

Climate change and health

The World Health Organization (WHO) and several international sustainability programmes repeatedly remind us that the health of people around the world is tightly linked to the health of the environment we inhabit. WHO recently stated on its website that ‘In the midst of a pandemic, a polluted planet, increasing diseases like cancer, asthma, heart disease, on World Health Day 2022, WHO will focus global attention on urgent actions needed to keep humans and the planet healthy and foster a movement to create societies focused on well-being.’ WHO also recognized that ‘The climate crisis is also a health crisis’.

Now, it is globally accepted that our climate is changing and is attributable to human interferences, also called anthropogenic activities. This is evident among many other factors from the increasing greenhouse gas (GHG) concentrations in the atmosphere and observed warming. The atmosphere and oceans are getting warmer, snow and ice are diminishing and the sea level is rising. Global surface temperature change by the end of the century is likely to exceed 2°–3°C relative to pre-industrial times. Continued emissions of GHGs will cause further warming and changes in all components of the climate system.

A special report of the Intergovernmental Panel on Climate Change (IPCC) (Global warming of 1.5 C, IPCC, 2018; <https://www.ipcc.ch/sr15/>) states that we are already facing the consequences of 1°C warming, such as extreme weather events, sea-level rise, glacier melting and so on. Fresh scientific evidence only reaffirms that climate change is inevitable. The purpose of the 2015 Paris Agreement was to limit global warming to less than 1.5°C. For this, we should have stabilized GHG concentration in the atmosphere to around 400 ppm of CO₂, which we have exceeded. Now the target is 450 ppm, which is the concentration target to limit warming to 2°C or less. Therefore, the world is currently striving to mitigate the effects of climate change and adapt to the changes along with efforts to prevent climate change.

An article published in the *Proceedings of the National Academy of Sciences USA* introduced a concept called ‘hothouse earth’ (Steffin, W. *et al.*, *PNAS*, 2018, doi:10.1073/pnas.1810141115). Hothouse earth is a term used to describe a scenario in which human activity causes a higher global temperature than any time during the past 1.2 million years. According to this, the predicted temperature increase

by 2050 is likely to be at least 2°C. Around 50% of the world’s population is likely to experience heat waves for at least 100 days every year. Extreme rainfall events may disrupt agricultural activities. At least 100 crore people may face issues related to migration.

Impacts of climate change have a significant effect on human health, either directly or indirectly. For example, extreme weather can cause injury, destruction and loss of life. Indirect effects include poor nutrition caused by crop failures, a lack of access to clean water, or issues related to poor air quality. Climate change can lead to poverty, displacement and mental health issues. Heat-related mortality or morbidity, air pollution-related illnesses, infectious diseases, particularly those transmitted indirectly by water through insect and rodent vectors, and refugee health challenges associated with forced population migration are all public health concerns due to a changing climate. Mental health issues include ‘eco-anxiety’, a condition that is more prominent in the younger generation. The American Psychology Association defines eco-anxiety as ‘the chronic fear of environmental cataclysm that comes from observing the seemingly irrevocable impact of climate change and the associated concern for one’s future and that of next generations’. Such negative health effects of climate on global public health have been increasing in recent years.

It is known that healthy ecosystems and biodiversity are essential to life on our planet. Unfortunately, many natural ecosystems and species are being lost due to various reasons, including climate change. According to a report by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) (Turnhout, E. and Purvis, A., *Griffith Law Rev.*, 2019, doi:10.1080/10383441.2020.1925204), about a million species are now threatened with extinction, and many of them in the next couple of decades. In India, about one-third of the forested area may be impacted by climate change. Climate change is also affecting the habitats of several species, including humans. Even small changes in average temperature can have a significant effect on ecosystems. An increase in global mean temperature is expected to impact biodiversity and species extinction significantly. ‘Bioclimatic envelope’ is the range of temperature, rainfall and other climate-related parameters in which a species currently exists. With climate change, climatic

envelopes will shift significantly. Consequently, the species can no longer survive in their current locations and will have to migrate to more favourable environments/locations. Such migration may not be possible because of geographical or human-made barriers, such as mountains or rivers in the case of animals, and state or international borders in the case of humans. Sea-level rise is another reason for a forced migration. The majority of the population living in coastal regions needs to migrate to other locations in response to sea-level rise. Such migration would result in health issues and also tremendous mental distress.

More than 230 medical journals in 2021 stated that climate change has already harmed human health; an increase in heat deaths, dehydration, kidney function loss, skin cancer, tropical infections, mental health issues, pregnancy complications, allergies, and heart and lung diseases. While most of these events are unavoidable, many of the health risks can be avoided by developing climate-resilient health systems that increase risk reduction, preparation, response and recovery. Vulnerability and adaptation assessments, as well as health system adaptation plans can help identify priority activities for effectively reducing the risks, such as disaster risk management and more resilient infrastructure.

Air-quality degradation is an issue of major concern in India. According to an estimate by the WHO, India ranks among the top 20 countries with high annual mortality rates due to air pollution. It is important to note that in 2014, WHO classified atmospheric suspended particulate matter as carcinogenic. Studies indicate that the number of asthma cases is increasing, especially in children in bigger cities and towns, because of growing air pollution. According to a paper published in *The Lancet* (Balakrishna, K. *et al.*, *Lancet*, 2018, **3**(1), E26–E39; doi:10.1016/S2542-5196(18)-30261-4), causes and health risks due to air pollution and climate change are intricately linked and need to be tackled together.

It is clear that the health of our planet is linked to the health of each one of us. One concept exploring this relationship in detail is planetary health. It is a solution-oriented, transdisciplinary field and a social movement focused on analysing and addressing the impacts of human disruptions to the Earth's natural systems on human health and all life on Earth. It indicates that everything is interconnected, and our actions today can affect us in future in ways that we do

not expect. Understanding and acting on these challenges calls for massive collaborations across disciplines and national boundaries to safeguard our health. This is one of the objectives of the Future Earth international programme, one of the global secretariats hosted by the Divecha Centre for Climate Change at the Indian Institute of Science, Bengaluru.

It is important to remember that we all have a responsibility to take action to prevent the climate from deteriorating further. Policy decisions that we make now and actions that we take in accordance with them in the coming years will have a significant impact on the future of our planet. Restoring better health of the planet will need massive efforts from all of us, both at the individual and community level along with collaboration from the public and private sector. Medical practitioners and climate scientists should work together to tackle such important global issues.

The world was not prepared to deal with the COVID-19 pandemic. The climate change community believes that the so called 'tipping points', which are irreversible and sudden changes in climate, will happen when the temperature rise crosses 2°C. The world is not prepared to face the consequences of tipping points like the case of the COVID-19 pandemic. This is a challenge for all of us. An article published in this journal (Srinivasan, J., *Curr. Sci.*, 2020, **118**(4), 1147–1448) states that 'Climate change occurs slowly when compared to a pandemic like COVID-19 but poses a larger existential risk than the pandemic. We cannot look for a vaccine to control climate change but need to go through the difficult transition to a world economy not dependent on fossil fuels' and 'The global pandemic and the threat of climate change demand global cooperation and response. They demand changes in behavior today to avoid more suffering in the future.' We hope that the experience gained from the COVID-19 pandemic will make the world leaders realize the serious implications of climate change and take appropriate policy decisions.

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