International Journal of Law Research, Education and Social Sciences

Open Access Journal – Copyright © 2025 – ISSN 3048-7501
Editor-in-Chief – Prof. (Dr.) Vageshwari Deswal; Publisher – Sakshi Batham

Climate Change: Impact, Challenges and Strategies for a Sustainable Future

Aradhya Yaduvanshi[a]

[a]Symbiosis Law School, Nagpur, India

Received 23 June 2025; Accepted 21 July 2025; Published 25 July 2025

Climate Change refers to shifts in temperature and weather patterns due to natural causes like volcanic eruptions, solar activity changes, and human activity like fossil fuel use.[1] Carbon dioxide and methane are greenhouse gases that cause global warming. Earth's average temperature since pre-industrial times has risen by 1.2° C, causing droughts, floods, cyclones, storms, and rising sea levels.[2] These factors impact human health, food security, migration, and biodiversity. Health issues also increased, like respiratory diseases, heat stress, and mental health issues. Due to climate change, crop yield decreases in India, affecting food security. Climate-induced disasters lead to displacement and migration. Because of that, social and economic inequality increased. Poor populations suffer more in India than more affluent populations. India implemented NAPCC (National Action Plan on Climate Change), which includes eight missions focusing on energy-efficient consumption, sustainable energy use, wastewater management, and water harvesting. These strategies mitigate climate change effects while promoting adaptation through sustainable practices, innovation, and capacity building. Collective action and policy support are essential for preventing climate change and ensuring a sustainable future.

[1] 'What is Climate Change?' (*United Nations*) <https://www.un.org/en/climatechange/what-is-climate-change> accessed 15 June 2025
[2] Rebecca Lindsey and Luann Dahlman, 'Climate Change: Global Temperature' (*Climate*, 29 May 2025) <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature> accessed 15 June 2025

Keywords: *climate change, global warming, social inequality, mitigation.*

INTRODUCTION

Climate change can be defined as a change in temperature and weather patterns. It can happen due to natural causes like volcanic eruptions and changes in solar activity. It can also occur because of man-made activity, mainly due to burning fossil fuels like coal, gas, and oil. The burning of fossil fuels causes the release of greenhouse gases that can act like a blanket around the Earth, preventing the sun's heat from escaping and raising the temperature. Carbon dioxide and methane are the leading greenhouse gases that cause climate change. Humans use fossil fuels for various activities. Like gasoline for driving cars, coal is used for heating, building, and clearing farming land. Land clearing and cutting forests release carbon dioxide. Agriculture, oil, and gas operations are the primary sources of methane emissions. Many scientists have already proved that humans are responsible for climate change. They have made the world warmer than it has been for two thousand years. 1.2° C is the average temperature of the Earth's surface, warmer than in the late 1800s and warmer than at any time in the last 100,000 years. The last decade (2011-2020) was the warmest decade on record, and each decade after 1850 is getting warmer than the previous. In a report by the UN, thousands of scientists and the government agreed that the Earth's temperature should not rise by 1.5° C to maintain livable conditions for humans and living beings. It should not increase by 3.1° C at the end of the century.[3] There are six major greenhouse gas emitters: the USA, China, Brazil, Russia, the European Union, and India. The most serious consequences of climate change are that it affects our health, the ability to grow food, our lifestyle, etc. So many small countries near water bodies face many problems due to climate change. Let us understand the impact of climate change.

HEALTH IMPACTS

Climate change affects the food we eat, the place where we live, the water we drink, and various aspects of life. It also affects health, including respiratory and heart disease, water and food illnesses. It affects mental health. As the climate and weather conditions change more frequently, there is a high risk of floods, drought, forest fires, storms, and intense heat. All these things affect

[3] What is Climate Change? (n 1)

the health of humans directly or indirectly. It leads to an increased risk of death, heart attack, the spread of infections, diseases, etc. Climate change affects our health workforce and infrastructure, decreasing the ability to provide universal health coverage (UHC). UHC means all individuals have access to basic healthcare facilities without financial hardship. Climate change has affected human access to clean air, water, and the environment. Intergovernmental Panel on Climate Change's IPCC Sixth Assessment Report (AR6) concluded that Climate change impacts the world more severely and faster. It will make the temperature warmer, which will be difficult to bear. About 3.6 billion people live in an area at risk of being easily affected by climate change.[4] It affects people's health in two ways: first, it will change the frequency of health problems that people already face, and second, it will generate new health problems. Different people face the effects of climate change differently depending on their environmental exposure. People who spend most of their time outside get exposed to extreme heat. Some people face more side effects of climate change due to their age and health conditions. People with asthma who live in areas with higher pollution have a high chance that their health will degrade. Dealing with climate change depends on a person's income, health care access, age, living conditions, etc. Suppose a person with a rich background can get an air purifier at home and in the workplace. They will face less effect of climate change compared to people experiencing poverty who live in huts, have more exposure to extreme heat, and do not have access to health care. If air quality is degraded from the normal level, it will lead to premature death and cardiovascular and respiratory illness. If precipitation decreases, it will increase ozone and particulate matter, increasing respiratory disease and death. Rising sea levels will increase coastal and inland flooding and expose people to adverse health impacts (like drowning, injuries, gastrointestinal, etc.) during, before, and after the event. It will impact our mental health due to climate change. Floods, droughts, and pollution will cause distress, extreme stress, and anxiety.

IMPACT ON FOOD SCARCITY

Earth provides a habitat for human beings and living organisms. It allows the growth of food, which is essential for the survival of living beings. For the past few decades, we have taken the function of the Earth for granted. The global review of climate change and food security in COP26 Climate Submit 2021 has shown that if we do not consider climate change a serious issue, it will

[4] 'Climate Change' (*WHO,* 12 October 2023) <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health> accessed 15 June 2025

lead to the risk of the Earth's temperature rising and eventually crossing the 2 °C threshold.[5] Due to the increase in temperature, we will face frequent droughts, floods, water scarcity, and salinity, which result in lower food production. Also, there is an increase in the population of food insecurity. FAO (Food and Agriculture Organisation) State of Food and Security and Nutrition Report 2021 showed that since 2014, there has been a prevalence of moderate or severe food insecurity, which FIES measures. 12% of the global population will face this in 2020. One in three people worldwide did not have access to food in 2020. SDG (Sustainable Development Goal) aims to achieve zero hunger by 2030, but we can observe that it is difficult to achieve by 2030.[6] The poor population in India will face more consequences of climate change on food security. Rising temperatures will affect crop production. Especially staple crops like wheat, paddy, pulses, etc., due to high temperatures, which will shorten the growing season. There will be a risk of heat waves, which will damage the crop. Climate change leads to unpredictable rainfall, which means there will be more rainfall in some regions, and in some areas, there will be less rainfall than usual. This will change the crop growth cycle, leading to poor harvest and crop failure. Due to less rainfall, poor crop irrigation will directly impact that region's food security. If there are more frequent and prolonged droughts, floods, and heat waves, soil erosion will occur, and soil fertility will be reduced. Less fertile soil reduces soil quality, leading to poor crop yields and increased food scarcity. Coastal, arid, semi-arid regions and flood-prone areas are likely to have more effects of climate change. These areas have long-term and short-term risks because of climate-related disasters. Small landholders are more vulnerable to climate change. They can't afford the latest technology for irrigation because of their limited finances. Due to climate change, there will be food scarcity and nutritional shortages. Due to climate change, fewer diverse crops can grow, reducing nutritional availability.

MIGRATION AND DISPLACEMENT

Human activities over the past few decades have increased, causing Earth's degradation. Because of climate change-induced disasters, people started to migrate from their native places. Lester Brown was the first to introduce the term "environmental refugees" in 1976. Essam EL-Hinnawi

[5] 'COP26: Together for our planet' (*United Nations*, 12 December 2023) <https://www.un.org/en/climatechange/cop26> accessed 15 June 2025

[6] 'CLIMATE CHANGE: ACTION PLAN FOR EARLY DETECTION AND EFFECTIVE MANAGEMENT OF FOOD INSECURITY' (*National Centre for Disease Control,* 12 December 2022) <https://ncdc.mohfw.gov.in/wp-content/uploads/2024/08/National-Action-Plan-on-Food-Security-and-Climate-Change.pdf> accessed 15 June 2025

used the term and described these refugees as people who are moved permanently or temporarily from their native place because of environmental disasters that put their lives at risk and degraded their quality of life. People displaced due to climate-induced disasters are known by various terms like climate refugees, environmental displaced, climate migrants, etc. In regions where people face ecological disasters, they will start to migrate. World Bank's Ground Well Report 2021 stated that about 216 million people will face internal migration within their own country by 2050, most of whom will be in the sub-Saharan region. According to NASA, most of the Gulf region is not livable for people because of the rise in global temperatures. Countries near sea level are likely to migrate in the future. 70% of Bangladesh is threatened with submergence due to rising sea levels. India, Bangladesh, China, and many more Southeast Asian countries will be more impacted by climate change. By 2025, about 45 million people from India will migrate due to climate change.[7] India, having significant geographical features, faces the impact of climate change in different forms, which include land degradation, coastal floods, and desertification. Due to climate change, a temperature rise will increase sea levels. Marginalised and poor communities will face more impact of climate change than upper communities due to a lack of resources and finances.

ECONOMIC CONSEQUENCES

Climate change impacts agricultural yield, water availability, human health, migration and displacement, labour productivity, infrastructure, disaster management, economic inequality, etc. Let us understand climate change's impact on the Indian economy in more detail. In India, about 60% of cultivation depends on rainfall.[8] Climate change leads to irregular rain that can lead to crop failure. If crop failure happens, it will also affect subsistence farmers and commercial agriculture. Rising temperatures impact the yield of staple crops like wheat, paddy, pulses, etc. If crop yield decreases, it will directly impact inflation, food supply, and rural income. Punjab, Haryana, Rajasthan, Delhi, some parts of Karnataka, Tamil Nadu, Telangana, and Andhra

[7] 'Millions on the Move in Their Own Countries: The Human Face of Climate Change' (*World Bank Group,* 13 September 2021) <https://www.worldbank.org/en/news/feature/2021/09/13/millions-on-the-move-in-their-own-countries-the-human-face-of-climate-change> accessed 15 June 2025

[8] 'India: Climate Change Impacts' (*World Bank Groups,* 19 June 2013) <https://www.worldbank.org/en/news/feature/2013/06/19/india-climate-change-impacts> accessed 15 June 2025

Pradesh are already facing groundwater depletion due to climate change.[9] Due to rising temperatures, there is a demand for AC that requires electricity. Irregular rainfall causes inconsistency in the flow of water in the rivers, which will hinder river flow and electricity generation. There will be more heat waves in the summer season that cause more heat-related deaths and illnesses. If more people become ill due to heat waves, government expenditure on the health sector will also increase. In the coming years, there will be a rise in malaria, dengue, and chikungunya cases. About 49.9% of the total workforce in India works in the outside environment.[10] So they are more exposed to higher temperatures, which will also increase heat stress, eventually affecting workers' working hours and productivity. Mumbai, Kochi, Mangalore, Chennai, and Visakhapatnam are coastal cities at risk of submerging due to rising sea levels and frequent storms.[11] There are frequent floods, droughts, and cyclones. These events cause the loss of people, infrastructure, etc. In 2018, Kerala had a flood that caused the death of many people; in 2021, Odisha and West Bengal faced floods that caused the death of people and damage to roads, electricity poles, food supply, etc. In 2023, Uttarakhand, Jammu & Kashmir, and Uttar Pradesh faced floods, and many people died. India has agreed to achieve 500GW of renewable energy by the end of 2030.[12] India will require a massive investment in the renewable energy sector. The government also needs to build infrastructure for that. In India, about 70% of electricity generation depends on coal. So, transitioning from fossil fuel to renewable energy for electricity also comes with losing many people's employment in coal-producing states like Jharkhand and Chhattisgarh. That will disrupt the economy for a short period. Climate change will impact industrial exports in some sectors, like agriculture, fisheries, textiles, etc. For example, due to higher temperatures in the sea, fish will also be reduced, and irregular rainfall affects irrigation, directly affecting crop yield and quality. India needs to build infrastructure around an early warning system for disasters, as well as urban planning and irrigation systems.

---

[9] 'Agricultural Situation in India since 1948' (*Department of Agriculture,* February 2021) <https://desagri.gov.in/wp-content/uploads/2021/06/Agricultural-Situation-in-India-February-2021.pdf> accessed 15 June 2025

[10] Abhishek Jha and Roshan Kishore, '49% of Indian Workers Are Employed Outdoors in Scorching Heat' *Hindustan Times* (29 May 2024) <https://www.hindustantimes.com/india-news/49-of-indian-workers-are-employed-outdoors-in-scorching-heat-101651514183004.html> accessed 15 June 2025

[11] 'Press Release: Coastal land at risk of getting submerged by 2040, says study' (*CSTEP, 0*1 August 2024) <https://cstep.in/drupal/sites/default/files/2024-08/PressRelease_Sea%20level%20rise%20scenarios%20and%20inundation%20maps%20for%20selected%20Indian%20coastal%20cities.pdf> accessed 15 June 2025

[12] '500 GW Non-Fossil Fuel Target' (*Ministry of Power,* 18 September 2023) <https://powermin.gov.in/en/content/500gw-nonfossil-fuel-target> accessed 15 June 2025

The government can introduce a carbon tax so that industries will adopt green technology to reduce taxes from the government. India needs investment from domestic and international companies.

SOCIAL INEQUALITY

Climate change not only causes higher temperatures, floods, cyclones, and droughts but also leads to social inequality. It makes it difficult for poorer people, labourers, and agricultural workers to cope with extreme weather conditions. A more significant number of people in India depended on rainfall for agriculture. Irregular rainfall, cyclones, droughts, and floods heavily affect small farmers. Small farmers cannot invest in the latest technology for irrigation systems due to a lack of income. The highest number of suicides happened in Maharashtra, and the second highest in Karnataka in 2023.[13] Climate change also increased gender inequality. In rural India, women are responsible for fetching water, collecting firewood, cooking, washing, etc. Due to water scarcity, women have to travel longer distances to collect water, which leaves them with less time for studying or doing other activities. According to social norms, women are expected to do household work and are not supposed to do activities related to earning an income. Due to environmental events, people were forced to migrate. West Bengal, Odisha, and Kerala are located near coastal regions, so due to rising sea levels, people have started to migrate to urban areas. In the end, the migrants move to big cities like Delhi, Mumbai, Kolkata, etc., where they lack resources and basic livelihood, and their quality of life is degraded. Cyclones like Aila, Amphan, and Bulbul damage houses, roads, electricity infrastructure, etc. People became helpless, and they started to move near cities. States like Bihar, Rajasthan, Madhya Pradesh, and Gujarat are in the northwestern and central parts of India. They experience frequent heat waves. These heatwaves affect outdoor workers and labourers because they spend most of their time in the heat and can't afford a cooling system like AC, a Cooler, etc. Annually, around 1116 deaths are caused by heat waves.[14] Due to climate change, the poorer population suffers more than the richer. The more affluent population can afford AC, health insurance, etc., but poorer populations spend a lot of income on necessities. Climate change disrupts education in rural areas. Rural areas suffer floods, droughts, and cyclones, so children, especially girls, are forced

[13] Sandhya Keelery, 'Number of Farmer Suicides in India by State' (*Statista,* 03 July 2025) <https://www.statista.com/statistics/1455499/india-number-of-farmer-suicides-by-state> accessed 03 July 2025
[14] Jeroen de Bont et al., 'Impact of heatwaves on all-cause mortality in India: A comprehensive multi-city study' (2024) 184 Environment International <https://pubmed.ncbi.nlm.nih.gov/38340402/> accessed 15 June 2025

to leave their education and help with household activities. The family now has to focus on short-term goals like food, shelter, and health rather than long-term goals like education. Due to water scarcity, there is conflict about river water distribution among states, like the Cauvery River Water dispute between Tamil Nadu and Karnataka. In rural areas, people depended on rainfall for their agriculture. Due to irregular rainfall, crop failure happens, so people from rural areas move to cities to earn an income. But these migrants in cities live in slums without basic amenities like washrooms, electricity, a drainage system, etc. Because of this, the number of vector-borne illnesses, like malaria, dengue, etc., increases. India has to face a double burden: first to solve climate change issues and second to pressure developed countries to fulfil their climate finance and technology transfer promises.

SOLUTION AND ADAPTATION

With the rising temperature, sea level, irregular rainfall, and water scarcity, India needs to adopt and implement strategies to reduce the impact of climate change. India launched the National Action Plan on Climate Change (NAPCC) in 2008. Lay out eight national missions on Climate Change. These are- the National Solar Mission (NSM), National Mission for Enhanced Energy Efficiency (NMEEE), National Mission on Sustainable Habitat (NMSH), National Water Mission (NWH), National Mission for Sustaining the Himalayan Eco-system (NMSHE), National Mission for Green India (GIM), National Mission for Sustainable Agriculture (NMSA), National Mission on Strategic Knowledge for Climate Change (NMSKCC).

NSM aims to develop and adopt solar panels as an energy technology and to achieve 100 GW solar capacity by 2022 and 280 GW by 2030. Reduce the usage of fossil fuels. Its initiative includes large-scale grid-connected solar projects, Rooftop solar installations, research in solar development, etc. NAMEEE aims to reduce energy consumption and make it efficient across the industrial sector. To promote energy-efficient LED bulbs, fans, star-rated devices, etc. NMSH aims to promote sustainable urban planning and to make the urban environment efficient. Promote public transport instead of using personal vehicles and encourage recycling and scientific disposal methods. NWM aims for sustainable usage of water. Reduce water wastage and encourage rainwater harvesting and groundwater research. Promote water management. NMSHE seeks to protect the Himalayan ecosystem from the impact of climate change. Study the effects of climate change on glaciers and water resources. Create a climate-resilient action plan

in 12 Himalayan states. GIM aims to increase forest and tree cover that acts as a carbon sink and provides ecosystem services. Its target is to increase forest cover on 5millon hectares of degraded forest land.[15] Improve biodiversity, water restoration, etc. NMSA will make Indian agriculture resistant to climate change. To promote irrigation practices by drip and sprinkler systems. It also wants farmers to use weather forecasts before cultivating crops to avoid crop failure. NMSKCC aims to build a knowledge base on climate change and improve research capacities. To establish climate research centres with national and international organisations.

CONCLUSION

Climate Change has impacted humanity in every aspect of life, from health to workforce, food security to economic stability, and social equality. It has become a global issue with many consequences that affect the population and our country. Rising temperature, sea level, melting glaciers, irregular rainfall, and frequent heat waves. India has adopted strategies to combat climate change's impact, like the National Action Plan on Climate Change, which includes the National Action Plan, Green India Mission, and National Solar Mission. This mission aims to adopt renewable energy, sustainable agriculture practices, rainwater harvesting, and protect biodiversity. We need to shift from fossil fuel energy consumption to sustainable energy consumption in the future. We can make this shift by focusing on renewable energy, investing in efficient energy, and strengthening climate resilience. India can overcome the impact of climate change, but it needs to ensure that economic growth and social well-being are given equal importance. Since heading toward a sustainable future will be challenging, we must do so with adequately informed policies, international collaboration, and local effort.

[15] 'Climate Change Programme' (*Department of Science & Technology*) <https://dst.gov.in/climate-change-programme> accessed 15 June 2025