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Climate Change and the Indian Economy

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A major environmental challenge that the world faces today is climate change. Regarding climate change and economic growth, India occupies an interesting position. India has an uphill battle on the road to a carbon-neutral economy despite its abundance of natural resources (forests, solar power, etc.). The country lacks both the financial backing and the expertise necessary to complete the journey. Rapid responses to climate change, such as COP26 (Conference of the Parties), are typically met with resistance and put a strain on the economy. A significant amount of damage to the Indian economy is being caused by the inevitable onset of climatic changes brought on by climate change. However, future progress will be hampered by not striving for an emission-free economy. In many cases, the energy needs are at odds with anti-global warming measures. Half of India's population is at a risk associated with the impact of climate change on agriculture. This paper's goal is to draw attention to the economic effects of climatic changes. It also offers strategies to mitigate the effect of climate change on the economy. The solution for India lies in its adoption of green goals and its gradual transition to a clean and green economic system.

Keywords: *climate change, economy, environment.*

INTRODUCTION

Climate change is a particularly challenging reality for India and other emerging nations. The reason is, traditional means of generating energy and resources form the backbone of a developing country's growth. Even if there have been tremendous technological advancements,

such countries are frequently at odds with one another. Increased risk and susceptibility can be the outcome of interactions between the economy, development, and climate change. As an example, climate change has led to a big drop in the amount of water in the ground in many places. The rate at which aquifers are refilled is slowing down because more land is being covered with concrete.[1] India is highly vulnerable to climate change, however, the impact varies by location due to its complicated geography. Since the mid-20th century, India has seen increases in average and high temperatures, decreases in monsoon rainfall, rising sea levels, and more droughts and cyclones. According to the El Dorado weather station[2], 10 of the 15 hottest cities in the world were in India in May 2020. According to United Nations Framework Convention on Climate Change (1992)[3], provides members with a strategy to combat the factors responsible for climate change. In short, climate change, often referred to as global warming, is an increase in average global temperature that will have serious consequences for the planet's ecosystems. Its dangerous effects on people's lives are due to the overexploitation of natural resources and widespread environmental pollution. The current state of human health and safety can also be significantly affected by the increase in global average temperature.

THE CONCEPT OF CLIMATE CHANGE: AN OVERVIEW

The topic suggests how weather patterns change over long periods, like decades. Both natural and human activities contribute to climate change. A rise in world average temperatures can be attributed in large part to human activities, such as the release of greenhouse gases and aerosols and changes in land use since the beginning of the Industrial Revolution in 1750. The melting of ice, as well as the increase in storms, floods, droughts, and sea levels, are only some of the

[1] Esha Zaveri et al., 'Invisible water, visible impact: groundwater use and Indian agriculture under climate change' (2016) 11(8) Environmental Research Letters <https://iopscience.iop.org/article/10.1088/1748-9326/11/8/084005/meta> accessed 20 February 2023

[2] Meenakshi Ray, 'Of the world's 15 hottest places, 10 are in India' (*Hindustan Times*, 27 May 2020) <https://www.hindustantimes.com/india-news/of-the-world-s-15-hottest-places-10-are-in-india/story-i7z7pGDp8J6Tf9aN6LLg3H.html> accessed 20 February 2023

[3] Uvesh Husain and Sarfaraz Javed, 'Impact of Climate Change on Agriculture and Indian Economy: A Quantitative Research Perspective from 1980 to 2016' (2019) 8(2) Industrial Engineering & Management <https://www.hilarispublisher.com/open-access/impact-of-climate-change-on-agriculture-and-indian-economy-a-quantitative-research-perspective-from-1980-to-2016.pdf> accessed 20 February 2023

potential effects of rising global temperatures.[4] Scientists call the change in weather and temperatures over time "climate change". These changes could have a natural origin, like the solar cycle changes. However, since the 1800s, human activities, especially combustion These changes can have a natural origin, just like changes in the solar cycle. However, since the 19th century, human activities, particularly the burning of fossil fuels such as coal, oil, and gas, have been a major cause of climate change. Greenhouse gas emissions, such as those from burning fossil fuels, act like a blanket, trapping the sun's heat and raising global temperatures.[5] Emissions of greenhouse gases such as carbon dioxide and methane are primarily responsible for the current state of the Earth's climate. They are created, for example, when gasoline is used to power a vehicle or coal is used to heat a house. Carbon dioxide is released when land and forests are cleared. Landfill use has a significant impact on methane emissions. Most emissions come from energy use, factories, cars, homes, farms, and other land types.[6]

INDIA AND THE CLIMATE CHANGE

South Orient and India will have a significant impact. This is because there are many different types of land. Change in climate conditions is likely to have a major impact on the region as the country is rapidly depleting its natural resources and degrading the environment, mainly due to "urbanization, industrialization, and economic growth." India is trying to protect its dwindling natural resources but faces serious environmental and economic problems. The quality of water and air is deteriorating every day as more and more pollutants enter the air. The country's coastal ecosystems, biodiversity, and agricultural productivity are also the areas most affected by climate change[7]. In addition, the region is already vulnerable to natural disasters such as the 2013 Uttarakhand floods and landslides, the 2015 Chennai floods, and the

[4] 'Climate Change and Resource Sustainability An Overview for Actuaries' (2015) Canadian Institute of Actuaries
[5] 'What is climate change?' (*United Nations*) <https://www.un.org/en/climatechange/what-is-climate-change> accessed 20 February 2023
[6] *Ibid*
[7] Tony George Puthucherril, 'Climate Change, Sea Level Rise, and Protecting Displaced Coastal Communities: Possible Solutions' (2012) 1 Global Journal of Comparative Law

2016 drought significant increase in intensity and/or frequency. Hunger, disease, financial ruin, and loss of livelihood are just a few of the many adverse effects of such disasters[8].

The latest report from the United Nations Intergovernmental Panel on Climate Change (IPCC)[9] paints a bleak picture of India's future. The report warns that the South Asian nation could be hit by several natural disasters over the next two decades due to climate change. According to the report, unless greenhouse gas emissions are drastically reduced by 2030, Indian authorities will struggle to avert the looming climate catastrophe. The Intergovernmental Panel on Climate Change (IPCC) Report indicates that various climatic and non-climatic hazards will interact, leading to an increase in global hazards affecting industries and territories[10].

CLIMATE CHANGE AND THE INDIAN ECONOMY

On the positive side, Indian democracy has resulted in greater equality and dependency than the world average. The low standard of living of farmers and people from socially and economically disadvantaged castes and regions hinders the stability of the economy. Climate change could undermine the economic standards of these people and result in severe losses of state and federal economic and industrial resources. According to recent forecasts[11], even if we manage to keep global temperature rise below 2 degrees Celsius, Indian GDP will fall by around 2.6% by 2100 as a result of climate change. This decline is expected to occur at a rate of 13.4% for another 4-degree Celsius global temperature increase. These numbers are a direct result of changes in precipitation and temperature levels, as well as the impact of climate change on labor productivity. Malaria, dengue fever, and other vector-borne diseases that are endemic to a particular area can also hurt productivity. The likelihood of outbreaks of these diseases is

[8] Shreerupa Mitra Jha, 'Natural disasters cost India $3.30bn in 2015: Here's why we should be very worried' (*Firstpost*, 2016) <https://www.firstpost.com/india/natural-disasters-cost-india-3-30bn-in-2015-heres-why-we-should-be-very-worried-2622940.html> accessed 20 February 2023

[9] Murali Krishnan, 'Climate change: It's never for India' (*DW*, 03 March 2022) <https://www.dw.com/en/climate-change-why-it-is-now-or-never-for-india/a-61000680> accessed 20 February 2023

[10] *Ibid*

[11] Manisha Sharma et al., 'Climate Change and the Indian Economy - An Overview' (22) 17(1) Current World Environment <https://cwejourn@l.org/vol17no1/cl!mate-change-and-the-ind!an-economy---a-review> accessed 20 February 2023

expected to increase as a direct result of climate change. However, due to the uncertainty at each stage, estimating the exact monetary and economic consequences of climate change seems like a daunting task. The absolute cost of climate-related risks such as floods, hurricanes, heat waves, water scarcity, sea level rise, etc. Land use planning and how hazards interact and multiply. Additionally, global warming will be a key factor in determining the value of the dollar[12].

CLIMATE CHANGE'S IMPACT ON THE INDIAN ECONOMY

One of the most important environmental issues facing the world today is climate change. India faces many problems. Climate change has many negative impacts including agriculture, water resources, forests and biodiversity, health, coastal management, and rising temperatures. The most significant impact of climate change on India will be a drop in agricultural productivity. Agriculture provides livelihood, directly or indirectly, to the vast majority of the world's population. Climate change will put further pressure on ecological and social systems already strained by increasing industrialization, urbanization, and economic development. These pressures are already having a significant impact[13].

INCIDENCE OF CLIMATE CHANGE ON VARIOUS SECTORS OF THE INDIAN ECONOMY

Agricultural Sector: Indian agriculture generates 20% of the GDP[14] and 42% of jobs[15]. The sector is vital as it affects 1.38 billion people. According to the 2011 census, 69% of the population lives in the countryside and is related to agriculture, which ties to the rest of the economy. Employment in agriculture fell from 70% in 1981 to 42% in 2016. In recent years, exceptional

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[12] *Ibid*

[13] M Balasubramanian and V Dhulasi Birundha, 'Climate Change and Its Impact on India' (2012) 6(1) The IUP Journal of Environmental Sciences <https://www.researchgate.net/publication/256034994_Climate_Change_and_its_Impact_on_India#:~:text=Climate%20change%20is%20associated%20with,of%20climate%20change%20on%20India.> accessed 25 February 2023

[14] 'Sector-wise GDP of India' (*Statistics Times*, 17 June 2021) <https://statisticstimes.com/economy/country/india-gdp-sectorwise.php> accessed 25 February 2023

[15] Aaron O'Neill , 'India: Distribution of the workforce across economic sectors from 2009 to 2019' (*Statista*, 11 January 2023) <https://www.statista.com/statistics/271320/distribution-of-the-workforce-across-economic-sectors-in-india/> accessed 27 February 2023

rains and droughts have had a significant impact on the sector's contribution. India has experienced 24 major droughts since 1891, and their frequency is increasing. Higher temperatures reduce yields and encourage weed and insect growth. Water is the most important agricultural resource, yet 50% of agricultural land is under-irrigated[16].

Energy: India ranks 4th in GHG emissions after China, the EU, and the US[17]. Energy emits two-thirds of GHGs[18]. Reducing emissions and providing electricity are compatible. Continuing to use coal will increase emissions. India maintains this delicate balance by increasing demand and energy efficiency of supply and promoting low-carbon energy sources such as solar and wind power. One is market forces, which reward energy efficiency for large energy-intensive companies, Perform, Achieve, and Trade (PAT) aims to increase energy efficiency by 1-2% every year. By 2022, India plans to generate 175 GW of solar power, 60 GW of wind power, 10 GW of biopower, 5 GW of small hydropower, and 450 GW by 2030. The Indian government implemented an INR 400 per tonne 46 coal tax to discourage coal use and promote renewables.

Health: Human health is seriously threatened by climate change. The IPCC said in its third assessment report that "climate change is expected to increase risks to human health". The increase in the frequency, intensity, and scale of extreme weather events, the deterioration in air quality, the spread of climate-sensitive diseases, and the increase in food poverty are just a few of the impacts of climate change on the health sector. The current epidemic will add harmful effects that insect and parasitic diseases, food, and water already have on human health and well-being[19].

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[16] Jitendra, 'Growing gap in irrigate!on potential and usage major challenge' (*Down to Earth*, 06 September 2019) <https://www.downtoearth.org.in/news/agriculture/growing-gap-inirrigation-potential-and-usage-major-challenge-66580> accessed 27 February 2023

[17] Subrata Chakrabarty, 'By the Numbers: New Emissions Data Quantify India's Climate Challenge' (*World Resources Institute*, 08 August 2018) <https://www.wri.org/insights/numbers-new-emissions-data-quantify-indias-climate-challenge#:~:text=India's%20Emissions%20Grew%20Faster%20Than,too%2C%20by%204.07%20percent%20annually.> accessed 27 February 2023

[18] *Ibid*

[19] *Ibid*

Infrastructure: India's urban population growth is projected to reach 745 million by 2041[20], already straining basic services and infrastructure in major cities. In addition, cities are also vulnerable to the dangers of climate change. Not only will climate change affect livelihoods and increase the risk of death, injury, and disease; will also cause damage to property, infrastructure, and homes due to hurricanes, coastal and inland floods, storms and sea level rise in Mumbai as well as other Indian coastal areas with similar topography will increase[21].

INDIA'S LEGAL FRAMEWORK ON CLIMATE CHANGE

In India, there is no legislation specifically aimed at climate protection. Air (Prevention and Control of Pollution) Act 1981.[22] (hereinafter called Aviation Law) enacted by the Indian Parliament under Article 253 of the Indian Constitution[23] is therefore the most important law that comes close to solving the problem of climate change. This is because there is no specific climate change legislation. The Air Law is important because it prevents, controls, and reduces air pollution that harms people, animals, and plants. The Aviation Act addresses climate change by linking air pollution to the environment. The Aviation Act makes no mention of climate change. The Air Act aims to protect air quality by reducing greenhouse gas emissions that cause global warming. The Aviation Act establishes state and central inspection bodies to oversee air quality improvement, surveillance, and the imposition of fines and law enforcement actions[24]. Before the Air Act, Parliament passed the Water (Prevention and Control of Pollution) Act in 1974. The Water Act regulates water pollution. Water and air laws contain similar provisions to achieve their goals. Following the Water and Air Bills, Parliament passed the Environmental Protection Act (EPA) in 1986 to fill gaps in India's environmental legislation. The EPA protects and improves the environment. The government may set emission standards in the

[20] *Ibid*
[21] *Ibid*
[22] Air (Prevention and Control of Pollution) Act 1981
[23] Constitution of India 1950, art 253
[24] Preethi Lolaksha Nagaveni & Amit Anand, 'CLIMATE CHANGE AND ITS IMPACT ON INDIA: A COMMENT' <https://eprints.lancs.ac.uk/id/eprint/125076/1/CLIMATE_CHANGE_AND_ITS_IMPACT_ON_INDIA_A_COMMENT.pdf> accessed 27 February 2023

Environmental Regulations Schedules 1986 (hereafter EPR). The EPR also includes industry-specific and general emission criteria[25].

WHAT INDIA CAN DO TO COPE WITH THE EFFECTS OF CLIMATE CHANGE

Climate change is directly responsible for the drinking water shortages in several places in India. Melting Himalayan glaciers will cause floods in north India; unpredictable monsoons will cause droughts in peninsular India. India must plan for the worst repercussions of climate warming. Most programs (such as electric vehicles and renewable energy) aim to slow future global warming. Developed countries should focus on 'mitigation' but India should focus on 'adaptation' i.e., How to deal with the inevitable effects of climate change such as storms, floods, and droughts. Adjusting is like blocking a shot. India has focused on mitigation; It's time to focus on adaptation.[26]

TWO STEPS ARE NEEDED FOR ADAPTION

- One option is to vigorously promote a concept that's been around for 150 years: the connecting of rivers. There is no other choice than to implement the interlinking of rivers (ILR) as quickly as possible given the high probability of floods and droughts occurring in different sections of the country, sometimes in conjunction with one another. It is to be hoped that the NDA government will view ILR from the perspective of climate action rather than as a step toward development. The NDA government has always been in favor of interlinking rivers.
- Genetically modified crops are another adaptive measure. Climate-smart agriculture relies heavily on GM technologies. Drought-tolerant plants and plants that produce more in the same area would reduce climate-damaging "land use". India rejected GM technology out of fear, not science. Ghost hunting doesn't help. Millions of people have been eating genetically modified foods for more than two decades. Globally, GM crop

[25] *Ibid*
[26] M. Ramesh, 'How Ind!a can cope with climate change effects' (*The Hindu Business Line*, 09 January 2022) <https://www.thehindubusinessline.com/opinion/how-india-can-cope-with-cl!mate-change-effects/article62251796.ece> accessed on 17 December 2022

area has increased 136 times since 1997, from 1.7 million to 230 million hectares. GM technology has benefited the US, Canada, Argentina, Brazil, and Bangladesh. Indian farmers have realized the benefits of GM and are producing GM crops in contravention of the law.[27]

SUGGESTIONS

While issuing permits to factories, the government should have a strict environmental policy that spells out strict guidelines for dealing with pollution and trash. Given the large role played by transportation in the creation of air pollution, a workable strategy must be devised to address the problem. The government should take the lead in mobilizing citizens to help with pollution monitoring. In addition, those who do not comply with the rules to protect the environment and fight climate change must be severely punished. When there are no public interest disputes, the Supreme Court can deal with important matters alone. These include climate change, environmental protection, and the impact of these things on the poor and vulnerable. When the state fails, the Supreme Court, in its role as judge, can make laws that all must obey.

CONCLUSION

Climate change could cause a lot of economic damage and has some scary "tail risks." It is a global externality, meaning that the emissions of one country affect all countries because they add to the amount of heat-trapping gases in the Earth's atmosphere, which causes warming. Climate change will severely affect the economies of many countries, with many low-income countries, particularly vulnerable. We have seen how climate change is damaging the pillars of India's economy (agriculture, livestock, etc.) and why people are often reluctant to take strict climate action (energy saving). Still, there's nothing wrong with India taking an even tougher approach to mitigating climate change, despite being the only G20 country where emissions are consistent with a 2° increase compared to 20%. It can make its future development efforts more resilient by implementing more carbon-efficient and resilient policies like the National Clean Energy Fund and the International Solar Alliance. To achieve this, both government and citizens

[27] *Ibid*

must work. When people comply with the laws and regulations enacted by the government to mitigate climate change, this becomes a reality. In this way, the government also sets incentives for the people. India's commitment to a zero-carbon economy was made public during the last session of COP26. Therefore, the terms "climate" and "economic development" in India will be inseparable and closely linked for decades to come.