

Climate Change and its Effect on Human Society

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Abstract: Due to extreme weather events and vector-borne diseases like malaria and dengue fever spreading, climate change poses an increasing threat to public health. While climate change will have a global impact on health, the effects will be unevenly distributed. In accordance with the Third Assessment Report, climate change vulnerability is a result of susceptibility to climate change, sensitivity to climate change, and adaptation to climate change (Intergovernmental Panel on Climate Change-2001). According to the World Health Organization, people are more vulnerable in developing countries, especially on small islands, in deserts, steep mountains, and coastal areas with dense populations. India is a huge developing country bordered on the north by the Great Himalayas, which contain the third greatest mass of ice on the planet, and on the south by a densely populated seashore. 700 million of the country's one billion rural residents are dependent on climate-sensitive areas (agriculture, forestry and fisheries), as well as on the country's natural resources (water and biodiversity) (including mangroves, coastal areas, and grasslands) for their very survival. Heatwaves, flooding (both on land and at the coast), and severe winds are all frequent occurrences. Malaria, starvation, and diarrhea are all serious health problems. Increased weather-related disasters and adverse health outcomes could wreak havoc on the country's already-fragile health system. As a result, the problem requires rapid resolution. To protect public health from the effects of climate change, both mitigation and adaptation are required. Climate change risks can be considerably reduced if the two work together.

Keywords: Climate change, health effects, India, public health.

1. Introduction

The effects of climate change are already having a significant impact on human health. Former US Vice President Al Gore and environmentalist Dr. Rajendra K. Pachauri have made it a priority on the international agenda as a result of their work on the issue (Director General, Institute of Energy and Resources, New Delhi). WHO's 2008 annual report stressed the need to safeguard human health from climate change's potentially catastrophic consequences. To raise awareness about global climate change and the health concerns it presents, the topic of World Health Day in 2008 was "Protecting health from climate change." There has been a lot of focus on this information because of the growing danger that climate change poses to public health around the world.

2. Scope of Research

Global climate change has already had a significant influence on human health and will continue to do so in the future, especially for indigenous peoples like Indians.

3. Climate Change and its Impact on Human Health

Although our health seems to be largely derived in terms of careful behavior, heredity, occupation, local environmental influences, and health, sustainable public health requires life-sustaining biosphere "services". All animal populations rely on food and water sources, the absence of highly contagious illnesses, and the physical security and comfort that climate stability provides. The global climate system is critical for this exercise's support system. In the long run, global climate change will have devastating effects on human health and well-being, as predicted (McMichael et al., 2003). According to the United Nations' third climate change assessment report by the Intergovernmental Panel on Climate Change, "climate change would exacerbate risks to human health." A direct impact on human health (e.g., death or injury as a result of heat stress, flooding, or storms) as well as an indirect impact (e.g., through changes in disease vectors (e.g., mosquitoes) and water-borne diseases are all possible consequences of climate change. Water quality, air quality, the availability of food, and the quality of that food are all important considerations. Global climate change, on the other hand, puts further pressure on efforts to protect human health (Ipcc Iii, 2001).

1) Climate change and India's concerns

The Intergovernmental Panel on Climate Change's Third Assessment Report (IPMK-2001) states that climate change sensitivity is a function of exposure, sensitivity, and adaptability to climate change. India is a huge developing country bordered on the north by the Great Himalayas, which contain the third greatest mass of ice on the planet, and on the south by a densely populated seashore. Around 70% of the rural population in the United States is dependent on climate-sensitive areas (agricultural, forestry, and fishing) and natural resources (water, biodiversity, mangroves, coastal areas, and grasslands). Landowners, forest dwellers, fishers, and nomadic pastoralists are particularly vulnerable to climate change because of their reliance on finite resources such as food and

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water (Ravindranath and Sathaye, 2002). According to India's National Liaison Report to the United Nations Framework Convention on Climate Change (UNFCCC), climate change is predicted to have a severe impact on all natural ecosystems and socioeconomic systems (Delhi, 2010).

Using the Hadley Center or PRECIS regional climate modelling system with the IPCC scenarios A2 and B2 for India, Kumar *et al.* (2006) developed high-resolution climate change scenarios and predictions for India (Kumar *et al.*, 2006). On average, these scenarios and predictions indicate a 3°C annual increase in surface temperature, rising to 5°C towards the end of this century. India is projected to grow by 20% in summer monsoon rains, with an expected increase in all provinces except Punjab, Rajasthan, and Tamil Nadu. Especially along with the west coast and central-western plains of India, maximum and minimum temperature limits, as well as excessive rainfall, are expected to increase. The rapid retreat of mountain glaciers has been documented in the Himalayas, where the melting waters of the Himalayas represent most of the rivers flowing into the Ganges, Brahmaputra, Indus, and other river systems (Smith *et al.*, 2001). The health of the people is dependent on clean drinking water, enough food, safe living conditions, and supportive social environments. Climate change is expected to have an impact on all of these circumstances.

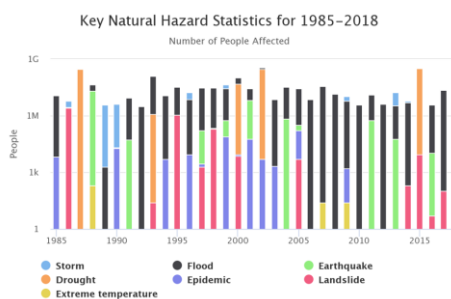


Fig. 1. Key Natural Hazard Statistics for 1985-2018

Several current and future health effects include the following:

2) *Extreme Temperature's Health Effects*

Extreme temperatures have the potential to be lethal. While Himachal Pradesh and Uttaranchal saw frigid temperatures, the rest of the country was sweltering. In 1998, Orissa witnessed one of the deadliest heat waves that killed nearly 2,000 people (Orissa State Disaster Mitigation Authority, 2008). 1998 was the hottest year in the world (WHO, 2021). In 2003, Andhra Pradesh was hit by a heatwave that killed 1,421 people, the largest in the state's history (Andhra Pradesh finally gets respite from heat waves, 2021). There was a heatwave in 2003 that affected Uttar Pradesh as well as Haryana and Punjab as well as Rajasthan, Gujarat, Bihar, and Orissa at the same time. In June 2005, Orissa experienced the hottest temperature in Bhubaneswar in 33 years, 46.3 °C, ten degrees above average (IMD, 2021), resulting in a heatwave. This isn't just an Indian thing. Five hundred fourteen people died and 3,300 ambulances were dispatched due to a heatwave in Chicago, United States of America in July 1995 (12 deaths per 100,000 people). In the

spring of 2003, record temperatures in Western Europe resulted in around 70,000 more deaths than in prior years. The majority of deaths occur during periods of high heat, particularly in people who already have cardiovascular or pulmonary problems. The old, very young, and frail are especially vulnerable (WHO, 2003). The maximum and minimum temperatures are also expected to rise. As heatwaves become more common and intense, the death toll is expected to rise.

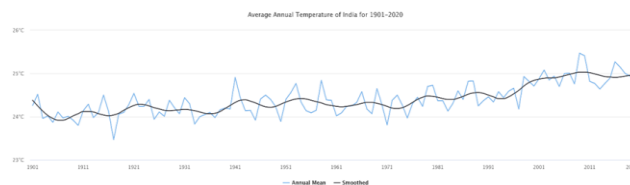


Fig. 2. Average Annual Temperature of India for 1901-2020

3) *Extreme Weather Events*

Thousands of people have died as a result of severe weather events like hurricanes, floods, and droughts, impacted millions of people, and resulted in significant economic losses and property damage in recent years. India and the peninsula have been the scene of five of the world's top twenty worst natural disasters. Hurricanes are not uncommon in Orissa, but Hurricane 1999 set a new standard for intensity, with gusts topping 300 kilometers per hour and killing about 10,000 people. Now dubbed Super Typhoon (WHO, 2005). At least one hundred persons were killed or displaced by the wars and floods that ravaged the northeastern United States in 2003. In much of northwestern, northern India, northeastern India, Andhra Pradesh, Telangana, and parts of Rayalseema, as well as Tamil Nadu, severe droughts have destroyed \$ 25 million in crops, resulting in many starvation deaths. Bihar is flooded every year, but the 2004 floods were unprecedented. A tsunami struck the Indian states of Tamil Nadu, Andhra Pradesh and Kerala in 2004, floods devastated Madhya Pradesh and Gujarat in 2005, Maharashtra was hit by rainfall and flooding in 2006, while hurricanes struck Andhra Pradesh in 2007 (World Health Organization, 2005). This climate not only causes extreme health problems but also damages public health infrastructure. As in most developing countries, India is not yet ready to cross the weather threshold. As a result, the number of persons killed, injured, or displaced as a result of natural catastrophes has significantly increased.

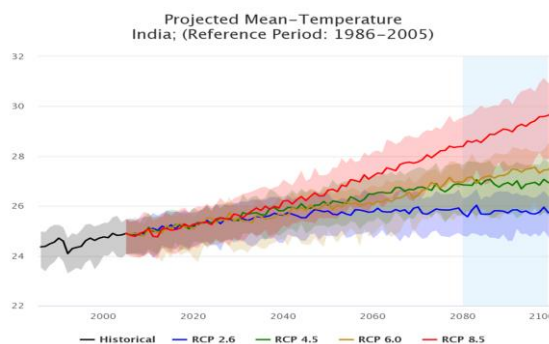


Fig. 3. Projected Mean - Temperature India; (Reference Period: 1986-2005).

4) More Variable Precipitation Patterns

In July 2005, Mumbai, India's financial capital, was besieged by the country's greatest heavy rains in a century, killing over 600 people. The Indian Meteorological Department reports that the highest daily precipitation in any location of India over the last century was 94.4 cm. In India, on July 12, 1910, the town of Cherrapunjee in Meghalaya broke the previous record of precipitation with a height of 83.82 cm (India Meteorological Department, 2021). Meghalaya's Cherrapunjee, the world's wettest spot for decades, is now dealing with a record-breaking rain-drought calamity. This can result in flooding in some places and drought in others, jeopardizing food security and impairing water supply and quality. The increased variability of precipitation patterns could jeopardize the availability of freshwater. For example, in the last decade, hot episodes have increased in Kashmir (India). Even though Srinagar is drenched in what appears to be rain, Kashmir is bracing for a milder winter, with snow melting in early January and a severe drought hitting the region in July and August than typical. Lack of water is usually observed in the wet summer months, which sometimes require filling the car with water. Due to water scarcity, there is an upsurge in water-borne illnesses and skin ailments (WHO, 2005). More than four out of every ten persons face water scarcity. Water supply and quality can be a source of concern for hygiene and health. This raises the danger of diarrhea, trachoma (an infection of the eye that can result in blindness), and other diseases that kill over 1.8 million people each year. Many diarrheal diseases show seasonal changes that indicate climate sensitivity. As in the rest of the tropics, diarrhea often peaks in India during the rainy season. Droughts and flooding can contribute to an increased risk of diarrhea. All of these common causes of diarrhea can be traced back to heavy rains and tainted water supplies, such as cholera, cryptosporidium, *E. coli*, shigella, and typhoid (Aron and Patz, 2001). India faces an even higher concern of decreasing water quality, as just 25% of the population collects water from their homes, yards, or plots, and only a third of households clean their drinking water. About half of those who purify the water filter the water from the cloth and boil about a third (International Institute for Population Sciences, 2007). Some areas are expected to see a 10% increase in diarrheal disease risk as a result of climate change by 2030. (WHO, 2003). Rainfall in Uttar Pradesh's Bundelkhand region plummeted from 987 mm in 2003-2004 to 240 mm in 2007-2008. 40% of the population was displaced, and the region was wracked by violent water collisions.

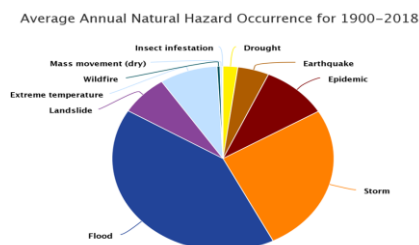


Fig. 4. Average Annual Natural Hazard Occurrence for 1900 – 2018.

5) Food Insecurity

A number of expanding tropical regions already grappling with food poverty will see crop output suffer from rising temperatures, more erratic rainfall patterns, and the loss of agricultural land due to flooding (WHO, 2005). Simulations using dynamic product models predict that yields will decrease with increasing temperature in some parts of India. Most likely, this could endanger the country's food security, as nutrition has become a serious health issue. Thousands of people die each year as a result of malnutrition, a lack of necessary nutrients, and a tendency to infectious diseases such as malaria, diarrhoea, and respiratory difficulties, for instance. There are more than 50 million children under five in India who are malnourished, as well as more than a third of all adults. According to government statistics, two out of every five women are malnourished in Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, and Orissa. Anemia is a significant dietary health problem in India, with women and children in particular suffering from the condition. Anemic children aged 6 to 59 months comprised the vast majority (70 percent) of the population. In India, anemic women account for more than half of the population (55 percent) while males account for a quarter of the population. Without proper treatment, anemia can cause the death of the mother as well as severe weakness, decreased physical and mental capacities, increased risk of infectious infections, perinatal mortality, low birth weight in infants, impaired cognitive function and motor development in children, and academic failure as well as impaired motor development in adults when left untreated (International Institute for Population Sciences, 2007).

4. Conclusion

Climate change and human health studies reveal a great degree of variety in the connections discovered. This heterogeneity is partly explained by changes in the design of the study, as well as by climatic and socio-economic differences between the sites. It is not known to what extent the results obtained from one place can be generalized to another. It is critical, therefore, to compile a thorough inventory of the health consequences of climate change across environments and populations that are predicted to be impacted. It is crucial that climate and population research be carried out in India if we are to obtain a better knowledge of how climate change impacts Indian health. It was adopted in 2008 that India's National Climate Change Action Plan set out to increase environmental sustainability and take part in global climate change negotiations as part of the country's growth trajectory. Sustainable development and climate change adaptation are important goals for countries like India, but tackling the complex issues of global warming and human health will necessitate the combined efforts of policymakers and scientists from all across the world. Researchers in locations like India are able to better understand the health effects of climate change and subsequent climate change through innovative research that uses environmental epidemiology approaches. However, such work will require increased collaboration between researchers, governments, and communities to develop mutually beneficial

approaches to addressing public health issues and the threat of climate change. It will provide the tools and infrastructure needed to adopt and implement research efforts, ask compelling scientific questions and build effective solutions to the complex challenges facing climate change.

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