (PEKB), PEKB Extention, Gighmuri Paturia, Madanpur South, and Chotia.¹⁸

If seen in this case, it is essential to improve the standard of living as a priority of the present BJP state government and the environment seems to be the priority of the former Congress government. If seen, the residents here are opposing the allocation of coal blocks, because they see biodiversity in danger. This means that people are aware of the environment. There is a difference in the approach to development between the two governments. There is a difference in political priority. The former Chhattisgarh government had passed the resolution to cancel the allocation of coal blocks as the state government does not have the power to cancel the allocation. In the Indian Constitution, “Forest” is listed in the Concurrent list. It is mentioned in 17A. On which both the Center and the state can make laws. But in the case of difference, the law of the Center is accepted. Protection of wild animals and birds also mentioned in 17 B.¹⁹

If seen, Hasdev is a dense forest, which is not only an area of biodiversity. Apart from this, it is also also a source of oxygen. That is called the lungs of Central India. It is an era of climate change. Its core is the

emission of carbon dioxide. As we know that's trees can absorb carbon dioxide. In such a situation, allocating coal blocks in this area by cutting dense forests can have side effects in the future. Therefore, regarding the Hasdev forest, the government should be reconsidered.

Opportunities- Climate change is currently a reality. Carbon emissions are the cause. The adverse effects of climate change are also being seen. In such a situation, the world is facing a challenge. But when solutions are found to deal with challenges, new concepts are born. Such as eco-friendly development. Such as moving towards renewable energy sources and a green economy.

Now we will describe renewable energy and green energy. “Renewable energy is energy derived from natural resources and replenished at a higher rate than they consumed. Example solar, hydro, wind, etc.”²⁰

India's total power generation capacity is 452.69GW. Renewable energy also contributes to this. The renewable power generation capacity in India is 201.45 by Oct 2024 is 201.45 GW, which is 46.3% of the total power generation capacity. The government of India committed to achieving 500GW of installed power generation capacity from non-fossil sources by 2030. The country is also taking measures and initiatives to promote renewable energy such as the National Hydrogen Green Mission, PM-Kusum, PM-Surya Ghar, and PLI schemes for solar PV modules.²¹

The government of India is trying to achieve a zero-carbon emission target by 2070. It is also making efforts for this so that the adverse effects of climate change can be avoided, employment can also be created and India will move towards a green future.

Green Economy- “Green Economy is defined as low carbon resource efficient and socially inclusion.” In the context of the green economy, economic activities are conducted through public and private investment to increase employment and income. Such infrastructure is encouraged to be created, which helps to reduce carbon emissions and pollution in the atmosphere, energy, and resource efficiency, and prevent loss of biodiversity.²² If seen, the basic objective of this concept is to conduct economic activities, that create employment for the people so that people's income increases and their standard of living improves, but with minimal harm to the environment. Climate change has posed challenges to the world economy. Therefore, the world has moved towards solutions to maintain the dynamism of the economy and the solution also has the potential to create jobs by reducing the carbon footprint in the environment. India is also not untouched by climate change. Therefore, India is also moving towards a green economy.

Indian transport is the backbone of the economy so the government is focusing on the transport sector so that the carbon emissions from the transport sector can be reduced. In August 2023, the PM Ebus Sewa Scheme was launched. The objective of this bus service is to increase 10,000 electric buses in 169 cities based on the public-private partnership model. The government of India launched the National Electric Bus Program in 2022. The aim was to improve and encourage clean fuel-based transportation.²³

Electric buses are, firstly, environment friendly. Second, employment is being created in this sector.

If we look at it in the context of the metro, the metro is being constructed in many states of India. I have seen the Delhi metro network. Delhi is well-connected Due to which it takes less time to go from one place to another and the most important thing is that many people can travel together. Metro is also environmentally friendly. A city like Delhi is facing the terrible blow of pollution today. In such a situation, the metro is very useful to reduce carbon emissions. The Metro sector also generated employment. Keeping in view problems

like pollution and traffic, a metro network is being built in many cities in India as Kanpur, Patna, etc. Both are under construction.

As we know in India, Electricity is also generated from coal and lignite-based thermal power plants. Ash is produced in large quantities by burning coal. It is used in making bricks, road construction, and cement industry. In a way, waste material is converted into a useful product. It has two benefits. One is the protection of the environment and secondly, employment has been created.²⁴

In the era of climate change, the importance of agriculture is increasing, because it is eco-friendly. This maintains the quality of the crops. Organic fertilizers are used in it, which are not made of inorganic chemicals. Covid-19 changed the perception towards organic food, that it is more healthy and safe food. Due to this, the immunity of the body is strengthened.

The Green Revolution in India began in the 60s and the Indian farmers became familiar with high-yielding seeds and fertilizers. This proved helpful in providing grains to the increasing population and the food crisis was resolved. However, due to the excessive use of inorganic fertilizers, the land lost its quality and moved towards barrenness. Punjab is an example.²⁵

If we look at it in the context of pesticides, they are making agricultural products harmful from the human and domestic animal health point of view.

A horrific form of pesticide was seen in 2017 in the cotton region of the Yavatmal district of Maharashtra. 21 farmers died due to pesticide poisoning.²⁶ When pesticides are sprayed on crops, farmers come into large quantities of pesticide and it reaches the body through breath. Pesticides are poisonous, and it has adverse effects on the body.

If seen, these are the challenges of inorganic agriculture. Which is not eco-friendly. Such eco-friendly agriculture has become a necessity in the era of climate change. Organic farming is being encouraged in India. It has many benefits. First, this will prevent the lands from becoming barren. This will maintain food security. Secondly, This organic agriculture sector will also generate employment. Organic farming will require organic fertilizers and pesticides. So there is a lot of potential in this sector also. Thirdly, it will also be better for people's health. Fourth, this sector will help reduce carbon emissions.

Suggestion

1. Hasdev is a dense forest. It is called the lungs of central India. It is rich in biodiversity, so it should be protected in the era of climate change. Carbon emissions are considered to be the main component of global warming.
2. The Indian government should minimize dependence on non-renewable sources of energy.
3. The government should spread awareness among the people about the environment so that people consider environmental protection as their responsibility.

Conclusion- The entire world is being affected by climate change and India is not untouched. It impacts on the social and economic condition of the people. In the long term, the Indian economy will also be affected, Therefore, the government of India should make honest efforts to reduce the risk of climate change without being influenced by any special interest. If the policy is better then its implementation should also be better,

because climate change will create many problems in the future. Due to this human values will be badly affected. People should also cooperate in dealing with climate change.

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