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Research Article

IMPACT ON ECONOMY OF INDIA DUE TO VARIATIONS IN CLIMATE

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ABSTRACT

India has a fascinating position in climate variability and economic progress. With abundant resources, but lacking in capital and technical expertise, the route to a net-zero-carbon economy in India is a long race. Climate change initiatives that are implemented immediately, such as COP26, are frequently met with resistance and put the economy under burden. Changes in climate have inexorably altered climate patterns and are now causing significant economic damage in India. However, failing to strive for a low-emission economy will stymie future progress. Climate change has an impact on agriculture as well, putting half of India's people at risk. The above-mentioned concerns are the subject of an empirical analysis in this paper.

Keywords: Climate, Economy, Energy, Development, Agriculture, Environment.

INTRODUCTION

Climate change is a bitter reality for a developing economy like India. It is mostly due to the fact that traditional energy and resource generation methods form the foundation of an emerging country's progress. Despite significant technological advancements, such nations frequently find themselves in contradictory positions. When the development, economy, and climate change collide, vulnerability and risk arise (Sharma *et al*., 2022). For the most portion of the year, agriculture sector of India relies on underground water and periodic rainwater. Due to the interaction of changing climate and development dynamics, India is experiencing a severe water deficit that affects a billion people, with roughly 180 million people experiencing water crisis every year (Mekonen and Hoekstra, 2016). National climatic changes policies (NAPCC) are focused on economic development of human and economic development strategies. Local initiatives have aided in the reduction of levels of air pollution in urban areas. India constitutes about 17.8% of the total world's population but it is not accountable for increasing temperatures. It only contributes for 3.2 percent of total emissions (Global Change Data Lab, 2021). According to a Deloitte Economics Institute paper titled "India's Turning Point: How Climate Action Can Drive Our Economic Future, " if current habits and regulations continue, India will lose $6 trillion in current value by 2050, which is only 6% of GDP. This amount becomes much higher by 2070, when India will have lost roughly $35 trillion, or 12.6 percent of its GDP (Phillip *et al*., 2021). We will discuss how climate change is affecting India's economy in this paper. Massive emissions endangering current and subsequent generations are not the responsibility of such nearly under-developed countries.

MATERIAL AND METHODS

Site Selection

This work provides a qualitative approach based on information retrieved and assessed from key official documents like the Assessment of Climate Change over the Indian Region Report 2020 and various research articles (Krishnan *et al*., 2020). In this paper, livestock, agriculture, low income households and infrastructure have also been highlighted.

Regional Indian Climate Change

From the Himalayan peaks to the low beaches, India's climate is highly diverse. The environment varies greatly, from the sub-zero temperatures of the mountains of

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Himalayas to the warm tropics of south India. Eastern states receive maximum rainfall in India, whereas the western states, which are devoid of water, form the dry deserts of Great Indian Desert and Thar Desert of India. India has always benefited from its diverse climate. However, numerous reports in past few years have predicted irreversible climatic consequences. The climate change report of IPCC's 2021 affirmed climate concerns and warned of dire repercussions.

Temperature

The yearly maximum and minimum temperatures from 1986 to 2015 have indicated significant warming, according to a report on the assessment of Indian climate.With the highest temperature increase; there has also been a considerable change in pre-monsoon temperatures (Krishnan *et al*., 2020). Between 1951 and 2015, the average increase in the temperature of sea surface of Indian Ocean was recorded by 1°C, which was about 0.7°C higher than the global mean temperature. It is estimated that human-caused emissions account for roughly 90% of global warming, and that this trend will remain this way in future in the event of both high and medium emissions (Deser *et al*., 2011).

Rainfall

The effect of rising temperatures on the region's rainfall is plainly visible. Heavy precipitation in the central Indian region has increased thrice between 1950 and 2015 (Roxy *et al*., 2017). However, while heavy precipitation has increased significantly over the subcontinent, an exceedingly opposing observation has also been reported. The yearly rainfall received by whole India and mean summer monsoon rainfall has been on a downward trend, as per the assessment report. The Indo-Gangetic Plains and Western Ghats have been particularly affected. In the northern hemisphere, an increase in anthropogenic aerosol concentrations is the major source of this trend. The main cause of increasing localized rainfall and decline in overall mean precipitation is thought to be due to urbanization, incorrect land use, and elevated levels of anthropogenic aerosols (All India Rainfall Time Series, 2021). It is predicted that monsoon rainfall will become more destructive in the future because of an increase in mixed content as a result of rising temperatures.

Himalayan Region

Significant heating in the Himalayan range has been recorded in the 20th century, according to India's "Assessment of Climate Change over the Indian Region report 2020."The area of Hindu Kush Himalayan (HKH) has experienced significant warming. In the area of HKH, the yearly average temperature has steadily risen. It is expected that the HKH region would have warmed approximately by 2.6°C to 4.6°Cby the end of the 21stcentury(Krishnan *et al*., 2020).

Economy and Climate Change

By 2100, climate change is expected to reduce India's GDP by about 2.6 percent, even if the global average temperature increases by less than 2°C.This decline is estimated to be 13.4 percent in a condition where global temperature continues to rise by 4°C.Malaria, dengue fever, and other endemic vector-borne diseases can all decrease labour productivity affecting the work efficiency. Change in climate is increasing the likelihood of outbreaks of such illnesses (Kahn *et al*., 2019). Floods and droughts, heat waves, rising sea levels, cyclones, and other climate-related dangers have an absolute cost that is calculated by the tier and direction of economic and social development, infrastructure development solutions, future spatial planning, and the intermixing of potential dangers. Above all, global warming will play a significant influence in deciding the economic costs.

Agriculture

74 years since independence, India's economy is still largely based on agriculture. About half of India's population is still reliant on agriculture to meet basic requirements, either directly or indirectly. The economy is benefited by agriculture if its harvest is satisfactory. As a result, economic progress of India is proportionate to its agricultural output. Agriculture, on the other hand, is reliant on natural phenomenon. Agriculture alone accounts for over half of the Indian economy. Even if this has been lessening in the recent times, minor changes in agriculture still have a major impact on the economy. Farmers in various parts of the country rely on the monsoon for irrigation and a successful harvest. Changes in the climate have the greatest impact on the agricultural sector, as well as the water requirements and availability. The North's agricultural production is reliant on spring snowmelt to restore water sources. The southwest monsoon is crucial for agriculture since it supplies around 80% of the country's rainfall (Ruosteenoja *et al*., 2003). Reduced food production will affect a large number of people, resulting in malnutrition, starvation, and illnesses. This will also put more pressure on the state and the federal government to help these small landowners. Due to change in climate, current infrastructure should be replaced and this will result in higher economic expenses.

Livestock

India has the world's largest livestock population. Huge dairy production, personal capital, manure production, draft animals, and other factors all contribute to this. In farm households, these livestock are used as household capital. Many rural families view livestock to be a possible financial asset and use animals as transportation. However, rising temperatures have an impact on animal reproductive and productivity (Whitman, 2006).

Infrastructure

A country's economy benefits greatly from strong and solid infrastructure. Many business opportunities and projects are doomed without sufficient infrastructure. As the number of food-related disasters has increased in recent decades, a significant percentage of the budget has gone to disaster assistance. In the last decade, India has spent $3 billion on food-related economic losses, accounting for 10% of worldwide economic losses (Hallegate *et al*., 2017). Cyclone Amphan hit India and Bangladesh in 2020, displacing 13 million people and causing more than $13 billion in damage. In the aftermath of a natural disaster, low-income families are uprooted and find difficulty to collect assets to improve their stability (Nagchoudhary *et al*., 2020).

Low Salaried Household

Variations in climate make low-income families more vulnerable to economic damage. This is due to the fact that they settle in heavily populated areas lacking basic infrastructural facilities such as road network, clean and potable water, good housing, sewage, and so on. Several people also live in low-lying coastal regions, steep hillsides, and flood-prone places since land is inexpensive in such areas (Satterthwaite *et al*., 2020).

Energy Economy and Climate Change

Everyone require energy to survive. It powers houses, industries, automobiles, as well as draws potable water, and much more. Energy use and generation are, in some ways, indicators of economic development. Changing climate has a significant impact on a nation's energy needs and output, and vice versa. Changing climate extremism is becoming a serious source of concern for emerging and underdeveloped countries' energy sectors (Sharma *et al*., 2022).

RESULTS AND DISCUSSION

We have a better understanding of how climate change has impacted us in every aspect. Something inescapable, perhaps. However, development policies carry a high danger of contributing to climate change. The atmospheric gases and hydrological cycles both influence temperature. The temperature of the world will increase until enough heat is trapped in the atmosphere as greenhouse gas concentrations increase. Changes in climate are fueling all of this. As a result of climate change, temperatures have risen. This will lead to higher water evaporation and an abundance of water for precipitation. Increased water evaporation and significant changes in wind patterns would result in lower rainfall, resulting in drought-like conditions. As a result, storms and heavy rains will become more common and places in direct touch with them will see a lot of rain. Water shortage will be felt in locations far from them. Agriculture is directly affected by both rainfall and temperature. The cause for this is that various crops require specific physical conditions to thrive. As a result, climate change may make it harder for a particular crop to grow. Development's contribution to climate change is highly variable and uncertain. Traditional modes of growth, such as reliance on fossil fuels, have harmed the climate and accelerated climate change. As time passed, policies began to adopt more environmentally friendly development strategies. Countries that are emerging or underdeveloped contribute little to the factors of climate change. India has a plethora of options for meeting its developmental needs. Higher carbon emission targets can be achieved without sacrificing development goals. When public debt is rising, modest reductions in public support for coal and improvements in energy delivery can help free up fiscal headroom. This could help to diversify the economy in areas where coal is the dominant source of revenue and employment. Encouraging green and clean electricity production can assist to shift the load away from fossil fuels, reduce the pollution, and create new jobs. Climate change has also been factored into India's agricultural and water plans. Low-carbon choices are frequently more affordable than their equivalents, and they also assist in meeting important socio-political demands such as air pollution and access to better services and jobs. Low-carbon alternatives will assist raise living standards while also lowering greenhouse gases (IEA, 2021 and Tibrewal *et al*., 2020). At the COP26 Glasgow summit, India pledged to cut carbon emissions by one billion tons by 2030 and lower its economy's carbon dependency by 45% by 2030. It also intends to be carbon-neutral by 2070.

CONCLUSION

We've seen how changing climate is harming India's economic foundations and why tough climate policies are typically met with resistance. Despite, India being the only G20 country with emissions that are 2°C compatible, there is no reason why it should not take a more active strategy to climate change mitigation. Climate-proofing future development attempts will require the adoption of much more carbon-efficient and robust strategies such as the International Solar Alliance and the National Clean Energy Fund. This will necessitate the people and government working together. This is feasible if people follow the government's legislation and norms aimed at dealing with climate change.

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