

Physical and Ecological Impacts of Climate Change on Indian Economy

Dr. Sanjay Shahi

Associate Professor, Department of Geography, J S Hindu P.G. College, Amroha, (MJP Rohilkhand University, Bareilly),
INDIA

Corresponding Author: shahibisen@gmail.com

ABSTRACT

Every country on every continent is now affected by climate change. People, communities, and countries are paying a high price for it today, and it will get worse in the future. People are already feeling the effects of climate change, which include shifting weather patterns, increasing sea levels, and an increase in the frequency and intensity of extreme weather events. More than any other group, those in need are being impacted the worst.

Keywords-- Legal Framework, Disasters, India, Climate Change

perspective. Briefly, the study touches on climate change. Several current climate-related occurrences are used to illustrate how climate change affects India in the sections that follow. Climate change legislation in India is discussed in a subsequent section of this article. It's important to include a section that summarises the worldwide response to climate change after that.

The paper's major goal is to examine the impacts of climate change on India only from a legal standpoint. An in-depth look at India's environmental laws, the socio-political and economic implications of climate change, the impact of climate change on countries other than India and the responses to it, and a comparative analysis of the situation in India with any other developing country will not be included in this paper.

This work employs a theological method to investigate climate change as it currently exists. Explanatory and prescriptive arguments are both used in this paper's argument structure.

I. INTRODUCTION

Combating the damaging consequences of climate change on our environment is a critical component of global policymaking today. People around the world have been riveted by the issue of climate change since it is a problem that can be traced back to human activity. The environment on our planet is always shifting. However, the Earth's climate has dramatically changed in the last century. The earth's temperature has risen, affecting coastal areas, small islands, food security, health, and other aspects practically immediately. This whole issue of climate change has more to do with how humans have been living in the modern era of urbanisation and industry. Despite the global community's recent focus on this issue, the climate change debate has thankfully begun and is sure to become more difficult as solutions are sought. However, there can be no discussion on climate change until the words "responsibility for damage to the environment" are included. Environmental damage has already been done, and countries have discussed who should bear responsibility for it, as well as whether or not climate change can be regulated to prevent more harm. Developing and developed countries alike must first examine their own laws and policies in order to avert additional environmental damage. Developing countries, in particular, may bear the brunt of the burden because they must combine economic progress with environmental concerns.

In light of the foregoing, this study examines the implications of climate change on India from a legal

II. IN-DEPTH ANALYSIS

"Everyone on the planet is being affected by climate change." People, communities, and countries are paying a high price for it today, and it will get worse in the future. People are already feeling the effects of climate change, which include shifting weather patterns, increasing sea levels, and an increase in the frequency and intensity of extreme weather events. Affecting those with the least means is a major problem.

"A change in climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is observed over comparable time periods in addition to natural climate variability," is how the United Nations Framework Convention on Climate Change (hereinafter UNFCCC) defines it. Increased temperatures around the globe will have a significant negative impact on ecosystems, which is what we mean when we talk about climate change and/or global warming. Climate change has already had a negative impact on people's lives due to the overexploitation of natural resources and the increasing pollution of the environment. The current state of human health and safety is anticipated to be made worse by an increase in global average temperatures.

Climate change is expected to have a negative impact on billions of people, particularly those in poor nations, over the next few decades. This will lead to acute water and food shortages, as well as increasing health and life hazards. "Climate change can take numerous forms and have significant effects on aquatic, terrestrial, and marine ecosystems' physical and biological systems." This process of climate change is predicted to result in lower agricultural yields and the loss of glaciers, as well as increased coastal flooding and the extinction of animals." The melting of glaciers will raise the risk of coastal flooding around the world, putting some small island states at risk of total submersion by 2020, according to estimates that put the number of people in Africa at 250 million. In addition, climate change is projected to have far-reaching repercussions on individuals in developing nations since they lack the resources to successfully adapt to the changing climate.

We can see that climate change presents complex scientific and economic problems that have been debated for years. The legal aspects of climate change have been overlooked for far too long, which is a glaring omission. An attempt is made here to examine the implications of climate change on India from a legal standpoint.

III. OVERVIEW OF CLIMATE CHANGE IN INDIA

Due to South Asia's wide range of topography, climate change will have a significant impact on this region in the near future, particularly on India. There will be a significant impact on this region from climate change because the country is rapidly depleting its natural resources and ruining its environment, mostly as a result of "urbanisation, industrialization, and economic growth." Protecting the country's finite natural resources is posing a serious environmental and socioeconomic issue for the country. As numerous pollutants in the atmosphere increase, so does the quality of our water and air. Additionally, the country's coastal eco-systems, biodiversity, and agricultural output are the sectors that would be most affected by climate change.

The area is already prone to natural disasters, such as the 2013 Uttarakhand floods and landslides, the 2015 Chennai floods, and the 2016 drought in the region. There is also strong evidence that extreme weather phenomena, such as heat waves, prolonged dry spells, and significant rains, are increasing in intensity and/or frequency. Famine, disease exposure, and the inability to support one's basic needs are just a few of the negative

consequences of these kinds of calamities. The World Bank predicts that a 2°C rise in global average temperature over the next few decades will only exacerbate the unpredictability of India's monsoon season. Several regions of India are expected to be submerged by rising water levels, while others will be unable to supply themselves with potable water. The majority of India's cropland is dependent on rainfall, rendering it sensitive to climate-induced changes in precipitation patterns. An increase in temperatures of 2 to 2.5 degrees Celsius above pre-industrial levels is expected to limit agricultural water supplies in the Indus, Ganges, and Brahmaputra basins by the mid-2050's, thereby affecting the food security of up to 63 million people.

The rate of poverty reduction is predicted to slow down as a result of a warming climate. Climate change will have an impact on everyone in the region, but the poor will be particularly hard hit because they are heavily dependent on rain-based agriculture and have few or no other means of generating an income. If global temperatures rise by two degrees by the 2040s, agricultural production in South Asia will fall by 12 percent, necessitating an increase in imports to keep up with domestic demand for the resulting shortages. Reduced food availability would also lead to significant health problems, particularly for women and children. The melting of glaciers and the loss of snow pose a huge threat to India's reliable water resources. The Ganges, the Indus, and the Brahmaputra all rely heavily on snow and glacial melt water, making them particularly vulnerable to warmer temperatures. Increased flooding in low-lying areas and potential harm to agriculture could result as a result of this development.

After a quick look at the effects of climate change, the following section will concentrate on some recent weather events in India that were mostly caused by climate change.

The Uttarakhand Disaster of 2013

When a devastating earthquake struck the state of Uttarakhand on June 16, 2013, it was one of the biggest calamities in recent memory. Flash floods and severe rains ravaged the state. Each and every one of the state's counties was affected by the storm. It was Bageshwar, Chamoli, Pithoraga, Rudraprayag, and Uttarkashi that took the heaviest hit in the state. As a result of the accident occurring during the peak tourist and pilgrimage season, both the number of deaths and the speed of the rescue and relief operations were impaired. Rudraprayag's Mandakini valley bore the brunt of the disaster's effects.



Figure 1: Uttarakhand Disaster of 2013

Source: [https:// www.kedarnathtemple.com/kedarnath-flood-story-and-reason/](https://www.kedarnathtemple.com/kedarnath-flood-story-and-reason/)

Flooding occurred at the Kedarnath Shrine and the surrounding areas due to torrential rains. In addition to Gangotri, Yamunotri, and Badrinath, which attract tens of thousands of pilgrims each summer, the state's other major pilgrimage sites were adversely affected. They had to find shelter in the mountains after being stranded for days. Flash floods caused thousands of people to become trapped on highways and in debris that had been washed away by landslides. On May 9, 2014, the State Government reported that 169 people had perished and 4021 others were missing or feared dead. Keep in mind that the 2013 Uttarakhand floods, according to research published by the American Meteorological Society, were primarily caused by "human-induced" climate change. Though the paper didn't directly link climate change to the

floods, it obviously went that way. Climate change is blamed for an increasing chance of catastrophic weather occurrences, according to the report's statistical analysis, which shows that the June 2013 downpour was unprecedented on a century-scale.

Chennai Floods in 2015

"The coastal districts of Chennai, Kancheepuram, and Tiruvallur were overwhelmed by repeated heavy downpour events during November and December 2015, affecting more than 4 million people and resulting in economic damage of around \$3 billion." Chennai's devastating floods were caused by rising global temperatures, according to the Deputy Director General of the Delhi-based Centre for Science and Environment. One day's rainfall covered a month's average in the city.



Figure 2: Chennai Floods 2015

Source: <https://www.newindianexpress.com/cities/chennai/>

Seasonal Droughts of 2016

An exceptionally dry drought spanning two years in India in 2016 affected virtually the whole country. May was the hottest month of the year in the state of Rajasthan, with temperatures topping 51 degrees Celsius. Drought assessments show that the country endured a moisture deficit of at least 50% in comparison to previous years. In addition, according to the Central Water Commission, the

water level in India's 91 reservoirs was at its lowest level in almost a decade and stood at barely 17 percent of their complete storage capacity in the month of May. Marathwada in Maharashtra was the hardest hit by the severe drought in the entire country. For the past five years, this area has seen a steady decline in water supplies, an increase in debt, and an increase in farmer suicides. The region's rain-fed agriculture has been harmed by erratic

climate patterns. Water shortages in dams, a lack of fodder for cattle, a lack of money to develop related enterprises, and joblessness are just a few of the issues people in this area confront. Over the previous few years, Maharashtra's agriculture has been impacted by extreme weather occurrences such as hailstorms, heat waves, frost, and

irregular rainfall. In addition, India's 2013 heat wave resulted in a drop in wheat production of over 4 million tonnes. Temperatures rose one degree during the blossoming period in Marathwada, resulting in a significant financial loss for the farmers.



Figure 3: Maharashtra-drought 2016

Source: <https://www.indiatoday.in/education-today/gk-current-affairs>

The People Most Affected

Every time a natural or man-made disaster strikes, the poor, the weak, and the underprivileged bear the brunt of its effects. This is true whether the floods in Uttarakhand were caused by illegal construction, the rains in Chennai were caused by inadequate plans to evacuate the city's rainwater, or the recent drought was responsible for a spike in the country's mortality rate. In the previous few years, the examples cited above have all had a similar outcome. Disasters are usually caused by the wealthy and powerful parts of society, while the poor and vulnerable are the targets. These people have very limited options for seeking redress in the legal system. When the state fails and the judiciary remains silent on critical matters like climate change, anarchy ensues, and desperate individuals take their own lives, as was the case with the Maharashtra farmers who perished in the ensuing dry spell.. Just relying on 'corporate social liability' clauses gets the big corporations out of trouble when it comes to polluting the environment on a massive scale. 34 Due to lax enforcement of the law, those responsible have escaped punishment. Dereliction of duty will not be punished by law. Although Public Interest Litigations bring cases to the Apex Court, they only have a marginal impact in preventing future crises. Climate change is causing a variety of problems in India, yet we haven't learned from our mistakes in the past.

IV. CLIMATE CHANGE IN INDIA: LEGAL FRAMEWORK

There is no explicit climate change legislation in existence in India. Consequently, in the absence of a

particular law, the Air (Prevention and Control of Pollution) Act 198135 (hereafter, the Air Act) passed by Parliament under Article 253 of the Indian Constitution is significant legislation that comes close to addressing the problem of climate change. The Air Act is significant because it establishes guidelines for reducing pollution in the atmosphere, which can harm humans and other living things and plants alike. Since air pollution has been linked to climate change, the Air Act tackles an important issue in climate change mitigation. Be aware that the term "climate change" is not used in the Air Act. The Clean Air Act's main goal is to limit greenhouse gas emissions that raise air temperatures and contribute to global warming in order to maintain a high standard of air quality. Central and state control boards are set up under the Air Act to look into issues relating to the improvement of air quality, to monitor operations, and to enforce fines and criminal prosecutions.

Individual states have the authority to designate specific areas as "air quality management areas," requiring any industrial facility in those areas to receive approval from the state board before it can begin construction or operation. For plants and autos, the State Boards of Environmental Quality and the Central Boards of Environmental Quality can also set emission guidelines. Even more so, an air polluter can be restrained from discharging pollutants under the Air Act if the Board has requested it, and a magistrate or judge of first class can shut down a company or cut off its supply of power or water if the Board's instructions are not followed. The Water (Prevention and Control of Pollution) Act of 1974 (hereinafter, the Water Act) was also passed by Parliament before the Air Act. The Water Act aims to keep waterways

free of pollutants. The Water and Air Acts have a lot in common when it comes to attaining their stated goals.

After the Water and Air Act, Parliament established the Environment (Protection) Act, 1986 (hereafter EPA) to fill in the gaps left in India's primary environmental law. It is the mission of the Environmental Protection Agency (EPA) to ensure environmental quality and safety. The Environmental (Protection) Rules 1986 also allow the government to set emission standards, which are contained in the Schedules (hereinafter EPR). In addition, the EPA's guidelines provide industry-specific emission criteria as well as overall emission norms. Schedule VII of the EPR deals with National Ambient Air Quality Limits, which specify "different standards and concentrations for industrial, residential, and rural areas and sensitive regions and are meant to preserve public health and vegetation with an acceptable margin of safety." To carry out its duties under Sections 6, 8 and 25 of the EPA, the Central Government passed the Ozone Depleting Substances (Regulation and Control) Rules 2000. It is against the rules for anybody to produce or consume ozone depleting compounds, or to import or export them to any country without first obtaining permission from the relevant authority. As previously mentioned, India still lacks a comprehensive legal framework addressing climate change. When climate-related claims have been brought to court and there is no comprehensive law, judges have been aggressive in safeguarding the environment. However, the number of climate-related lawsuits that make it to the courts is extremely low.

Climate Change Legal Action in India

The Supreme Court of India has attempted to address climate change challenges by interpreting Article 21 of the Constitution in a broad sense. According to Article 21, India's constitution includes the right to pollution-free air and water for the full enjoyment of life. "Environmental, ecological, air and water contamination amount to violations of the right to life provided by Article 21 of the Constitution," the Supreme Court ruled in *Kedia Leather & Liquor Ltd. Healthy living requires a clean and sanitary atmosphere. In the absence of a humane and healthy environment, "the right to live with human dignity becomes a mirage."* According to the court's rulings, in order to protect "life," "environment," and "air, water, and soil," "the Supreme Court has given substance to the rights accessible to the people and persons alike under Article 21." In cases involving the enforcement of Article 21 rights under public law, the Court has awarded damages to those responsible for disrupting the ecological balance through the operation of industries or any other activity that results in pollution of the environment in the exercise of its powers under Article 32. Damages are awarded in accordance with the "Polluter Pays Principle," which has

long been acknowledged as a way to pay for pollution and its mitigation.

V. CLIMATE CHANGE AND GLOBAL IMPACTS

197 countries ratified the UNFCCC, the United Nations Framework Convention on Climate Change, in 1992. In order to study global warming and prepare for its consequences, the pact was created (e.g., temperature change and other climatic events). The UNFCCC is an agreement that asks for the international community to work together to address the problems posed by climate change in the interests of human safety. Carbon dioxide and other greenhouse gases are recognised as a shared resource by the Convention's parties as having the potential to alter the climate in a way that is of paramount importance. Establishing a framework to report on emissions and removals of greenhouse gases using uniform classification and definitions was one of the UNFCCC's successes. It is expected that most of the nations that are signatories to the Convention will comply with this approach in submitting data. It is crucial for the following processes:

1. Climate scientists are projecting whether or not climate change and the speed of climate change constitute a substantial risk to humanity or the environment (looking at the relationship between greenhouse gas emissions, temperature change, and other environmental factors).
2. Track previous emissions and removal trends to see how things are progressing.
3. Actions for reducing emissions should be prioritised."

The Kyoto Protocol

A multinational pact to limit greenhouse gas emissions was the first of its kind. On February 16th, 2005, the Kyoto Protocol, which was first agreed upon by countries in 1997, came into effect. The Kyoto Protocol advances the UNFCCC's primary goal of "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." Industrialised countries are required to reduce their emissions because they are historically responsible for the current levels of greenhouse gases in the atmosphere, according to the Protocol's provisions. The treaty has been approved by all except one country, which is the United States of America. As a result, the pact did not require developing countries such as China, India, Brazil, and South Africa to reduce their greenhouse gas emissions because these countries only contributed a small percentage of the present emissions.

The Copenhagen Consensus

Even though world leaders agreed to a political agreement on climate change at the United Nations Climate Change Conference in Copenhagen in 2009, which included explicit emission pledges from all major economies, including China and other major developing countries, one of its major criticisms is that it did not lay out a clear path toward a treaty with binding commitments. After a long and contentious process, the agreement was only "recognized" by the 193 countries present at the summit in Copenhagen.

Paris Agreement of 2015

To the best of our knowledge, the Paris Agreement, sometimes referred to as the Conference of Parties Protocol on combating climate change, is the UNFCCC's first comprehensive regime for dealing with the issue. It was signed into law on December 12th by 197 countries in Paris. The agreement will go into effect once 55 countries have approved it, accounting for at least 55 percent of global emissions. As of November 4, 2016, the Paris Agreement was in full force. This century's global temperature rise should not exceed 2 degrees Celsius above pre-industrial levels, and efforts should be made to limit the increase even further, to a temperature increase of no more than 1.5 degrees Celsius. "Countries' ability to deal with climate change repercussions is also a goal in this agreement." If we are to meet these lofty targets, new financial resources, new technological frameworks, and more capacity-building will all be put in place to help the world's poorest and most vulnerable countries achieve their respective national goals. A more rigorous transparency framework is also part of the agreement, which makes it easier to see how the parties are acting and supporting one another.

In terms of India, the Paris agreement is essential since India accounts for more than 4% of global emissions and must cut its carbon footprint by 33% to 35% from 2005 levels by 2030, which must be done.

VI. CONCLUSION

It has been said in the study that India is becoming increasingly concerned about the effects of global warming. There is a pressing need to adopt particular legislation that addresses climate change. Many state governments in India must establish legislation to address climate change and reduce greenhouse gas emissions because the existing legal framework is woefully inadequate for putting policies into action. Setting long-term goals for reducing emissions of these hazardous gases may also be beneficial. There is also a rising need to devote resources to increasing domestic research capabilities. As a result, the effects of climate change may be better assessed across many industries.

Indian climate change implications are yet unresolved due to a lack of thorough research.

Some other potential initiatives include a rise in the use of LED lighting and compressed natural gas as a fuel, as well as more strict automobile pollution standards and a shift to renewable energy sources. Environmental pollution and waste management must be addressed as part of a comprehensive national environmental policy that grants permits to industrial establishments while also establishing strict guidelines for those establishments to follow. This problem must be addressed on a practical level if we are to reduce air pollution caused by automobiles. Participation in pollution monitoring by the general public must be promoted by the state itself.

According to the study, India has ratified a number of international accords on climate change. However, none of these international agreements can be implemented by the Indian government on its own. New legislation must be drafted in India to execute these requirements to the letter and spirit.

It's also imperative that people who flout environmental and climate change regulations face severe penalties. A subject of fundamental concern to poor and vulnerable people, like climate change and environmental protection, can be tackled by the Apex Court even if no public interest litigation is filed. The Apex Court, in its judicial position, has the power to enact laws that are binding on everyone when the state fails. Climate change can only be dealt with to a considerable extent if the state, judiciary, and civil society work together, and the impact it has on the people, especially the marginalised, may be reduced to a minimum if they work together.

REFERENCES

- [1] Eric A. Posner and Cass R. Sunstein. (2008). Climate Change Justice, *Georgetown Law Journal*, 96(5) 1565, 1567.
- [2] Tony George Puthucherril. (2012). Climate Change, Sea Level Rise and Protecting Displaced Coastal Communities: Possible Solutions 1 *Global Journal of Comparative Law* 225, 227.
- [3] <https://www.newindianexpress.com/cities/chennai/>
- [4] Shibani Ghosh. (2013). Demystifying the Environmental Clearance Process in India 6(3) *NUJS Law Review* 433, 433.
- [5] Malgosia Fitzmaurice. (2013). Responsibility and Climate Change 53 *German Yearbook of International Law* 89, 89.
- [6] <https://www.kedarnathtemple.com/kedarnath-flood-story-and-reason/>
- [7] Balaji Narasimhan and others, 'Chennai Floods 2015: A Rapid Assessment' (Interdisciplinary Centre for

[8] Water Research Indian Institute of Science, Bangalore, May 2016).

[9] <https://www.indiatoday.in/education-today/gk-current-affairs/story/maharashtra-drought>

[10] Companies Act, 2013, sec. 135. Schedule VII of the Act and Companies CSR Policy Rules 2014

[11] Mahmoud SH, Gan TY. (2018). Impact of anthropogenic climate change and human activities on environment and ecosystem services in arid regions. *Science of the Total Environment*.15(633):1329-1344.

[12] Afzall Ghulam S, Muhammad I, Syed SA, Sohail A. (2018). Impact of climate change on crop adaptation: current challenges and future perspectives. *Pure Applied Biology*.;7(3):965-972.

[13] Diffenbaugh, N.S. and M. Burke (2019), "Global warming has increased global economic inequality", *Proceedings of the National Academy of Sciences*, 116(20), 9808-9813.