



## CLIMATE CHANGE AND HEALTH: WHY SHOULD INDIA IS CONCERNED ?

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### Abstract

Overwhelming proof shows that global climate change presents growing threats to public health security – from extreme weather-related disasters to wider blowout of such vector-borne diseases as malaria and dengue. The impacts of climate on human health won't be equally distributed round the world. The Third Assessment Report ended that vulnerability to global climate change may be operate of exposure, sensitivity, and adaptive capability. Developing country populations, notably in little island states, arid and high mountain zones, and in densely inhabited coastal area unitas are thought of to be notably vulnerable. Asian country may be a massive developing country, with the nice Himalaya Mountains, the world's third largest formation within the north, 7500 kilometer long, and densely inhabited coast line within the south. Nearly 700 million of her over one billion population living in rural areas directly depends on climate-sensitive sectors (agriculture, forests, and fisheries) and natural resources for his or her subsistence and livelihoods. Heat wave, floods (land and coastal), and draughts occur normally. Malaria, deficiency disease, and, diarrhea are major public health issues. To any extent further increase, as projected in weather-related disasters and connected health effects, might cripple the already inadequate public health infrastructure within the country. Hence, there's associate degree imperative ought to reply to true. Response choices to safeguard health from effects of global climate change embody mitigation similarly as adaptation. Each will complement one another and along will

considerably scale back the risks of global climate change.

**Keywords:** Climate Change, Health Effects, Public Health.

### Introduction

Climate change may be an important but day by day its growing threat affecting to the public health. Hence, it's finding a more and more central position on the international agenda as last proved by the honor awarded to the previous America vice chairman, Al Gore, and a team of global organization specialists below the chairmanship of Dr. Rajendra K. Pachauri for his or her work on the topic 'The Health Practitioner's Guide to Climate Change: Diagnosis and Cure'. In 2015, the world Health Organization (WHO) targeted on the requirement to safeguard health from the adverse effects of global climate change. The world Health Day 2015 theme "*Why the climate change agreement is critical to Public Health*" raises the side event notes that while climate change presents important health risks, it can also stimulate strengthening of health systems and a transition to a greener, low-carbon economy. The side event promotes the message that a strong and effective international climate treaty is critical to public health. It absolutely was designated because of overwhelming proof shows that global climate change presents growing threats to international public health security.

### Scope

This article describes the method of world global climate change, its current and future impacts on human health generally and India specially, and the way we will reduce those adverse impacts by mitigation and adaptation ways.

### Global Climate Change

Climate change occurs over decades or longer time scales. Until now, changes in the global climate have occurred naturally, across centuries or millennia, because of continental drift, various astronomical cycles, variations in solar energy output, and volcanic activity. Over the past few decades, it has become increasingly apparent that human actions are changing atmospheric composition, thereby causing global climate change. Humankind's activities are altering the world's climate by increasing the atmospheric concentration of energy-trapping gases thereby amplifying the natural "greenhouse effect" that makes the Earth habitable. These GHGs comprise, principally, carbon dioxide (mostly from fossil fuel combustion and forest burning) plus other heat-trapping gases such as methane (from irrigated agriculture, animal husbandry, and oil extraction), nitrous oxide, and various human-made halocarbons. According to the Sixth Assessment Report (2014) of the Intergovernmental Panel on Climate Change (IPCC), the observed effects include:

- The global average surface temperature has increased by approximately 0.65°C over the last 50 years.
- Tenth of the last 11 years (2005–2015) among the 10 warmest years since records began in the 1850s.
- The rates of warming and of sea level rise have accelerated in recent decades.
- Many areas, particularly mid- to high-latitude countries, have experienced increases in precipitation and there has been a general increase in the frequency of extreme rainfall.
- In some regions, such as parts of Asia and Africa, the frequency and intensity of droughts have increased in recent decades.
- The frequency of the most intense tropical cyclones has increased in some areas, such as the North Atlantic, since the 1970s.
- As we continue to change atmospheric composition, climatologists forecast further warming during the coming century and beyond. The IPCC has made the following projections for the next century:

- Global mean surface temperature will rise by 1.1–6.4°C, depending partly on future trends in energy use. Warming will be greatest over land areas and at high latitudes.
- Heat waves, heavy precipitation events, and other extreme events will become more frequent and intense.
- Sea level rise is expected to continue at an accelerating rate.

### Impact of Climate Change on Human Health:

Our personal health may seem to relate mostly to prudent behavior, heredity, occupation, local environmental exposures, and health-care access, but sustained population health requires the life supporting "services" of the biosphere. Populations of all animal species depend on supplies of food and water, freedom from excess infectious disease, and the physical safety and comfort conferred by climatic stability. The world's climate system is fundamental to this life support. A changing climate is likely to affect all these conditions and hence have a powerful impact on human health and well-being. In its Third Assessment Report, the United Nation's IPCC concluded that "*climate change is projected to increase threats to human health.*" Climate change can affect human health directly (e.g., impacts of thermal stress, death/injury in floods and storms) and indirectly through changes in the ranges of disease vectors (e.g., mosquitoes), water-borne pathogens, water quality, air quality, and food availability and quality. Global climate change is, therefore, a newer challenge to ongoing efforts to protect human health.

### Why Should India Be Concerned?

The United Nations Department of Economic and Social Affairs has anticipated that by the year 2028 India will be the world's most crowded nation, with 1.45 billion individuals. As indicated by the International Monetary Fund (IMF), India is the world's more quickly developing economy with GDP development of 7.5 percent, in front of China. Starting today almost a large portion of a billion Indians don't have full access to power supply and running water. If anybody somehow happened to tune in to the yearnings and guarantees of Indian lawmakers amid decision revitalizes, it would seem clear that this extraordinary majority rule government is as yet battling with destitution and giving its kin their fundamental needs. The

legislature of India was as anyone might expect gave an unmistakable command for financial advancement. As India quickly advances towards a brilliant future, its kin will encounter sensational enhancements in their ways of life, with a large number of Indian jumping out of neediness consistently. India will have a developing white collar class with high yearnings, and by augmentation rising utilization and generation. There can be little uncertainty that as Indians get wealthier, owning more autos and electrical apparatuses; they will start to emanate more carbon than they have customarily done. Presently, the World Bank has India's carbon emanation rate at 1.67 metric huge amounts of carbon dioxide per capita, contrasted and China's 6.19 metric tons for each capita and America's huge 17.56 metric tons for each capita. This recommends the potential ascent in India's carbon discharges.

The latest high-resolution climate change scenarios and projections for India, based on the Regional Climate Modeling system, known as PRECIS, developed by the Hadley Center and applied for India using IPCC scenarios A2 and B2, show an annual mean surface temperature rise by the end of the century, ranging from 3 to 5°C under the A2 scenario and 2.5 to 4°C under the B2 scenario, with warming more pronounced in the northern parts of India. A 20% rise in all India summer monsoon rainfall and further rise in rainfall is projected over all states except Punjab, Rajasthan, and Tamil Nadu, which show a slight decrease. Extremes in maximum and minimum temperatures are also expected to increase and similarly extreme precipitation also shows substantial increases, particularly over the west coast of India and west central India. Rapid mountain glacier retreat has been documented in the Himalayas, melt water from the Himalayan glaciers contributing a sizeable portion of river flows to the Ganges, Brahmaputra, Indus, and other river systems. Public health, to a large extent, depends on safe drinking water, sufficient food, secure shelter, and good social conditions. A changing climate is likely to affect all these conditions.

### **Direct Impact of Climate and Weather Change on Health**

Changes in temperature and precipitation and occurrence of heat waves, floods, droughts and fires directly impact health of people.

### ▪ **Impact of Cold and Heat Related:**

The IPCC Special Report on Extreme Events (SREX) infers that it is likely that there has been a general abatement in the quantity of icy days and evenings, and a general increment in the quantity of warm days and evenings, at the worldwide scale. On the off chance that there has been an expansion in day by day most extreme temperatures, at that point it takes after, in our view that the quantity of warmth related death is probably going to have likewise expanded. The association amongst climate and health impacts is regularly adequately direct to allow solid derivations about circumstances and end results.

### ▪ **Health Effects of Extreme Weather Events:**

Extreme weather events such as severe storms, floods, and drought have claimed thousands of lives during the last few years and have adversely affected the lives of millions and cost significantly in terms of economic losses and damage to property. India and the subcontinent saw five of the 20 major natural calamities recorded worldwide in terms of victims. Orissa is no stranger to cyclones, but the 1999 cyclone was unprecedented for the sheer severity, with wind speed reaching over 300 km/h, leaving nearly 10,000 dead, and has gone down in history as the Super cyclone. In 2015, floods claimed thousands of lives and rendered millions of people homeless in Assam, Bihar, West Bengal, Orissa, Uttar Pradesh, Himachal Pradesh, Rajasthan, and Gujarat. Severe drought conditions is most of the north west, major parts of north India, north east India, and parts of Andhra Pradesh, the Telangana and Rayalseema regions, and parts of Tamil Nadu destroyed crops to the tune of USD 25 million, with many starvation deaths being reported. Floods are an annual feature in Bihar, but the 2004 floods were unique for its severity. Recent climate emergencies in India included a heat wave in Orissa, a cold wave in Uttaranchal and Uttar Pradesh, a tsunami affecting Tamil Nadu, Andhra, Kerala, and the Andaman-Nicobar Islands, floods in Madhya Pradesh and Gujarat, rains and floods in Maharashtra, and a cyclone in Andhra Pradesh. These climate extremes, apart from health, also damage the public health infrastructure. India, like other developing countries, is poorly equipped to deal with weather extremes. Hence, the number of people

killed, injured, or made homeless by natural disasters has been increasing rapidly.

▪ **Impact of Heat:**

In India, death toll because of extreme warmth happens each year. As of late, Akhtar has inspected the mortality because of warmth wave in India and found that warmth waves happen in the month of March to June. Greatest death 2500 happened in the year 2015. Andhra Pradesh, Odisha, Punjab, Uttar Pradesh, Rajasthan, Bihar and Madhya Pradesh were the most influenced states. With anticipated ascent in temperatures, mortality is relied upon to ascend because of warmth waves. The National Physical Laboratory, New Delhi is dealing with evaluation of warmth weight on human health in perspective of environmental change and utilizing PRECIS show for A1B situation and demonstrated high event of most extreme temperature for three back to back days in the scope of 45– 50°C in April to June months in the times of 2030, 2050, and 2080 in a few regions of Andhra Pradesh, Bihar, Gujarat, Odisha, Rajasthan, Uttar Pradesh, and West Bengal. Increased temperatures are likewise prone to cause increment in eye maladies like waterfall, dry eyes, pterygium, and vernal keratoconjunctivitis and skin infections. The effect of an Earth-wide temperature boost and ultra-violet radiation on eye ailments is being considered in the National Capital Region of Delhi and Guwahati

▪ **Health Effects of Rising Sea Levels:**

**Potential effects on health due to sea level rise include**

- Death and injury due to flooding.
- Reduced availability of fresh water due to saltwater intrusion.
- Contamination of water supply through pollutants from submerged waste dumps.
- Change in the distribution of disease-spreading insects.
- Health effect on the nutrition due to a loss in agriculture land and changes in fish catch
- Health impacts associated with population displacement.

India has a 7500 km long densely populated coast line, which is vulnerable to coastal floods, hurricanes, cyclones, and tsunamis. Any increase in frequency and severity of these extreme climate events or change in coastline as projected is likely to have serious effects and can cause

population displacement. These displaced people are likely to face diverse health consequences traumatic, infectious, nutritional, psychological, and other that occur in demoralized and displaced populations in the wake of climate-induced economic dislocation, environmental decline, and conflict situations.

**Air Pollution Related Health Effect:**

Groupings of air pollution are on ascending because of human exercises. Air-contamination fixations are the aftereffect of associations between varieties in air flow highlights, wind, geography and vitality use. As the changing atmosphere may modify the temperature and mugginess, communication among the toxins may get adjusted as well as their arrangement relies upon these variables. Some air contaminations exhibit climate related regular cycles. Expanded air temperature can prompt prior dust season and adjusted dissemination of allergen and along these lines prompting asthma scenes. There is more grounded prove for the health effects of particulate issues on bleakness and mortality, so expanding focuses would have critical negative health impacts. The relationship between day by day variety in meteorological conditions and mortality has been depicted in ponders from an extensive variety of populaces in mild atmospheres. These investigations demonstrate that presentation to temperatures at either side of a 'solace go' is related with an expanded danger of for the most part cardio-pneumonic mortality. Increment in other illness measures showed by expanded outpatient participation at healing facilities has been related with outrageous temperatures. Cardiovascular infection (CVD) has the best portrayed temperature-mortality relationship, trailed by respiratory infection and aggregate mortality in calm nations.

▪ **Water and Food Borne Diseases:**

Environmental change-related modifications in precipitation, surface water accessibility and water quality could influence the weight of water-related infections. These illnesses can be arranged by course of transmission, in this way recognizing water-borne and water-washed maladies. Diarrhoeal sickness is a standout amongst the most vital reasons for ailment trouble, especially in creating nations. There is solid confirmation that looseness of the bowels, especially the one

caused by the microscopic organisms and protozoan pathogens which prevail in creating districts, is very delicate to varieties in both temperature and precipitation over day by day, regular, and between yearly eras.

It is, in this way, likely that long haul environmental change will prompt steady changes in diarrheal rates. Environmental change can bring about expanded temperatures in both sea water and encompassing air. Ascend in ocean level because of expanded temperatures can prompt beach front flooding, which can constrain the groups to utilize sullied water, deficient sanitation frameworks, or trigger movement into regions with uncertain water and sanitation accessibility which can prompt the spread of Cholera. Warm water, direct saltiness, and number of oceanic spineless creatures are the conditions impacted by environmental change which advance the development of Cholera species.

▪ **Vector Borne Diseases:**

Climate influences vector populace progression and illness transmission, with temperature and stickiness considered as key factors. Climatic changes are known to build the accessibility of water amid storm, adjust the air temperature other than different changes. Thus, there would be an expansion in the number of inhabitants in the vectors in the changed atmosphere.

Clean water is known to advance rearing of vector mosquitoes, for example, anophelies, culexvishnui gathering and aedes while contaminated water body's advance reproducing of culexquiquefasciatus. Vector-borne ailments are as of now pervasive in the tropics and sub-tropics and generally uncommon in mild zones of India. Involvement with mosquito-borne plagues in the past has shown that expanded water accessibility particularly amid post-storm period can prompt checked expanded populace of the vector mosquitoes. In specific situations, it is conceivable that mosquitoes that do not regularly transmit a malady could assume a part in transmission of vector-borne illness like Japanese encephalitis (JE), particularly if high densities of the specific species happen. As the vector life cycle is unequivocally affected by temperature and stickiness, an adjusted atmosphere with higher temperature and moistness will abbreviate the improvement time

of the vectors prompting bigger generation of vector populace.

**Effects of Food and Water Shortage:**

Rising temperatures and changing examples of precipitation are anticipated to diminish edit yields in many creating nations, worrying upon nourishment supplies. Both intense and ceaseless dietary issues are related with atmosphere changeability and change. The impacts of dry spell on health incorporate death, hunger, irresistible sicknesses and respiratory infections. Lack of healthy sustenance is considered as the absolute most critical hazard factor for health, representing an expected 15 for each penny of aggregate illness load as far as death-balanced life-years (DALYs). While numerous organic and social variables impact lack of healthy sustenance, the basic determinant is the accessibility of staple nourishments. For the populaces that rely upon subsistence cultivating, or don't have adequate salary to purchase sustenance, this circumstance is relied upon to bring unhealthiness. Thusly, lack of healthy sustenance and under-nourishment increment the seriousness of numerous irresistible ailments, especially among kids. Under-sustenance and related illness is right now the best supporter of the worldwide weight of ailment, slaughtering more than 3.5 million individuals per year, for the most part kids in creating countries. Millions of more individuals are anticipated to wind up in danger of nourishment frailty and the health results of lack of healthy sustenance. Increment in worldwide temperature is probably going to cause dry spells and related interruptions in agribusiness and water supplies.

**Health Impacts from Conflicts over Access to Vital Resources:**

Over the long haul, the best health dangers may not be from cataclysmic events or sickness scourges, but rather from the moderate develop of weights on normal, monetary and social frameworks that maintain health. These are as of now under anxiety, especially in the creating nation like India. Environmental change is anticipated to bring changing precipitation designs, expanded temperatures, vanishing, and salinization of water sources through rising ocean levels. Throughout the years, water supplies put away in ice sheets and snow cover is anticipated to decay. This will diminish water accessibility to populaces provided by soften

water from real mountain ranges. Atmosphere change related increments in temperature could expand the rate of snowmelt and decrease the measure of snowfall, if the winter is abbreviated. In the event that environmental change alters the precipitation design in the Himalayas, the effects could be felt in the downstream conditions of India bringing about dry spell like circumstance. Dry spell and the subsequent loss of jobs is additionally a noteworthy trigger for populace developments, especially from provincial to urban territories. With much reliance on common assets and climate sensitive divisions, for example, agribusiness, water and ranger service, India may confront a noteworthy danger from shortage of key assets.

### Conclusion:

The paper demonstrates that linkages between environmental change and human health are unpredictable and multi-layered and forecasts without bounds health effects of environmental change are as yet dubious. Over India, the yearly mean temperature has expanded in the previous hundred years. Projection without bounds environmental change situation indicates disastrous occasions will show an expansion in recurrence and power bringing about huge effect on human life regarding loss of life and malady pandemic. Environmental change is going on and outflows are bound to increment because of developing economy of India. Thusly, tending to both moderation and adjustment is essential. Indeed, even the created countries are attempting to adapt up to the difficulties postured by the evolving atmosphere; India needs to put more endeavors to counter the same. Considering the expanding pattern of effect of environmental change on human health, selection of moderation measures like reinforcing health frameworks and administration conveyance components through early observing, illness observation, vector and ailment control, and medical coverage to counter the same ends up noticeably basic. Interest in innovative work, health hazard evaluation thinks about, defenselessness mapping considers, foundation of standard conditions, situation displaying and reception of clean advancement instruments, and so on are the need of great importance.

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