

CONVERGING PATHS

GLOBAL GOVERNANCE
FOR CLIMATE JUSTICE
AND HEALTH EQUITY

Vikrom Mathur and Aparna Roy
Editors



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Preface

THE CLIMATE, BIODIVERSITY, and health and nutrition are tightly interconnected and could form virtuous patterns; their negative outcomes, however—global warming, biodiversity loss, and poor health and nutrition—can result in a vicious cycle that have massive ramifications. Climate change is now recognised as an important determinant of health, given its consequences on the different dimensions of health of every living being on the planet. It is indeed one of the greatest challenges of the 21st century, directly and indirectly impacting our air, water, food, and shelter. Climate change-induced events, such as prolonged high temperatures, sea-level rise, and erratic rainfall patterns result in heat stress, poor air, water and food quality, changes in infectious disease epidemiology, and population displacement.

According to the World Health Organization (WHO), there will be 250,000 additional deaths per year between 2030 and 2050 from diseases caused by climate change which will cause direct costs to health between US\$2-4 billion annually. Vulnerable groups, including pregnant women, infants and

people above 65, may see increased morbidity and mortality. It is estimated that around 37 percent of heat-related deaths are attributed to human-induced climate change globally. Intersectionality with gender, age, ethnicity and poverty means that climate change impacts those who are already least able to withstand shocks. In particular, women, who are usually responsible for ensuring the supply of water and food for their families, face economic insecurity due to loss of livelihoods as an aftermath of natural disasters. People's mental health is also bearing the adverse effects of acute or chronic climate change, and today the term 'eco-anxiety' is becoming more commonly used to describe the state of mind of many young people.

Globally, about 1.1 percent of the population are displaced people. According to the United Nations, the number of displaced persons increased from 84.8 million in 2019 to 89.4 million in 2020. Climate change is one of the major reasons for such high incidence of migration; the other factors are violence and conflicts. Perhaps the most alarming effect of climate change on coastal regions is displacement due to uncertainty in livelihood and shelter, with the threat heightening every year during the monsoon season; there are also issues of coastal inundation, flooding, and sea-level rise. The UN International Organisation of Migration (IOM) estimates that there will be around 1 billion climate migrants in the next 30 years.

The COVID-19 pandemic did not help, disrupting the world's economy and causing the global gross domestic product (GDP) to fall by 3.4 percent in 2020 alone. Some 1.3 billion people were identified globally as 'multidimensionally poor' in 2022. Poverty has caused unemployment and food insecurity among populations which, in turn, has a direct impact on health and nutrition. Increasing poverty adds to the health burden and jeopardises the pursuit of Universal Health Coverage (UHC) around the world, thereby widening inequities in access to health care.

The call for 'climate justice' means implementing climate action using a human rights-based approach. People across the globe should have access to basic resources, a healthy and clean environment, and quality health care, regardless of their ability to pay. Fifty percent of the greenhouse gas emissions are attributed to the world's wealthiest (who comprise 10 percent of global population), whereas the poorest 50 percent of the

population are responsible for 10 percent of the historical emissions. Therefore, climate justice should include strategies to combat social, gender, economic, intergenerational, and environmental injustices that permeate current mechanisms.

Similarly, global health should be an issue of justice, and not charity. We all witnessed the stark inequities between countries in access to diagnostics, oxygen, vaccines, and other medical products during the COVID-19 pandemic. The principle of ‘mutual collective accountability’ must guide both global health governance and climate action, with the aim of meeting the needs of all the world’s people. Factors responsible for global health and other inequalities—such as blurred lines of responsibility, lack of global standards, undue influence of powerful countries, and hyper pluralism—need to be tackled to bring justice to global climate and health governance. Given the intimate connection between health and climate change, and that both need concerted and collaborative global efforts, the imperative is to think about their governance in parallel. At the recent UNHLM on UHC, countries reaffirmed their commitment to achieving the target, along with the SDGs, by 2030.

The UNFCCC parties should commit to prioritising the protection of human rights, development and well-being of children, adolescents, and youth and preventing the adverse effects of climate change. Other measures such as enhancing community engagement and considering their inputs while designing action plans, improving community ownership, promoting redistribution of power resources, strengthening inclusivity and addressing intersectionality, respecting social, cultural traditions and context, and ensuring universal human rights, should be considered. Investing in climate-smart technologies and health systems would be a win-win for all.

At COP28, WHO is preparing to address key health issues such as adaptation, migration, loss and damage, finance, agriculture, food systems, gender, youth, and intergenerational equity. There is also the issue of including health in the different negotiating streams and having the guiding principles for health in the Global Stocktake (GST), ensuring it is science-based, raises collective ambition, and protects the health and well-being of people. The outputs proposed include a rapid, equitable phaseout of fossil

fuel which is essential to keep the rise in average global temperature to 1.5 degree Celsius above pre-industrial levels. Other requirements are the evaluation of the extensive health and economic benefits of climate action, and strengthening adaptation action for long-term resilience and well-being.

For the first time in the history of the UNFCCC, COP28 will have a dedicated 'health day'. On that day, discussions will be held on the health impacts of climate change, health benefits of climate mitigation, climate-resilient low-carbon health systems, adaptation and action for health, relief, recovery, and peace. COP28 should exert effort to analyse the ways of linking health equity and climate justice, and draft possible action plans for the global community.

All living beings in the world are interconnected; in order to protect the harmony of the Earth, we will need collective responsibility and mutual accountability. In light of this, India's G20 presidency was guided by the principle of '*Vasudhaiva Kutumbakam*', a Sanskrit phrase meaning 'The world is one family'. It is time to come together as One World to address the challenges and commit to a more equitable, fairer, healthier and safer world.

Dr. Soumya Swaminathan

Chairperson,

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Preamble

THE RELATIONSHIP BETWEEN GLOBAL HEALTH and climate change is profound and multidimensional. Climate change is already causing widespread impacts across the globe and exacerbating existing health vulnerabilities. Extreme weather events, such as heatwaves, floods, and hurricanes, contribute to the spread of infectious diseases, disrupt health systems, and strain resources, especially in vulnerable regions. Climate-induced disruptions to food and water supplies are further compromising nutrition and sanitation, resulting in adverse health outcomes. Climate change is also undermining many of the social determinants for good health, such as livelihoods, equality, and access to health care and social support structures.

Countries that have, historically, contributed the least to greenhouse gas emissions are the ones bearing the most adverse ramifications of climate change. Low- and middle-income countries, in particular, are facing the brunt of health inequities. Unless current patterns are reversed, vulnerable populations, women, indigenous communities, the elderly, and those with pre-existing health conditions, will suffer the most acute health impacts of climate change. For instance, increased temperatures can lead to more

frequent and severe heat waves, creating the worst impact on those without adequate housing or proper ventilation.

This volume highlights the inextricable link between climate justice and health equity, and calls for the creation of global governance frameworks that are better aligned to ensure global equity and justice. The principle of 'climate justice' is rooted in the idea that the burden of climate change should not disproportionately fall on those least responsible for creating the crisis; the aim should be the equitable distribution of resources and responsibilities. Mirroring the goals of climate justice, global 'health equity' refers to the principle of ensuring that every individual has a fair opportunity to achieve their full health potential, regardless of geographic location, race, ethnicity, economic status, gender, age, or other socially determined circumstance.

Silos now need to be broken. Global health governance should adopt principles of climate justice, acknowledging the disproportionate impact of climate change on those without equitable access to health services and resources. Health should be central to efforts to ensure climate justice. Breaking down these barriers, however, is not an easy task. Yet, through informed and decisive leadership, it is possible to create a more integrated approach to global governance that serves both the planet's health and the well-being of its inhabitants.

The Conference of the Parties of the UNFCCC, COP 28 must move the climate-health nexus to the centrestage of the global climate change agenda. The nexus of climate justice and health equity needs greater attention to address the deepening global inequalities in the health impacts of climate change. The objective of this volume is to shape both the framework for global health governance and that for global climate governance, and explore pathways for their convergence.

The compendium begins by uncovering the impacts and vulnerabilities that climate change inflicts on human health.

In Section I, *Robin Fears and Andy Haines* outline the pathways of climate risk and the direct and indirect effects of climate change on human well-

being. *Saleem ul Huq and As-Saba Hossain* then delve into identifying the regions, communities, and social groups most vulnerable to the health impacts of global warming, and trace the historical trajectories that shape these vulnerabilities.

Climate change acts as a powerful stress multiplier, exacerbating vulnerabilities across a spectrum of global systems, intricately linking the health of populations to systemic impacts and changes. Section II explores the most crucial of these interlinkages.

In her essay, *Sara Roversi* probes how climate change affects food security and exacerbates malnutrition, especially among vulnerable populations. She proposes effective strategies to address the intricate relationship between climate, nutrition, and better health outcomes. *Vidisha Mishra*, in the fourth chapter, dives into gender-specific health risks tied to climate change, advocating for gender-responsive policies within healthcare systems.

Chapter 5, authored by *Meelan Thondoo, Tolu Oni and Akeem Ali*, draws on the lessons of the COVID-19 pandemic to shed light on the societal, economic, and political factors that amplify the consequences of climate change and pandemics on marginalised populations. *Reva Dhingra* and *Ciaran Donnelly's* essay then explores how climate change-induced migration and displacement, and the ensuing socio-economic challenges impact health inequities. The chapter also tackles the political implications of addressing the health needs of 'climate refugees' and managing the strain on health infrastructure in receiving regions.

Section III of this volume explores the integrated pathways for building climate-resilient global health systems and frameworks for the convergence of global health and climate change governance.

In their piece, *Sanjay Pattanshetty, Aniruddha Inamdar, Kiran Bhatt, and Helmut Brand* outline the elements of resilient global health systems amidst evolving diseases driven by climate change. *Nishant Sirohi and Priti Patnaik* shift the focus to redefining global health governance mechanisms to incorporate climate change effectively within international agreements and policies. *Railla Puno* and *Danielle Yeow* then examine how global climate policy and climate justice frameworks under the UNFCCC could emphasise and address health concerns.

We conclude the volume with our essay that outlines ten key action points for converging pathways for global governance to ensure climate justice and health equity.

- ***Vikrom Mathur and Aparna Roy***



I.

IMPACTS AND VULNERABILITIES

Climate Change and Health: From Impacts to Action

Robin Fears and Andy Haines

Tracing the Critical Vulnerabilities of the Global South

Saleem ul Huq and As-Saba Hossain



Climate Change and Health: From Impacts to Action

Robin Fears and Andy Haines

THE WORLD HEALTH ORGANIZATION (WHO) has stated that climate change presents a fundamental threat to human health.¹ The nature, distribution, and timescale of the health impacts, however, differ among countries and their populations. Low- and middle-income countries (LMICs) and marginalised groups within countries at different levels of economic development are disproportionately affected due to economic and social inequities.²

It has been demonstrated³ that multiple Earth system boundaries, including climate, have now been breached. This worrying finding emphasises the need for a 'planetary health'⁴ approach for evidence generation and governance that encompasses the health of human populations as well as the state of natural systems on which human health depends.

Both mitigation and adaptation solutions as well as their better integration are important in responding to the growing adverse impacts of climate change on health, including by helping develop resilient and equitable health systems with low environmental impacts. Policymakers must work more closely with the scientific community and other knowledge producers

to strengthen the objectives and procedures for generating and using robust evidence to inform policy development and implementation. Members of the G20 have a central role to play in supporting the generation and implementation of evidence for climate action.

Using the evidence base

This essay draws on the work of the InterAcademy Project (IAP)—a global network of more than 140 academies of science, engineering, and medicine, including a number from G20 nations. A global synthesis report from a recent, inclusive project⁵ on climate change and health brought together diverse evidence from Africa, Asia, the Americas, and Europe to demonstrate commonalities in deteriorating health outcomes that warrant shared approaches to identifying and implementing science-based solutions. One distinctive finding of the IAP that can add value to international studies of climate challenges is the encouragement of national science academies to summarise evidence and engage with decision-makers within countries and regions in order to devise collective and customised solutions.

Multiple Pathways of Risk and Impact

Health risk is a function of the compounded effects of hazard, exposure, and vulnerability. The complex pathways of direct and indirect risks include notable recent examples of extreme heat, wildfires, floods, droughts, the spread of infectious diseases, food insecurity, and forced displacement. Pathways are modified by social determinants and lead to a multiplicity of physical and mental health consequences (Figure 1).

Figure 1: Pathways of Exposure to Climate Change and their Health Consequences



Source: IAP 2022⁶

This figure emphasises key exposures, mediators, and effects. Previous studies have provided an overview of systematic reviews of the literature;⁷ they also discussed the pathways and conducted a detailed exposition of the IAP's messages on governance for policymakers.^{8,9,10}

There is a growing body of evidence attributing health effects from human-induced climate change as distinct from health effects from natural climate variability. For example, a study of data from over 700 locations in 43 countries estimated that about one-third of heat-related deaths in recent decades can be attributed to climate change.¹¹ Human populations have historically developed within highly conserved climatic limits, known as the "human climate niche."¹² There is a primary peak of global population density at a mean annual temperature of ~13°C and a secondary peak at ~27°C (particularly in the monsoon climates of South Asia). If global average temperatures increase by about 2.7°C (as projected under current

climate policies), about one-third (22–39 percent) of people would be living outside the niche by the end of this century (2080–2100).¹³ Some population groups, such as pregnant subsistence farmers, are particularly susceptible to heat exposure and have very limited capacity to adapt.¹⁴

Increasing risks of floods, droughts, and wildfires pose wide-ranging threats to human health—both physical and mental. For example, droughts can create increased risks of undernutrition, water-related zoonoses, vector-borne diseases, airborne and dust-related diseases, exposure to air pollution from wildfires, displacement of populations, and mental health effects.¹⁵

Nutrition is threatened through multiple pathways, including decrease in crop yields, particularly in tropical and sub-tropical regions; pollinator declines; increased pests; decreased micronutrients such as zinc and iron; and reduced protein from rising carbon dioxide levels.¹⁶ Childhood stunting, which has long-term effects on height, cognitive development, and life prospects, is projected to increase substantially as a result of worsening climate change.¹⁷

Compared to patterns recorded in 1970–99, the population at risk of malaria and dengue could increase by up to 4.7 billion by 2070, depending on the projected temperature increases and the implemented mitigation measures.¹⁸ Public health systems may be unprepared for geographical shifts in transmission, and populations may lack natural immunity. The increase in malaria risk is projected in the tropical highlands of Africa, in the Americas, and the Eastern Mediterranean.^{19,20} Increased suitability for transmission of dengue is predicted mainly in lowland areas in the Western Pacific region and the Eastern Mediterranean region, as well as in highland areas in the Americas.^{21,22}

Additionally, climate change, in combination with land-use change, is projected to increase the probability of viral sharing between wild animals and humans, thus increasing the risks of emerging zoonotic diseases.²³

While there is much to be done to clarify and quantify the risks as well as evaluate their interactions, compound effects, and attribution to climate change and its drivers, it is clear that the successful implementation of adaptation and mitigation actions is essential to protect and promote health. There are crucial evidence gaps on the effective adaptation strategies in LMICs; in a systematic review of 1,682 research papers providing evidence on LMICs, only two conducted ex-ante evaluations of the effects of actions to adapt to climate change on public health.²⁴ Nevertheless, early warning systems for infectious disease show promise in using increasingly powerful climate data integrated with disease and vector surveillance systems and cross-sectoral responses to reduce disease risks. Such approaches are being developed in the Caribbean²⁵ and elsewhere.²⁶ In Machala, Ecuador, for example, climate forecasts were used to predict an early peak in dengue transmission following an El Niño event in 2016.²⁷

The development of early warning systems for extreme heat, vector-borne, and other infectious diseases are likely to make significant contributions for effective climate change adaptation. Integrated cross-sectoral policies could be most effective; for example, in the case of extreme heat, early warnings must be transmitted effectively to vulnerable communities and individuals, including the elderly, refugees, and informal settlements.²⁸ Increasing the amount of green space in cities can help reduce the urban 'heat island' effect and thus reduce heat-related deaths. A study of urban greenness and heat-related mortality in 452 locations across 24 countries showed that a 20-percent increase in green space can lead to a 9-percent decrease in heat-attributable fractions.²⁹

Climate change mitigation actions could potentially prevent millions of premature deaths annually through reduced air pollution as a result of phasing out fossil fuels; increased consumption of healthy, low greenhouse gas (GHG) emission diets; and increased physical activity from active mobility.³⁰ These co-benefits can be experienced in the near term and are additional to the gains resulting from reduced risks of climate change because of rapid cuts in GHG emissions. However, the assessment of mitigation performance in G20 countries using a composite index demonstrates

wide variation,³¹ and examples of good practice need to be collected and shared more widely to raise mitigation expectations and accomplishments worldwide.

It is also important to emphasise the need to capitalise on the health co-benefits—such as those derived from reduced air pollution—of mitigation policies across a range of sectors, including agriculture, land use, energy, housing, transport, and urban planning. A comprehensive review by the Pathfinder Initiative collected evidence on the development and implementation of multi-sectoral actions to sustain and improve health while accelerating progress towards a net-zero carbon economy.³² Although there are evidence gaps, there is urgent need to act on the available evidence while also generating new ones by evaluating climate adaptation and mitigation actions. Therefore, it is imperative to correct current imbalances in the design, methodology, and use of research that results from underinvestment in the knowledge needs of LMICs.

Climate Justice and Health Equity

As noted in the IPCC synthesis report of 2023,³³ prioritising equity, climate justice, social justice, inclusion, and just transition processes can enable ambitious adaptation and mitigation actions and climate-resilient development; lead to more sustainable outcomes; reduce trade-offs (such as increased energy demands from air conditioning); and support transformative change towards an equitable and healthy net-zero emission economy.

Many member countries of the G20 are responsible for a disproportionately large share of global GHG emissions. Meanwhile, LMICs, which have historically had the least contribution to GHGs, have suffered the worst consequences of climate change on the health of their populations and economic growth. In higher-income countries, there is a disproportionate increased burden of climate change on households that are already experiencing poverty.³⁴ What should be done to correct these longstanding inequities?

Climate justice for LMICs relies on transforming current international funding mechanisms to support health protection and promotion. For example, global finance for climate adaptation across sectors comprises only a small fraction of financing for mitigation, and the health sector is particularly poorly funded. Although there are gaps in the data, estimates suggest that only 1–5 percent of total adaptation funding has been committed to health activities in the past decade.^{35,36} Moreover, the paucity of health indicators as part of adaptation project monitoring and the lack of emphasis on local adaptation are particularly stark weaknesses.

The IMF estimates that fossil fuel subsidies in 2022 amounted to about US\$7 trillion, having increased by US\$2 trillion since 2020.³⁷ They further estimate that 18 percent of the 2022 subsidy reflects undercharging for supply costs (explicit subsidies), and 82 percent was attributed to undercharging for environmental and health costs and forgone consumption taxes (implicit subsidies).³⁸ To accelerate mitigation, harmful subsidies for fossil fuels and unsustainable agricultural practices should be phased out and redirected through targeted cash or near-cash transfers to protect the poor. Additional priorities include increased financing of universal health coverage; public transport; clean renewable energy; and affordable, healthy food choices.

The COP27 has agreed to fund “loss and damage” arising from unavoids climate change impacts, whether from extreme weather or slow-onset events. It is now essential that the COP28 operationalises the commitment to introduce practical mechanisms to support LMICs. It has been anticipated that, as part of the Global Stocktake of Paris Agreement objectives, the COP28 places ‘loss and damage’ on the same footing as adaptation and mitigation.³⁹ However, integrating these differing routes and fulfilling funding promises to facilitate climate action requires political leadership and accountability. The scientific community can play an important role by developing the robust global evidence base to underpin ‘loss and damage’ priorities,⁴⁰ including by attributing health effects to climate change and by acting locally to inform and monitor action targeted at the most vulnerable.⁴¹

The G20 has the collective responsibility as well as financial and other resources to act in solidarity on health and health equity goals, with particular focus on vulnerable groups. The recent accession of the African Union to the G20 strengthens the grouping's global representation and credibility and aids in reforming the currently skewed distribution of evidence generation and uptake for solutions to climate change—an objective that is consistent with the recent recommendation from the G20 Chief Science Advisors,⁴² which highlighted the need to address existing knowledge asymmetries in global science advice.

Integrating Policy for Climate Change Solutions with the SDGs

A new report from UNDESA and UNFCCC⁴³ emphasises the need for the climate and sustainable development crises to be tackled together. While the Paris Agreement goals and SDGs are mutually reinforcing, there is need for greater ambition to push integrated planning and implementation to tackle the knowledge, institutional, and economic barriers to transformative change. The SDG midterm review outcomes can now be integrated with long-term low-GHG emission development strategies and the Global Stocktake process under the Paris Agreement to accelerate the converging paths in global governance.

While many scientific studies have been published on the SDGs, their political impact has remained largely discursive, with little indication that this evidence has substantially influenced legislative action or resource allocation.⁴⁴ To improve the receptivity for scientific evidence at the intersection of science and policy, it is important to ensure that the evidence is actionable—and, where possible, addresses the policy-relevant economic considerations. Furthermore, it should capitalise on transdisciplinary, systems-based approaches to the co-production of knowledge.⁴⁵ Therefore, resetting the SDG principles to prioritise addressing poverty, health, and climate should be considered seriously.⁴⁶

In conclusion, health must be moved to the foreground in creating accelerated, radical, concerted, and equitable governance actions. The pace and extent of environmental changes pose serious challenges to the global health gains made over recent decades. The warnings are stark—with UN Secretary-General António Guterres proclaiming that “humanity has opened the gates of hell”⁴⁷—and current climate action is dwarfed by the scale of the challenges. However, while the health threats are unprecedented, there are numerous opportunities to devise and use science-based, equitable, and sustainable solutions.

The G20 members possess the adequate resources and influence to provide leadership for rapid progress towards healthy, net-zero societies and increase momentum for mitigation and adaptation solutions, including a fossil fuel phase-out, without which effective adaptation cannot be achieved.

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Tracing the Critical Vulnerabilities of the Global South

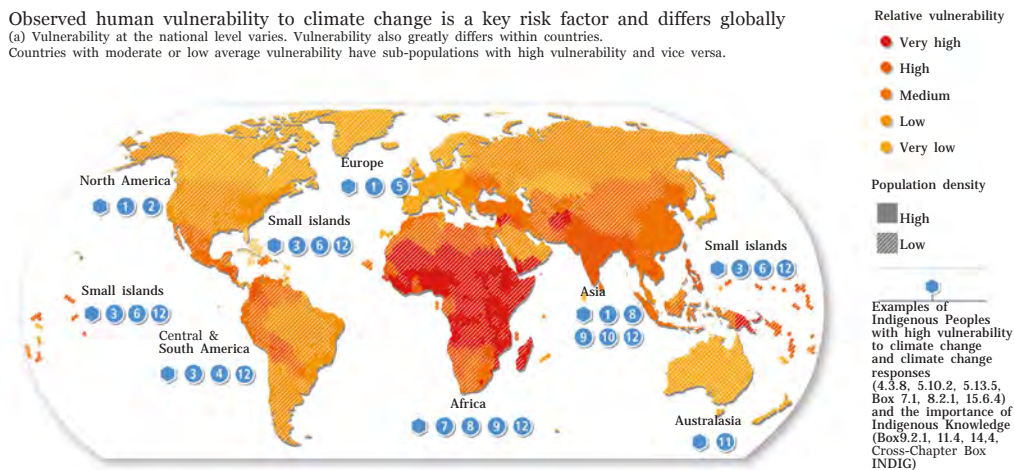
Saleem ul Huq and As-Saba Hossain

THE CLIMATE CRISIS IS CASTING a long shadow across regions and countries, and the least culpable and most vulnerable communities are bearing the direst repercussions. Countries with frail financial and other infrastructure required to accommodate the fallout are unable to mitigate the consequences. Disparities in adaptation will only aggravate conflict, starvation, forced migration, and disease epidemics, ultimately threatening every nation across the world.

Climate-sensitive health risks are disproportionately borne by the most vulnerable and disadvantaged regions, including least developing countries, coastal areas and floodplains, and regions with poorly maintained or aging health infrastructure with limited ability to invest in improvements. Climate change is expected to cause approximately 250,000 additional deaths per year, from undernutrition, malaria, diarrhoea, and heat stress alone between 2030 and 2050.¹

Fig. 1: Global Distribution of Vulnerable People, With Examples

Observed human vulnerability to climate change is a key risk factor and differs globally (a) Vulnerability at the national level varies. Vulnerability also greatly differs within countries. Countries with moderate or low average vulnerability have sub-populations with high vulnerability and vice versa.



Examples of vulnerable local groups across different contexts include the following:

- Indigenous Peoples of the Arctic | health inequality, limited access to subsistence resources and culture CCP 6.2.3, CCP, 6.3.1
- Urban ethnic minorities | structural inequality, marginalisation, exclusion from planning processes | 14.5.9, 14.5.5, 6.3.6
- Smallholder coffee producers | limited market access & stability, single crop dependency, limited institutional support 5.4.2
- Indigenous Peoples in the Amazon | land degradation, deforestation, poverty, lack of support| Box 8.6
- Older people, especially those poor & socially isolated | health issues, disability, limited access to support | 8.2.1, 13.7.1, 6.2.3, 7.1.7
- Island communities | limited land, population growth and coastal ecosystem degradation | 15.3.2
- Children in rural low-income communities | food I insecurity, sensitivity to undernutrition and disease | 5.12.3
- People uprooted by conflict in the Near East and Sahel prolonged temporary status, limited Imobility | Box 8.1, Box 8.4
- Women & non-binary limited access to & control over resources, e.g. water, land, credit | Box 9.1, CCB-GENDER, 4.8, 8.3, 5.4.2, 10.3.3
- Migrants informal status, limited access to health services & shelter, exclusion from decision-making processes | 6.3.6, Box 10.2
- Aboriginal and Torres Strait Islander Peoples | poverty, food & housing insecurity, dislocation from community | 11.4.1
- People living in informal settlements poverty, limited basic services & often located in areas with high exposure to climate hazards | 6.2.3, Box 9.1, 9.9, 10.4.6, 12.3.2, 12.3.5, 15.3.4

Sources: *Intergovernmental Panel on Climate Change (IPCC)*

Climate change has a significant impact on human health, and certain groups are more vulnerable than others due to different determinants of health like income, education, access to health care, and housing.

The most vulnerable populations include:

- **Communities of Small Island Nations:** These groups are at greater risk because they may live in locations that are prone to climate-related health hazards, such as extreme weather events (tropical cyclone, flooding, drought and heat stress) and air pollution. They can also have higher rates of existing medical conditions, such as disabilities, underdiagnosed mental health issues, and non-communicable diseases, which can be worsened by climate change impacts.
- **Low-income groups in the LDCs (Least Developing Countries):** Individuals in these communities may struggle to access resources and care needed to adapt to extreme weather events. They may also have limited resources along with cultural, language, or citizenship barriers

that restrict their ability to avail health care and social safety nets. They may include immigrants from conflict zones, or climate refugees.

- Women, children, and older adults: These groups may have health vulnerabilities due to age, chronic or pre-existing medical conditions, or else are taking certain medications. For example, the elderly, babies, and children are more vulnerable to extreme heat.
- Outdoor workers, displaced people due to conflicts and war, homeless people, people living in flood plains, or people living in informal settlements in urban areas: These groups are more exposed to climate-related health impacts, such as extreme heat, flooding from extreme weather events, and water-, food-, and vector-borne diseases.

Key Vulnerability Factors

Climate change precipitates a range of “loss and damage” outcomes that are often irreversible and fall into economic or non-economic categories. Within the realm of public health, economic consequences manifest as heightened healthcare costs and diminished productivity across various industries. Non-economic damage, which primarily encompass health effects, are even more pervasive.

Direct non-economic repercussions on health include injuries, diseases, and deaths resulting from climate-aggravated natural disasters. However, indirect non-economic health impacts are broader, touching upon numerous environmental factors that influence health. These encompass the psychological and physical health effects emerging from the loss of homelands, erosion of cultural foundations, the diminishing of traditional and local knowledge, and the weakening of communal or cultural identities. Additionally, the decline in biodiversity and the degradation of ecosystems essential for health due to climate change represent significant non-economic health losses.

Rising temperatures driven by the emission of greenhouse gases, resulting in escalating the threat of morbidity and mortality for humans, are compounded by rapid urban growth. All these impact the vulnerable population of children, elderly and people with disabilities. Health issues from episodes of heatwaves in the past 20 years can be partly attributed to global warming. Intense heat significantly impacts physical as well as

mental health.³ Echoing the overall patterns, increased heatwave effects impact overall cardiovascular mortality, the elderly, ischemic heart disease, and stroke.⁴

Warming of the Earth caused by anthropogenic greenhouse gas emissions has profound long-term implications for the prevention and control of vector-borne diseases. Vectors, which are ectotherms, thrive in higher temperatures. Climate change affects the transmission dynamics and geographic spread of vector-borne diseases. Climate change has already made conditions more conducive to the spread of certain infectious diseases, including Lyme disease, water-borne diseases, and mosquito-borne diseases such as malaria and dengue fever.⁵ High temperatures can also alter pathogen survival, replication, and virulence; heavy rainfall events can mobilise pathogens and compromise water and sanitation infrastructure; and droughts can concentrate pathogens in limited water supplies.⁶ Moreover, cholera outbreaks are closely related to environmental conditions, and studies have found that increases in ambient temperature are linked to more cases of diarrheagenic *E. coli*.⁷ Extreme precipitation can lead to significantly increased turbidity, and cryptosporidiosis and giardiasis risk.⁸

Changes in temperature and precipitation can affect the distribution and survivability of pathogens that cause foodborne illnesses. Changes in climate can cause severe droughts or flooding, which can affect pathogens and introduce toxins to crops. Climate change can modify the seasonal and geographic occurrence of bacteria, viruses, parasites, fungi, and pests as well as chemical contaminants.⁹ Climate change can result in higher air and water temperatures, increased precipitation, or water scarcity, which poses a risk to food safety due to possible contamination of irrigated produce by pathogens.¹⁰

The effects of climate change on respiratory health depend on temperature changes, air pollutants, heatwave and flood risks, and influences on air quality, allergens, and molds. Climate change may change the frequency of infections like tuberculosis and respiratory syncytial virus. The seasonality of respiratory infections is influenced by temperature and behavioural patterns, such as the time spent outdoors during milder winter.¹¹ Climate change is expected to both exacerbate existing respiratory diseases and bring about or promote adverse respiratory conditions.¹²

Climate change results in job losses, displacement, and erodes community ties, all of which impact mental health. Increased temperatures and pollution from greenhouse gases amplify risks of neurological issues like strokes and dementia. Shifts in food quality can lead to psychiatric conditions, and changing disease patterns expose more to neuropsychiatric effects. New terms, including “eco-anxiety,” “ecological grief,” and “solastalgia,” capture the psychological ramifications of climate change. Eco-anxiety, often experienced by the youth, reflects concerns about the future and can lead to feelings of despair and inaction.¹³

In 2019, globally, high temperatures were responsible for 0.54 percent of deaths and 0.46 percent of DALY (disability-adjusted life year),^a translating to age-standardised rates of 3.99 and 156.81 per 100,000 people, respectively. While high-temperature related issues with lower respiratory infections had the highest rates and showed a decline, the burden from non-communicable diseases due to high temperatures rose between 1990 and 2019. Regions with a low sociodemographic index (SDI) bore the brunt of these temperature-related health issues, whereas those with high SDI experienced lesser impacts.¹⁴

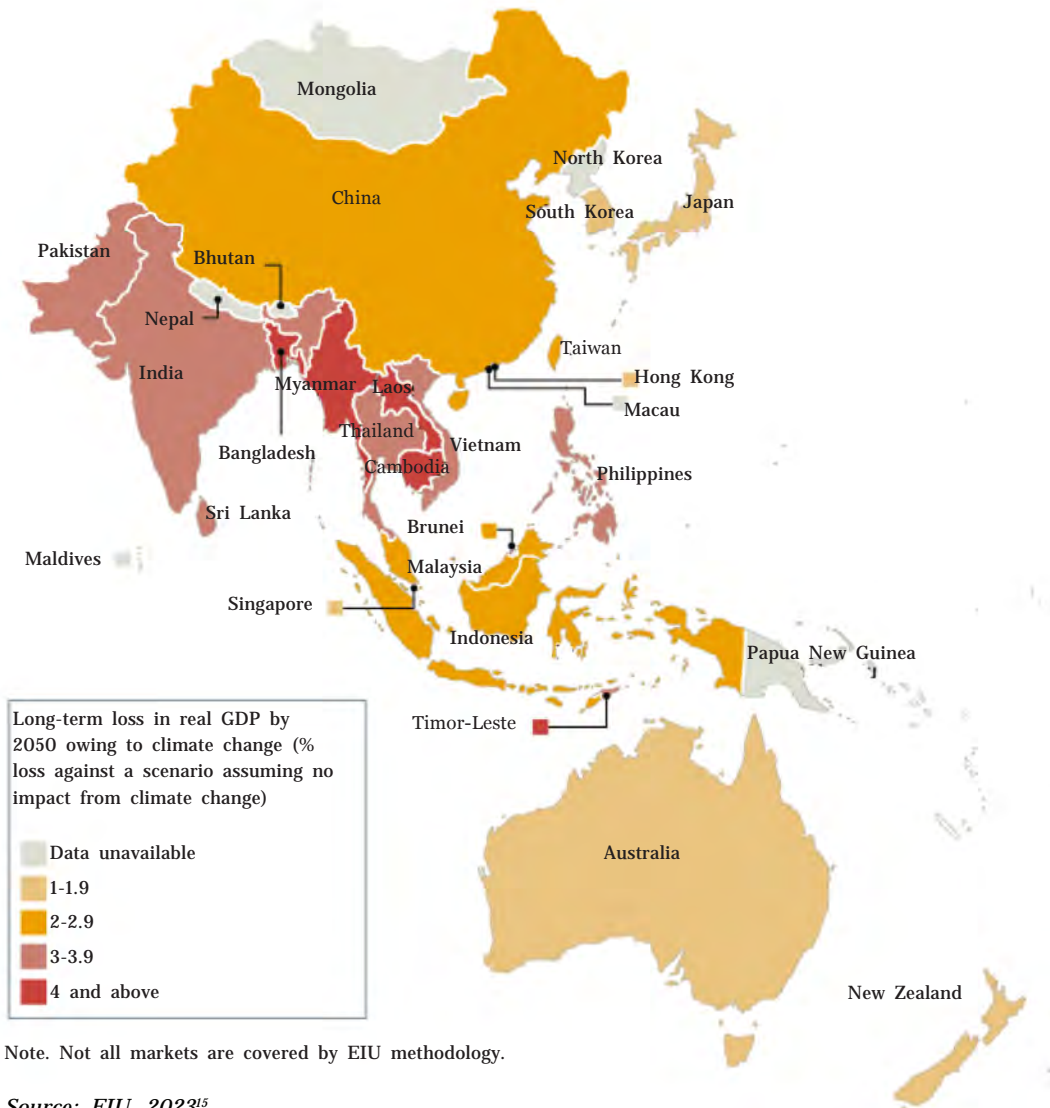
Due to the dependency on agricultural growth along with poor infrastructure and questionable governance, the climatic impact of the phenomenon of El Niño Southern Oscillation (ENSO)^b would have greater impact with increased incidence of extreme weather events along with the result of erratic rainfall. The lack of rainfall will compel the economies to have impaired growth which would be compounded by loss of GDP due to reduced agriculture and livestock harvesting. The economic burden for such incidence will push marginalised farmers into the quagmire of debt, which in turn will dwarf the possibility of sustainable growth and development.

^a DALY is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.

^b A warming of the ocean surface, or above-average sea surface temperatures, in the central and eastern tropical Pacific Ocean.

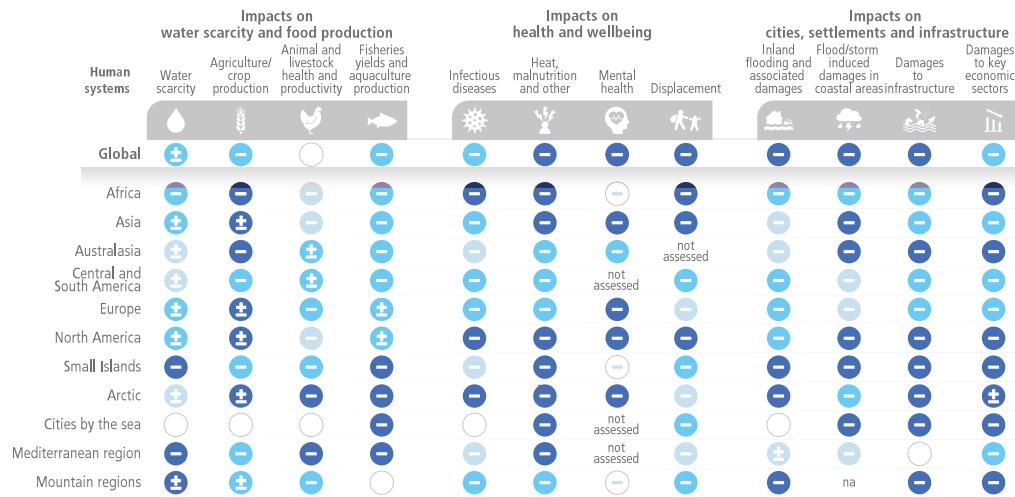
Fig 2: Loss of GDP by 2050 (in %) Attributable to Climate ChangeL

Asia's long-term growth trajectory is vulnerable to climate disruption



In a paper published in 2013, Cherchi and Navarra warned that El Niño and IOD (Indian Ocean Dipole), when they coincide, will cause prolonged monsoons for the northeast part of South Asia.¹⁶

Fig 3: Impacts of Climate Change on Health Systems



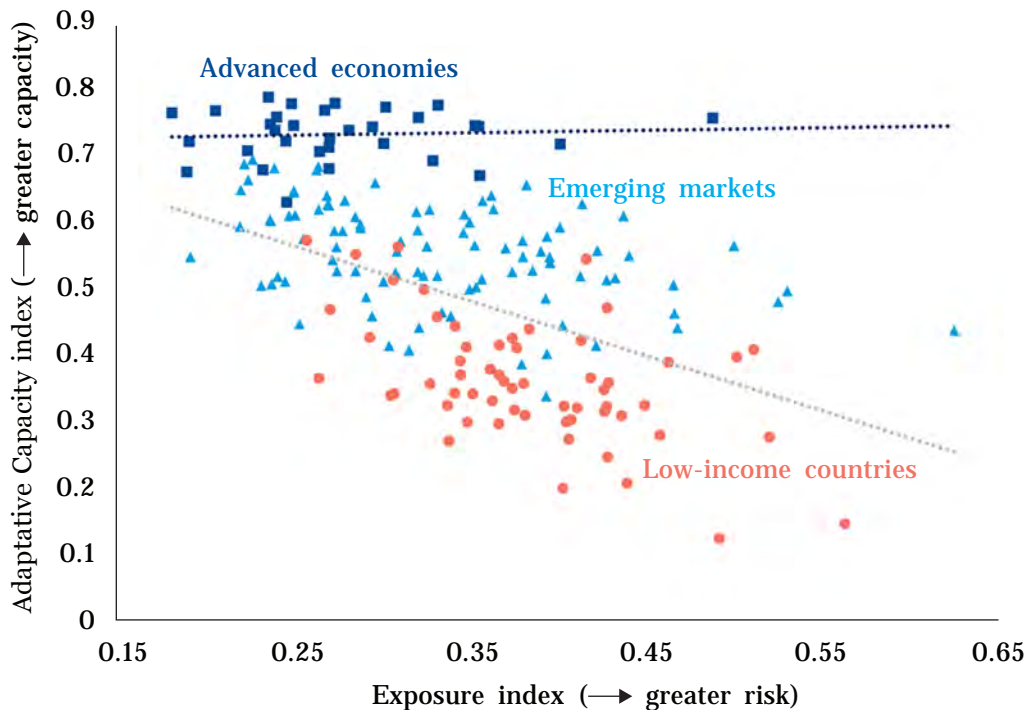
Source: *Climate change 2022: impacts, adaptation and vulnerability – summary for policymakers.*¹⁷

Health System Weakness and Adaptive Capacity

According to recent research, countries with lower Gross Domestic Product (GDP) per capita are at greater risk of suffering losses and damage as a result of climate change.

The poorest countries face the greatest risks from climate change and require international support to finance adaptation. These are the Sub-Saharan nations, countries in South Asia and Southeast Asia, and the Small Island Nations, who are all vulnerable to the climate change crisis due to lower per-capita incomes, poor social determinants of health, and limited investments in health infrastructure. These countries are at risk of losing lives, land, and livelihoods and are facing the threat of catastrophic damage.¹⁸

Fig 4: Unequal Cost of Climate Change



Source: IMF staff calculations based on 2015-18 data from the European Commission, the United Nations University Institute for Environment and Human Security, the University of Notre Dame, and the April 2020 World Economic Outlook.

Note: Dotted lines show estimated linear relationships for advanced economies, and for emerging market and low-income countries combined, respectively.

People living in these regions are burdened by poverty, with some countries also having to deal with repressive state rule; they often suffer the harshest consequences of climate change while possessing the least ability to cope. They typically lack the financing and institutional capacity to implement needed adaptation programmes.

Justice demands that responses to the climate crisis be rooted in fairness. Global mitigation efforts must reflect a country's past and present greenhouse gas contributions, as well as their ability to address the challenges. Technologically advanced economies are thus called upon to accelerate their emission reductions, with targets surpassing current commitments by 2030 and aiming for net-zero before 2050. This is imperative not just

for reducing carbon emissions but also for halting biodiversity decline and environmental degradation. Moreover, there must be collective effort to ensure that the development of clean technologies does not perpetuate ecological damage or human rights abuses.¹⁹

Countries most responsible for environmental degradation must provide greater support to low- and middle-income countries in their transition to greener and more resilient economies. The allocation of funds should be balanced between mitigation strategies and adaptive measures, such as bolstering the resilience of health systems against climatic impacts.

Support should manifest as grants, not loans that compound debt burdens, thereby fostering local capacity and empowering communities. This should accompany debt forgiveness for impoverished nations, liberating them from financial shackles. Significant funds should also be earmarked to address the loss and damage already inflicted by the climate crisis.

***Prof. Saleem ul Huq** was the Director of the International Centre for Climate Change and Development (ICCCAD), Bangladesh. He passed away shortly before the publication of this volume.*

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II.

SYSTEMIC INTERSECTIONALITIES

**A Model for Ecological Regeneration Towards
Global Well-being and Health Equity**

Sara Roversi

**Accelerating Gender Equality and Health
Equity in Climate Action**

Vidisha Mishra

**Climate Strategies for Better Health
Outcomes and Health Equality in Cities**

Meelan Thondoo, Tolu Oni and Akeem Ali

**Climate Change, Displacement, and Health
in Fragile and Conflict-Ridden States**

Reva Dhingra and Ciaran Donnelly



A Model for Ecological Regeneration Towards Global Well-being and Health Equity

Sara Roversi

THE 2023 REPORT of the Intergovernmental Panel on Climate Change (IPCC) paints a bleak picture, noting that “human activities” have “unequivocally caused global warming” and are leading to “widespread and rapid changes”,¹ many of them irreversible. Despite previous warnings,² efforts to keep global warming below 1.5°C (from pre-industrial levels) have failed. Data³ shows that September 2023 was the hottest month ever recorded in history, and it is highly likely that the coming years will see more temperature records being broken. If immediate action is not taken, global temperatures will rise by 3.2°C by 2100.⁴

What does this mean for human and planetary health, for the environment, social justice, food security, and mental well-being? What are the ways by which the global community can stop this self-perpetuating cycle of destruction?

Paradoxically, the sector of Agriculture, Forestry, and Other forms of Land Use, together known as AFOLU—which is supposed to nourish the planet and not annihilate it—is one of the biggest contributors to the climate emergency, responsible for 22 percent of global greenhouse gas (GHG)

emissions. (If AFOLU's indirect connection with the energy, transportation and construction sectors, and industry in general, is taken into account, its GHG emissions rises to 79 percent.⁵) Unsustainable agricultural expansion driven by unsustainable diets is significantly increasing the vulnerability of the ecosystem. The prevailing agribusiness model has turned land into industry, causing pollution, damage to biodiversity, soil erosion and degradation, land and water resource deficits, landscape alterations, and social imbalance. Some of the effects that have occurred are irreversible. Existing techniques or planned measures cannot wholly eliminate some of the emissions of the AFOLU sector, such as methane and nitrous oxide. Although agricultural productivity has increased overall, the climate damage being caused has slowed its overall growth, negatively impacting crop and crop yields, especially in mid- and low-latitude regions.

Add to that the warming of the oceans, which has contributed to an overall decrease in maximum catch potential, exacerbating the impacts of overfishing for some fish stocks and negatively affecting the food production of aquaculture and shellfish fisheries in some ocean regions. It is clear that the entire global food supply is already at risk. This will have dire consequences on food availability and access, leading to rising food prices—exacerbated by ongoing geopolitical conflicts—and rising morbidity and mortality. Illnesses linked to environmental factors (about 24 percent of all the world's diseases),⁶ the prevention of which would save nearly 3 million children a year, are on the rise. There is also an increase in food-borne diseases, nutrition being directly correlated with health. According to the World Health Organization (WHO), sufficient consumption of fruits and vegetables would save about 3 million people a year. Poor dietary and lifestyle behaviours are the main reasons behind chronic diseases, which are the leading cause of mortality worldwide.⁷

These phenomena mainly affect regions that the IPCC 2023 report calls “highly vulnerable to climate change”.⁸ They account for about half the global population, but again, paradoxically, this half is the least responsible for creating the climate urgency.

An additional reason to counter climate change is, therefore, social justice. In the least developed countries—where, according to the IPCC, deaths from

extreme events (floods, storms, or droughts) are 15 times higher than in the rest of the world—the increase in extreme weather and climate phenomena has led to severe food insecurity, reduced water security, unstable supplies, increased mortality, and rising incidence of food-, water-, and vector-borne diseases.⁹ No doubt negative health consequences are occurring in other nations too, due to the destruction of entire ecosystems, pollution, and damage to the soil and its products. The damage to the economy (for instance, due to increased healthcare spending) and rise in social inequity is widespread. Of great relevance, though less immediately perceptible, are also the effects on mental health—stress due to loss of livelihoods caused by rising temperatures, or the trauma induced by extreme weather events, or even cognitive weakening caused by food progressively losing essential nutrients.¹⁰

Emissions have to be brought down close to zero by 2050. Carbon dioxide levels, with 2019 as the base, must be reduced by 48 percent by 2030, 65 percent by 2035, 80 percent by 2040, and 99 percent by 2050. All GHG emissions must similarly fall progressively by 43 percent, 60 percent, 69 percent, and 84 percent in the same years.¹¹ If these targets are fulfilled, air and water quality, soil performance, health, welfare and nutrition, and biodiversity protection will all thereby improve.

A Model Diet

Health is not, as WHO has noted, just an “absence of disease and infirmity”, but the concomitance of elements triggered in a chain. Human actions have a direct impact on climate, ecosystems, and the environment.

The IPCC report, in a section on ‘Health and Nutrition’, notes that food is a foundational element of one possible climate adaptation strategy: healthy, balanced, and sustainable diets contribute to nutrition, health, biodiversity, and other environmental benefits;¹² to “food and nutrition security”; which is “culturally acceptable, accessible, economically equitable and affordable; nutritionally adequate, safe and healthy”.¹³

The Future Food Institute,¹⁴ driven by the regenerative thinking that sees the world as built around reciprocal and co-evolutionary relationships, has shown that it is still possible to safeguard the environment, benefit new generations, ensure social justice, and take effective action on food security through a *sustainable, participatory, and integral model of development*, based on the Mediterranean Diet.^a This model, with millennial-old roots, has been codified in Pollica (in Salerno district, Italy). In 2010, UNESCO listed it as Intangible Cultural Heritage,¹⁵ the Food and Agricultural Organization (FAO) declared that this diet¹⁶ could be a tool in stopping world hunger and fulfilling the 2030 Agenda to reach the sustainable development goals (SDGs). WHO has also called it an extraordinary nutritional model of health and well-being.¹⁷

The Mediterranean Diet is a model and a framework. It is not the final goal but a starting point for combining human health and environmental protection, and developing an ecosystem capable of nourishing and regenerating itself. It can serve as a blueprint for achieving an array of socio-ecological goals. Its principles are not confined to any specific geography or culture. The Mediterranean Diet serves as an indicator for establishing the sustainability of other diets, according to the FAO definition,¹⁸ enriching both our gastronomic heritage and fortifying global efforts towards sustainability. It is a virtuous model whose feasibility has been studied in the UNESCO dossier within different countries in the Mediterranean basin: seven “Emblematic Communities” (Agros, Cyprus; Brač and Hvar, Croatia; Soria, Spain; Koroni, Greece; Pollica, Italy; Chefchaouen, Morocco; Tavira, Portugal) who have become its custodians.

The Future Food Institute, inspired by the “*Mediterranean Diet*” cultural framework, created the integral ecological developing tool, a reference model for territorial development.

^a The word ‘diet’ derives from ancient Greek: “*diaita*”, lifestyle. “The Mediterranean diet involves a set of skills, knowledge, rituals, symbols and traditions concerning crops, harvesting, fishing, animal husbandry, conservation, processing, cooking, and particularly the sharing and consumption of food”. UNESCO, “Decision of the Intergovernmental Committee - 5.COM 6.41, Mediterranean diet as intangible heritage of humanity”.

Other culturally grounded and sustainable diets can also serve as additional pathways to a more sustainable and equitable global food system. By embracing a polycentric approach to diet sustainability, we can harmonise food security, environmental stewardship, and cultural preservation, thus generating a more inclusive and resilient ecosystem. It is thus possible to use diet changes to bring about political, economic, environmental, human, cultural, and social regeneration, achieve the goal of global health equity, and establish a harmonious ecosystem between humans and nature.

Concrete Actions Needed

Re-imagining food security through shifts in food culture and diet is imperative. The following paragraphs outline specific actionable recommendations across the multiple dimensions of politics, economics, culture, environment, and society—these steps can help actualise the goals of ecological restoration and create meaningful impacts.

Political Action

- Promote local food policies and development plans that prioritise integral health. This will create communities that are sustainable and resilient to socio-economic and ecological challenges.

Economic Action

- Incentivise farmers through tax benefits to adopt eco-conscious agricultural practices, issue green bonds to bolster sustainable food systems, and fortify infrastructure to climate-proof food supply chains.

Cultural Action

- Champion the preservation of local creative knowledge and elevate the role of knowledge keepers as a vital step in sustaining both ecological and cultural heritage.

Environmental Action

- Emphasise the importance of conserving essential resources, focusing on the quality of soil and water, biodiversity, and environmental health.
- Invest in technologies that enable climate-resilient agriculture, such as drought-resistant crops.

Societal Action

- Foster the expansion of local rural markets by collaborating with global initiatives like the World Farmers Market Coalition.
- Harness digital health technologies to focus on fertility and optimise longevity factors while simultaneously educating consumers about the environmental impact of their food choices through initiatives like the EU-SWITCH^b project.¹⁹

Politics, economics, culture, environment, and society must all work in tandem to keep health in balance. Funding is needed to actively promote education in this regard. Schoolchildren need to be educated about health. As is well known, in some deterministic phenomena, small changes in inputs produce large changes in outputs, leading to ‘deterministic chaos’—i.e., small causes can produce large effects. There is a need to start with education in small practices that could reverse the looming threat of climate change to our well-being and our world.

Sara Roversi is Founder, Future Food Institute.

^b SWITCH stands for Switching European food Systems for a just, healthy and sustainable dietary transition through knowledge and innovation..

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Accelerating Gender Equality and Health Equity in Climate Action

Vidisha Mishra

THE CLIMATE CRISIS is already having a devastating impact on human health and well-being—a trend that will only accelerate unless urgent action is taken. Such impact is not equal nor gender-neutral, however, and there is evidence that disadvantaged populations face multiple and intersecting vulnerabilities and bear the disproportionate burden of the climate crisis.¹

Gendered Impacts of the Climate Crisis

The impacts of the climate crisis and nature crisis are already evident. Women and girls, who make up the majority of the world's 1.8 billion poorest people, face greater health risks compared to those with greater capacity and resources to absorb shocks and shifts in their local environments.² Women and children are 14 times more likely than men to die during natural disasters; this is largely attributed to patriarchal gender norms in some regions.³ Eighty percent of people displaced by the climate crisis globally are women, who are then at heightened risk of violence, including sexual violence.^{4,5}

Climate change also impacts sexual and reproductive health. During the 2022 floods in Pakistan, nearly 650,000 pregnant women lacked access to maternal health services in affected areas.⁶ Air pollution has been linked to higher rates of miscarriages, pregnancy complications, stillbirths, and worsened reproductive health outcomes, in addition to causing 7 million premature deaths annually.⁷ Lack of access to clean water and sanitation is deemed among the top five causes of women's deaths worldwide.⁸

As climate change exacerbates temperature rise and the frequency of extreme weather events, water and food scarcity, and air pollution — the gendered impacts of the climate crisis continue to worsen.⁹ For example, climate change can increase the threats from existing infectious diseases such as malaria, with pregnant women being the most at-risk adults and children under the age of five accounting for over 80 percent of global malaria-related deaths.¹⁰

However, the gendered impacts of the climate crisis are not restricted to women, and not all women are affected equally; the vulnerabilities are compounded for those whose gender intersects with other marginalised identities, such as race, class, ethnicity, disability, age, and migrant status.¹¹

Gender Integration in Climate Policy

Even as rapidly worsening health outcomes highlight the human costs of the climate crisis, there is an absence of systematic integration of gender and health considerations in climate policy and implementation, and key actors continue to operate *in silo*.

The COP28 in UAE—with the inaugural Health Day, the Climate-Health Ministerial, and the first Global Stocktake—presents a critical opportunity to raise the political profile of the convergence between gender equality, health equity, and climate adaptation and mitigation efforts to drive a unified agenda towards concrete measurable outcomes. The draft Health and Climate Ministerial Declaration, set to be released at COP28 and previewed at the World Health Summit in Berlin on 17 October 2023,

appears to recognise the need for better cross-sectoral collaboration and the mainstreaming of health into climate policies.¹² However, it is crucial that the declaration explicitly includes mention of the interlinkages with gender (in)equality in an action-oriented manner.

Equally, it is important to differentiate the mere inclusion of gender-sensitive language from the practical implementation of gender-responsive approaches.¹³ For instance, of the Nationally Determined Contributions (NDCs) submitted in 2022 by countries to the UNFCCC to outline their progress towards climate goals, 90 percent mentioned 'gender', but the word appeared in less than 20 percent of their long-term low-emissions development strategies.¹⁴

The effective integration of gender in climate policies requires addressing current policy fragmentations. Further, studies across the Global South and Global North alike demonstrate that, even when gender is mentioned within climate policies and included in strategies, the lack of gender-sensitised policy staff and inadequate financing lead to ineffective implementation.^{15,16} As noted in the UNFCCC's 2019 synthesis report on the integration of gender considerations in climate policies, plans, and actions, the process of integration risks "being tokenistic or superficial where gender analysis is not comprehensive enough, or is undertaken too late in the process, or where monitoring and evaluation are not sufficiently rigorous."¹⁷

As policies do not operate within a normative vacuum, the policies aimed at addressing structural barriers to women's economic participation could also lead to positive climate impacts,¹⁸ such as projects that support women innovators and entrepreneurs in the green economy and the transition to net zero.¹⁹ The green economy is projected to be responsible for 67 million new jobs by 2030, although, according to one analysis, at the current trajectory, women will hold only 25 percent of these new jobs.²⁰ However, investments aimed at ensuring equity in green economy jobs could address multiple other vulnerabilities.

Gender-Responsive Climate Financing

Financial capacity dictates the ability of countries and communities to engage in gender-responsive climate change adaptation and mitigation actions. Countries that are most affected and possess the least resources have noted how current vertical climate finance mechanisms are “hard to access” besides having ineffective disbursement processes.²¹ The global health community has also flagged the need for a comprehensive approach to financing health protection from climate change and for investing in climate-resilient health systems.

It is promising that climate funds that initially had gender-blind approaches have steadily updated their structures and policies over the last decade to integrate gender considerations in not only what they fund but also how they fund, such as by elevating women and key communities to decision-making roles.²² However, a recent OECD report estimated that only 0.04 percent of all development assistance finance for climate action in 2018–19 also targeted gender equality.²³

It is crucial that decades of progress in one sector is not undermined by the re-prioritisation of funding in another. COP28 could serve as an inflection point for these critical conversations, including the need for more and better financing. Now, more than ever, the use of scarce funding for competing priorities necessitates greater multisectoral coordination and innovative financing approaches towards addressing gender inequality and health inequity in climate action, underpinned by the recognition that these issues are inextricably linked. The G20 Joint Finance and Health Ministerial Taskforce (JFHTF), which is currently working towards optimising financing mechanisms to address health challenges, particularly related to pandemic preparedness in Low- and Middle-Income Countries (LMICs), could expand its scope and play an important role in this regard.

Towards Climate-Resilient Communities

Climate change is a multiplier of existing health vulnerabilities which are, in turn, determined by gender and intersecting inequalities. The direct damage cost of climate change to health is estimated to reach between US\$2 and US\$4 billion per year by 2030.²⁴ The COVID-19 pandemic has already exposed the fragility and unpreparedness of our current health systems, which will be strained further as global warming worsens.

Healthier and more gender-just communities can be more climate-resilient.²⁵ Women can, and indeed do play a pivotal role in community-based adaptation and mitigation strategies through employing local knowledge, particularly in agriculture and natural resource management.²⁶ Similarly, women's engagement is key to building a climate-smart health workforce. There is a small window of opportunity to learn from the lessons of the COVID-19 pandemic and invest in strengthening the capacities of the health workforce. Women, who comprise 70 percent of the global health workforce and 90 percent of frontline health workers, are also in the best position to build climate-resilient and environmentally sustainable health systems.²⁷

Historically, women have been underrepresented in domestic and international climate-change discussions and decision-making roles. National delegations must work to include the voices of communities that bear the impacts. However, representation is only a starting point and does not equate to meaningful participation or upliftment unless they pave the way to concrete outcomes.

A Way Forward

The climate crisis has been described as a health emergency that the global community can no longer afford to neglect.²⁸ Addressing gender and intersecting inequalities must be at the core of interventions to safeguard planetary and human health.

COP28 presents an opportunity to learn from the past and provide leadership and governance mechanisms to navigate a difficult future. However, calls to action and commitments are meaningless without tangible, measurable

strategies for decarbonisation, financial resources for adaptation, and more robust evidence that consolidates existing knowledge bases across the climate, health, and gender equality sectors instead of duplicating processes. For example, a new report from the UNDRR examines how the international human rights framework for women can be better integrated into disaster risk reduction at the country level.²⁹

Climate justice, gender equality, and health equity are interlinked and mutually reinforcing issues. They are also existential and vital for planetary survival. Time is running out, and small steps are no longer good enough. COP28 must be more ambitious in its intended outcomes.

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Climate Strategies for Better Health Outcomes and Health Equality in Cities

Meelan Thondoo, Tolu Oni and Akeem Ali

CLIMATE MITIGATION EFFORTS can address important drivers of health inequalities in cities. There is growing evidence of how climate change can significantly impact the distribution, prevalence, and transmission of diseases.¹ The scientific community is now also aware that vulnerable populations are disproportionately affected by the growing burden of climate-sensitive diseases. Low-income communities, marginalised groups, and those with pre-existing health conditions, are more likely to live in areas with limited access to healthcare and resources to cope with the health impacts of climate change.²

This reality is even more stark in cities, where health inequalities can sometimes vary from one street to the next. In this chapter, we highlight how strategies to mitigate the effects of climate change can tackle the rise in climate-sensitive health outcomes while promoting health equality and justice. We present the case of COVID-19, not just as an example of an infectious disease magnified by climate change, but as a cross-societal

health challenge that amplifies health inequalities and requires action from multiple actors. We conclude with insights on how to leverage lessons learned from the pandemic to address the social, political, and economic determinants of health in the context of climate change realities in cities.

Climate-Sensitive Health Outcomes

Climate-sensitive health outcomes are a complex and growing public health concern across countries.³ Exploring the relationship between climatic phenomena and health outcomes is crucial to developing adequate strategies and interventions for the protection of health. More recent advances show how the forecasting of extreme climate events, such as floods, droughts, tropical cyclones, and heatwaves, can be used to generate prediction models to anticipate the risk of climate-sensitive disease outbreaks.⁴ Yet, there is a lack of evidence on the links between climate and the underlying vulnerability and exposure factors that can inform anticipatory public health and climate action.

Climate change can have combined, direct, or indirect consequences on diseases. While climate change can directly trigger the proliferation of disease vectors, in addition to causing direct illness and aggravations, it can also indirectly affect health behaviours through physical activity, exposure to air pollution, and dietary patterns. These direct and indirect mechanisms are also strongly driven by geographical realities (e.g., arid to non-arid regions) as well as temporal (e.g., seasonal climatic events).⁵ The synergistic effects of climatic phenomena on disease patterns are compounded by the environment, local economies, and the mortality and morbidity profiles of different countries. Table 1 presents some disease profiles and high-level examples of climate-related mechanisms or pathways.

Table 1: Disease Profiles and Climate-Related Pathways

Disease profiles	Climate-sensitive health outcomes	Climate-related pathways
Vector-borne	Malaria, Dengue, Zika virus	Rise in temperatures can change the geographical distribution, expansion, and behaviours of disease vectors such as mosquitoes, ticks, and flies.
Water-borne	Cholera, Dysentery	Precipitation, floods, or droughts can contaminate water systems and disrupt sanitation systems.
Food-borne	Salmonellosis, Shiga toxin-producing E. coli (STEC)	<p>Change in temperature and humidity can affect food production and storage.</p> <p>Rise in temperature can spur the growth of food-borne pathogens.</p> <p>Climate disasters can affect the food supply chain (food security and availability).</p>
Respiratory	Asthma, Chronic obstructive pulmonary disease (COPD), Bronchitis	<p>Climate change affects air quality through dust from droughts and smoke from wildfires.</p> <p>Rise in temperatures causes more ozone at the ground level and exposure to allergens such as pollen.</p> <p>Climate disasters can damage buildings and allow water or moisture inside. Damp indoor conditions can lead to the growth of harmful pollutants such as mould and bacteria.</p>
Heat-related	Heat stroke, Heat exhaustion	Frequent and severe heat waves or prolonged exposure to extreme heat can weaken the immune system, and increase susceptibility to infections and vulnerability to chronic illness and death.

WHO's Recommendations for Tackling Climate-Sensitive Health Outcomes

The World Health Organization (WHO) recognises the importance of addressing diseases that are sensitive to climate change.⁶ It has underlined the need to integrate health into climate policies and promote the development of surveillance and early warning systems that monitor and respond to disease outbreaks influenced by climate factors. Recommendations include building the capacity of healthcare professionals and public health organisations to understand and address the health impacts of climate change; supporting research efforts to better understand the link between climate change and climate-sensitive health outcomes by gathering data and evidence to inform decision-making and targeted interventions; and raising awareness among governments, healthcare providers, and the public on the importance of climate action and its connection to public health through infectious disease management.

A wide range of guidance— structured under ten components outlined in WHO's Operational Framework for Building Climate Resilient Health Systems—has been developed to support countries in their health adaptation to climate.⁷ To strengthen the overall resilience of health systems and adopt a systemic approach to building climate adaptation plans, the operational framework caters to variations in the scale and nature of health systems. For instance, it addresses the needs for policy prioritisation in legal and regulatory systems to be aligned with accountability and community participation to address climate risks. It also provides measurable outputs— such as the designation of climate change and health focal points within health ministries, with specific climate-related action plans and budget allocations—and encourages the use of health impact assessments.⁸ Operational and effective health systems should be able to provide comprehensive, efficient, and equitable responses that are grounded in the core functions of the health sector but are linked to the wider environmental and social determinants of health, safeguard the provision of universal health coverage, and contribute to overall sustainable development, considering the future risks presented by climate variability and climate change.

The COVID-19 Pandemic in Cities: Lessons and Strategies

The COVID-19 pandemic highlighted how the climate change-disease outbreak linkage is embedded within complex interactions between social, political, and economic determinants of health. It also showed the critical role of cities in tackling complex health emergencies while dealing with cross-societal health challenges that amplify health inequalities. While the primary driver of the pandemic was the transmission of the SARS-CoV-2 virus among humans, there is evidence that climate change exacerbated the spread and impact of COVID-19. Further, vulnerable populations bore the unequitable burden of disease and death.

What insights can be gained from the COVID-19 pandemic regarding the societal, economic, and political factors that magnify the consequences of climate change and pandemics on vulnerable populations? What strategies can be developed to mitigate these vulnerabilities?

The first lesson

The economic fallout of the pandemic forced governments to prioritise immediate economic recovery over long-term environmental protection and climate goals. This pressure led to budget cuts in different areas, including those dedicated to climate action and environmental conservation. This also led to the de-prioritisation of public expenditure on social infrastructure, which further exacerbated social inequities. In response, some philanthropic organisations stepped in to fill the public spending gaps and many cities had to mobilise their resource reserves. In the face of climate change, balancing expenditures in health care and social care will be an important aspect of emergency foresight and response. This response will also require increased government investment in health. In 2001, countries in the African region pledged a target of at least 15 percent annual budget allocation to the health sector.⁹ Yet, as of 2017, only three countries had met this goal.¹⁰ In the UK, government spending on the National Health Service as a proportion of GDP has fallen for at least the last decade.¹¹ Therefore, strategies to invest in health systems while maintaining social support must be considered by countries taking loans to cover health and climate expenditures. It will

be important to consider loan conditions in different countries to avoid regressive, longer-term consequences in countries with lower credit ratings.

The second lesson

The COVID-19 pandemic showed how inequalities drive infection. Additionally, it underlined that the one-size-fits-all approach to tackle COVID-19 was not necessarily equitable in its impact and instead drove inequalities in the long term. The divide between rich and poor cities was stark, as was the disparity in deaths. To face the challenges of climate change and fight against future pandemics and climate events, we must figure out which cities are more likely to suffer than others. We also witnessed that the economic impact of lockdowns was unevenly distributed and primarily impacted the two billion people earning their livelihood in the informal economy, of which 90 percent live in LMICs.¹² The same inequality drivers increase vulnerability towards climate change and COVID-19—i.e., socio-economic background, gender, and pre-existing health conditions.

This is also the case for structural inequality drivers—i.e., weak governance, lack of transparency, and poverty. Yet, the most important lesson perhaps is that the same populations that are vulnerable to climate change suffered the most from the pandemic due to unjust and unequal access to healthcare. During the COVID-19 pandemic, the impact of inequitable access to healthcare was equally evident in high-income countries that had poor access to quality healthcare and poor health system preparedness. In the face of upcoming climate challenges, strategies such as the passing of an emergency bill to expand healthcare coverage to uninsured individuals¹³ will be crucial to address inequalities and to increase access to health before, during, and after emergency events.

The third lesson

The nature of urbanisation (e.g., proximity to water and informality) informs the degree of exposure to and the impacts of risks associated with climate change, with potentially different implications for food and physical activity when these environments experience climate-change-induced disruptions. The COVID-19 pandemic illustrated the societal disruptions that have direct

and indirect consequences for diet and physical activity.¹⁴ The issue of food security was stark, compounded by a reverse mechanism between the loss of daily wage and the disruption in food supply chains. The UN reported that 300 million children who relied on school meals for most of their nutritional needs were at risk of acute hunger,¹⁵ but in many parts of the world, an increase in unhealthy diets placed urban populations at much higher risk of non-communicable diseases (NCDs).¹⁶

During the pandemic, it was estimated that, for instance, the level of physical activity of university students in Italy decreased up to 40 percent, with important implications on body weight,¹⁷ posing an equally important risk factor to NCDs. In the face of climate change, disruptions to food supply due to extreme weather events in low-lying areas, LMICs, and small islands may result in increased nutrition insecurity, decreased access to healthy foods, and reduced spaces to engage in physical activity, while simultaneously fostering economic inequality in these regions. The COVID-19 pandemic indicated that there is a critical need for evidence-informed NCD prevention interventions that are cognisant of potential ecological vulnerabilities that may be exacerbated by urbanisation processes and accelerated by climate change.

These processes shape the built and food environments in ways that influence diet and physical activity, especially among the urban poor. These negative impacts are more with interventions that lack in-depth knowledge and understanding of the ways in which communities function. We need to grasp every opportunity to harness community assets and leverage unique local processes that increase resilience and build local capacity. Furthermore, such interventions have the potential to synergistically contribute to a reduction in climate risks while mitigating the negative impacts of climate change and urbanisation.

Climate Change, Pandemics, and Health Systems

The complex challenges of climate change demand a holistic approach. On the one hand, we are confronting the impact of threats and risks to health, which encompasses the prevalence, incidence, and outcomes of diseases. On the other, we are grappling with health systems that are wrestling with

systemic issues, such as chronic understaffing, inadequate investment, and limited emergency preparedness. It is crucial to recognise the role of health systems in climate change and understand how reorienting infrastructure as both an adaptation and mitigation strategy can influence health outcomes. Factors like energy, water, and supply chain dynamics must be integrated into comprehensive interventions in order to bridge the realms of health, climate, and the environment.

Furthermore, we must address the element of uncertainty and future risks. This involves implementing forecasting, integrated surveillance, and early warning systems. It also entails grappling with the challenges of cost and impact assessment. These complexities make the planning, preparedness, and response infrastructure and systems even more challenging. The transition from current systems to the climate-resilient health systems of the future, especially in low- and middle-income countries, is a critical task. Therefore, this transition should not focus solely on healthcare but encompass a broader perspective, considering the interplay of health, climate, and environmental factors. We propose taking these initial steps in this direction:

1. Identifying the locations and specific needs for developing surveillance and early warning systems, particularly in support of vulnerable and hard-to-reach populations;
2. Designing adaptation measures that enhance healthcare accessibility while preserving social support; and
3. Channelling efforts and resources towards achieving universal healthcare coverage for uninsured communities and those most susceptible to the impacts of climate change.

Conclusion

There are clear opportunities to move forward on tackling climate change and climate-sensitive health outcomes by riding the momentum initiated by current resolutions and decisions around healthy and green COVID-19 recovery plans. While the pandemic measures prioritised public health and economic recovery, it also highlighted the urgency for climate action and the immediate need to build a more equitable, resilient, and sustainable world.

The imperative is for a multi-pronged approach that focuses on social justice, access to healthcare, education, community engagement, and policies that prioritise vulnerable populations. This essay proposes coordinated global efforts aimed at mitigating and adapting climate and health challenges in favour of health equity and justice.

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Climate Change, Displacement, and Health in Fragile and Conflict-Ridden States

Reva Dhingra and Ciaran Donnelly

CLIMATE MIGRATION IS FINALLY on the agenda for this year's annual United Nations (UN) Climate Change Conference, or COP28.¹ As part of a day of events on health, recovery, and peace, discussions will explicitly focus on human mobility and displacement.² This is an important step in addressing the intersecting impacts of climate change on migration and health. For millennia, human migration has been a response to environmental changes.³ However, climate change is contributing to increased displacement globally, through slower-onset environmental degradation such as desertification and sea-level rise, as well as increasingly frequent extreme weather events such as hurricanes and typhoons. In 2022 alone, 32.6 million people were internally displaced as a result of natural disasters.⁴

In addition to directly forcing people to flee extreme weather, climate change intensifies existing drivers of migration and displacement. It acts as a “threat multiplier,”⁵ widening existing political, social, and economic inequities; disrupting livelihoods; and exacerbating pressures on local services. These ramifications are particularly acute in fragile and conflict-affected countries, which are among the most vulnerable⁶ to climate change.

Underlying challenges in state capacity, weak and agriculturally dependent local economies, and conflict, combined with climate change, push more people into poverty and vulnerability. These cycles can contribute to increased displacement. Yet, these countries receive significantly less⁷ climate financing compared to the average for developing states, resulting in weak systems being pushed to the brink, with already-marginalised groups—particularly women and girls—bearing the worst impact.

A clear illustration of this dynamic is the effect of climate change and climate migration on health and healthcare systems. Climate change can both increase the need for health services and simultaneously undermine a system's ability to provide adequate services. Climate change has severe direct impacts⁸ on health and well-being, including through extreme heat and injuries from natural disasters. Climate change also erodes agriculture systems and water infrastructure, threatening access to food, clean drinking water, and sanitation. Changing climate patterns expose communities to new, often life-threatening disease vectors.

Rapid displacement—both internal and across borders—can create challenges for weak and under-resourced local healthcare systems if additional needs are not responded to effectively. For example, in conflict-torn Libya, the September floods this year directly⁹ destroyed critical health and water infrastructure and displaced tens of thousands of people into neighbouring areas that had limited existing health facility capacities as a result of years of state corruption and civil war. However, migration can also be a key adaptive strategy, and the effective planning and resourcing of health services can benefit both migrants and host communities.

As leaders convene for COP28, the global community has the opportunity to take concrete action on the compound impacts of climate change on displacement and health. Policymakers should focus on how global warming intersects with existing drivers of displacement and health, food security, and water systems issues in order to provide sustainable support.

Climate Change, Displacement, and Fragility

In fragile and conflict-affected states, climate change is often part of a vicious cycle that compounds existing challenges, drives displacement, and strains local health, water, and food systems. According to the International Monetary Fund (IMF), as a result of their geographic locations, fragile states are already experiencing higher temperatures¹⁰ than those in the rest of the world. Three times more people in these countries are affected by natural disasters annually.

Conflict and political instability, weak state governance, and economic underdevelopment also make these countries less equipped to manage the devastation wrought by droughts, floods, and other extreme weather events. In the Central Sahel countries of Burkina Faso, Mali, and Niger, underinvestment by the government in outlying communities has left¹¹ much of the population dependent on agriculture and livestock, which are highly susceptible¹² to environmental shocks. These shocks, along with intensifying conflict, increase the likelihood of forced migration. In Iraq, desertification¹³ and government policies have driven unemployment and rapid urbanisation, creating pressures on local services and livelihoods in an already-fragile context. Research by the International Rescue Committee finds that, in Nigeria and the Democratic Republic of Congo, displacement from rural to urban areas caused by conflict and climate change is straining local water systems,¹⁴ with women and children in underserved urban areas shouldering the disproportionate impact.

The Compound Effects on Health

The compound threats of climate change, conflict, and fragility directly impact the health and well-being of vulnerable and displaced populations. Extreme heat and disasters cause physical damage to health infrastructure, create infrastructure maintenance challenges, increase malnutrition, and cause water scarcity and contamination, ultimately threatening sanitation and health. In Yemen, for instance, many days during the year already reach temperatures where simply being outside for prolonged periods is deadly¹⁵—a situation that is expected to worsen by the end of this decade. Desertification has led to global food insecurity, along with a rise in

communicable diseases such as cholera. In all areas, women and girls are the hardest hit; in 2021, 150 million more women than men experienced food insecurity.¹⁶ Climate change also has a significant negative impact on maternal and child health, including higher rates of miscarriage and stillbirth.¹⁷ Women are also at higher risk of both communicable and non-communicable diseases.

Numerous countries cope with extreme heat and natural disasters through better infrastructure and governance. However, conflict and underinvestment in local healthcare systems have left the most vulnerable countries incapable of providing basic services to their populations without adequate international support. In Yemen, prior to the conflict in 2015, government healthcare spending was only 0.43 percent of GDP,¹⁸ which is extremely low even compared to other developing countries. This means that some places will become literally unlivable without investment in local systems and food security, leaving many with no choice other than to migrate.

Climate migration can also impact food security, access to water, and health systems. Rapid urbanisation due in part to the collapse of agricultural livelihoods is driving increased water scarcity globally,¹⁹ which has implications for health and sanitation. Already-deeply insufficient healthcare infrastructure can become even more strained. Yet this pressure may not necessarily lead to social conflict or political turmoil. Research has challenged the notion of a direct causal link between rapid migration and conflict, as the majority of refugee movements have not led to conflict in receiving states.²⁰ Rather, key factors that could fuel tensions between migrants and host populations include the existing strength of service systems, resource availability and management, and government policy responses²¹—indicating ample space for effective policy interventions supporting both the displaced, and the communities in the countries where they migrate.

Finally, the health of climate migrants as well as those who are already displaced as a result of conflict is deeply affected by climate change. Eighty percent²² of climate-displaced are women and girls, who face significant risks of gender-based violence²³ and disrupted access to critical sexual and reproductive healthcare. Analysis from MSI Reproductive Choices across 26 countries found that an estimated 11.5 million women lost their access to

contraception due to climate-related displacement.²⁴ The majority of refugees and internally displaced communities are located in ‘climate hot spots’²⁵ that are disproportionately impacted by extreme weather and natural disasters; in Bangladesh, monsoon-induced floods in Rohingya refugee camps have caused more dengue fever cases than anywhere else in the country.²⁶

A Way Forward

The health impacts of climate change are already evident. Policy approaches need to help local communities and governments effectively respond to current impacts and set up sustainable health, food, and water systems to manage intensifying climate change and related displacement.

First, policymakers must ensure that fragile and conflict-affected states are not left behind in funding and support. These countries are both highly vulnerable to climate change and host much of the world’s displaced population. Without significant efforts to rectify the sharp climate financing disparity, local systems are bound to crumble further. Climate financing for these states must prioritise building resilience and sustainable adaptation for health, food, and water systems. Donors could also focus on innovative interventions such as anticipatory action, which helps communities prepare for climate shocks and mitigate their impacts on malnutrition and health. For example, the government of Germany has committed to spend 5 percent of its humanitarian budget on anticipatory action²⁷—other donors should follow suit.

Second, the government-first model of current response systems makes climate financing inaccessible for civil society, local government, and other delivery partners working in fragile contexts.²⁸ Research estimates that in 2017, less than 10 percent of international climate adaptation finance reached the local level.²⁹ City and local officials in particular are at the forefront of service provision during rapid climate change-driven urbanisation, and many key adaptations in water and food security are being pioneered by local community groups. For many rural communities in these countries, localised, community-based approaches are the only way to reach the last mile. The recent World Bank evolution roadmap update emphasises non-sovereign partnerships in financing, which presents important progress to build on at COP28.³⁰

Third, policy approaches should address the disproportionate impact of climate change and displacement on the health of women and girls. Deliberate efforts need to be made towards ensuring that women and girls are included in health, water, and food security initiatives. This could involve partnering³¹ with women-led organisations and ensuring their voices are heard in policy processes, investing in sexual and reproductive healthcare, and combining food security initiatives with programming to combat gender-based violence.

Finally, political and financing discussions would benefit from alternative pathways to manage both internal and external displacement as a result of climate change and conflict. This could also allow local officials and organisations to better plan for the delivery of crucial services. This requires acknowledging that migration can be an important and necessary adaptation tool. Lawrence Huang at the Migration Policy Institute has argued that fears of migration have inhibited donors from climate financing.³² He recommends adopting climate adaptation financing that supports the integration of climate migrants in local communities, rather than financing with the primary goal of preventing migration, which is often doomed to fail. Building on regional efforts, such as the Kampala Convention³³ and the Kampala Ministerial Declaration in Africa and Argentina's climate humanitarian visa³⁴ in Latin America, could help establish safe and regular pathways for climate migrants.

The World Bank estimates that, without urgent action to reduce emissions and help communities adapt, about 216 million people across six global regions will migrate within their own countries by 2050.³⁵ Without the necessary planning, financing, and action, this can have a significant negative impact on the health of the affected communities as well as the effectiveness of health service provisions. COP28 offers policymakers with a key opportunity to course-correct on an increasingly dire global situation.

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III.

TOWARDS AN INTEGRATED GLOBAL GOVERNANCE FRAMEWORK

**Approaches to Building Climate-Resilient
Health Systems**

*Sanjay Pattanshetty, Aniruddha Inamdar, Kiran Bhatt,
and Helmut Brand*

**Blindspots on The Climate Crisis in Global
Health Governance**

Nishant Sirohi and Priti Patnaik

Health Equity Under the UNFCCC

Railla Puno and Danielle Yeow

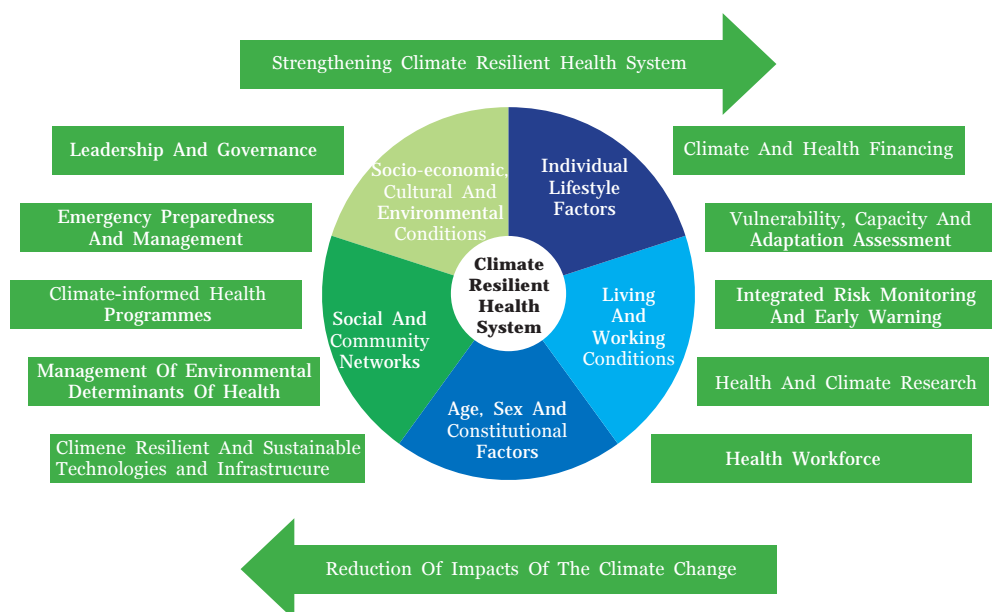


Approaches to Building Climate-Resilient Health Systems

Sanjay Pattanshetty, Aniruddha Inamdar, Kiran Bhatt, and Helmut Brand

THE IMPACTS OF CLIMATE CHANGE are being felt increasingly across the globe, highlighting the immediate need to strengthen the capabilities of healthcare facilities and infrastructure to cope with the challenges. In the WHO American region, for example, 67 percent of health facilities are located in high-disaster-risk areas, leaving some 24 million people in danger of not having access to healthcare in the event that a calamity causes destruction of health infrastructure.¹ There is a heightened requirement to hasten the implementation of WHO's recommendations for climate-resilient and sustainable health systems that promote a multisectoral approach within the established system, and well-coordinated policy-making with other sectors such as energy, agriculture, transport, and finance.²

Figure 1 illustrates the interaction between the 10 building blocks of a climate-resilient health system, provided by WHO, and the determinants of health inequity as provided by Dahlgren and Whitehead's socioecological 'rainbow model'.³ To be sure, however, health systems vary according to certain economic, geographic, social, and developmental parameters, and therefore the challenges they face are also different. Thus, the variance of social positions necessitates policy actions for formulating climate-resilient health systems in the context of different vulnerabilities and consequences.⁴



While health is increasingly being recognised as a priority in global climate discussions, there is a need for rhetoric to be translated to concrete actions, and incorporate learnings effectively into official statements, negotiations, and frameworks. The initiatives should aim towards the transformation of health services and systems to counter diseases that are increasingly being influenced by climate change. The materialisation depends on enhancing the knowledge base of the climate change-health nexus through continuous improvement in data collection and dissemination. This provides an overall picture of changing weather patterns for both short- and long-term actions. However, its implementation could be successful through the cooperation of universities, private entities, government, and intergovernmental organisations. The evidence also doubles as a case for mobilising finance, including private investors.⁵ The data also enables the studies to understand the cost of adaptation, and climate-induced disease burden and the results could be used to create an integrated regional platform electronically for storage, analysis, and action.

A robust system of data collection paves the way for another important adaptive measure for addressing climate change—i.e., an Early Warning System (EWS). These systems help in preparing effective response and recovery measures in case of extreme climate events. EWS are usually a cost-effective mechanism, especially when considering the potential socio-

economic losses they could prevent.⁶ However, technology transfer to the more vulnerable countries helps in further reducing the associated costs related to maintenance and upgrades. The role of data sharing is also critical in the functioning of EWS as information on diseases, status of vegetation, and other parameters, helps in preparing integrated systems to cater to diverse sectors of the economy while enhancing the resilience of populations.⁷

The success of the data sharing or early warning systems is also dependent on the educational policies and their capacity to incorporate the understanding of the impact of climate change on health. Health professionals, government, businesses, and the public, in general, are required to proactively approach the implications of climate change on health.⁸ Education policies can focus on how climate and health intersect and formal exposure to streams like climate science and public health. The inclusion of climate education in university curriculums of public health, medicine and nursing enhances the health workers' ability to respond to the unintended consequences that could arise from climate-health interactions.⁹ However, such a policy action should not be limited to health professionals but introduced into various streams. This can be materialised by incorporating climate and health education into the broader curriculum, which can lead to the formation of informed stakeholders across various sectors of the economy and in turn help in a holistic assessment of the complexities arising from the issue. Further, there is a need for the introduction of more executive and diploma courses for government officials and policymakers, as the training could sensitise them to understand and overcome challenges to build climate-resilient health systems.

The need to have climate-informed emergency systems and mitigation plans could prove to be essential to the process of enhancing the resilience of the health system to address the outbreaks and emergencies triggered by climate change. In most cases, the responses are crisis-based, resulting in possible delays and exhausting resources. Thus, to enable effective resilience in health systems, there is a need to aim for comprehensively managing the health crisis through robust preparedness measures. These measures can start with simpler actions such as while planning for newer facilities, their location and physical infrastructure should be considerate of the climate factor to ensure they continue to function during extreme weather events.

The health workforce forms an important component in determining the best outcomes from health systems. However, the number of health workers and other technical staff required could change based on climate variability.¹⁰ Thus, there is also the need to develop the professional and technical know-how of the health workers to understand and use climate information in their decision-making. Further, imparting intersectoral monitoring techniques while planning for research and interventions would help in effectively managing the risks to health and the performance of the health system during distress.¹¹

Managing environmental determinants of health is crucial for developing resilience, which can be achieved by enabling “Health in all policies”.¹² Such an approach could help in scaling up both inter, and multi-sectoral public health initiatives aimed at facilitating effective responses to climate-related health risks. Aligning health-related policies in various sectors such as transport, finance, energy and housing could aid in reducing health risks. In this regard, policy action to regulate the key environmental determinants such as monitoring air and water quality, food security, and waste management to reflect climatic conditions and adopting environmentally sustainable ways.¹³ Hence, developing an integrated monitoring system to collect data pertaining to environmental and socioeconomic factors could help in the analysis and formulation of active and intersectoral coordination.

The measures of resilience can only become a reality if the financing mechanisms for these actions are in place. The Development Assistance for Health (DAH) is one tool which can influence the designing and implementation of health policies and systems in developing countries to strengthen and promote health access.¹⁴ Introducing climate-smart principles in DAH extended by bilateral agencies, multilateral development banks and other funding agencies, could catalyse health sector investments in climate-resilient development models to ensure zero emissions.¹⁵ The Bridgetown Initiative is another measure that could provide an inclusive and resilient financing mechanism through the proposed loss and damage funds to address the issues of climate crises.¹⁶ Additionally, the inclusion of health as a component of the Environment, Social, and Governance (ESG) finance mechanism by private industries can mobilise the climate and health-integrated funding.¹⁷ In addition to the health systems becoming climate-resilient, they also need to mitigate their contribution to climate change as healthcare systems contribute to 4-5 per cent of greenhouse gas emissions.¹⁸

Thus, a stringent check on greenhouse gas emissions by the health sector can be done by including the health sector in the carbon credit system to ensure the limit of emissions and penalise if exceeded.¹⁹

Conclusion

Taking the example and the milestones set by its preceding climate conferences by the United Nations Framework Convention on Climate Change (UNFCCC), COP28 must carry forward and build the discussion of climate change and health. While several commitments for climate action for health have been made by international organisations and national governments, there is a need to ensure its compliance. The review of National Adaptation Plans suggests a distinct gap between the identified climate-related health risks and the policy measures in place.²⁰ This implementation gap can be addressed through climate change and global health diplomacy discussions and negotiations.²¹ These dialogues can enable strategies for a participatory and holistic approach to climate change in all policies, which is the need of the hour.

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Blindspots on the Climate Crisis in Global Health Governance

Nishant Sirohi and Priti Patnaik

THE CONVERSATION AROUND CLIMATE CHANGE is now several decades old, and numerous international norms have recognised the health impacts of the climate crisis. Despite the ubiquitous nature of climate change impacts, however, there are few legal commitments, if at all, to address their health dimensions.

Climate change-related health risks and strains on the health system are no longer future abstractions.¹ They have been extensively documented,² and there is enough evidence that the effects have been disproportionate on disadvantaged and vulnerable communities whose right to health and access to healthcare is often under threat due to socio-economic disparities.³ Yet, there are only a few established partnerships within the United Nations (UN) system that explicitly focus on the global health implications of climate change.⁴ Over the years, global health law has failed to address the real consequences from the climate crisis, including severe health consequences and loss of lives. It has been estimated, for example, that more than 70 percent of infectious disease outbreaks emerge from zoonotic spillovers.⁵

This article argues that, as the world grapples with the lingering effects of the COVID-19 pandemic,⁶ the global health community should seize the opportunity to integrate actions on climate change to address environmental concerns into existing and new global health mechanisms. These mechanisms, such as the International Health Regulations and a proposed Pandemic Agreement, must be fortified to address the intersection of the climate crisis and health.⁷ It is imperative to integrate universally recognised environmental rights and climate change laws with global health laws to address both climate change and future infectious disease outbreaks.⁸

1 WHO's Approach to Climate-induced Health Challenges

The World Health Organization's (WHO) institutional strategy to respond to climate change has several pillars.⁹ These include WHO's advocacy efforts to spotlight health risks associated with climate change;¹⁰ its collaborations with various programs and the UN system to address climate challenges;¹¹ its ongoing review and monitoring of scientific developments using health and climate countries profiles;¹² its support for national projects that merge climate change and health initiatives;¹³ and its commitment to prioritise capacity building.¹⁴

The elements of WHO's policy are shaped by World Health Assembly resolutions and the outcomes of WHO's Health & Climate Change conferences.

1.1 Resolutions of the World Health Assembly on Health and Climate Change

The World Health Assembly (WHA), which governs WHO, uses its powers in norm-creation¹⁵ to define strategies and direct action on global health challenges posed by climate change. For example, in Resolution A51/21 of 1998, the Assembly recognised WHO's critical role in working with international partners to address the health consequences of climate change.¹⁶ The Resolution also stressed the importance of incorporating a health perspective into global discussion and actions on climate change.¹⁷

Building on this commitment, Resolution WHA 61/19 of 2008 emphasised the significant impact of climate change on global health, urging collective action and adaptation.¹⁸ Since then, however, little progress has been made in addressing the impacts of climate change on health.¹⁹

Starting in 2009, the Assembly began adopting the focused five-year work plan. The current work plan for 2019–2023 is focused on integrating the One Health Approach to prevent and control infectious outbreaks.²⁰

1.2 WHO's Health and Climate Change Conferences

Furthermore, WHO's Health & Climate Change conferences have emerged as a platform for stimulating global political dialogue on these intertwined issues of health and climate.²¹ They have also shaped the organisation's institutional framework to combat climate change-related public health risks.

The UNFCCC's 2015 Paris Agreement, primarily a climate-focused instrument, has been lauded as “potentially the strongest health agreement of this century”²² for explicitly linking climate action and the right to health. It stated: “Parties should, when taking action to address climate change, respect, promote and consider their respective obligation on ... the right to health.”²³

This accord not only influenced WHO's Health & Climate Change conferences but also conferred the necessity of collaborative efforts between health and climate change. For example, the 2016 edition emphasised enhancing the implementation of the Paris Agreement,²⁴ and the 2018 conference launched an initiative to address climate change and health issues in Small Island Developing States.²⁵

1.3 WHO's Reactive Approach to Climate Change

WHO's strategic framework addressing climate-induced health risks is undoubtedly comprehensive. However, it appears to be reactive rather than proactive.²⁶ The gap between WHO's aspirations and actual outcomes underscores the complexities and challenges of harmonising global health

and climate change governance. To be sure, the climate-health nexus is gradually gaining wider recognition in the UN framework.

2. Right to Health and a Healthy Environment

The right to health, as outlined in Article 12 of the International Covenant on Economic, Social and Cultural Rights, has been codified in numerous legally binding international treaties, regional instruments and national constitutions.²⁷ The right to health mandates States to ensure everyone can access the highest standard of physical and mental health,²⁸ and compels the State to maintain minimum core obligations²⁹ to consistently improve health conditions and avoid any regressive measures that diminish the fundamental entitlement.³⁰

2.1 General Comment 14 on UN Committee on Economic, Social and Cultural Rights

The broader understanding of the right to health includes improving “all aspects of environment and industrial hygiene.”³¹ This perspective was highlighted in General Comment 14 of the UN Committee on Economic, Social and Cultural Rights, which emphasised that healthy environmental conditions are a fundamental determinant of health.³² Therefore, it is imperative to note that the right to health, which hinges on progressive realisation and resource availability,³³ not only bridges the gap between environment and human rights but also underscores the environmental factors as a fundamental requirement for the realisation of the right to health.³⁴

2.2 In the Human Rights Council

The UN Human Rights Council has repeatedly emphasised the correlation between a healthy environment and the human right to health.³⁵ In 2021, the Human Rights Council formally endorsed the human right to a healthy environment.³⁶ This commitment was reinforced when the UN General Assembly recognised that a clean, healthy and sustainable environment is a universal human right.³⁷ Additionally, the UN Human Rights Committee, in its General Comment no. 36, has also emphasised the significance of

environmental protection for the enjoyment of the right to life.³⁸ The Human Rights Committee has ruled in multiple instances that a State's failure to prevent environmental damage can equate to a violation of the right to life, considering such degradation as a major threat to present and future generations' right to life.³⁹

Furthermore, both the UN High Commissioner for Human Rights and the UN Special Rapporteur on Human Rights and the Environment have drawn attention to the nexus between environmental degradation and infectious diseases, as seen in the COVID-19 outbreak.⁴⁰ The UN Special Rapporteur on the Issue of Human Rights Obligations relating to the Enjoyment of a Safe, Clean, and Sustainable Environment asserts that "biodiversity is necessary for ecosystem services that support the full enjoyment of a wide range of human rights, including the rights to life, health, food, water, and culture."⁴¹

2.3 Health and Climate Change at the Regional Levels

Regionally, instruments and institutions have reflected similar concerns. For instance, the African Commission on Human and People's Rights,⁴² the Inter-American Commission,⁴³ the Inter-American Court of Human Rights,⁴⁴ and the European Court of Human Rights⁴⁵ have consistently recognised the connection between a healthy environment and human rights. They frequently highlight how environmental degradation infringes upon these rights. However, even with this widespread recognition, there is limited action to address the health challenges posed by climate change. The latest draft of the Negotiating Text of the WHO Pandemic Agreement does not adequately reflect this critical nexus.

3. WHO Pandemic Agreement, Climate Change and a Right to Healthy Environment

In October 2023, WHO's Intergovernmental Negotiating Body (INB) released a draft of the Negotiating Text of the WHO Pandemic Agreement,⁴⁶ which attempts to offer a framework for States to collectively respond to future pandemics. However, the draft Negotiating Text, across its 29 pages and 36 Articles,⁴⁷ falls short of addressing the compounded challenge of climate

change and zoonotic spillover in the context of global public health. Specifically, the draft overlooks the impacts of anthropogenic environmental shifts—such as climate change, biodiversity loss, land degradation, and wildlife trade—on escalating pandemic risk.

A new Pandemic Agreement must recognise the inherent link between climate change conditions and the right to health. The current Negotiating Text does not align with existing obligations under international environmental and climate change laws. The current text does not promote the implementation of these norms, neither through binding rules (hard law obligation) nor through non-binding, more flexible measures (soft law approach).

Compared with INB's Zero Draft,⁴⁸ which has also been criticised widely for missing the mark on human rights⁴⁹ and for its soft law language,⁵⁰ the Negotiating Text has further alienated the provisions related to climate change and health rights.⁵¹ For instance, while the Zero Draft articulated “the right to health” under Article 4, Guiding Principles and Rights,⁵² the Negotiating Text omits any mention of the right to health and has no reference to a right to a healthy environment. Moreover, references to “climate change” have diminished, appearing only once in the Negotiating Text, as opposed to twice in the Zero Draft.

3.1 The ‘One Health’ Approach

The Negotiating Text of the Pandemic Agreement approaches climate change in the context of health through the “One Health” approach. The One Health approach emphasises integrated efforts and collaboration across institutions, governance regimes and disciplines to optimise the health of humans, animals and the environment.⁵³ It emerged from a workshop hosted in New York City in September 2004, organised by the Wildlife Conservation Society and the Rockefeller University.⁵⁴ Its prominence grew after the inaugural One Health Summit, in Davos, Switzerland in February 2012.⁵⁵

By bridging the gap between these interconnected health sectors, 'One Health' seeks to address cross-sectoral challenges, particularly in preventing zoonotic disease spillover and underscores the interdependence of human health on environmental conditions. The Negotiating Text, for the first time, defines "One Health approach" under Article 1 (d). At first glance, the definition seems to bring coherence among the triad of animal, planet and human health and integrate existing international environmental and climate change law obligations. However, a closer inspection of Article 5 of the Negotiating Text, which lays down provisions to operationalise the One Health framework, lacks adequate specificity.

Despite wide recognition of the climate change and health nexus, the environmental dimension of 'One Health' has not been addressed enough to advance action on climate change-induced health challenges. There are no specifics yet on whether, and how, countries will raise resources to implement these provisions effectively to make a difference. Articles 5 (6) read with Article 21, propose to develop a Conference of Parties system, similar to the UNFCCC, and defer developing appropriate modalities to address the measures, including those related to One Health.

It is important to note that although the One Health approach has received broad endorsement,⁵⁶ various concerns have been raised by developing countries and experts and academicians alike. For instance, developing countries argue that the One Health approach, with its strong emphasis on standard-setting and regulatory harmonisation, undermines the principle of 'common but differentiated responsibilities'.⁵⁷ Furthermore, the developing countries view it merely as a massive system for collecting data that will not be able to ensure equitable benefits-sharing.⁵⁸ Analysts, for their part, critique the One Health approach for its narrow focus on human medicine and inadequate engagement with environmental stakeholders, and for overlooking environmental health factors like climate change and implementation challenges in developing countries, given the limited funding.⁵⁹

This oversight not only jeopardises efforts in preventing zoonotic spillover and safeguarding public health but also misses an opportunity to boost pandemic prevention measures. By integrating the right to a healthy environment, the envisaged Pandemic Agreement could be instrumental in emphasising critical environmental interventions, enhancing collective resilience against future pandemics.

4. The Cost of Inaction

Many scholars have argued that WHO must declare the climate crisis as a public health emergency. Like in many other forums, however, WHO member states are divided along familiar Global North-Global South lines on who pollutes and who suffers the consequences. Yet the debate is more complex and pervasive than merely putting labels on countries, who will need to get over their narrow interests to collectively respond to the challenges. The impact of the failure to do so is already being witnessed.

Health emergencies such as COVID-19, like the epidemics and pandemics that came before, have magnified the interface between health and climate change. Given the sheer urgency of the climate crisis, the governance of health-related impacts of environmental degradation has to be proactive. Global health agencies, such as WHO and the Global Fund, must stop working *in silo* to swiftly address these transboundary and complex challenges. This would mean making difficult political decisions by member states and donors alike.

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Health Equity Under the UNFCCC

Railla Puno and Danielle Yeow

THE INTERGOVERNMENTAL PANEL on Climate Change (IPCC) in its Sixth Assessment Report¹ made a grave assessment of the effects of climate change on health, well-being, and the changing structures of communities.² Climate-related illnesses are increasing, and the cascading and compounding risks to health due to extreme weather events are expected to worsen across regions. The direct health impacts (e.g., mortality, premature deaths, and malnutrition) and the indirect as well (e.g., disturbance in complex ecological and economic processes) may influence the distribution and abundance of vector-borne, water-borne, food-borne, and other infectious diseases.³ The World Health Organization (WHO) has also reported that climate change impacts could result in an additional 250,000 deaths every year by 2030 and reverse over 50 years of progress in development, global health, and poverty reduction while increasing inequality.⁴

The IPCC and WHO both agree that synergistic policies, strategies, and programmes that prepare and manage health risks of climate change may be an effective solution. The prioritisation of health co-benefits, the integration of health-related metrics and targets with climate adaptation and mitigation actions, and the close collaboration and continued dialogue between climate and health stakeholders can result in transformational change.⁵ Within this climate-health nexus, it is necessary to examine global

climate governance to determine how existing frameworks can be improved to sufficiently respond to the challenges.

At present, the link between climate change actions and health are not comprehensively referenced in climate change instruments. These global policies have focused more on the impacts of climate actions on public health and well-being, rather than the direct impacts of climate change on human health.⁶ The United Nations Framework Convention on Climate Change (UNFCCC) mentions human and public health twice,⁷ while the Paris Agreement mentions it only once, in the preamble, calling for parties to consider their obligations on the right to health when taking action to address climate change.⁸ Indeed, while the climate-and-health nexus was first addressed as early as the Second Conference of the Parties to the UNFCCC (COP2) in 1996, it was not until COP22 in 2016 that a declaration on health, environment, and climate change was signed. The declaration recognised health as a pillar of sustainable development and climate action, called for the development of measures that address both needs, and launched a global initiative to foster the better management of environmental and climate risks to health.⁹

The following year, the COP included health as a key thematic area of the Nairobi work programme and directed parties to undertake activities to address health in adaptation planning and actions at the regional, national, and subnational levels. This has translated well into the Nationally Determined Contributions (NDCs) submitted by parties, as reported by WHO in 2020. According to this report, 70 percent of the submitted NDCs—or 129 of the 184—include various health considerations.¹⁰ While highly encouraging, it is worth noting that these considerations are concentrated on health impacts (47 percent) and adaptation (84 percent), and not on mitigation (10 percent) and finance (3 percent).¹¹

Considering the co-benefits of investing in health systems, infrastructure, water and sanitation, clean energy, affordable healthy diets, low-carbon housing, public transport, air quality, and social protection, this reflects a significant opportunity for parties to direct more attention to these issues. According to the International Energy Agency, as many as 1.7 million premature deaths from outdoor air pollution worldwide by 2040 can be avoided by providing energy access for all through a 7 percent increase

in investments within a “Clean Air Scenario”.¹² Following the success of integrating health concerns in the Nairobi Work Programme, parties should ensure that health is similarly mainstreamed and prioritised in mitigation actions and reflected in their NDCs. The Global Stocktake should include health-specific assessment tools, common indicators, and set targets to guide and encourage parties to enhance their level of ambition and monitor progress in health and climate.

Science-based policies and measures on mitigation and adaptation that integrate health into domestic, regional, and international climate policy are necessary. To this end, parties should mandate the IPCC to release a special report focusing on the climate-health nexus to ensure science-based recommendations and metrics. Mapping studies and health risk assessments due to climate change that can then be integrated into infrastructure design can result in effective measures that address global targets for both health and climate. For example, in Singapore, an urban heat analysis that considered socio-economic indicators and health vulnerability can be translated into emergency management, hazard reduction, public policy, building design, and community education.¹³ Such assessments can support urban planners in determining where to increase green areas and wind corridors to lessen heat exposure and heat stress.¹⁴ A Heat Stress Advisory for the public was also launched in May 2023 that enables the general population to make more informed decisions on undertaking prolonged outdoor activities.¹⁵

In the United Kingdom, a health-focused, macroeconomic assessment of mitigation strategies for urban transport, food and agriculture, and household energy efficiency could result in a reduction of 50–60 percent of greenhouse gas emissions in those sectors.¹⁶ With the increasing need to address sustainable development goals in a holistic manner, assessments and studies that highlight co-benefits can catalyse progress in these areas by strengthening political appetite and mobilising the necessary funding for these initiatives.

At present, global investments in health adaptation alone account for <1 percent of international climate finance allocation, while less than 0.5 percent of overall funding is aimed at protecting health.¹⁷ While health and well-being is one of the adaptation result areas under the Green

Climate Fund's Integrated Results Management Framework,¹⁸ its Strategic Plan for 2024–2027¹⁹ does not reflect this in its targeted results. All other adaptation result areas (most vulnerable people and communities, food and water security, infrastructure and built environment, and ecosystem and ecosystem services) are otherwise reflected as targeted results.

The integration of health concerns into climate finance considerations should be prioritised to further the realisation of climate justice. Vulnerable countries whose health sectors are highly sensitive to climate impacts do not have access to financing that could reduce current and future economic costs related to environmental health risks. Furthermore, vulnerable sectors, such as low-income communities; communities of colour; the elderly; pregnant women; children; and the urban and rural poor—may require specific interventions that address their societal, cultural, environmental, political, and economic contexts.²⁰

On 28 July 2022, the United Nations General Assembly adopted a landmark resolution that recognised the human right to a healthy environment. This underscores the need to ensure that clean air, stable climate, access to safe and sufficient water, healthy ecosystems and biodiversity, healthy and sustainable food, and a non-toxic environment is enjoyed by all.²¹ It also recognised how the environment impacts human well-being and the complete enjoyment of all other human rights and stressed the need for increased support for an integrated response by states, the UN system, and all other relevant stakeholders.²²

Therefore, effective response measures require the complete participation and cooperation of various sectors. Greater collaboration between the UNFCCC and WHO is needed to ensure complementarity of measures and policies. Both regimes could also work together to optimise and enhance their respective areas of expertise and bring together technical, legal, and policy experts to work together in synergy. Additionally, governments and the private sector should exercise vigilance to ensure that climate actions do not inadvertently impede health and well-being. For example, hydroelectric projects could lead to reduced river flows that potentially affect the traditional ways of life and even the survivability of downstream communities that depend on the rivers for access to clean water, sanitation, and food.²³ Therefore, proper safeguards need to be in place to ensure

that health and well-being are key considerations that are integrated into climate actions.

The One Health agenda—a collaborative, multisectoral, and transdisciplinary approach working at the local, regional, national, and global levels—aims to optimise the health of people, animals, and the ecosystem and can also serve to ensure effective and coordinated actions that respond to cross-cutting global health and climate issues. With the growing urgency for policy coherence and the integration of health considerations and climate change, these cross-sectoral interactions should be addressed in a holistic manner.

The United Arab Emirates, COP28 host, has promised to deliver the first “Health COP” with the first ever COP28 Health Day and will also host an inter-ministerial meeting on climate and health.²⁴ The presidency has initiated a COP28 Health Programme that will focus on five key topics—the health impacts of climate change; the health benefits of climate mitigation; climate-resilient low-carbon health systems; adaptation for health; and action for health, relief, recovery, and peace. There will also be a Health Pavilion hosted by WHO and the Wellcome Trust with the goal of convening the global health and climate community and key stakeholders across various sectors to ensure that health and equity are placed at the centre of climate negotiations and help drive bold climate action.²⁵

These opportunities for dialogue are essential to promote synergies between international agreements, policies, and collaboration on climate change and health. It is hoped that these events will be integrated as a standalone workstream, whether formal or informal, within the UNFCCC framework. The aim is to contribute to aligning and integrating health into international climate governance.

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A TEN-POINT FRAMEWORK FOR CLIMATE JUSTICE AND HEALTH EQUITY





A Ten-Point Framework for Climate Justice and Health Equity

Vikrom Mathur and Aparna Roy

THE G20 HAS TAKEN A UNANIMOUS and significant step towards prioritising climate-resilient health systems, recognising the critical need for a deeper understanding of the intricate interlinkages between climate and health. The 2023 edition of the Conference of the Parties (COP), scheduled for November in Dubai, UAE, is a milestone. It places renewed emphasis on the intersection of climate and health, and introduces the inaugural Health Day and Climate-Health Ministerial that highlights the crucial role of health in the global climate agenda. In drafting the COP28 Declaration on Climate and Health, it is imperative to prioritise the following:

- 1. Support interdisciplinary research to generate evidence on global burden of disease due to climate change and integrate data on climate change and health.**

Integrated research, expertise and data is needed for the domains of climate change and health to inform evidence-based policies. A clear division currently exists, for instance, between early-warning systems for climate-related hazards and those for pandemics or infectious diseases. The expertise in climate change and health sectors rarely

converge, hindering collaborative efforts. The assessment of risks at the population level is inadequate, and health impact projections due to climate change are typically based on obsolete data. New data on the worldwide disease impact from climate change is crucial. Majority of investments in global health research go into genetics, diagnosis, and treatment, and tend to overlook the foundational environmental drivers and causes of health outcomes; this needs to change. The One Health (OH) approach could offer an integrated framework to examine both human and planetary health and for integration across sectors. The establishment of an Intergovernmental Panel for One Health (IPOH), akin to the Intergovernmental Panel on Climate Change, holds promise. Such a panel could offer a unified and authoritative voice from the scientific community, aid donors and institutions in prioritising their investments, facilitate evidence-based policy implementation, and help streamline the global health system.

2. Prioritise gender integration and inclusive climate action to promote an equitable and resilient future.

Many of the health risks posed by climate change are gender-differentiated. There is no dearth in evidence that conducting gender-sensitive assessments and implementing gender-responsive interventions can enhance health, promote health equity, and improve climate change adaptation efforts. Inclusion of gender considerations in climate and health policies should prioritise practical implementation, address policy fragmentation, empower policy staff with gender sensitivity, and allocate sufficient financial resources. Climate funding should not only consider gender in their priorities but also in their funding mechanisms, promoting a more inclusive and equitable approach.

It is crucial to enhance the capacity of the healthcare workforce, particularly women, to ensure climate-resilient health systems. Removing structural barriers to their economic participation can yield positive impacts on both climate and health, particularly through investments in equitable green economy jobs.

Incorporating the voices of under-represented women, in both domestic and international climate change discussions and decision-making, is of utmost importance. The vast majority of populations displaced by conflict are women and children. While there has been progress in promoting gender equality, policies related to planned relocation, displacement, and migration frequently fail to adequately address gender-specific concerns. Access to sustainable and clean energy, participation in policy process and investment in sexual and reproductive healthcare will ensure protection, gender equality, food security, health and well-being, livelihood opportunities, and environmental preservation in displaced settings.

3. Promote holistic reform in food systems, including eco-conscious farming and the use of resilient technologies.

Global food insecurity has been on the rise, largely due to climate-related factors. The UNFCCC's Koronivia Joint Work on Agriculture and Food System Reform must recognise the need for food system reforms. There is a need for concrete measures to reduce greenhouse gas emissions from the agriculture sector while developing strategies for adapting to climate change and addressing losses and damages in food systems. It is vital to incentivise environmentally conscious farming through tax benefits, issue green bonds to bolster sustainable food systems, and fortify infrastructure to make food supply chains resilient to climate impacts.

Approximately 80 percent of the global population most vulnerable to crop failures and hunger and malnutrition caused by climate change reside in Sub-Saharan Africa, South Asia, and Southeast Asia. At the primary agriculture level, investments in climate-resilient technologies, including drought-resistant crops, are imperative for building resilience in the region. Integrating digital health technologies for adequate food access and waste reduction, and educating consumers about the environmental impact of their food choices, will foster a comprehensive

approach to well-being and ecological health. The decision on Food Systems at CoP27 should be re-evaluated, with an expanded focus that goes beyond terrestrial agriculture and underscores the importance of increased food production as the primary solution to address climate-related challenges.

4. Enhance pandemic prevention and preparedness to address interrelated health, environmental, and societal challenges, particularly in cities.

The COVID-19 pandemic underscored the shortcomings in the capabilities for public health emergency response, particularly in urban regions. It is crucial to gather evidence regarding the factors that contribute to the occurrence and resurgence of diseases in cities at the intersection of human, animal, and environmental interactions, including climate change, alterations in land use, desertification, and worsening antimicrobial resistance. Establishing a comprehensive, real-time One Health surveillance platform equipped with mechanisms for data and sample sharing across cities globally, is vital for a comprehensive and effective response. It is important to enhance capacity-building efforts and establish robust systems for the prompt detection, assessment, notification, and response to unusual health incidents with potential international implications.

The importance of well-structured knowledge creation and adoption processes at the local level is also underscored by recent events. Strengthening local resilience and capacity should involve leveraging community assets and local processes. This involves identifying specific locations and requirements for developing surveillance and early-warning systems, with a particular focus on vulnerable and hard-to-reach populations. Moreover, adaptation measures should aim to improve healthcare accessibility while preserving social support, working towards universal healthcare coverage for uninsured communities and those most vulnerable to the impacts of climate change.

5. Increase climate adaptation funding for healthcare by exploring new funding sources, and promoting equity in climate and health investments.

Climate adaptation funding falls short in all areas, including healthcare. Meagre financial support is allocated to the health sector for climate-related issues, and global health funding rarely addresses climate adaptation. This critical situation is worsened by the strain that the pandemic has placed on healthcare systems and the substantial financial resources needed to bolster health systems that are ill-prepared for the increasing health risks of climate change. The global community should actively explore avenues to generate new funds, such as reforming subsidies for fossil fuels, and direct these funds back into healthcare. Adaptation funding mechanisms for climate adaptation, including the adaptation fund, should prioritise health equity and climate justice. To correct historical inequities, a larger share of international funding should be allocated to health protection and promotion in vulnerable regions, with a particular emphasis on local adaptation. Global development aid for health should also incorporate and prioritise building resilient healthcare systems that can withstand the impact of climate change, in addition to addressing infectious diseases like COVID-19. In the future, financing for climate and health should be geared toward redistribution, with a focus on channeling investments directly to affected communities without perpetuating global health disparities. Equity should be the central principle guiding these investments.

6. COP28 should transform the ‘Loss and Damage’ funding commitment made at COP27 into actionable measures.

Health impacts, especially those that do not lead to mortality, and ones related to mental health, can be difficult to quantify in monetary terms. Developing frameworks for compensation and support to vulnerable populations who suffer health losses are critical to operationalise. Primary and frontline health workers should be enrolled to establish baseline health data and measure the incremental impacts of climate change on health. COP28 needs to put ‘loss and

damage' on the same footing as adaptation and mitigation, and demand greater accountability from developed countries to fulfill their financial commitments by establishing an ambitious Loss and Damage Fund that also looks at the nexus of health and climate change. The scientific community holds a crucial position in establishing a strong global evidence base to support Loss and Damage priorities. This involves attributing specific health effects to climate change and actively engaging at the local level to guide and oversee actions aimed at the most vulnerable populations.

7. Integrate the Paris Agreement and SDGs and recalibrate SDG principles to prioritise poverty, health, and climate.

In an era of multiple and simultaneous global crises, where various development challenges converge, a renewed approach to Sustainable Development Goals (SDGs) must be ambitious. It is essential to calibrate SDG principles to prioritise poverty, health, and climate, enabling faster and equitable governance actions. Achieving SDG targets necessitates deliberate measures to bring about systemic change that corrects power imbalances and tackles underlying inequalities. A profound transformation in leadership, institutions, and nations is imperative. The Paris Agreement and the SDGs mutually complement each other, highlighting the necessity for integrated planning and execution to overcome obstacles hindering transformative change.

Prioritising health is imperative to address environmental challenges that endanger global health achievements. The warnings about the consequences of inaction are becoming increasingly severe, but they also present opportunities for science-backed, equitable, and sustainable solutions.

While scientific studies have shed light on the SDGs, their influence on policy and resource allocation is limited. This situation needs to change.

8. Address Climate Change and Environmental Rights Comprehensively in the WHO Pandemic Agreement.

In October 2023, WHO's Intergovernmental Negotiating Body unveiled a draft of the WHO Pandemic Agreement, presenting a collective framework for states to address future pandemics. It is critical to push for a comprehensive agreement that bolsters preparedness, response, and coordination against infectious diseases and public health emergencies, adequately emphasising their connection to climate change. Such an agreement should directly tackle the impacts of environmental changes, including climate change, biodiversity loss, and land degradation on increasing pandemic risks. It should harmonise with current international environmental and climate laws, promoting their application through both binding and flexible measures. While the Pandemic Agreement incorporates the 'One Health' approach, addressing health in the context of climate change, it needs to better emphasise the environmental dimension of the OH to tackle climate-induced health challenges. The interpretation should prioritise equity, focusing not just on standards and data but also on benefit-sharing. It should also address concerns about its narrow scope on human medicine, limited engagement with environmental stakeholders, and the unique challenges faced by developing countries.

9. Declare the climate crisis as a public health emergency and broaden scope of International Health Regulations 2005.

The IHR 2005 primarily focuses on disease surveillance and early-warning systems. The effectiveness of global health governance institutions is limited because of the narrow scope and framing of the IHR 2005 which further limits itself to health emergencies and communicable diseases. IHR 2005 should be expanded to encompass health risks emerging from climate change, recognising the multifaceted nature of global health threats. Prevention is not adequately addressed in these rules and environmental drivers of health emergencies are a policy blindspot. With the rising health risks due to climate change, this approach has become insufficient. It is crucial for States and global health institutions to recognise this gap and recast IHR to

emphasise global health equity and create governance frameworks to strengthen the universal human right to swift and affordable access to essential medicines, vaccines, and therapeutics for all.

10. Promote a rights-based approach and ensure fulfillment of Right to Health and Healthy Environment.

The right to health, enshrined in Article 12 of the International Covenant on Economic, Social and Cultural Rights, is reinforced by numerous global treaties, regional instruments, and national constitutions. The UN Human Rights Council and the UN General Assembly both emphasise the intrinsic link between a healthy environment and the fundamental human right to health. The framework of the right to health now defines state obligations, emphasising its core attributes like availability, accessibility, and quality, and advocating for the progressive realisation of health-related rights. It is essential to promote health as a fundamental right and ensure equal access to medicines and health services, means to protect health, and ensure health equity. This includes adopting rights-based environmental actions, especially for vulnerable communities facing climate threats, and establishing legal mechanisms that uphold their human rights.

Putting health at the heart of climate action and framing climate change as a health issue is likely to create greater policy attention and public support on climate adaptation and mitigation. Communication about health risks due to climate change is underdeveloped, but health can be a powerful driver for climate initiatives. Instead of focusing solely on negative outcomes, positive communication about health benefits of climate action and low-carbon lifestyles can influence values, encourage social and behavioural change for mitigation, and build more equitable and just societies.

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