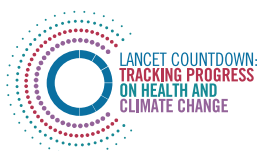


The Lancet Countdown on Health and Climate Change

Policy brief for India

2022



Introduction

India is one of the most disaster-prone areas in the world. The country's twenty-seven states and seven union territories are frequently exposed to recurrent hazards such as cyclones, landslides, floods, droughts, and other extreme and slow-onset events, all of which are intensified by climate change.¹ More severe heat waves and droughts in the western and other northern states are occurring while the acceleration of glacial melt in the Himalayas is leading to landslides and flash floods in the northern states of Uttarakhand and Himachal Pradesh.² Meanwhile, India's southern states are vulnerable to cyclones and floods due to cloud bursts.³ These extreme events bring food insecurity, malnutrition, the emergence and re-emergence of infectious diseases, loss of lives and livelihoods, and have deleterious impacts on the social and environmental determinants of health such as the provision of clean air, safe drinking water, and secure shelter.⁴ Such consequences disproportionately affect vulnerable populations such as older people over 65, children, and socio-economically disadvantaged populations.⁵

Coastal regions are susceptible to rising sea level and coastal erosion, which can make these areas unliveable and lead to displacement, migration, and major health impacts for those unable or unwilling to move. Sea level rise negatively affects health through saltwater intrusion of drinking water, food insecurity arising from loss of arable land, altered infectious disease ecology, and through psychosocial impacts.

India is the sixth largest economy in the world today after the USA, China, Japan, Germany, and the United Kingdom.⁶ Its government has committed to creating a sustainable economy that delivers significant economic growth and development goals, while also supporting a transition to clean energy, the possible hydrogen economy, and decarbonisation of production and supply chains. India has a target of net zero carbon emissions by 2070 and aims to achieve this through a range of decarbonisation policies, investments, and innovative technologies under development to help reduce emissions. Industries and households will be encouraged to use cheaper, cleaner energy sources of low-emission fuels for electrification so that India can address climate change without haltering its economic growth.⁷

This year's policy brief for India, which accompanies the 2022 Global *Lancet* Countdown report,⁸ will focus on three key areas which are of growing concern for India: i) exposure to warming ii) migration, displacement and rising sea levels and iii) energy systems and health. The aim of this document is to highlight some of the key challenges of climate change and its impact on health, and to put forward policy recommendations that will help India adapt to climate change impacts that are already being experienced.

Recommendations

1

The National Disaster Management Authority of India has guidelines in place to address the prevention and management of heat waves; however, it must formally recognize heat waves as a disaster, which would facilitate the delivery of relief mechanisms, develop resilience and create early warning systems.

2

Displacement and migration of those living in the coastal zone are serious challenges. India needs to invest in multipronged approaches consisting of planned relocation strategies and building sea defences that work with nature.

3

The Government should plan and implement its energy system transition by reducing its dependency on coal in a phased manner, adopting renewable energies and investing in the domestic manufacturing of renewable energy technologies.

Exposure to heat

Higher temperatures impact the health of people both directly and indirectly. The direct impacts of heat waves on health often manifest as nausea, vomiting, muscle cramps and fatigue and can result in dehydration, exhaustion and heat stroke. Heat waves also indirectly result in water and food insecurity from which water- and food-borne illness and malnutrition may emerge. Higher temperatures, combined with altered rainfall patterns, affect the transmission of vector-borne diseases such as dengue fever, chikungunya, Zika, and malaria, resulting in the emergence and re-emergence of infectious diseases.⁹ Heat waves have been found to disproportionately affect vulnerable populations such as children, older people, socio-economically poor communities, and those with underlying health problems.

The 2022 global *Lancet* Countdown report found that the average summer temperature populations were exposed to in 2021 were 0.6°C higher than the 1986–2005 average, representing twice the global mean temperature increase over the same period (0.3°C) (indicator 1.1.1). This is explained, in part, by inhabited land areas

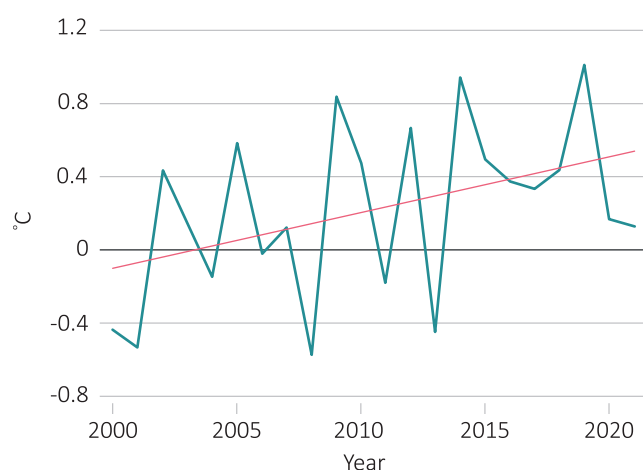


Fig 1: Difference in mean summer temperature, relative to 1986-2005 baseline

experiencing faster warming than oceans. India is specifically vulnerable to heat waves. For instance, India's average summer temperatures from 2017 to 2021 were 0.4°C higher than average summer temperatures during 1986-2005, outpacing the global mean temperature increase of 0.3°C during the same period and reflecting India's greater exposure to heating from climate change. In March 2022, the country experienced the hottest temperatures in its history and it is estimated that the country will face more frequent and intense heat waves over the next decade. The World Bank has warned that India could become one of the first places in the world where heat waves may surpass human survivability limits.¹⁰

Higher temperatures also affect work productivity, resulting in economic losses and deteriorating socio-economic determinants of health. The *Lancet* Countdown estimates that in 2019, 118.3 billion potential labour hours were lost in India as a result of exposure to high temperatures, equivalent to 111.2 hours of potential work lost per employed person. These losses are substantially higher than the global average of 52.7 potential work hours per working person, reflecting the increased exposures and potential impacts of climate change on Indian populations. Furthermore, the agricultural sector, which is essential to food security in India, was the sector most affected by heat-related loss of labour capacity.

The National Disaster Management Authority of India has initiated various measures under the guideline 'Preparation of Action Plan–Prevention and Management of Heat Wave' to address this issue. Under this guideline, Heat Wave Action Plans have been created by seventeen heat wave prone states to develop measures and strategies for heat wave assessment, forecast, preparedness and mitigation. However, India still needs to formally recognize heat waves as a disaster under disaster management law. This would enable the utilization of the government's disaster response fund for building relief and resilience and creating early warning infrastructure.¹¹

Migration, Displacement and Rising Sea Levels

Higher temperatures have contributed to an increase in average summer melting of mountain glaciers. This, along with diminished snowfall due to later winters and earlier springs, water thermal expansion, and to a lesser degree the melting of the polar ice caps, contributes to sea level rise.^{12,13,14}

According to 2022 *Lancet* Countdown report indicator 2.3.3, in 2020, globally, 149.6 million people were settled less than one metre above current sea level, in regions increasingly at risk of rising sea level and coastal erosion. Some 17.2 million (11.5%) of these live in India.

The mega cities such as Mumbai, Kolkata and Chennai were built in coastal regions with an average elevation of 2-10 metres, areas classified as being in Low Elevation Coastal Zones (LECZ). Approximately 81,000 km² of land in India are in these zones and these are frequently exposed to storm surges and coastal erosion. Rising sea levels threaten coastal and riverbank erosion, soil and water salinization, spread of infectious diseases, loss of coastal biodiversity and permanent inundation.¹⁵

The compounding effects of sea level rise can also contribute to health risks such as salinification of drinking water due to sea water intrusion; food insecurity occurring through loss of arable land; reduced crop yields and soil salinification; and altered infectious disease ecology.

Sea level rise can also lead to psychosocial impacts, especially as people may be forced to migrate away from coastal areas to other nearby low-lying sites or higher grounds causing displacement and

loss of livelihood. Fishing communities are particularly susceptible due to the disruption of their livelihoods. They may be forced inland in search of alternative employment and may create new migrant settlements. Human relocation (forced or as a proactive adaptation measure) and its health impacts will largely depend on how well the process of relocation is managed and the support given to migrant populations.¹⁶ This is particularly relevant as empirical studies identify diverse health consequences of forced or poorly managed retreat from sites of coastal risk, including deterioration of mental health, food and water insecurity, increased transmission of infectious diseases, injury, and adverse health outcomes from reduced health care access or poor sanitation.¹⁷ However, if adequately planned and managed, with solid systems in place to ensure the health and well-being of those relocating is protected, migration can also be an adaptation response that protects at-risk populations from the harms of rising sea levels.

Given the multidimensional health risks of the rising sea levels, there is an urgent need to address this issue and plan multipronged strategies such as the use of locally appropriate soft and hard engineering techniques in the coastal zones including barriers, sea walls, and natural solutions including encouraging mangrove, coral, or sea grass defences, in addition to planning of appropriate relocation strategies.

Energy Systems and Health

A just transition of global energy systems from fossil fuels to renewables is not only critical for climate change mitigation, but could also contribute towards universal, affordable, and clean energy access. It would also reduce air pollution and its impact on health, as well as decrease local dependence on international markets and foreign policies.¹⁸

The energy sector is the largest contributor to greenhouse gas emissions, and in 2022 energy-related emissions reached a new record high.¹⁹ According to the global *Lancet* Countdown 2022 report, the carbon intensity of the energy system has decreased by less than one per cent since the year the UN Convention on Climate Change (UNFCCC) was adopted in 1992 (**indicator 3.1**). Phasing-out coal globally is particularly urgent given its high greenhouse (GHG) and air

pollution intensity. In India, 44.3% of India's total energy supply in 2019 was provided by coal which was 9.7 percentage points higher than in 1992. Moreover, even though the carbon intensity of the energy system fell to 58.8 tCO₂e/TJ in 2019 after increasing for three consecutive years, this level is still 25.7% higher than 1992 levels.

As with many other economies, India has relied on coal for initial industrial development; however, as India progresses towards meeting its development goals, it must also meet the needs of a large population that will require greater access to clean energy technologies. In 2020, 32% of the population in India still relied primarily on dirty fuels and technologies for cooking (**indicator 3.2**). New data from the *Lancet* Countdown estimates that, on average, the air that Indian populations breathed inside their home had an average concentration of

approximately 75ug/m³ of toxic small particulate air pollution (PM_{2.5}), 15 times the maximum levels recommended by the WHO (**indicator 3.2**). In addition, outdoor PM_{2.5} air pollution from anthropogenic sources in India led to 724,000 deaths in 2020 alone, and 41% of these deaths were directly related to the burning of fossil fuels (**indicator 3.3**).

India has massive renewable energy potential that has yet to be fully exploited.²⁰ The country would benefit greatly from investing in domestic manufacturing of renewable energy technology such as wind turbines and solar PV and also through promoting electric vehicles to reduce air pollution from petrol and diesel. This would help reduce energy poverty, and prevent Indian populations from breathing toxic air. In recent years, the country has started investing in renewable, zero-carbon energy sources such as wind, hydro or solar power. India doubled its use of renewable energies from 2015 with 7.4% of India's electricity being produced by renewable energy in 2019.²¹ Nevertheless, in 2016, India set a target of reaching 175GW of renewable energy capacity by 2022, comprising 100GW of solar, 60GW of wind, 10GW of biomass power and 5GW of small hydropower. Yet, by August 2022, India had only achieved around 57% of the 100GW solar target and 67% of the wind target.

Even though India is the world's fourth biggest emitter of carbon dioxide (CO₂) after China, USA and the EU, its emissions per capita are much lower than other major world economies irrespective of its large population. In 2019, India emitted 1.9 tonnes of carbon dioxide per head of population, as compared to 15.5 tonnes per capita for the USA and 12.5 tonnes for Russia. Keeping in mind the criticality of India's transition to renewables for climate change mitigation, India has pledged to cut its emissions to net zero by 2070 in a phased manner by achieving 50% of its energy from renewable resources by 2030 and reducing total projected carbon emissions by one billion tonnes by the same year.²² India's domestic policy goal is to work towards mitigating GHG and adapting to climate change impacts without compromising economic growth. However, this goal should be reinforced and better supported through planning and implementation of a rapid energy system transition. This transition should prioritise those areas which could deliver immediate health benefits by reducing the exposure of local populations to air pollution, including phase out of coal, access to clean energies in the domestic sector, and decarbonisation of road travel.

Conclusion

India faces significant health impacts from climate change, from heat stress and displacement of people through sea level rise to food insecurity and increased vulnerability to vector-borne diseases. India's population also suffer the direct health harms of an energy system reliant on dirty fuels. In the coming decades India has huge

opportunities to transition from fossil fuels and become a leader in renewable energy technologies. This will help the world to reduce its dependency on fossil fuels and improve population health through cleaner indoor and ambient air, saving hundreds of thousands of lives each year.

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Organisations and acknowledgements

The concept for this brief was developed by the *Lancet* Countdown on Health and Climate Change. The brief was written by Dr. Leyanna Susan George, Scientist E (Medical) of the Virology unit and Dr. Nivedita Gupta, Scientist F (Medical) & HOD, Division of Epidemiology & Communicable Diseases of the Indian Council of Medical Research, Delhi Headquarters. Review was provided by Dr Frances MacGuire, Dr Megan O'Hare, Dr Marina Romanello, and indicator data by Maria Walawender MSPH of *Lancet* Countdown.

THE LANCET COUNTDOWN

The Lancet Countdown: Tracking Progress on Health and Climate Change exists to monitor the links between public health and climate change, and the transition from health threat to opportunity. We are a global collaboration of over 300 leading experts from academic institutions and UN agencies across the globe, bringing together climate scientists, engineers, energy specialists, economists, political scientists, public health professionals and doctors.

Each year our findings are published annually in medical journal The Lancet ahead of the UN climate change negotiations. Our data makes clear how climate change is affecting our health, the consequences of delayed action and the health benefits of a robust response.

THE INDIAN COUNCIL OF MEDICAL RESEARCH, HEADQUARTERS, NEW DELHI

The Indian Council of Medical Research (ICMR), New Delhi, is the apex body in India for the formulation, coordination and promotion of biomedical research. It is considered to be one of the oldest medical research bodies in the world. ICMR has always attempted to address the growing demands of scientific advances in biomedical research and finding practical solutions to the health problems of the country. The Council promotes biomedical research in India through intramural as well as extramural research. ICMR's research priorities coincide with the National health priorities such as control and management of communicable diseases, non-communicable diseases, maternal and child health, control of nutritional disorders, developing alternative strategies for health care delivery, environmental and occupational health problems along with drug research (Including traditional remedies). All these efforts are undertaken with a view to reduce the total burden of disease and to promote health and well-being of the Indian population.