COP29 SPECIAL REPORT
ON CLIMATE CHANGE AND HEALTH

HEALTH IS THE ARGUMENT FOR CLIMATE ACTION

World Health Organization

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Contents

Foreword

The climate crisis is a health crisis. Extreme weather events, record-breaking temperatures, storms and floods are causing disruption to health systems, water and sanitation infrastructure and supply chains, fuelling outbreaks of infectious diseases and contributing to higher rates of noncommunicable diseases.

Nature is our most important health resource: 40% of pharmaceutical products today draw from nature; one-third of our food supply is reliant on pollinators; most of our water is naturally filtered; and biodiverse environments act as a buffer from zoonotic diseases. The climate crisis puts all of these at risk.

Many of the tools to meet these challenges are already at hand, including sources of clean, efficient, cheap, renewable energy. Now is the time to utilize them on a grand scale, to make them the norm rather than the exception. We must reshape our cities to prioritise public transportation and human-powered vehicles, not just to reduce emissions but for the health benefits of daily exercise. Green spaces in cities can improve air quality, provide space for physical activity, enhance mental health, and help to cool urban areas.

The health and associated economic benefits of climate resilience and mitigation far outweigh the investment needed to put them in place. Tackling climate change requires a radical shift in how we prioritize energy spending. Consider: last year was a record-breaking year for fossil fuel subsidies - that is public money that is effectively exacerbating the climate crisis.

This report, Health is the Argument for Climate Action, shows how we can protect and promote human health through concrete climate action. This report is a collective call to action from the health community on the frontlines of the climate crisis.

As Member States review their Nationally Determined Contributions to achieve their goals to meet the Paris Agreement, we must not think of the commitments as an expenditure. These are investments in a healthier future. Investing in climate resilience and mitigation, implementing nature-based solutions, and transitioning away from fossil fuels is an act of collective self-preservation.

Dr Tedros Adhanom Ghebreyesus
Director-General
World Health Organization

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Abbreviations

ATACH	Alliance for Transformative Action on Climate and Health
CBDR-RC	Common but differentiated responsibilities and respective capabilities
CDoH	Commercial determinants of health
COP	Conference of the Parties
GDP	Gross Domestic Product
GGA	Global Goal on Adaptation
GHG	Greenhouse gas
GST	Global Stocktake
HICs	High-income countries
HIIP	Health Impact Investment Platform
HNAP	Health National Adaptation Plan
IPCC	Intergovernmental Panel on Climate Change
L&D	Loss and Damage
LDCs	Least developed countries
LMICs	Low- and middle-income countries
LT-LEDS	Long-term low-emission development strategies
NAP	National Adaptation Plan
NbS	Nature-based Solutions
NCDs	Noncommunicable diseases
NCQG	New Collective Quantified Goal
NDC	Nationally Determined Contribution
NELD	Non-economic loss and damage
REACH	Research Agenda for Action on Climate and Health (WHO)
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SLCPs	Short-lived climate pollutants
SRHR	Sexual and reproductive health and rights
UHC	Universal health coverage
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
WASH	Water, sanitation and hygiene
WHA	World Health Assembly
WHO	World Health Organization

Executive summary

Climate change is making us sick, and urgent action is a matter of life and death. From the direct effects of extreme weather and air pollution to the indirect consequences of ecosystem disruption and social instability, climate change threatens physical and mental health, well-being, and life itself. These impacts are not distant or abstract – they are felt now, through record-breaking temperatures in India, deadly floods in Kenya and Spain, megafires in the Amazon, and hurricanes in the United States. The hardest hit are often those least responsible for emissions. Prioritizing health and well-being in climate action is not only a moral and legal imperative but a strategic opportunity to unlock transformative health benefits, secure economic opportunity, and ensure a just and equitable future.

In 2022, the Intergovernmental Panel on Climate Change (IPCC) called for immediate transformative action in order to retain a liveable future *(1,2)*. Thirteen negative climate feedback loops have been triggered, and six – almost seven – planetary boundaries surpassed, accelerating climate impacts that far exceed scientific models *(3,4)*. Yet, fossil fuel emissions continue to increase, with record-high carbon emissions in 2023 and US$ 7 trillion in explicit and implicit fossil fuel subsidies in 2022 *(5)*. For the health community, this is incoherent and directly at odds with our duty to safeguard health.

The **COP29 Special Report on Climate Change and Health** outlines priority actions from the global health community for governments, policy-makers, and other sectors to place health at the heart of climate solutions. Developed by the World Health Organization (WHO) with over 100 organizations and 300 experts, this report emphasizes health as the definitive argument for climate action across people, place and planet. Fundamental to these actions is the urgent need to end fossil fuel reliance and ensure people-centred adaptation and resilience.

PEOPLE: Climate change poses a fundamental threat to human health and survival, with ripple effects across all sectors, including economic stability and national security. Achieving equity, protecting rights, and ensuring a just transition will enable everyone to benefit from climate strategies. Mobilizing the health workforce and creating resilient, climate-proof health systems are key to advancing people-centred solutions.

PLACE: Health is shaped by the built environment and sustained through nature and biodiversity. Cities – home to over half of the world's population and responsible for more than 70% of global emissions – can drive change through sustainable urban design, clean energy and transport systems, resilient housing, and improved water, sanitation and hygiene. Protecting and restoring natural systems crucial to clean air, safe water and productive land, along with promoting sustainable food systems, offer synergistic benefits at scale.

PLANET: Economic and financial systems must radically realign to support both human and planetary health. A rapid and equitable removal of fossil fuel subsidies, implementing fair carbon pricing, and mobilizing finance for climate and health action would save millions of lives per year. In the face of escalating crises, governance that centres health in climate policy-making – and climate in health policy-making – is essential.

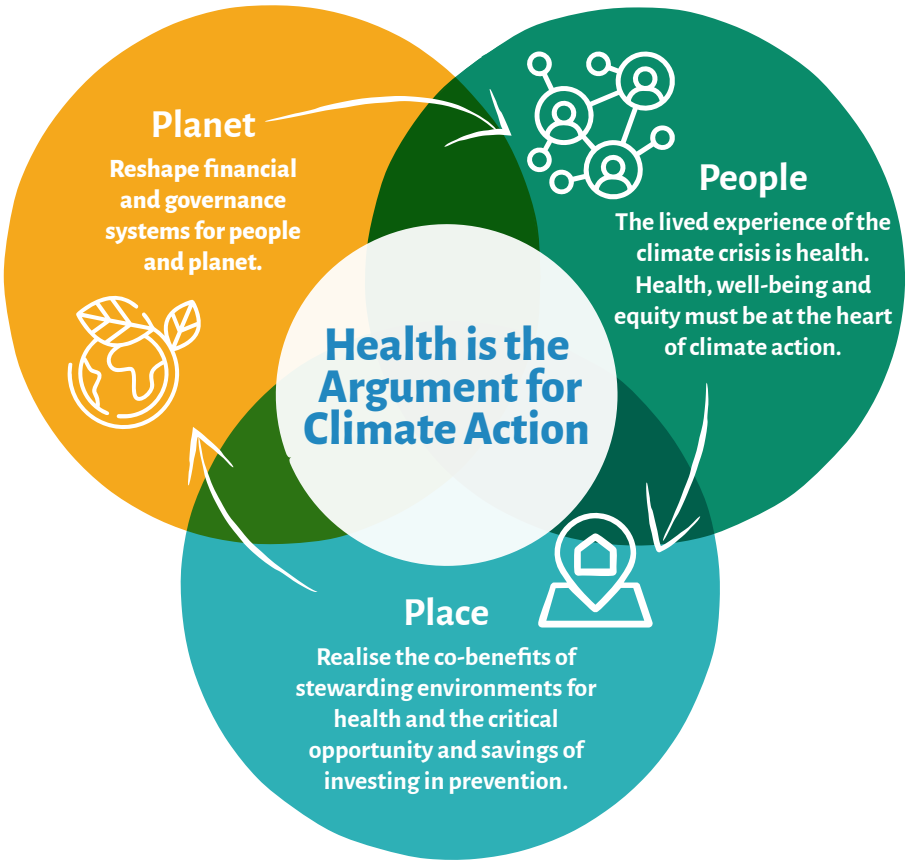
This report aims to address the COP29 Presidency's key priority areas through the lens of health, across human development, smart and healthy cities,

Children walking to a nearby river to get water in Lao PDR. © ADB / Asian Development Bank

and financing that turns ambition into action to reduce emissions, adapt to climate change, and address Loss and Damage.

Health must not be sidelined or siloed in climate negotiations – it is the lived experience of climate change. This report is a call to action: the success of collective efforts to combat climate change will be measured not only by greenhouse gas (GHG) reductions but also in the tangible improvements in people's lives. It highlights opportunities to reduce health inequalities, bridge the development gap, and presents a vision for a just, resilient, and sustainable future, where the needs and aspirations of all people are met, and where the health of communities and ecosystems is protected and promoted. Achieving this vision requires collaboration, innovation, and leadership across all sectors and scales, with health and well-being as the central outcome of climate action.

Taking Action for climate change and health



1. Our health is not negotiable.

End fossil fuel reliance and ensure people-centred adaptation and resilience.

PEOPLE

2. Unlock human development and put people at the heart of climate action.

Prioritise equity, human rights, and a just transition to ensure everyone benefits from climate action.

3. Build future-proofed health systems.

Invest in low-carbon climate-resilient health systems and a fit-for-purpose, well-supported global health workforce.

PLACE

4. Cities are key to unlocking climate and health co-benefits.

Deliver wins for health and climate by financing and implementing clean energy, zero-emissions transport, infrastructure design, effective waste management, and climate preparedness.

5. Nature and biodiversity are the foundation of our health.

Protect and restore natural systems as fundamental for healthy lives, sustainable food systems, and livelihoods.

PLANET

6. Transform financial systems and the economy away from extraction towards a well-being and circular economy.

7. Lead with bold governance that serves the many.

Empower and resource communities.

Floods affect people, a house almost submerged, family members on the roof and in a small coracle, Bangladesh.
© Moniruzzaman Sazal / Climate Visuals Countdown

The pace of climate change and environmental degradation has accelerated, emerging as a major threat to human health in the 21st century. Global temperatures are continuing to rise and are expected to exceed 1.5oC over pre-industrial levels by 2030. Severe weather events, air and chemical pollution, microbial breaches across the animal–human-environment interface and climate-sensitive epidemic diseases are increasing in frequency across the globe, with a disproportionate impact in particularly vulnerable areas, including small island developing States (SIDS). Human migration and displacement have reached unprecedented levels: an estimated 1 billion people have chosen to migrate or have been forcibly displaced, either within or beyond their country, owing to economic, environmental, political, conflict and other forces ...

WHO's General Programme of Work 14 *(6)*

COP29: Health for all policies

Health, as defined in the 1946 WHO constitution, is: i) a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity, ii) one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition, and includes iii) the ability to live harmoniously in a changing total environment *(7)*.

Put simply: health is not a secondary issue, and the health consequences of climate inaction are driven by and felt across sectors – whether economic stability, education, decent work, social justice and cohesion, peace and security, trade, development assistance, or governance. **We fail to address the lived experience of climate change if health is siloed or considered a separate issue in climate negotiations and actions.**

COP29 offers a critical opportunity for integrating health for all policies, to foster people-centred, just, economically prudent, and sustainable climate solutions. The "Baku COP Presidencies Continuity Coalition for Climate and Health" between five COP presidencies from COP26 to COP30 prioritizes climate and health as a key topic on the climate agenda. It aims to support mobilizing collective efforts and finance to scale up climate and health action, harmonize and synergize existing climate and health related initiatives. Further integration of health will be realized across initiatives through COP29 including in the "Baku Initiative on Human Development for Climate Resilience", and "COP29 Multisectoral Actions Pathways (MAP) Declaration for Resilient and Health Cities", operationalization of the Health Impact Investment Platform (HIIP) and events at the COP29 Health Pavilion.

This report provides essential guidance, evidence syntheses, and an urgent call to action from the global health community for governments, policy-makers, and other sectors – at COP29 and beyond – to address this head on by placing health at the heart of climate solutions across all domains and scales.

HEALTH is the argument for climate action

Key Messages

Fossil fuels are making us sick, and their time is up. Urgent climate action is a matter of life or death. Despite this, we continue to increase emissions and overlook the human impact of inaction even as we pass critical tipping points.

The climate crisis is a health crisis, and climate drives disease burdens of all types – communicable and vector borne diseases, noncommunicable disease, maternal and child health, mental health, and trauma.

Climate change is exacerbating threats to social, economic, political and commercial determinants of health and altering access to critical resources including food, water and land.

Putting health at the heart of climate action across all domains unlocks powerful co-benefits for health, climate, security and economies, and drives action at the scale and pace required at this critical time.

1. Our health is not negotiable

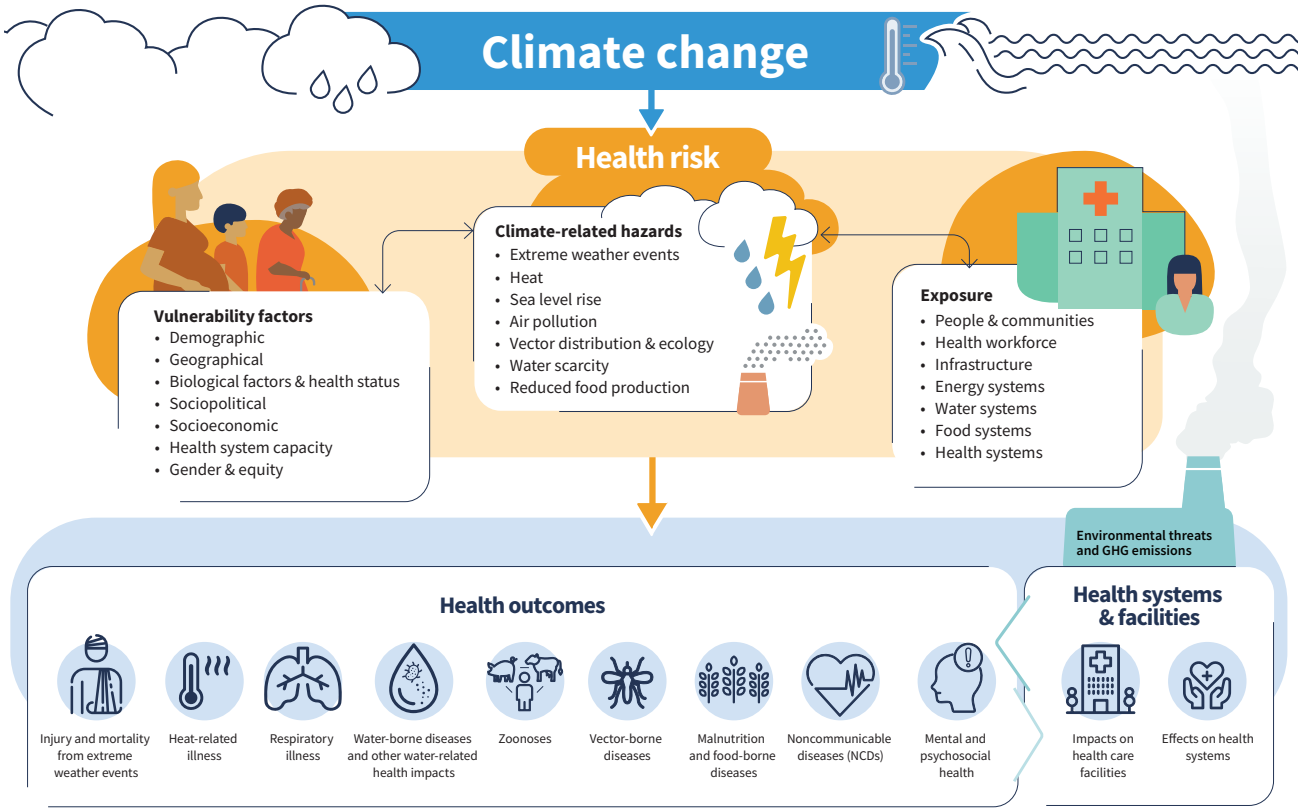
End fossil fuel reliance and ensure people-centred adaptation and resilience.

Critical asks

- Prioritize health in national climate plans in order to accelerate the Paris Agreement goals.
- Make human health and well-being the top measure of climate success to catalyse progress and ensure well-being.
- Commit to the climate and health agendas of the WHO and the United Nations Framework Convention on Climate Change (UNFCCC).
- Ensure policy-makers, the private sector and economic leaders understand the immense costs of climate-related health impacts on populations and markets, and the co-benefits of action.
- Account for the health impacts and costs of climate change in climate commitments including the Nationally Determined Contributions (NDCs) and Loss and Damage frameworks.

Cyclist in Tanzania. © Cilia Schubert

Figure 2 **An overview of climate-sensitive health risks, their exposure pathways and vulnerability factors**



1.1 The health impacts of climate change

Climate change is the defining challenge of our times. Health is no exception; the consequences of burning fossil fuels touch every determinant of health, from the food we eat, air we breathe and water we drink, to the stability of socio-economic systems and health infrastructure (see Figure 2). Climate change impacts health both directly and indirectly, and is strongly mediated by environmental, social and public health determinants.

1.1.1 Direct effects

The direct impacts of climate change extend across multiple facets of human health and well-being – triggering or worsening noncommunicable diseases (NCDs) and mental health conditions, altering the patterns and distribution of communicable, zoonotic and vector-borne diseases, posing threats to sexual and reproductive health and rights, including maternal, newborn and child health, financial hardship due to out-of-pocket health costs, and increasing the frequency and severity of pandemics and large scale health emergencies (see Table 1). Climate effects create environmental conditions that can affect even healthy populations by exposing them to unfamiliar diseases or threats, exacerbate pre-existing health issues and disproportionately affect the already vulnerable.

Health impacts are worsened by the increased frequency of cascading and compounding climate events, with multiple extreme occurrences – such as heatwaves, floods, and storms – happening simultaneously or in quick succession. These overlapping crises exacerbate the direct impacts on health by overwhelming infrastructures, disrupting essential services, and intensifying health issues. The cumulative strain from these events impedes the ability of health systems to respond effectively and equitably, amplifying the overall health risks associated with climate change.

Examples of **the direct health impacts of climate change**

Noncommunicable diseases (NDCs)

NCDs – primarily cardiovascular diseases, chronic respiratory diseases, cancer, diabetes – **cause about 41 million deaths/year** – 74% of total deaths – of which 17 million are premature deaths *(8)*. Climate change and air pollution increase NCD risks: Air pollution is linked to almost **7 million premature deaths** annually, and 85% of air pollution deaths are caused by NCDs *(8,9)*. NCDs burden health systems, making it harder to achieve universal health coverage (UHC) *(10)*.

Because of climate change, people faced, on average, a record **50 more days of health-threatening heat in 2023** *(11)*. Extreme heat leads to health risks such as kidney disorders, strokes, adverse pregnancy outcomes, cardiovascular and respiratory diseases, organ failure, and death *(12)*.

2.41 billion workers – 71% of the working population – are exposed to excessive heat, resulting in **22.85 million injuries and 18,970 deaths annually** from heat stroke and other NCDs. In 2023, 512 billion potential work hours in the agriculture, construction, service, and manufacturing industries were lost due to heat exposure, corresponding to **potential income loss of US$ 835 billion** *(13)*.

Emergencies and acute care

Climate change increases healthcare demand but also damages health infrastructure, disrupts continuity of care, and causes globalized health emergencies including increased risk of pandemics.

Many climate-related health effects present with acute disease processes such as asthma exacerbations, yet acute care systems are often weak and underdeveloped, especially in places experiencing the worst impacts of climate change.

Extreme events lead to an increased risk of injury, such as drowning.

Maternal health and sexual and reproductive health and rights (SRHR)

Pregnant women face risks from climate change and air pollution, such as **preterm birth, low birth weight, and maternal death**. Climate change worsens food insecurity, affecting breastfeeding and maternal-child health.

Climate change impacts SRHR, including decreased fertility, increased gender-based violence, and forced marriages.

Flooding, cyclones and typhoons have been associated with a lack of proper pregnancy care, pregnancy complications, and maternal death. Pregnant women and young children are particularly susceptible to climate-mediated food insecurity and reduced access to clean water and healthcare.

Mental health

Climate change impacts mental health through multiple pathways *(14)*. Rising temperatures **worsen pre-existing mental health conditions and increase rates of hospital admission and risk of suicide** *(15,16)*. Extreme weather events lead to trauma and mental health problems, including post-traumatic stress disorder, anxiety and depression.

Increased exposure to air pollution has been found to be associated with various negative mental health outcomes, particularly with depressive symptoms and suicide *(17,18)*.

The cost of mental health conditions as a direct result of climate-related hazards, air pollution and inadequate access to green space is projected to reach nearly **US$ 47 billion per year by 2030** *(19)*.

Young people report increasing levels of eco-anxiety and other eco-emotions *(18,20)*.

Climate change increases stressors of the social determinants of mental health, including poverty and unemployment *(21)*.

Child health

Children are arguably the most vulnerable to the impacts of climate change, and its effects will have the longest-lasting consequences for them. Early childhood is a critical period for physical, cognitive, and emotional development, and is highly sensitive to environmental and social disruptions caused by climatic stressors such as drought and extreme weather events *(24)*. However, **only 2.4% of climate finance incorporates child-responsive activities** *(25)*.

In 2021, more than 700 000 deaths in children under the age of five were linked to air pollution, representing 15% of all global deaths in children under five *(26)*.

Communicable and vector-borne diseases

Climate change increases the transmission of deadly infectious diseases such as **dengue, malaria, West Nile virus, Vibriosis and respiratory infections, including pneumonia, Legionella, TB, Covid-19 and influenza**, across existing and new locations.

Malaria transmission is intricately connected with temperature and rainfall patterns, and extreme weather events have been shown to cause rapid spikes in cases.

2023 saw an estimated 692 000 Vibriosis cases. 1.42 billion people live within 100 km from coastal waters with conditions suitable for Vibrio transmission, and 83 countries show coastal water conditions suitable for the transmission of Vibrio at any one time – all record highs *(11)*.

Climate-related displacement and gathering behaviours aggravate disease transmission *(22)*.

Rates of snakebite have been found to increase under a changing climate *(23)*.

1.1.2 Indirect effects: Impacts on the upstream determinants of health

Health and well-being are indirectly affected by climate change through its impact on the social, economic, and commercial determinants of health – the environments in which people live, grow, work, and age. Factors including gender, rights, discrimination, education, employment, poverty, food and water security, housing, and access to health services all shape health outcomes. Climate change intensifies these challenges as a threat multiplier by worsening food and water insecurity, damaging infrastructure, increasing job loss, and fuelling resource competition and conflict. As climate injustice worsens, systemic change is urgently needed to address interconnected crises including climate change, biodiversity loss, pollution and their impact on health through a holistic, whole-of-government and whole-of-society approach.

Flooding in Mexico. © Huitzil

Vulnerability and marginalization **exacerbated by climate hazards**

Poverty

Climate change threatens to reverse hard-won gains in economic development and push 132 million people into extreme poverty by 2030 – particularly in sub-Saharan Africa and South Asia *(27)*.

Health and economic impacts are not distributed equally. Low- and middle- income countries (LMICs) are experiencing disproportionate effects, despite contributing least to emissions.

As climate change affects livelihoods and income, financial vulnerabilities increase, further compounding existing health and social inequities and reducing already precarious access to healthcare.

Food and water security

Droughts and other extreme weather events threaten food security and drive malnutrition.

920 million children are currently highly exposed to water scarcity, which is likely to worsen as climate change increases the frequency and severity of droughts, water stress, and water contamination *(33)*.

Rising sea levels increase the salinity of drinking water in some coastal areas, which may be associated with increased blood pressure, progressive kidney disease and gestational hypertension in pregnant women.

Resource scarcity is contributing to an increase in inter-community conflict, for example between herders and farmers in Africa *(34)*.

Conflict

Climate change may indirectly **increase the risk of conflict by exacerbating existing social, economic and environmental factors**. In turn, the natural environment is damaged by war, and conflict is a contributor to climate change.

Populations in humanitarian settings are at heightened risk for a variety of adverse health outcomes, perpetuating a vicious cycle of inequities and inequalities.

Migration

Climate change and environmental disasters are increasingly prominent drivers of migration and displacement.

In 2023, **20.3 million people were internally displaced due to weather-related disasters**, primarily floods and storms *(28)*. Over the period 2016–2021, 43.1 million children were internally displaced due to with weather-related disasters *(29)*.

Estimates suggest that 3.6 billion people live in areas highly susceptible to climate change *(30)*, and 1.2 billion might be displaced globally by climate change by 2050 *(31)*. In 2022, 153.8 million people were living less than 1 m above current sea levels, indicating potential future displacement *(30)*.

Disruption of the social determinants of health can amplify other factors that cause individuals to flee their homes, including conflict, violence, and lack of opportunities. As a key determinant of health, people on the move experience poorer health outcomes than the communities who host them, often due to their living and transit conditions *(32)*. Climate change-induced displacement of Indigenous communities affects self-determination, erodes traditional cultural practices and religious beliefs, and impacts mental health and well-being.

Equity and marginalization

Climate change exacerbates existing health and social inequalities, determined by power structures at different levels of society, and impacting biology across the life course *(35)*.

People in the Global South, Indigenous Peoples, those living with pre-existing medical conditions and other marginalized populations are often least responsible for climate change and yet bear its greatest burdens, including its health impacts *(36)*. These populations are disproportionately affected by food insecurity, malnutrition, extreme weather events, and displacement into areas with higher exposure to zoonotic and vector-borne diseases, and face heightened risks of mental health disorders, occupational hazards, and inequitable access to healthcare systems.

People living with a disability and older people are more likely to die or be injured in climate emergencies such as floods or heatwaves *(37)*.

Globally, by 2050, climate change may push up to 16 million more women and girls into poverty than men and boys. Worsening environmental conditions impose greater caregiving and unpaid labour on women and girls, perpetuating cycles of gender inequality by reducing time and opportunities for education, employment, and political participation *(38)*.

Further reading and resources

- The Compendium of WHO and other UN guidance in health and environment, 2024 is a comprehensive collection of available WHO and other UN guidance for improving health by creating healthier environments.
- The Climate and Health Solutions Space showcases case studies from communities around the world who are reducing the impact of climate change on human health.
- The *Lancet* Countdown on Health and Climate Change is an international, multidisciplinary collaboration, dedicated to monitoring the evolving health profile of climate change, and providing an independent assessment of the delivery of commitments made by governments worldwide under the Paris Agreement.
- The Climate & Health Evidence Bank brings together evidence on climate mitigation actions with the largest potential health benefits across sectors.
- The METEOR research cluster lays out a broad and detailed view of how health is impacted by the environment and suggest policy recommendations to protect our health and the planet.

Earth is like the human body, a complex adaptive system that possesses important feedback loops and potential for non-linear change. When a patient passes physiologic tipping points and they start to 'crash', the treatments that would have worked ten minutes prior are no longer effective.

Based on current thinking around Earth System tipping points, the same is true of the Earth.

This is key as we begin to enter the 1.5–2.0°C range where we can no longer rule out triggering tipping points. This level of warming is of deep significance to Earth System physiology, and could represent the gateway to runaway, non-linear change, where the impacts of climate change become out of control, completely unpredictable, and cause unprecedented harm.

We can take our cue from the way we do cardiopulmonary resuscitation: push hard, push fast, and not stop.

Dr Courtney Howard, Emergency Medicine Physician

God's country. A lone tree. Kenya. © Lazerus Marson / Unsplash

1.2 The building blocks of climate action

Our response to climate change requires rapid scale up of mitigation to prevent further damage, adaptation to an already changing world and resilience to the worsening shocks, and Loss and Damage (L&D) to address impacts that cannot be prevented. Key in all these strategies is recognition of the opportunities and benefits – to health, economies and society – that can be unlocked through the co-benefits of climate action.

1.2.1 Mitigation: Tackling GHG emissions as primary prevention

Mitigation – reducing or preventing GHG emissions in order to curb the progression of climate change – is primary prevention and should form the bedrock of climate action. Adaptation is increasingly impossible beyond critical warming points and in particular populations, and an over-reliance on the ability to adapt is an unacceptable risk given the unknowns of climatic tipping points *(39)*. There is no path forward to improve the health of people and the planet that does not lead with a rapid phase out of fossil fuels. However, progress on mitigation falls woefully short, with record global CO_2 emissions in 2022 increasing by 1.1% in 2023 *(40).* Fossil fuels still account for 80% of global primary energy *(12)*, and countries continue to massively fund their production and use, with subsidies, either financial or in the form of uncompensated damage to health and the environment amounting to US$ 7 trillion in 2022 *(41)* – over US$ 3000 for every household in the world. Business operations for too many companies do not commit to net zero practices, and the strategies of major oil and gas companies (see Box 1) – and the policies that support them – remain fundamentally misaligned with Paris Agreement goals *(42)*.[1] There is very limited time to meet the carbon reduction required to remain within 1.5°C of heating *(43)*.

A **just transition** means moving to a low-carbon and climate--resilient society in a way that is fair and inclusive, ensuring that the benefits of a green economy are shared widely, while also supporting those who may lose livelihoods or suffer additional costs in the shift away from carbon-intensive industries. This concept is central to addressing the social, economic and health disparities that can arise from climate policies, particularly for vulnerable and marginalized communities.

1.2.2 Adaptation: Responding to climate-related health risks

Adaptation involves adjusting to actual or expected climate effects to moderate harm or exploit beneficial opportunities *(49)*. Adaptation in human systems can be anticipatory or reactive, incremental or transformational. For health and the health system, this includes increasing capacity to prevent and address the growing health impacts of climate change (see Section 3). This is highly contingent on the capacity of health systems to deliver on UHC and health emergency preparedness, response and resilience *(50)*. Health adaptation must include actions beyond the health system, in the environments and determinants that influence health. Adaptation has limits, both hard (physical or ecological thresholds) and soft (such as socio-economic constraints). Separating mitigation and adaptation efforts risks creating imbalanced development, and slowing progress on effective climate action and addressing them in isolation is neither cost-effective nor reflective of their complex, interconnected nature. A combined approach is essential for more effective responses to the impacts of a warming planet *(50)*.

1 At COP21 in Paris in 2015, Parties to the UNFCCC reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low-carbon future. Among other aspects, it reaffirms the goal of limiting global temperature increase to well below 2°C, while pursuing efforts to limit the increase to 1.5°C.

Box 1 **The commercial determinants of the global climate and ecological crisis** *(44)*

The commercial determinants of health (CDoH) – the "systems, practices and pathways through which commercial actors drive health and equity" *(45)* – highlight how corporate power influences the systems that shape health and equity. This lens reveals the fossil fuel industry's detrimental impact on public and planetary health *(46,47),* deploying a range of strategies, including lobbying, misinformation, public relations campaigns, privileged access to government policy-makers, and unique structural importance to the global economy, to weaken, block, and delay government climate action *(48)*.

Fossil fuel industry practices exacerbate inequalities and undermine efforts towards climate justice. A CDoH lens reveals the wide range of systemic actions that can be taken to drive a transition away from fossil fuel dependence and towards the realization of multiple interconnected planetary health goals. This could include the elimination of fossil fuel subsidies, shifting investments into sustainable energy, and international cooperation, including binding treaties (for example - similar to the Framework Convention on Tobacco Control) and restrictions on fossil fuel interaction in national policy spaces and international fora such as the COP.

1.2.3 Loss and damage

Loss and damage (L&D) refers to the unavoidable effects of climate change, including economic and non-economic losses and damages (NELD) such as impacts on infrastructure, livelihoods, biodiversity, cultural heritage, and human health (see Figure 3). NELD increasingly affects physical health and causes emotional distress in populations facing climate extremes. L&D can severely weaken health systems by destroying infrastructure, displacing workers, disrupting supply chains, and overwhelming services – especially in LMICs facing disproportionate health burdens.

The L&D fund established at COP27 and operationalized at COP28 aims to provide financial assistance to vulnerable developing countries. Initial pledges totalled US$ 770 million, but projected demands will potentially exceed US$ 1 trillion by 2050. This fund is expected to cover losses from extreme weather and slow-onset events like sea-level rise and desertification. However, discussions about funding specifics and disbursement mechanisms are ongoing. There is an urgent need – and opportunity – to increase support for health-related L&D interventions, especially in LMICs. Health is a critical underpinning of functional society and requires protection from the impacts of climate change. Accessible and equitable financing mechanisms, such as grants and insurance, are crucial for immediate responses and for building long-term health resilience.

A little girl arriving at her home carrying water, Kenya. © Evans Dims/ Unsplash

Figure 3 **Non Economic Loss and Damage (UNFCCC)**

Box 2 **Health in L&D at COP29 and beyond**

For COP29 and beyond, the operationalization of the L&D Fund must prioritize health interventions in countries most vulnerable to climate change.

Key priorities for health L&D for and beyond COP29:

1. **Establish a dedicated health workstream:** Develop a permanent health workstream within the L&D framework to maintain a continuous focus on climate-related health impacts.
2. **Quantify and address non-economic health losses:** Create standardized methodologies for measuring and addressing NELD, including mental health impacts, loss of traditional health practices, and other cultural dimensions.
3. **Prioritize equity and inclusivity:** Ensure that vulnerable and marginalized populations, especially from climate-affected regions, are meaningfully involved in equity-driven decision-making.
4. **Strengthen long-term support and slow-onset health response:** Establish long-term support programmes for communities facing slow-onset climate events and ensure health systems can respond effectively to the prolonged health impacts of these events.
5. **Innovative financing for health:** Develop and implement innovative financing mechanisms, such as a global health insurance scheme for climate-vulnerable nations, to specifically address health-related L&D, for both immediate disaster response and long-term health resilience.
6. **Enhance global health surveillance and rapid response systems:** Strengthen health surveillance systems, particularly in low-income countries, to better track and respond to climate-related health impacts. Develop mechanisms to rapidly deploy health resources during climate disasters to avert immediate health crises.
7. **Foster interdisciplinary collaboration:** Promote collaboration between health professionals, climate scientists, and policy-makers to develop integrated, evidence-based solutions that address both the short- and long-term health impacts of climate change.

Box 3

Health co-benefits **in numbers**

7-8 million deaths per year are attributable to air pollution exposure, and many could be avoided by fossil fuel phaseout. 4–5 million deaths per year are attributed to the burning of polluting fuels and use of inefficient cooking devices in homes *(51,52)*. A green energy transition offers significant health co-benefits, especially in low-income countries *(11)*.

Modelled estimates of emissions reductions in just nine countries showed that **sustainable pathways lead to a reduction of 1.2 million air pollution-related premature deaths**, 5.9 million diet-related premature deaths, and 1.2 million premature deaths due to physical inactivity per year by 2040, with some overlap between them *(53)*.

In 2021, **11.2 million deaths were attributable to dietary risks** - both from low intake of whole grains, vegetables, and legumes, as well as high red meat and dairy intake - that could be reduced through balanced, low-emission diets *(11)*.

In monetary terms, the economic benefits achieved through **health impacts of climate actions outweigh the costs of implementing actions** *(53)*. For example in New Zealand, a programme promoting active travel including cycling or walking returned a benefit-to-cost ratio of 11:1 – mainly from air pollution reduction, improved health and reduced number of injuries *(53)*.

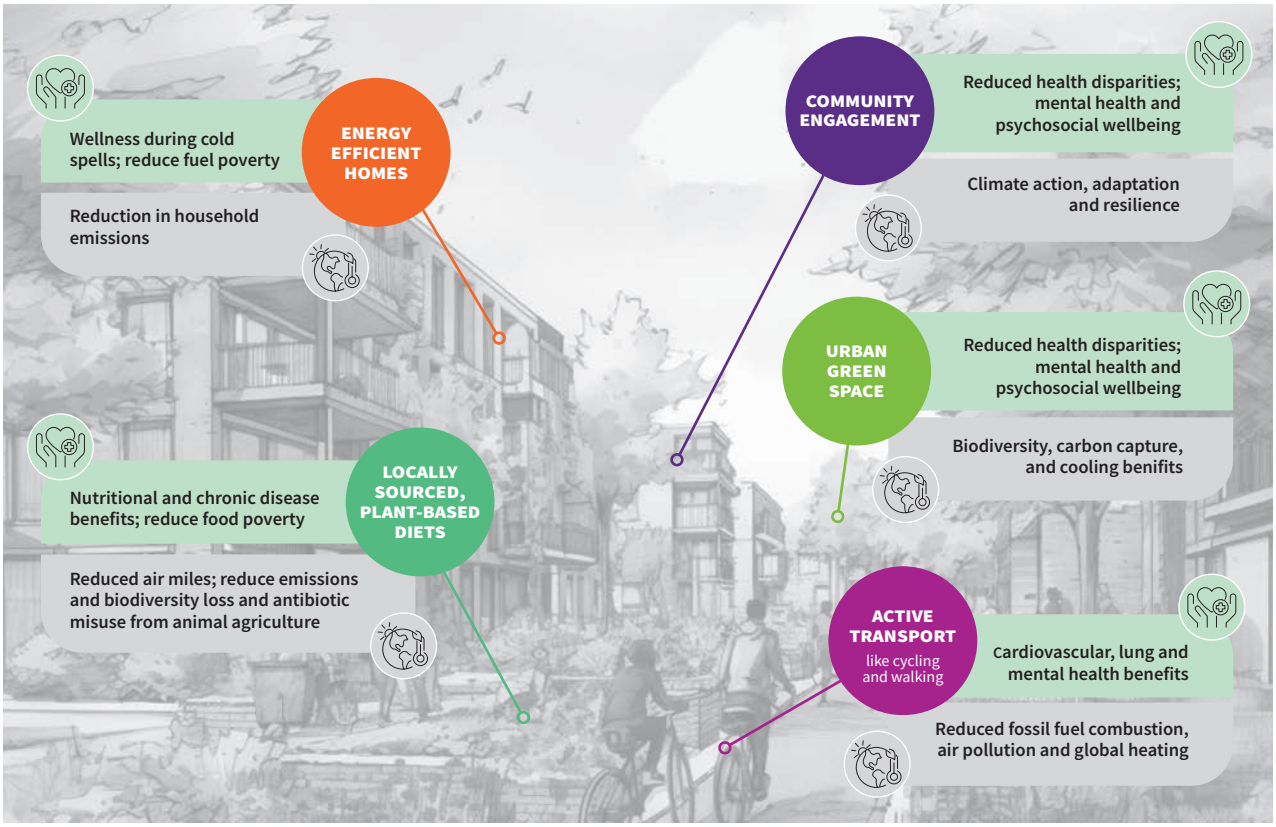
1.2.4 Health co-benefits of climate action

Taking rapid, ambitious climate action offers significant health benefits. For example, physical activity and sustainable diets not only lower CO_2 emissions but also reduce the burden of NCDs and promote healthy ageing, creating so-called virtuous cycles of well-being and resilience. Health co-benefits (see Figure 4) can be unlocked across sectors including energy, transport, food, housing, and urban planning *(54)*, with the greatest impact coming from reduced air pollution, improved diets, and increased physical activity *(53)*.

Almost all climate initiatives can be seen as public health interventions, offering a double dividend of environmental protection and improved human well-being (see Box 3). Yet, many climate strategies fail to fully consider these co-benefits *(55)*. Policies should include processes to monitor and evaluate the effects of mitigation and adaptation on both GHG emissions and health, using standardized metrics, and integrating them into NDCs. Carbon pricing can further improve health outcomes by targeting revenues to support food security, healthier diets, and active transport *(56)*.

Health co-benefits not only safeguard the planet but also deliver immediate, life-saving gains, motivating policy-makers to act *(53)*. A co-benefits approach which frames climate policies as health policies fosters intersectoral collaboration and opens avenues for financing shared actions, accelerating climate and health outcomes for a more resilient world.

Figure 4 **Health benefits of climate action**



Box 4 **WHO estimates of lives saved from key climate-health actions** *(57)*

As part of the WHO Global Investment Case for Climate Change and Health, health impact estimates were produced for five selected interventions. Each intervention was modelled for global scale-up from 2023, using the latest publicly available data sources:

1. **Heat-health warning systems:** Modelled for 57 countries without a warning system, with 100% coverage by 2024, saves an estimated 98 500 lives annually.
2. **Electrification of primary healthcare facilities:** Using decentralized solar systems and life-saving medical devices, modelled for 63 countries, saves 290 500 lives per year by 2024.
3. **Water, sanitation, and hygiene (WASH) for climate adaptation:** Modelled for 183 countries from 2024–2030, prevents 173 000 deaths annually.
4. **Cleaner household energy sources:** Transition to 100% clean household energy by 2030 for 129 countries, averts 133 000 deaths each year.
5. **Fiscal policies on fossil fuel pricing:** Phasing out fossil fuel subsidies and taxing fossil fuels, modelled for 168 countries, saves 1 202 500 lives annually by 2034.

In total, these interventions could avert 1.9 million deaths per year. Future steps should include economic evaluations and expanding the scope of interventions, with efforts to strengthen models and incorporate uncertainty estimates.

Further reading and resources

- The *Lancet* Pathfinder Commission collates and assesses the potential and magnitude to date of the benefits for health and climate of various mitigation actions and, where evidence allowed, the factors facilitating or impeding implementation.
- The WHO Climate and Health Toolkit offers tools to assess, plan and finance interventions on climate change and health as well as assess the full range of health and economic impacts from sector policies and air quality interventions.
- The WHO report on the Commercial Determinants of Noncommunicable Diseases in the WHO European Region highlights the substantial impact of commercial determinants such as tobacco, alcohol, processed food, fossil fuels and occupational practices on NCDs.
- The WHO publication Quality criteria for integrating health into Nationally Determined Contributions (NDCs) outlines how countries can strengthen their NDCs to the Paris Agreement by developing health-inclusive and health-promoting climate targets and policies.

PEOPLE: The lived experience of the climate crisis is health – health, well-being and equity must be at the heart of climate action

Key Messages

Health is not a secondary issue; it is central to well-being, functioning societies, social cohesion, security, and productivity. The health consequences of climate change impact all essential sectors.

Climate justice and rights-based approaches which centre health are crucial for addressing the unequal impacts of climate change on marginalized populations and must be the guiding principles of a green transition.

People-centred action able to meaningfully deliver mitigation, adaptation and resilience must include green health systems and a fit-for-purpose health workforce.

Investing in human development across health, education, work, opportunities and our children's futures is essential for resilience, economic stability, and security in an unpredictable climate. Unlocking human potential is key to fundamentally changing the trajectory of action.

Key initiatives aiming to support countries' scale-up interventions on climate and health. These include the WHO-led Alliance for Transformative Action on Climate and Health (ATACH), in which over 85 countries and over 75 partners work together to ensure countries have the technical and financial resources they need to protect health from climate change.

2. Unlock human development and put people at the heart of climate action

Prioritize equity, human rights, and a just transition to ensure everyone benefits from climate action.

Critical asks

- Drive health-focused climate mitigation, adaptation and L&D to unlock human potential, including through climate-aware education, training, jobs, and fostering climate strategies that ensure the well-being of present and future generations' health, economies and security.
- Put equity, justice and human rights at the core of climate action by delivering a just transition that is inclusive, resilient and holds health as the top measure.

An African farmer on his plantation with a bunch of freshly harvested bananas, Cameroon. © Media Lens King / istockphoto

2.1 People-centred approaches are essential to unlocking human development and addressing convergent climate and health drivers and impacts

Health is the fundamental currency for thriving, productive, connected and stable people and societies. Health must not be seen as a secondary issue, as it impacts all sectors and societal outcomes. Healthy individuals can care for their families, generate income and realize their own and their communities' full potential. Poor health, including that accelerated by climate change, negatively impacts economic stability and national security.

Our failure to curb GHG emissions and rapidly address adaptation and L&D requirements is eroding the human right to the highest attainable standard of physical and mental health enshrined internationally *(59)* (see Box 6). A health-centred – human-centred – approach to climate change can unlock human development, close equity gaps, shape inclusive economies, reduce conflict and pressure on resources, and build thriving communities around the globe.

Centring human development in climate action ensures that individuals and communities have the health, education, skills and opportunities necessary to thrive in an increasingly unpredictable world. Emphasizing dynamic growth, resilience, and inclusivity, investing in human development lays the foundation for populations today and tomorrow to lead fulfilling, healthy, sustainable lives while alleviating poverty and ensuring a just transition to a green economy. Low-carbon, climate-resilient health systems are foundational for building and securing human development under a changing climate *(60)*.

2.2 Supporting future generations

Children make up 30% of the world's population and are critical to humanity's future *(61,62)*. Empowering young people with the knowledge and skills to tackle climate challenges is essential for building tomorrow's leaders and innovators as well as addressing the problems of today. This starts with equitable access to education, healthcare, nutrition, and climate literacy. Investments in early childhood, particularly during the first 1000 days, have proven to yield significant returns – US$ 9 for every dollar spent on pre-primary education, rising to US$ 17 for children in greater vulnerability *(63)*. Ensuring access to the building blocks of health, including nutritious food, clean air and water, and supportive communities, is critical for fostering lifelong health, resilience, and success under a changing climate.

2.3 Equity and social justice

Climate change disproportionately impacts already marginalized individuals, communities, and groups, both within and across countries. Countries that least contributed to climate change through historical and cumulative emissions are paying the highest price in terms of climate impacts. They are often those with the greatest disease burdens, most fragile health systems, and the lowest densities of health and care workers, and most vulnerable to exacerbation of health risks and determinants of health. The cumulative effects of climate change – the collective and synergetic impacts of climate change on health – pose a notable challenge to climate justice and health equity.

Human development involves redressing the systemic inequalities that exacerbate marginalization across multiple dimensions, including gender, socioeconomic status, race, disability, age, and geography, both within and between countries. This process empowers individuals and communities to participate fully in economic, social, and political life, and to respond to global environmental challenges such as climate change. Means of delivering this include climate justice (see Box 5) and rights-based approaches (see Box 6).

Societies start and end with the collective security of the planet.

The Lancet, 2021 *(58)*

Box 5 **Climate justice as a means of delivering equity**

Climate justice acknowledges that climate change can have disproportionately harmful social, economic, and public health impacts on marginalized populations, and that those who bear the brunt of climate change have often had the least part to play in contributing to the processes that have caused it. Advocates for climate justice are striving to have these inequities addressed head-on through long-term mitigation and adaptation strategies, with a fair distribution of the benefits and impacts of climate action and a prioritization of the most marginalized.

Climate Change in Afghanistan. In the Afghan city of Bamiyan, young girls are caught by a sandstorm on their way to school.

Box 6 A rights-based approach to climate change and health action

A rights-based approach to climate and health action is rooted in human rights law and principles, emphasizing equal opportunity, meaningful participation, and empowerment for all people. This approach holds duty-bearers, including governments and businesses, accountable for fulfilling these rights without discrimination.

Article 25 of the Universal Declaration of Human Rights guarantees the right to a standard of living adequate for health and well-being, including food, housing, medical care, and essential social services. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) upholds Indigenous rights to land, culture, and self-determination. Other climate-related rights include the right to the highest attainable standard of health[2] and the right to a sustainable healthy environment.[3]

A rights-based approach means involving people in governance and decisions affecting their health and environments. Policies grounded in this approach ensure that health facilities and services are available, accessible, acceptable, and of high quality. By empowering individuals to claim their rights, this approach makes public health responses to climate change more inclusive and equitable, addressing the specific needs of marginalized groups, including people with disabilities, ethnic minorities, women, children, Indigenous Peoples, and those in vulnerable situations.

Climate change threatens multiple human rights, highlighting the need for a rights-based response. Human rights are indivisible, inalienable, and interdependent, which broadens this approach to encompass a wide range of rights essential for addressing climate impacts on health.

Using a human rights lens for climate and health policy strengthens accountability mechanisms, such as national and international monitoring frameworks, legal remedies for rights violations, and inclusive public participation in decision-making. This framework helps governments and other duty-bearers meet their obligations to respect, protect, and fulfill the right to health. It also promotes actions that reduce disease burdens, build community resilience, alleviate poverty, and address inequities. Respecting Indigenous rights includes honoring their autonomy, safeguarding access to ancestral lands, and recognizing their vital role in biodiversity conservation and sustainable resource management.

2 Preamble, WHO Constitution and Article 12, International Covenant on Economic, Social and Cultural Rights.

3 Reflected in the 2021 United Nations Human Rights Council Resolution 48/13.

2.4 Education and jobs

Education and job creation are fundamental to human development. A just transition to a low-carbon economy requires a workforce that is equipped with the necessary skills to implement and sustain climate solutions. This includes technical training, vocational programmes, and lifelong learning opportunities *(64)*.

Working conditions and occupational safety and health adaptation is critical in the context of climate change, especially for workers in occupations or industrial sectors that are more vulnerable to its impacts *(65)*. All workers face some level of climate-related risk, but outdoor workers and workers in specific occupations and sectors like manufacturing, construction, transportation, tourism, and agriculture are particularly at risk, which in many places account for a significant proportion of both workforce and GDP *(66)*.

Just transition strategies are implemented to achieve emission reductions and environmental targets whilst ensuring decent and productive employment for all. Climate and environmental policies must reflect, incorporate, promote and ensure measures that promote employment and decent work in enterprises, for workers and communities in adaptation, mitigation and other environmental contexts. Employment policies must respond to, anticipate and proactively address the challenges and opportunities for decent work related to climate change and responsive policies for adaptation and mitigation.

Further reading and resources

- The International Labour Organization (ILO) has outlined critical evidence related to the impacts of climate change on occupational safety and health in their guidance on Ensuring safety and health at work in a changing climate.
- The ILO report Green recovery with jobs through employment policies offers guidelines for shaping employment policies that support a green recovery and a just transition.
- United Nations Children's Fund (UNICEF) has developed guidance in their report A threat to progress: Confronting the effects of climate change on child health and well-being which provides a comprehensive stocktake of the impacts of climate change on children across six major hazards that impact their health and well-being: extreme heat, droughts, wildfires, floods and storms, air pollution and ecosystem changes.
- UN Women offers guidance on climate change impacts on women and girls, including in A gender-responsive just transition for people and planet and Feminist climate justice: A framework for action.

3. Build future-proofed health systems

Invest in low-carbon, climate-resilient health systems and a fit-for-purpose, well-supported global health workforce.

Critical asks

- Invest in and deliver low-carbon, climate-resilient and environmentally sustainable health systems to promote health, mitigate climate impact on the health sector, and protect and promote populations from climate and all health challenges.
- Invest in growing, employing and upskilling the health workforce to respond effectively to the health impacts of climate change. Build the health sector's capacity to tackle climate change head on.
- Mobilize the health workforce to guide mitigation, adaptation, and resilience both in the health sector and through system-wide actions.

Doctor examines woman in Sindh, Pakistan. © Russell Watkins

3.1 Training and capacity building for a climate-resilient health workforce

Health and care workers, in both formal and informal sectors, play a critical role in protecting and promoting community and population health in response to climate change. Strengthening workforce education, training, numbers, distribution, protection and support enhances the multiple capacities of health systems under stress from climate change including promoting resilience; preventing, preparing for and managing climate-related health challenges; reducing service disruptions; mitigation of the health systems' contributions to climate change; and ensuring education of the wider community.

We face a global shortage of health workers – 10 million by 2030 *(67)*, six million of whom are in sub-Saharan Africa *(68)*, one of the most vulnerable regions to climate change. Central to any climate and health response is the recognition of the growing burdens of disease due to climate change which increases the demands on the workforce. Scale-up and increased investments are necessary to build a well-distributed, fit-for-purpose workforce that can meet accelerating needs, especially in already vulnerable settings. Health workers provide critical, flexible responsiveness to myriad health challenges. Investing in the health workforce also means ensuring retention of those already trained. Governments and partners must prioritize access to decent jobs, resources, and support to deliver high-quality, climate-resilient health services. This includes essential protective equipment, supplies, fair compensation, and safe working conditions such as adequate personnel numbers, skills mix, and supervisory capacity.

In addition to scaling up the workforce, equipping health and care workers with the skills and knowledge to address climate-related risks is a key component in improving health system effectiveness and patient care. This effort requires integrating climate-related health impacts – from extreme heat, air pollution, extreme weather, to rising seas – into pre-service medical, nursing, public health and other health and care worker curricula, along with clinical training and continuing education for current practitioners, all of which require improvements *(69,70)*. Education and training must include understanding of the social determinants of health which are being undermined by climate change and indirectly accelerating health impacts.

A strong, well-supported workforce is pivotal in transitioning to a low-carbon, sustainable health and care sector. Through training, resource provision, and incentives, health workers can promote sustainable practices such as waste reduction, energy efficiency, and the adoption of renewable energy technologies and identify means to make facilities and care delivery systems more carbon neutral. Furthermore, as improving health outcomes is proven to reduce GHG emissions, scaling up the workforce to focus on prevention will reduce the carbon cost of patient care pathways *(71,72)*.

3.2 Health and care workers as climate and clean air leaders and advocates

The health and care workforce has a moral, professional and public responsibility to protect and promote health, which includes advocating for climate action, leveraging prevention for climate mitigation and cost savings, and safeguarding healthy environments *(74)*. As trusted members of society *(75)*, health and care workers are uniquely positioned to raise awareness about the health impacts of climate change, ensure evidence-based decision-making, and champion sustainable policies within their workplaces, in the broader community *(76,77)*, and among policy-makers. Health is a lived experience of climate change, and health-centred climate messaging resonates with diverse audiences – peers, patients, and the wider public. Increasingly, the private sector and policy-makers are understanding the breadth and scope of climate and health impacts on their goals. By framing climate action as essential for patient experience, healthier societies and the subsequent benefits of economic growth, stability and security, healthcare workers can support processes to promote health-centred responses and unite climate action towards a common goal.

Case study

The critical role of health workers in climate change adaptation in Malawi

Health workers play a critical role in climate change adaptation. As climate change threats intensify, countries in sub-Saharan Africa, like Malawi – already facing severe health worker shortages – are especially vulnerable.

In March 2023, during a historic cholera outbreak, Malawi was struck by Cyclone Freddy. The storm caused widespread devastation, killing hundreds, destroying property and cutting off entire populations from access to life-saving care. The government declared a state of disaster, vital water and electricity sources were incapacitated for weeks, health centres were cut off, and cholera continued to spread widely. In the badly affected Nsanje district, damage to houses led to the displacement of 145 870 people needing shelter in temporary camps.

The Ministry of Health worked with partners, including Seed Global Health —whose mission is to train a health workforce aligned with national priorities—to respond and ensure provision of essential health services. Led by highly skilled family medicine physicians, teams conducted assessments in camps to identify the key challenges and ensure continuity of essential health services.

Around 200 health workers were trained in cholera case management and Nsanje district's Kalemba Community Hospital became a comprehensive emergency obstetric and newborn care site. Health workers were able to perform interventions for pregnant women and newborns experiencing life-threatening complications, including severe bleeding, obstructed labour, eclampsia, and newborn asphyxia. All mothers and newborns, many of whom were referred from smaller health centres in Nsanje, were promptly managed and discharged safely. Recognizing this crucial role health workers and family medicine physicians can play in transforming healthcare in Malawi, the Ministry of Health has developed a ten-year plan to train two family medicine doctors for each of the 28 districts across the country. This will ensure there are capable health workers in primary care settings to provide quality care and prevent deaths in climate-related and other health emergencies.

Approaches to managing climate change's impact on health systems are specific to each country. Strengthening health systems, including strategic investments in skilled health workers, is essential for building resilience against emerging threats. This approach enhances emergency coordination, prevents disease spread, and ultimately saves lives.

Case study

Building climate resilience in primary healthcare: Americares and Harvard Chan C-CHANGE Toolkit *(73)*

Primary care providers need accessible, evidence-based resources on the health impacts of climate change to prepare their facilities and support their patients. To meet this need, Americares and Harvard Chan C-CHANGE developed the Climate Resilience for Frontline Clinics Toolkit. This resource helps community health centres manage climate risks such as extreme heat, wildfires, floods, and hurricanes.

Key features of the toolkit include clinical guidance and action plans for specific health conditions like asthma, cardiovascular disease, and diabetes; tip sheets for patients and checklists for clinic staff; and emergency preparedness information for facility administrators.

Launched in 2023 and updated in 2024, the toolkit is co-developed with clinics across the United States and reviewed by climate scientists and public health experts. It is now used by clinics and health departments nationwide and is being adapted for the Philippines in collaboration with local stakeholders, highlighting the importance of co-creation and local adaptation for successful implementation.

Despite this critical role, many healthcare workers face barriers to effectively communicating about climate change, due to a lack of education, resources, capacity, leadership, and will *(78,79)*. These challenges can be addressed by integrating climate-related content into curricula, training programmes, continuing education programmes and professional guidelines, and bolstered through institutional support of health worker leadership, advocacy, and action on climate change.

In addition to raising awareness, health and care workers have an important role to bring their expertise to climate litigation, helping to advocate for the right to a healthy environment and other human rights (see box 6). As climate-related legal cases increase, health testimony can emphasize the human consequences of inaction.

Further reading and resources

- Health workers can find support on speaking up on climate change through the WHO Communicating on Climate Change and Health, Toolkit for Health Professionals.
- The WHO Air pollution and health training toolkit for health workers (APHT) is a set of materials designed to enable health workers, in both the clinical and public health fields, to understand the health risks of air pollution and identify risk reduction measures.
- The WHO training package on Climate Change and Health consists of 17 standalone modules covering a range of topics to help build the capacity of public health professionals who are involved in management of public health programmes impacted by climate change.
- UN training on Climate Change Negotiations and Health supports delegates attending the UNFCCC COP to participate in climate diplomacy.
- Visual storytelling tools can support health workers in advocating for the health benefits of climate action, engaging patients and communities in conversations that promote both personal and planetary well-being. Resources include the Climate Visuals Research Project, Health and Climate image collection by Climate Visuals, Visualising Air Pollution and Guidance for Visualising Extreme Heat.
- The Global Consortium on Climate and Health Education (and the newly launched European Network on Climate and Health Education) equip health professionals worldwide to address the health impacts of climate change, through core competencies, courses, resources and capacity building.

3.3 Climate resilient and low-carbon health systems support human development

3.3.1 Health systems as a driver of climate change

The global healthcare sector is responsible for approximately 5% of GHG emissions *(80)*. If the healthcare sector were a country, it would rank as the fifth-largest emitter worldwide *(81)*. The majority of emissions – about 71% – come from the healthcare supply chain *(82)*, which includes the procurement, production, transport, and disposal of medical goods and services. Remaining emissions derive from healthcare facilities, vehicles, and energy consumption including heating and cooling. For essential health products such as medicines, medical devices, and diagnostics, the bulk of carbon emissions arise from the materials and energy used during manufacturing, as well as from transportation and storage. Notably, inhalers used for asthma and other lung diseases are alone responsible for roughly 0.03% of all GHG emissions, with metered dose inhalers using hydrofluorocarbons that are over 1000 times more potent than CO_2 *(83)*.

High-value, low-carbon systems must focus on preventing disease through investments in primary healthcare, effective screening, education, and evidence-based treatments aimed at preventing disease progression. This approach contrasts with low-value, high-carbon systems – that is, ineffective treatments and wasteful practices – by addressing health issues before they escalate. It also results in healthier patients, less use of the medical system and resources, and lower emissions.

Sustainable practices – such as using renewable energy, retrofitting buildings for energy efficiency, reducing waste, transitioning to electric vehicles, promoting telemedicine, optimizing operating room energy, and leveraging digital technologies – can significantly reduce carbon emissions while yielding financial savings and improving health outcomes. Decarbonizing supply chains, particularly in the procurement of medical equipment and pharmaceuticals, presents a major opportunity for emission reductions, as does shifting from environmentally harmful inhaled anaesthetic gases, metered dose inhalers, and single-use devices to more sustainable alternatives.

It is worth noting the broader environmental footprint of health supply chains and the importance of reducing pollution from plastics, medical waste, and harmful waste generated during the manufacturing of health products. The circular economy principles, emphasizing reduce, reuse, repair, and recycle, can guide efforts towards more sustainable healthcare.

Residents of the Vosman area of Witbank, Emalahleni, South Africa. People in the area suffer from breathing problems related to air-pollution from the nearby mines. © Gulshan Khan / Climate Visuals

Case study

From milligrams to megatons *(84)*

The production and distribution of vital health products, including HIV medications, diagnostic tools, and mosquito nets, play a critical role in saving millions of lives each year. However, these products also contribute significantly to carbon emissions – an estimated 3.5 megatons of CO_2 annually – equivalent to the emissions of a small city. Additionally, the manufacturing, transport, and disposal of these items generate substantial plastic waste and pollution, placing further strain on ecosystems and public health.

At the same time, the availability of these essential health products is increasingly threatened by the impacts of climate change. Extreme weather events such as floods and storms can severely disrupt supply chains, cutting off access to life-saving treatments in LMICs. Rising global temperatures further exacerbate the challenge by degrading medicines, reducing their potency and shelf life. This puts vulnerable populations, particularly those in LMICs, at greater risk of disease outbreaks and worsening health outcomes.

As such, there is a growing need for climate-smart health products – products that are not only less carbon intensive and harmful to the environment but also more resilient to the shocks of climate change and better suited to meet the evolving needs of a warming world. Twenty technical solutions could significantly reduce the environmental footprint of key health products (outlined in Unitaid's From milligrams to megatons: A climate and nature assessment of ten key health products), with the potential to cut emissions by 70% by 2030, 40% of these reductions achievable without increasing costs. Innovations such as improved production processes, the use of renewable energy, and community-based recycling programmes are key steps in making health systems more sustainable.

The environmental impact of health products extends to nature. The improper disposal of products like mosquito nets is expected to generate 57 500 tons of plastic waste by 2030. This highlights the importance of developing more circular and sustainable approaches to product design, disposal, and recycling within the health sector.

Without action towards sustainable, climate-smart health products to protect the environment and ensure global health systems remain resilient in the face of climate-related disruptions, the global health community risks reversing progress on key health goals, especially in areas like infectious diseases, maternal health, and emergency response.

Case study

Hospital Israelita Albert Einstein – driving resilience and environmental efficiency

Hospital Israelita Albert Einstein in São Paulo has launched a comprehensive environmental efficiency and resilience strategy to address rising operational costs and the impacts of climate change. Key initiatives include upgrading its air conditioning system, saving **6000 m^3 of water** and **2000 MWh of energy** annually, while reducing **CO_2 emissions by 173 tons**. These efforts save the hospital **BRL 2.5 million** (almost US$ 500 000) per year. Additionally, the hospital has expanded its renewable energy capacity by installing photovoltaic plants and transitioning to a free energy market. Leadership engagement and careful planning were crucial to the success of these projects

Hospital Israelita Albert Einstein, Brazil.

3.3.2 Ensuring UHC under a changing climate: Building climate-resilient and low-carbon health systems

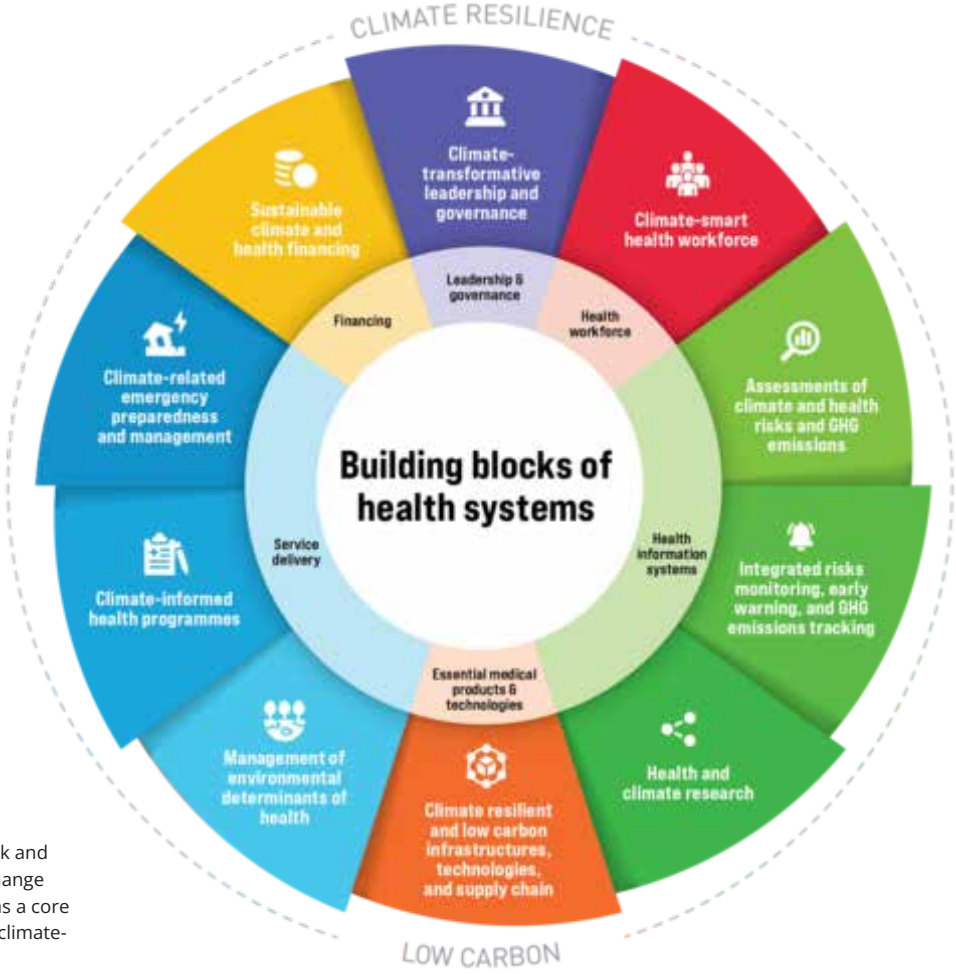
A climate-resilient and low-carbon health system[4] protects people from the direct and indirect impacts of climate change and ensures continuity of services in situations of extreme weather events and disasters. Climate change considerations must be integrated in UHC policies and implementation, including essential health services that cover emerging climate sensitive diseases and comprehensive population coverage, especially for those displaced by climate impacts. UHC is a fundamental determinant of climate-resilient health systems globally and is particularly critical in LMICs, often having the highest disease burden and fewest health and care workers. However, progress towards UHC has stalled with 4.5 billion people lacking access to essential health services and 2 billion people facing financial hardship due to health costs paid out-of-pocket.

Innovation in health sector mitigation and adaptation is transforming how healthcare systems tackle climate challenges. Key advancements include integrating environmental considerations into health technology assessments to promote eco-friendly medical products and technologies, and expanding telemedicine, especially in rural and low-income regions. While digital health can reduce emissions by cutting travel and improving efficiency, it may also increase energy use, requiring further study to ensure a net positive climate impact.

Delivering UHC under a changing climate can be supported through action on the ten components outlined in the WHO Operational framework for building climate-resilient and low-carbon health systems, a vital tool for health adaptation planning (see Figure 5).

Figure 5

Operational framework for building climate-resilient and low-carbon health systems *(85)*



4 The WHO 14th Global Programme of Work and WHA77 resolution on health and climate change established responding to climate change as a core priority, including through low-carbon and climate-resilient health systems.

Box 7 **Integrating health into national climate action – Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs)**

Healthy NDCs are national climate commitments that protect climate systems and advance human health and well-being for present and future generations. Integrating health into the 2025 and subsequent NDCs ensures that health is prioritized in climate commitments and policies *(55)*. Key action points include:

- **Identify and quantify** health co-benefits of mitigation actions in key health-determining sectors.
- Prioritize **air pollution and short-lived climate pollutants** (SLCPs) reductions, including stand-alone, health-based targets for the reduction of air pollution.
- Include specific **emission reduction targets** for national health systems.
- **Ensure health is a priority sector in the adaptation component**, which complements and supports national approaches to adaptation planning and implementation.
- **Integrate health in the adaptation targets of health-determining sectors**.
- Identify **synergies between mitigation and adaptation** for health and with other international frameworks.
- **Quantify** climate-sensitive health risks and outcomes, including health systems and facilities, as well as the financial implications of health-related L&D.
- Include priority interventions to **avert, minimize and address losses and damages** to health and health systems and facilities.

NAPs are long-term, voluntary plans designed to help countries adapt to the impacts of climate change. Suggested actions for integrating health in this process include:

- **Understand the health risks of climate change:** Assess where and how population health and health systems are vulnerable to climate change and use the information to identify effective actions to build resilience.
- **Foster collaboration for integrated adaptation:** Coordination between health sector actors, ministries, and key health-determining sectors is essential. Health adaptation and resilience will also be determined by actions in other sectors, such as energy generation, food and agriculture, and water and waste management, and ongoing cross-sector collaboration is needed.
- **Mobilize resources for health adaptation:** Health adaptation is severely underfunded *(85)*. Access to climate finance for adaptation in the health sector include funding streams such as the Green Climate Fund, the Adaptation Fund and the Global Environment Facility. The WHO offers support for countries to develop funding proposals for climate change and health, including as a GCF readiness delivery partner and Adaptation Fund implementing entity.
- **Monitor, evaluate, and adjust adaptation approaches:** As countries establish their monitoring, evaluation, and learning systems for adaptation, there is an opportunity to incorporate key indicators of health and climate-resilient health systems. At the same time, the data collected in the health sector, such as mortality and morbidity related to heat stress, can be an important input to monitoring climate change impacts and the potential effectiveness of adaptation efforts.

The comprehensive quality criteria for integrating health in NDCs can be found in the WHO publication Quality criteria for integrating health into Nationally Determined Contributions (NDCs), Further information on NAPs can be accessed in the WHO Review of Health in National Adaptation Plans.

Health sector engagement in the National Adaptation Plan (NAP) process and the development of a Health National Adaptation Plan (HNAP) support countries to move towards UHC under a changing climate (see Box 7). The WHO-led Alliance for Transformative Action on Climate and Health (ATACH) includes over 85 countries and over 75 partners working together to ensure countries have the technical and financial resources they need to protect health from climate change.

3.3.3 The wider benefits of health system action

Beyond the health system, there are numerous public goods that arise from UHC and health system action, offering significant opportunities to drive societal change towards a healthier, more sustainable way of life. A key component of health system resilience and reduced consumption is to support healthy populations, which in turn can support positive climate action, such as using active transport or eating locally grown foods. In this regard, a sustainable health sector offers benefits beyond reduced carbon emissions: an opportunity for positive system change across all aspects of society *(86)*.

Further reading and resources

- The CARING NATURE project has the ambition to develop and test 10 innovative solutions to reduce the impact of the healthcare sector on the environment, without interfering with the safety of patients and operators.
- KitNewCare is a pioneering EU co-funded project to make kidney healthcare more environmentally sustainable.
- The NetZeroAICT project is a Horizon Europe research and innovation project developing artificial intelligence (AI) technology to help improve the efficiency and quality of diagnostics involving CT scans.
- The Healthcare Without Harm Quick Guide to climate-smart procurement offers support to healthcare workers to reduce the sector's carbon footprint through sustainable procurement practices.

PLACE: Realize the co-benefits of stewarding environments for health and the critical opportunity and savings of investing in prevention

Key Messages

Health is shaped by our environments and the world around us.

The success of climate and health action largely depends on the decisions made in and by cities – home to over half of the world's population and responsible for more than 70% of global GHG emissions – through renewable energy systems, sustainable healthy urban design and transport systems, and decent climate-resilient housing and water, sanitation and hygiene. Lessons from city-level actions have relevance for all built environments.

The built environment – our energy and transport systems, infrastructure, city design and sanitation – are drivers of better or worse climate change and health outcomes.

Health is sustained by well-functioning ecosystems, providing critical resources such as clean air, fresh water, natural medicines and food security.

4. Cities are key to unlocking climate and health co-benefits

– delivering wins for health and climate through clean energy, zero-emissions transport, infrastructure design, effective waste management, and climate preparedness.

Critical asks

- Prioritize prevention, health promotion and well-being in climate mitigation by addressing health determinants, ensuring access to clean energy, zero-emission transport, active mobility, healthy and low-carbon food systems, and effective waste management.
- Centre health and equity in urban climate and clean air policies, regularly monitoring and evaluating their health co-benefits.
- Focus adaptation programmes on key health determinants by expanding green spaces, improving air quality, controlling vector-borne diseases, and improving heat mitigation and water management.
- Build climate-resilient urban infrastructure, including housing, transport, water, and sanitation systems to protect public health from climate impacts.
- Leverage partnerships across governments, the private sector, the scientific community and residents to innovate, share knowledge, and prepare for climate risks, with improved data systems for decision-making and early warnings.

Urban forestry seen from and on the High Line in New York, USA. © Lance Cheung / USDA

Box 8

Cities **in numbers**

55% of the world's population lives in urban areas, expected to increase to 70% by 2050. In LMICs where the pace of urbanization is fastest, 85% of people live in cities *(87)*.

Cities consume over two-thirds of the world's energy and account for as much as 70% of human-induced GHG emissions, primarily through the consumption of fossil fuels for buildings and transportation *(88)*.

Ambient (outdoor) air pollution caused an estimated **4.2 million premature deaths** in 2019 *(89)*.

The global scale up of heat-health warning systems in cities would **save almost 100 000 lives per year** *(90)*.

Of city leaders surveyed from 118 cities in 52 countries *(87)*:

Only 20% of the cities indicate "strong coordination" between city departments – such as health, environment, transportation, urban planning – essential to forge an integrated response to tackle the many challenges related to climate, health and equity.

37.1% of the cities have a city resilience plan or other planning documents or tools that address climate threats. However, only 22.9% of the cities have a plan that concurrently addresses climate and health. Few cities have reliable access to early warning systems (30.0%); climate information (e.g., heat, air quality forecasts, 41.3%); prevention strategies to avert climate-related risks (35.6%); or emergency response plans for acute climate shocks (40.7%).

Many cities are already investing in/ planning to invest in clean energy, renewable energy generation or energy efficiency improvements (41.9% invested/29.1% planning); green infrastructure such as parks (49.4%/22.5%); and supply chain management and local production (35.1%/32.4%).

Most (>65%) rate heat, extreme weather events, mental health, drought and food insecurity, and greater exposure to climate-sensitive infectious diseases of "high concern".

Nearly all cities (>90%) report economic losses due to weather-related events like floods, storms, or heatwaves. More than 70% report a reduction in labour capacity or work productivity due to climate and health issues.

Cities – responsible for over 80% of global GDP – are crucial for climate mitigation, adaptation, and innovation *(91)*. Simultaneously, many cities, especially in coastal areas, are also highly vulnerable to climate impacts, making them necessary sites for adaptation. Cities are not socially neutral but reflect historical patterns of discrimination and uneven development, which shape many health vulnerabilities in the face of climate change. For example, city areas with greater proportions of minority populations tend to be hotter, prone to flooding, and more exposed to air pollution *(35,92)*.

Urban policies directly influence public health through their effects on air quality, transport, energy use, urban design, green spaces, housing, and food access. As hubs of innovation, cities drive technological and social advances that can reduce emissions, enhance resilience to climate impacts, and improve health and well-being. For example, quality, energy-efficient housing that is well-ventilated, well-insulated and not overcrowded can help minimize the impacts of extreme temperatures and reduce the risk of infectious and NCDs *(93,94)*. Sustainable transportation systems can lower air pollution and promote physical activity, green spaces mitigate urban heat islands and offer mental health benefits, and local food systems boost food security and reduce transport emissions.

The success of global health, human development and climate action will largely depend on the decisions made at the city level. Achieving a climate-safe future requires that all cities undertake transformative measures, including cutting transport emissions, enhancing building energy efficiency, transitioning away from fossil fuels in energy production, minimizing waste sent to landfills or incinerators, and shifting consumption *(93)*. By investing in low-carbon, climate-resilient infrastructure – including health facilities – promoting sustainable mobility, and fostering green jobs and skills, cities can become powerful catalysts for positive change.

Box 9 **Taking a systems approach to city-level actions** *(95)*

Rather than analysing climate events, health outcomes, and urban stressors in isolation, a systems approach encourages an integrated perspective that considers how these elements interact and influence each other. For example, a heatwave not only causes direct health impacts but also strains critical infrastructure like water, food, and energy systems, disrupts economic activities, and exacerbates social inequalities, particularly for the most vulnerable. By examining how infrastructure, governance, and social capital interact with environmental risks and public health, this approach facilitates interventions that address multiple challenges simultaneously and promotes a comprehensive understanding of the short-, medium-, and long-term impacts of urban planning and policy decisions. Systems-based interventions integrate environmental, social, and economic considerations to promote resilient urban ecosystems. Ultimately, systems approaches underscore that urban resilience is not just about short-term crisis management but about creating adaptive systems that enhance cities' and their residents' ability to thrive amidst ongoing and future challenges.

Oxygen is vital to life, and we should all live in an equal world and have clean air.

Youth participant

Top view of building with trees. © Chuttersnap / Unsplash

4.1 Energy systems

Rapid decarbonization of urban energy systems yields powerful health and climate impacts. Fossil fuel combustion is responsible for about two-thirds of outdoor air pollution *(85)* and unfairly impacts those living in slums, near highways, lacking access to clean cooking, or in vulnerable occupations *(97)*.[5] Shifting from fossil fuels to renewable energy in urban areas can significantly reduce ambient air pollution – of which combustion vehicles constitute a significant portion *(98)*.

Improving energy efficiency in buildings, which account for 30% of global energy consumption, can also reduce emissions while enhancing thermal comfort and reducing energy poverty *(99)*. Reducing ambient and household air pollution can reduce CO_2 emissions and SLCPs,[6] contributing to climate change mitigation. Transitioning to clean cooking fuels in urban areas of developing countries can significantly reduce household air pollution, a major cause of respiratory and cardiovascular disease (see Box 11) *(100)*.

Action across all sectors, including energy, transport, and land use, is critical, led by regional and international cooperation *(101)*. The health sector must play a leading role in addressing the impacts, advising patients, and leading by example in healthcare settings *(102,103)*.

4.2 Transport and mobility

Urban transport systems significantly impact both climate change and public health. Shifting towards greener mobility options offers substantial co-benefits. For instance, active transport such as cycling and walking reduces GHG emissions, increases physical activity and improves air quality. Electrification of public transport can also reduce ambient air pollution, which caused about 4.2 million premature deaths globally in 2019 *(100)*. Moreover, redesigning cities for sustainable mobility can reduce traffic injuries, the leading cause of death for people aged 5–29 years *(104)*.

4.3 Urban design

Comprehensive urban climate action across slums, peri-urban areas, villages, towns, and cities could improve health while significantly reducing GHG emissions *(93)*. This includes addressing urban heat islands and the availability of so-called cool zones during increasing periods of extreme heat, as well as building regulations for promoting passive cooling of buildings without carbon intensive air conditioning *(105)*. Urban design that prioritizes Nature-based Solutions, such as green spaces and urban forests, can mitigate urban heat island effects *(106)* and help sequester carbon, improve air quality, and enhance mental health: Studies suggest that exposure to tree canopies was associated with lower odds of psychological distress *(107)*. Compact, mixed-use urban development can reduce car dependency, decreasing both emissions and air pollution while promoting physical activity *(108)*. Moreover, designing cities for climate resilience, including improved stormwater management and flood protection, can safeguard public health in the face of increasing extreme weather events *(109)*.

4.4 Housing

The health impact and recovery from climate-related events are dependent on multiple elements within the housing system *(110)*. Housing unaffordability and tenure insecurity, living in overcrowded dwellings, lacking indoor thermal regulation, and experiencing structurally deficient

5 While 99% of the population is exposed to levels of particulate matter that exceed those recommended in the WHO air quality guidelines, air pollution levels and the related health burden are unequally distributed and vary between populations and regions worldwide.

6 SLCPs are pollutants that have a short atmospheric lifetime but far greater warming potential than CO_2. SLCPs include emissions from the incomplete combustion of solid fuels and kerosene, such as methane and black carbon, and have very powerful short-term warming effects on the climate. Biomass fuels such as wood, if fully renewably harvested, can be climate neutral in terms of CO_2 emissions. However, estimates suggest around 30% of the wood fuel harvested globally is unsustainable, resulting in further climate-damaging emissions.

Box 10 **The health cost of a delayed transition – air quality, energy and health**

Air pollution is a significant environmental risk factor, responsible for 7–8 million premature deaths annually, largely from NCDs like heart disease, stroke, lung cancer, and respiratory infections such as pneumonia *(9,96)*. Additionally, air pollution increases the risk of asthma, diabetes, neurological disorders, stillbirth and other pregnancy complications. Children are especially vulnerable to the health impacts of air pollution, which can hinder lung and brain development and increase the risk of diseases later in life. Household air pollution (see Box 11) exacerbates health issues and has broader societal impacts, including gender inequality and loss of education and income, safety issues during collection of fuels, injury and burn risks, as well as environmental impacts such as deforestation. Interventions that make the polluter pay for the environmental and associated health damages of consuming fossil fuels can improve health, save lives and address climate change. For example, WHO estimates that 1.2 million of the lives lost to air pollution from fossil fuel combustion per year could be saved if the world scales up fiscal policies to efficiently price fossil fuels, namely putting an end to subsidies and introducing a corrective tax for fossil fuels *(90)*.

Box 11

Climate implications of household air pollution towards a just and clean energy transition in homes *(100)*

Solar panel used for lighting village homes. Sri Lanka. © Dominic Sansoni / World Bank

In 2022, 2.1 billion people still cooked using open fires or inefficient stoves fuelled by firewood, waste, dung, charcoal, and coal, leading to harmful household air pollution. This pollution causes about 3.2 million deaths annually, worsens air quality, impacts the climate, and harms local environments and livelihoods.

Globally, transition to clean cooking is occurring too slowly to meet Sustainable Development Goal (SDG) 7, which calls for "affordable, reliable, sustainable and modern energy for all" by 2030. While cleaner alternatives are common in wealthier countries or populations, they remain unaffordable and inaccessible for many poorer communities and especially in LMICs. Reducing emissions from cooking and other household uses is critical to achieving climate goals. The inclusion of clean cooking in NDCs is a significant step towards using clean cooking to mitigate climate change, while also taking advantage of adaptation and development co-benefits.

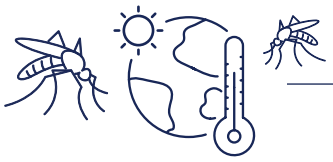
housing due to poor construction or maintenance multiply the impacts of the climate crisis *(111)*. Appropriate thermal insulation systems can improve comfort and energy efficiency while mitigating the effects of cold and heat on health. Energy alternatives should be considered, such as renewable electricity systems and natural ventilation. These measures should be equitably available to population groups at risk of poverty, social exclusion, and severe material deprivation, and re-evaluated to keep pace with an ageing population.

4.5 Water, sanitation and waste (WASH)

In the face of increasing environmental pressures and increasing rural-urban migration driven by climate change, climate-resilient ecological sanitation models that provide climate and health co-benefits should be scaled. Particularly in rapidly urbanizing areas, the expansion of urban slums and informal settlements will place greater strain on waste management services and could lead to urban pollution and exacerbated health and environmental risks.

Scaling up WASH systems to be climate-resilient worldwide will save over 170 000 lives per year *(90)*. The reuse of treated wastewater to maintain water availability is a vital strategy, particularly in drought-prone regions. Enhancing water supply and distribution infrastructure can help reduce inefficiencies and water loss. Climate-resilient sanitation systems can also prevent the spread of pathogens during extreme weather events, such as floods or storms. Incorporating renewable energy sources into water treatment processes helps reduce emissions and improve sustainability. Circular economy practices in waste management – such as reusing sludge from wastewater treatment as fertilizer – can lower GHG emissions and mitigate environmental impacts.

Case study



Building resilience at the intersection of climate, health, and equity in Latin American cities *(112)*

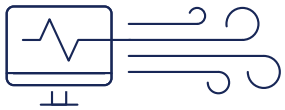
The Urban Pulse programme, a collaboration between Yale University and the Resilient Cities Network, supported by the Rockefeller Foundation, focuses on addressing climate, health, and equity challenges in Latin American cities. Through interviews with municipal authorities, common issues were identified, including the rise in extreme weather events such as flooding, heatwaves, and droughts, the spread of arboviruses like dengue due to shifting climate patterns, and significant gaps in data management and surveillance due to inadequate or fragmented health, climate, and sociodemographic information systems.

In **Buenos Aires, Argentina**, the city has taken a community-based approach to data management by involving residents in monitoring air temperatures in vulnerable neighbourhoods. This data collection aims to provide evidence for decision-makers on the benefits of urban green infrastructure. The city has also implemented a heat plan, focusing on public awareness and preparedness for heatwaves, and partnered with WHO to establish a system for reporting heat-related deaths, similar to its existing dengue fever surveillance.

Montevideo, Uruguay has focused on improving flood response by issuing targeted warnings to at-risk groups and revising emergency response procedures. The city has also prioritized data transparency through its Data Observatory, which integrates environmental, health, and urban data to support collaborative decision-making and public access. Montevideo's Climate Action and Risk Management Plans address health impacts including vector-borne diseases, respiratory illnesses, and the effects of floods, with a focus on vulnerable populations.

In **Porto Alegre, Brazil**, two interdepartmental committees have been established to improve resilience and disaster response. One committee coordinates emergency actions during climate-related disasters like droughts and floods, while the other focuses on building long-term resilience by updating the city's climate strategy. Porto Alegre's Climate Action Plan also includes surveillance on climate-related health impacts, and the city has invested in sustainable rural development to reduce pollution and improve public health.

Case study



Shanghai's health risk forecasting – a model for climate resilience in cities *(113)*

Shanghai has developed a health risk forecasting system to address the growing impacts of climate change, particularly heatwaves, cold spells, and typhoons. Integrated with the city's "One Net For All" digital platform, the system combines meteorological and health data to issue timely warnings to vulnerable groups, such as the elderly and those with chronic illnesses.

One key success has been the **whole-chain service model** for chronic disease management, which reduced chronic lung disease patient consultations by **17.6%** and lowered medical costs by 2.5%. Automated health alerts and cooling centres have proven effective in preventing heat-related illnesses.

Cross-sectoral collaboration and digital integration have enhanced emergency responses, making Shanghai a model for climate health risk management. Future plans include improving personalized warnings and expanding the system to rural areas and other cities.

Further reading and resources

- The Global Covenant of Mayors is the largest global alliance for city climate leadership, built upon the commitment of over 12 500 cities and local governments.
- The C40 knowledge hub offers leading insight and practical resources to help all cities act on climate change.
- The Resilient Cities Network brings together global knowledge, practice, partnerships, and funding to empower cities.
- The WHO Housing and health guidelines bring together the most recent evidence to provide practical recommendations to reduce the health burden due to unsafe and substandard housing, including as a result of climate change.
- The WHO WASH and climate change adaptation and mitigation for health document takes stock of actions at the interface of WASH, climate change and health.

5. Nature and biodiversity are the foundation of our health

Protect and restore natural systems as fundamental for healthy lives, sustainable food systems and livelihoods.

Critical asks

- Advocate for biodiversity policies and Nature-based Solutions (NbS) that protect ecosystems and essentials such as water, food, medicine, and climate regulation, prioritizing conservation, sustainable use, and restoration.
- Apply a One Health approach to address the links between human, animal, and ecosystem health, tackling issues such as infectious diseases and antimicrobial resistance.
- Engage health workers in prescribing NbS to improve physical and mental health.
- Incorporate Indigenous knowledge and leadership in biodiversity conservation, ensuring equal partnership and respecting Indigenous rights.
- Promote sustainable, culturally appropriate, regenerative and diverse food systems that protect the environment, support livelihoods, and reduce harmful agricultural practices, like excessive pesticide and antibiotic use.
- Support sustainable fisheries management to protect aquatic ecosystems and ensure long-term viability.

Climate Resilience in Zambia, local people digging out a water channel. © CIF Action

Box 12

Biodiversity and nature **in numbers**

Indigenous Peoples represent an estimated 6% of the global population but manage over 38 million square kilometres of land globally *(118)*, which includes nearly 40% of all protected areas and 80% of global biodiversity, making them crucial stakeholders and rights holders in the conservation and sustainable management of biodiversity *(119)*.

Forests, which store 80% of terrestrial biodiversity, absorb approximately 2.6 billion tonnes of carbon dioxide annually, contributing to climate regulation and reducing the incidence of diseases. Over 50% of modern medicines are derived from natural sources, including antibiotics from fungi and painkillers from plant compounds *(115)*. However, between 2016 and 2022, the world lost almost 182 million hectares of forest cover, 5% of the global tree cover *(11)*.

A One Health approach to pandemic prevention offers an annual rate of return of up to 86%, with significant climate and health co-benefits *(117)*.

75%

Healthy ecosystems provide **75%** of global freshwater resources, with wetlands playing a key role in water purification. However, 35% of wetlands have been lost since 1970, threatening water supplies *(115)*.

The global economic impact of biodiversity loss amounts to US$ 10 trillion annually, including healthcare costs from increased disease transmission and agricultural losses from declining pollinator populations *(115)*.

Approximately **75%** of emerging infectious diseases are of zoonotic origin, transmitted from animals to humans *(115)*.

Coastal ecosystems such as mangroves provide natural barriers against storm surges, preventing up to US$ 65 billion in annual property damages *(116)*.

More than **75%** of global food crops rely on pollinators, contributing US$ 235–577 billion annually to global agricultural output. The decline in bee populations threatens global food security and nutrition *(115)*.

Human health and human civilization depend on flourishing natural systems and the wise stewardship of those natural systems. However, natural systems are being degraded to an extent unprecedented in human history. *(114)*

Seaweed Farming Against Gender Inequality and Climate Change, woman working on the beach.
© Natalija Gormalova / Climate Visuals Countdown

5.1 Biodiversity and nature

Biodiversity and nature are inextricably linked to climate change and human health. Reducing climate action to a sole focus on GHG emissions overlooks the criticality of healthy ecosystems on human health and well-being. A Social Determinants of Health lens, which incorporates access to clean water, healthy foods, and green spaces, encourages protecting nature as an extension of our health and shared existence. Healthy communities are sustained by well-functioning ecosystems, which provide clean air, fresh water, natural medicines and food security, as well as regulate diseases, support mental health *(120)*, and stabilize the climate.

Biodiversity loss is accelerating at an unprecedented rate, with approximately 1 million species at risk of extinction, threatening vital ecosystem services and exacerbating public health risks globally *(115)*. Biodiversity loss also has profound economic consequences, particularly in sectors like agriculture, fisheries and healthcare.

Shifts in climatic patterns have both direct and indirect effects on human health through their impact on the health of terrestrial, aquatic, and marine ecosystems, influencing their productivity and the availability and distribution of plant and animal species, pathogens, and even human populations. Marine ecosystems, for instance, are particularly vulnerable to ocean acidification driven by increased carbon levels in the atmosphere. Forests and wetlands serve as natural carbon sinks, absorbing CO_2 and helping to regulate global temperatures, and play a critical role in preventing the impacts of extreme weather events, such as floods and droughts *(121)*.

Write out Nature-based Solutions (NbS) address societal challenges and promote human well-being and biodiversity through "actions to protect, sustainably manage, and restore natural and modified ecosystems" *(122)*. NbS offer synergistic benefits for climate mitigation, adaptation, and health and are indispensable for achieving global climate goals. Implementation of NbS have at times been fraught, with forced privatization and commercialization of public resources, marginalization of local and Indigenous communities, and limited tangible impact on global heating. Respectful partnerships with communities throughout design and implementation, alongside equitable access and availability to all population groups, will ensure that NbS fulfil their potential and support the equitable distribution of their benefits.

One Health is an integrated approach that recognizes the interdependence of people, animals (domestic and wild), plants, and their environments, and aims to balance and optimize the health of these systems. This aligns with Planetary Health practices, which emphasize the interrelationships between human well-being and the global systems on which life depends. In the context of climate change, One Health helps address the disruption of human, animal, and environmental health through ecosystem alteration, biodiversity loss, and increased disease transmission. The three main One Health focus areas – zoonotic diseases, antimicrobial resistance, and food safety – are all deeply impacted by climate change. For example, climate-driven ecosystem changes can alter animal habitats and increase the risk of zoonotic diseases, which account for about 60% of known infectious diseases in humans. One Health can support climate adaptation and mitigation strategies, such as combating zoonotic diseases, ensuring food safety, reducing the use of antibiotics, and addressing the environmental burden of livestock production.

Indigenous communities have long upheld stewardship and conservation principles that are vital in today's context of climate change and biodiversity loss. Traditional knowledge systems, which encompass sustainable land use, wildlife management, and holistic health practices, offer invaluable insights and solutions that can enhance the effectiveness of climate action, and should be centred in all related actions for biodiversity and nature.

Protecting Forests from the Impact of Destruction and Climate Change, a local forest ranger patrolling the rain forests and wild coffee plantations, Indonesia. © Dhana Kencana / Climate Visuals Countdown

Further reading and resources

- The WHO Compendium of guidance on health and environment 2024 update is a comprehensive collection of available WHO and other UN guidance for improving health by creating healthier environments.
- Responding to international requests to prevent future pandemics and to promote health sustainably through the One Health approach, the Quadripartite Organizations – the Food and Agriculture Organization of the United Nations (FAO), the United Nations Environment Programme (UNEP), the World Organisation for Animal Health (WOAH, founded as OIE), and WHO – has developed the One Health joint plan of action (2022–2026).
- Health In Harmony is dedicated to breaking down policy and philanthropy silos between environmental conservation and human health. Using the innovative process of Radical Listening, they collaborate with rainforest communities, implementing their solutions to climate change, human health and well-being, and reducing pandemic risk.
- The Planetary Health Alliance offers guidance and resources for analysing and addressing the impacts of destabilized natural systems on human health and all life on Earth, through a planetary health lens.

Box 13

Food systems **in numbers**

Globally, systems of **food production are responsible for 34% of GHG emissions** *(123)*.

Animal-based food systems account for over half of GHG emissions from food production *(124)*.

Roughly one third (1.3 billion tonnes) of the world's food is lost or wasted annually *(125)*, **contributing to 8–10% of global emissions** *(126)*.

Agriculture accounts for about **70% of global freshwate**r withdrawals *(127)* and 40% of the world's land surface use, contributing to biodiversity loss and ecosystem degradation *(128)*

Climate change **threatens food security** through breakdown of food systems, disruption of food distribution, and erosion of ecosystem services *(129)*.

More sustainable and plant-based diets can **reduce food-related emissions by up to 60%** *(130)*.

Testing Soil Health, Kenya. © Georgina Smith / CIAT

5.2 Food systems

Food systems are at the heart of climate change adaptation and mitigation. Transitioning to sustainable practices across the entire food system can deliver significant co-benefits, from reducing GHG emissions to improving public health (see Box 14) and food security.

Localizing food production, including urban and peri-urban agriculture, can mitigate emissions by reducing the distance food is transported, enhancing resilience to climate disruptions, strengthening food security, and increasing access to fresh, nutritious food *(131)*. Urban food policies that incentivize sustainable, healthy diets can address the double burden of malnutrition and obesity.

Sustainable food production systems prioritize the reduction of agrochemicals and synthetic fertilizers, and focus on practices that improve soil health, conserve water, and reduce reliance on fossil fuels. Agroecological approaches can support climate mitigation and have strong social and economic benefits, particularly in LMICs, by fostering community engagement and creating local jobs.
In the face of growing challenges posed by climate change, resilient food systems can be achieved through diverse cropping systems, soil conservation practices, and water-efficient farming techniques. Traditional and indigenous agricultural practices attuned to local ecosystems are naturally lower in emissions, integral to climate adaptation, mitigation, and preserving cultural heritage.

Sustainable, culturally appropriate dietary practices play a key role in reducing the environmental footprint of food systems *(93)*. Traditional food practices are often well-adapted to the local environments and with a lower carbon footprint than many global food production systems *(130)*. Ensuring food security for vulnerable populations must also be a priority in both climate mitigation and adaptation strategies, including through mechanisms to protect against price fluctuations and disruptions in food supply due to climate impacts.

Box 14 The health cost of delayed transition – health impacts of high carbon diets

A high carbon diet refers to eating patterns that are associated with high GHG emissions during their production, processing, transportation, and consumption. This typically includes consumption of animal products, processed and ultra-processed foods, out-of-season fruits and vegetables, foods with excessive packaging, and highly refined and energy-intensive products. High carbon diets are heavily reliant on industrial agriculture and factory farming, long supply chains and transport distances, and are often associated with food waste. This contributes significantly to GHG emissions through deforestation for agricultural land, livestock methane, nitrous oxide from fertilizer use, and carbon dioxide from transportation and processing.

High carbon diets have wide-ranging negative impacts on human health, including increased risks of chronic diseases like obesity, diabetes, cancers, and cardiovascular disease. Much of this food is nutrient-poor but calorie-rich, meaning that nutritional deficiencies often occur despite high calorie intake. Industrial farming practices contribute to antibiotic resistance, air and water pollution, and increased risk of zoonotic diseases. Additionally, agricultural workers face occupational hazards, and the transformation of traditional farming can impact mental health in rural communities. These interconnected issues underscore the need for more sustainable and health-conscious food systems to address both human and environmental health concerns.

Basket full of apples and pumpkins, France. © Fabien Twb / Unsplash

Case study

NOURISH network

The NOURISH project exemplifies an innovative, community-led, translocal approach to addressing the nexus of climate change, food systems, and health, with a particular focus on indigenous and marginalized communities. This global initiative uses participatory learning and action cycles across seven sites in six countries to gather local insights on how climate change disrupts food systems and impacts health. NOURISH uniquely integrates Indigenous knowledge with Western research methods, employing a two-eyed seeing approach to ensure that local perspectives and traditional wisdom are centred in both evidence gathering and policy-making processes.

By combining community-driven data collection, participatory economic modelling, and strategic communications, NOURISH aims to develop scalable policy roadmaps that address the health impacts of climate-related food system disruptions. The project's translocal learning and action framework facilitates knowledge sharing across diverse global localities, enabling local insights to inform global policy. This approach not only makes the complex linkages between climate change and health more visible but also promotes multi-solving policies that simultaneously address climate, food system, and health challenges while respecting Indigenous rights and biodiversity conservation. NOURISH demonstrates how community-led, culturally appropriate interventions can be scaled to influence broader climate and health policies, offering a model for more equitable and effective global health governance in the face of climate change.

PLANET: Reshape financial and governance systems for people and planet

Key Messages

Economic and financial systems must radically realign to support both human and planetary health.

Synergistic investments in health and climate action have the potential to save millions of lives annually, with WHO estimating nearly 2 million lives saved by scaling up key climate-health actions, primarily through air pollution reduction.

Bold, decisive governance delivers meaningful action while empowering and resourcing communities in the decision-making processes that impact them.

Fossil fuel subsidies – currently US$ 7 trillion a year including both financial support and uncompensated health and environmental damage – are perverse as they harm both human and planetary health. Funds can be redirected towards a fair and healthy energy transition, cash transfers and social protection to people at risk of living in energy poverty, health systems and sustainable initiatives.

Climate financing is health financing, yet more must be done to mobilize funds for health system adaptation and mitigation.

6. Transform financial systems and the economy away from extraction towards a well-being and circular economy

Critical asks

- Reform fiscal policy to ensure fossil fuels are efficiently priced by ending fossil fuel subsidies and introducing a corrective price on polluting energy to maximize benefits to society.
- Recycle the accrued economic benefits from climate-health actions to finance the strengthening of health systems and the transition to renewable, resilient and sustainable infrastructure, energy, food and other systems.
- Substantially increase funding for health-focused climate adaptation and mitigation by shifting financial flows toward evidence-based interventions that deliver climate and health co-benefits while generating economic returns.
- Transition from growth-centric and extractive economic systems towards a well-being and circular economy that prioritizes health, and resilience and sustainability.
- Ensure the New Collective Quantified Goal (NCQG) on Climate Finance and Loss and Damage Fund arrangements are substantial, fairly funded, and centre health.

Amazonian women at a march for International Women's Day, March 8, 2020, Ecuador. © Karen Toro / Climate Visuals Countdown

Box 15

Financing climate and health **in numbers**

US$ 2–4 billion per year by 2030 is projected to be lost in direct damage costs to health, with 250 000 additional deaths per year between 2030 and 2050 *(132)*.

Fossil fuel subsidies amount to US$ 7 trillion annually *(41)*. Efficient pricing could save 1.2 million lives from air pollution *(90)*.

The cost of air pollution was US$ 8.1 trillion in 2019 (6.1% of global GDP) *(133)*.

Health-specific climate funding amounts to only 6% of adaptation funding and 0.5% of multilateral climate funding *(134)*.

Fossil fuel financing by 60 top banks has amounted to US$ 6.9 trillion since the Paris Agreement, and US$ 705 billion in 2023 alone *(135)*.

US$ 3 trillion is required to finance climate change action for developing countries, US$ 2 trillion of which should come from domestic sources *(136)*.

Between 2025-2034, losses of US$ 164.5 billion are expected due to stranded coal assets *(11)*.

Economic systems mediate humanity's impact on people and the planet *(137)*. However, current economic models often prioritize short-term gains and extraction over long-term sustainability and regeneration, leading to entrenched cycles of environmental degradation and health inequities.

Aligning economic and financial systems to support the fundamental conditions for health and well-being is not only morally necessary but is also economically prudent. Investing in climate adaptation can support local business while delivering over US$ 7.1 trillion in value, with a benefit-to-cost ratio of between 2:1 and 11:1 *(53,138)*. Despite this, investments in climate action for health remain limited.

6.1 Addressing the health losses and economic costs of fossil fuels

Continued dependence on fossil fuels comes at an enormous cost. In 2022, the International Monetary Fund (IMF) estimated the annual fossil fuel subsidies by governments cost the world US$ 7 trillion; around 18% was in explicit subsidies and nearly 60% was due to undercharging for harmful environmental externalities such as global warming and air pollution *(5)*. To put this into context, global health spending was approximately US$ 9 trillion in 2019.[7]

Reforming fossil fuel prices so they reflect the true cost of fossil fuels (that is, removing explicit and implicit subsidies and imposing a corrective sales tax on fossil fuels) has the potential to reduce global carbon dioxide emissions to ensure global warming remains below 1.5–2°C and avert about 1.2 million premature deaths per year from local air pollution *(5)*. This same reform would raise substantial revenues – around 3.6% of global GDP – which would create enormous fiscal space for public investment in health, development and climate, and exceed the estimated extra spending needed to achieve the Sustainable Development Goals *(5)*.

6.2 An economy for people and the planet

WHO, including its Council on Economics of Health For All, advocates for a fundamental shift in our economic paradigm, moving from a growth-centric model to one that prioritizes human and planetary well-being and sustainability *(139)*. The Council's recommendations call for reorienting public and private finance towards long-term investments in Health for All, emphasizing the need to **VALUE** health beyond its monetary aspects, **INVEST** in the foundations of a healthy society, and **FINANCE** health equitably and sustainably. The Bridgetown Initiative also highlights the failures of the international financial system, calling for a paradigm shift in how capital flows towards solidarity with people and the planet *(136)*.

6.3 Financing climate and health

Climate finance is, ultimately, health finance. Funding for climate action can protect the planetary systems on which human health and survival depends, reduce the direct and indirect impacts of climate change on health, and support a range of interconnected benefits across infrastructure, development, gender, agriculture and education that ultimately boost human well-being. Orienting towards shared, mutually reinforcing financing objectives through synergistic and regenerative approaches can improve funding efficiency, leverage additional resources, reduce emissions, and enhance outcomes across multiple sectors.

On the one hand, significantly more finance is needed; on the other hand, the quality – such as grants vs. loans – and distribution of funding is a critical determinant of equitable, effective approaches to address the escalating climate and health crisis. Commitments to mobilize US$ 100 billion annually by 2020 for climate action[8] in developing countries (a cornerstone of international

7 This figure includes spending from governments, households, and donors, covering a range of healthcare services and infrastructure across more than 190 countries.

8 Climate action (SDG 13) refers to measures to address climate change and its impact.

Box 16 **Health in the 2025 NDCs – financing** *(55)*

To integrate health into the 2025 NDCs, ensuring that health is prioritized in climate financing, the following is key:

- Estimate resources required to implement health-related actions and policies in the NDC, including in other sectors.
- Specify the conditionality of climate finance for health actions and plans.
- Use health impacts and indicators as a basis to prioritize investments in key health-determining sectors.

Further information can be found in the WHO publication Quality criteria for integrating health into Nationally Determined Contributions (NDCs).

climate finance discussions), or to fill the US$ 10 billion funding gap for climate and health activities, fall woefully short of the true needs, and are vastly outweighed by the subsidies and financing that are driving fossil fuel consumption.

Reparative justice for LMICs encompass measures such as implementing a fair United Nations Tax Convention, securing debt relief, and fair climate financing for L&D and for transitioning to renewable energy *(140,141)*. It also includes putting in place the necessary mechanisms to ensure governments and citizens in the Global South retain sovereignty over their natural resources and have the means to hold transnational corporations (including fossil fuel corporations) and their investors accountable for climate and health harm *(142,143)*.

A variety of mechanisms are available for funding climate and health action. While new and innovative funding mechanisms evolve, there is an ever-present need to strengthen existing mechanisms such as health and environmental taxes, and enhanced support for climate-vulnerable nations is required, as under development in the NCQG[9] on climate finance.

In the health sector, mitigation measures include implementing carbon taxes, shifting away from fossil fuel revenues, merging health coverage schemes for efficiency, and incentivizing health facilities to reduce their climate footprint through green purchasing and adjusted payment methods *(144)*. Adaptation measures focus on increasing health sector revenues to address climate-related health burdens, improving risk pooling mechanisms, making benefits packages more flexible to include climate-related health conditions, and increasing funding for prevention and promotion activities *(144)*. Cross-cutting strategies involve digitalizing administrative processes and adapting financial management for greater flexibility during climate emergencies *(144)*.

Regardless of the mechanism, health sector capacity to navigate, access and utilize existing climate funding to achieve shared objectives is critical: for example, funding for health mobilized through multilateral climate funds involves cross-sectoral collaboration, capacity building within health sectors to understand climate finance, and designing projects that demonstrate clear co-benefits, such as climate-proofing health facilities

9 The NCQG is an element of the Paris Agreement. It is a climate finance target being negotiated to replace the current US$ 100 billion annual goal after 2025. It aims to fill gaps in climate finance, establish a more comprehensive framework for developed countries to support developing nations in addressing climate change, and support developing countries in their climate actions post-2025.

or implementing early warning systems for climate-sensitive diseases *(145)*. Capacity building and technical assistance should be closely linked with tools like Vulnerability and Adaptation Assessments, HNAPs and integrating health financing considerations into NDCs (see Box 16).

The COP28 Guiding Principles for financing climate and health solutions represent a significant milestone in aligning global efforts to address the intertwined challenges of climate change and public health (see Box 17).

Box 17 **The COP28 set of Guiding Principles for financing climate and health solutions** *(146)*

1. Accelerate transformative climate and health solutions to save and improve lives now and in the future.
2. Support the health and climate priorities of the most impacted countries and communities.
3. Promote an inclusive and equitable approach to financing climate and health solutions.
4. Mobilize a suite of financing from all partners.
5. Embed climate and health goals in financing strategies.
6. Enhance equitable access to finance.
7. Support holistic approaches.
8. Support innovation and scientific research and development.

Further reading and resources

- The WHO Council on the Economics of Health For All aims to reframe health for all as a public policy objective, and ensure that national and global economies and finance are structured in such a way to deliver on this ambitious goal, with the report Health for all: transforming economies to deliver what matters outlining pathways to delivering this.
- The WHO Climate-Health Economic Framework – developed with the International Institute for Sustainable Development (IISD) and Health Canada – presents a framework to link science, policy and practice for a comprehensive assessment of climate mitigation and adaptation investments and their impact on human health.
- The WHO finance for health and climate change page outlines mechanisms and initiatives to facilitate climate finance initiatives and health-relevant adaptation and mitigation.
- The World Bank has recently launched a roadmap for climate-health finance and action.

7. Lead with bold governance that serves the many and empower and resource communities

Critical asks

- Place health at the heart of UN climate talks.
- Ensure that health is a core component of climate change processes and policies at international, national, and local levels, with a cross-sectoral approach, including in the NAPs, NDCs, and long-term low-emission development strategies (LT-LEDS).
- Implement a Health in All Policies approach to address the root causes of climate vulnerability.
- Foster international and cross-sectoral collaboration on climate-health challenges, ensuring equitable participation.
- Empower and resource communities, especially Indigenous Peoples and frontline communities, to lead climate and health initiatives.
- Enhance cross-sectoral cooperation to ensure climate actions protect and promote people's health.
- Increase funding and focus on interdisciplinary and intersectional research on climate change health monitoring, evaluation, and solutions.
- Restrict fossil fuel industry interactions within national policy spaces and international fora such as the COP.

Containerized Gardening, a Great Solution to Mitigating Pollution, a man and his son tending plants. © Mark Linel Padecio / Climate Visuals Countdown

Governance and decision-making underpin all actions to address the escalating health impacts of the climate crisis. Global health governance refers to the formal and informal institutions, rules, and processes supporting cross-border collective action to address health challenges *(147)*, with a focus on global public goods, externalities, global solidarity, and stewardship *(148)*. Good governance ensures that actions are inclusive, equitable, and capable of delivering long-term benefits to both health and the environment. Central to this is the recognition of the vital role that communities, especially marginalized populations, play in developing solutions grounded in local knowledge and lived experiences. Based on the principle of subsidiarity, approaches to governance can be equitable, participatory, and prioritize community-driven initiatives and the incorporation of Indigenous values.

Successful governance also encourages multi-stakeholder collaboration, bringing together governments, civil society, and the private sector to create comprehensive policies that address the systemic nature of climate-related health challenges. Mechanisms such as the Fossil Fuel Non-Proliferation Treaty and a strengthened UNFCCC Conflict of Interest Policy can play a pivotal role in minimizing the influence of industries that undermine public health and climate goals.

Environmental education, Seychelles. © Ryan Brown / UN Women

Ensuring that health remains a priority in climate adaptation, mitigation, and financing will be key to safeguarding communities and achieving the long-term objectives of the Paris Agreement and will steward the sustenance and creation of health-enabling environments, systems, and policies for human capacity development.

7.1 Health in climate policy-making, and climate in health policy-making

The threats to health from climate change are now well recognized by the health community, reflected in the clear emphasis on climate change and health in key global fora and in the great progress made in national policy and planning processes working to protect health from the effects of climate change (see Box 18).

The recent WHA resolution on climate and health, adopted by Member States, marks a significant step forward in global health governance *(152)*. Recent G20 and G7 declarations have increasingly recognized the link between climate change and health, emphasizing the need for coordinated global action. The G20 Ministerial Declaration on Climate and Health and the Delhi Leaders' Declaration on Climate and Health both call for integrating health into climate policies and accelerating efforts to reduce emissions and build climate-resilient health systems *(153,154)*.

The global prioritization of climate change and health has been driven by strong national leadership and political will. At COP26, over 50 countries, at ministry of health level, made specific commitments to take action to build climate-resilient and low-carbon sustainable health systems. To date, over 85 countries have made these commitments, and 151 countries signed the

COP28 Declaration on Climate and Health. Over 40 of these countries have gone beyond committing to low-carbon health systems, additionally aiming to achieve net-zero emissions from healthcare. This represents a bold move toward aligning healthcare with broader climate goals, such as the vision of a 1.5°C world, and contributing to global carbon neutrality.

ATACH brings together global climate and health actors and governments to support country ambitions and commitments towards climate-resilient and low-carbon sustainable health systems and health-promoting interventions in key health-determining sectors, with an initial focus on nutrition, agriculture and food systems *(155)*.

Many countries have already integrated health into national climate processes and plans or have committed to do so. This includes NAPs, and the development of specific health components, HNAPs, which are vital mechanisms for integrating

Box 18 **Snapshot of progress of climate and health policies and plans**

Health in national climate plans

- The progress in integrating health into NDCs has slowed. While the inclusion of health keywords increased from the first NDCs (70%, or 135 out of 192 countries) to the second or updated NDCs (94%, or 162 out of 172 countries) *(149)*, this trend has not continued into the third round of submissions. As of February 2024, only 47% (27 out of 58) of the submitted NDCs mention health *(11)*. However, fewer than a third of countries have submitted new NDCs.
- Of 19 NAPs analysed, all highlight health as a high-priority sector vulnerable to climate change. However, the extent to which the health risks are considered and addressed varies *(150)*.
- There are disparities in the degree to which specific health outcomes are covered in NDCs, for example, the 2023 review found that only 3% mentioned mental health, while 28% included vector-borne diseases *(151)*.
- About half of LT-LEDS analysed include some reference to health, either as part of their overall strategy or within specific sections. These references often focus on the co-benefits of reducing emissions for public health, such as decreased air pollution leading to lower rates of respiratory and cardiovascular diseases *(152)*.

Inclusion of climate change in global health policies

- Climate change and health has been elevated as one of six strategic priorities under the 14th WHO General Programme of Work (GPW14) – the new global health agenda endorsed by the 194 WHO Member States *(60)*.
- The World Health Assembly adopted a resolution on climate change and health in 2024.
- The development of a Global Plan of Action on climate change and health is being put forward for adoption at the World Health Assembly (WHA) in 2025.

Box 19 **Policy highlight – the Global Goal on Adaptation and Global Stocktake**

The Global Goal on Adaptation (GGA), a key component of the Paris Agreement, aims to enhance adaptive capacity, resilience, and reduce vulnerability to climate change, with a focus on supporting the most vulnerable countries. The Global Stocktake (GST), conducted every five years, assesses progress on the Paris Agreement's goals, including adaptation, mitigation, L&D, and finance.

In 2023, the GGA framework was finalized with broad targets, though measurable indicators for tracking progress are still being developed. This offers an opportunity to integrate health-focused indicators into adaptation efforts into the UNFCCC, ensuring health is prioritized in climate actions.

Health is recognized under the GGA, which urges parties to promote climate-resilient health services, reduce climate-related health impacts, and consider respective obligations on human rights, including the right to a clean, healthy and sustainable environment, the right to health, the rights of Indigenous Peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations, the right to development, as well as gender equality, empowerment of women and intergenerational equity.

The GST in 2023 emphasized the need for increased ambition, as many countries are falling short on adaptation targets. Although parties report progress in all areas (mitigation, adaptation, and means of implementation and support), implementation of current NDCs would result in an average 2% reduction in emissions by 2030 (compared to 2019) which is not sufficient to reach the Paris Agreement goals. Accelerated action to mitigate climate change is urgent, and parties are requested to enhance the ambition of their 2030 goals in their NDCs, with consideration to national circumstances. Equity and common but differentiated responsibilities and respective capabilities (CBDR-RC) and the specific circumstances of least developed countries and SIDS remain important considerations in climate action. Adaptation action can be significantly enhanced by the establishment of user-driven climate services systems, including early warning systems. This necessarily involves improved access, better coordination and greater financial investment. Capacity building support and technology transfer also need to be scaled up to meet needs.

These findings set the stage for stronger NDCs in 2025.

At COP28, health was added as a pillar of the Sharm el Sheikh Adaptation Agenda, with Four Adaptation Outcomes defined for health by 2030:

1. Resilient health systems and access to quality health services for vulnerable populations;
2. Multi-sectoral heat action plans protecting high-risk groups;
3. Climate-informed health surveillance systems and early warning systems in place for priority climate-sensitive diseases in all countries; and
4. Increased financing for climate-resilient health systems.

health resilience into national climate strategies, as well as NDCs (see Box 18 and Box 20), countries' commitments towards the goals of the Paris Agreement. However, many countries face significant resource challenges and barriers to implementation of their plans *(156)*.

7.1.1 Health in the NDCs

The 2025 NDC enhancement round offers a critical opportunity to put health at the centre of climate goals and action. Some important actions for health integration in NDCs include calling attention to, quantifying and tracking the health co-benefits of climate actions in key health-determining sectors including energy, transport, agriculture, industry, and urban planning. Health must be considered in climate policies and plans across these sectors, and cross-sectoral collaboration and health stakeholder engagement is essential. For many countries, adaptation and building resilience will necessarily be the focus of their NDCs to work towards a health system which promotes and protects health and delivers high quality care while setting up a low emissions pathway for the health sector where possible. The NDC adaptation component supports and complements the national adaptation planning approach, including the NAP and HNAP processes. Strengthening accountability by setting measurable health targets and regularly updating NDCs can keep health a priority in national climate strategies.

While the health community has accelerated its commitment to climate action in recent years, substantial efforts are needed to prioritize health as the ultimate goal of climate action and make implementation of mitigation and adaptation actions for health a priority.

Rush Hour Copenhagen. © Colville-Andersen

Box 20 **Health in the 2025 NDC goals – governance and leadership (55)**

Integrate health into the 2025 Nationally Determined Contributions, through governance and leadership, with the following key actions:

- Set population health and well-being as the ultimate goal and guiding principle of the NDC.
- Identify health vulnerabilities to climate change and quantify current and projected risks.
- Ensure Ministry of Health leadership in the health contribution to NDCs.
- Integrate climate-informed health planning and programming and health-informed climate programming in key health-determining sectors. Include existing health policy priorities and relevant climate change and health legislative and regulatory mandates.
- Facilitate cross-sectoral coordination and policy coherence of national climate change and health policy processes.

Further information on how to include health in NDCs can be found in the WHO publication Quality criteria for integrating health into Nationally Determined Contributions (NDCs).

7.2 Community-led action

Community-led initiatives that harness local knowledge and practices in both climate action and health strategies are fundamental for creating interventions that are both culturally appropriate and effective. These initiatives ensure that climate and health solutions are tailored to the specific needs and realities of those most impacted by climate change but also grounded in their lived realities. By placing community-driven actions at the forefront, policies and frameworks can better support community buy-in and implementation, aligning national and global strategies with the needs and capacities of local populations.

Supporting the rights of Indigenous Peoples and recognizing the value of their traditional knowledge systems and intrinsic connection to nature is essential to the success of community-led strategies. Their time-tested environmental stewardship practices strengthen responses to global and local challenges, fostering sustainability and resilience to global environmental challenges. Youth play a critical role in driving climate action. Policies must actively support youth-led initiatives and incorporate their perspectives in climate and health strategies through co-design. By involving young people, strategies become more future-oriented and adaptable to the evolving challenges posed by climate change.

Cooperation across sectors, stakeholders and rights-holders – governmental institutions, local authorities, local leaders including religious authorities and traditional medicine practitioners, NGOs, businesses, the health community, Indigenous Peoples as well as local communities – can help better address climate and health challenges. Multistakeholder collaboration ensures that diverse perspectives are integrated into policy, and NGOs play a particularly

significant role in educating the public, facilitating dialogue, and implementing innovative projects. Strengthening these partnerships will be critical for advancing holistic and inclusive climate and health governance.

7.3 Research

High-quality, locally relevant, and timely information is essential for communities, leaders, and policy-makers to advance climate and health action. Improved data collection, especially in LMICs, is necessary to track climate-related health impacts, guide resource allocation, and inform policy decisions, particularly in areas that offer co-benefits for health and the environment. Disaggregated data can highlight intersectional experiences and ensure equity in action. Ethical data practices must address historical biases in collection and ensure representation, with transparent data governance frameworks that protect privacy while promoting responsible data sharing. Data sovereignty must be respected, allowing individuals and communities to retain control over their data.

Despite progress, significant knowledge gaps remain at the intersection of climate change and health. These gaps are particularly pronounced in understanding the full range of health impacts, effective interventions, and scalable solutions, especially in LMICs. There is a need to broaden research beyond health impacts to encompass implementation strategies, scalability, financing, and governance. Gaps also exist in integrating Indigenous and traditional knowledge systems and in conducting research that looks holistically at climate and health across sectors and levels of intervention.

To address these gaps, several high-level recommendations can guide future climate-health research:

1. **Engage communities and policy-makers in co-design** from the start to ensure that research addresses real-world needs and priorities.
2. **Ensure equity in research**, focusing on vulnerable and marginalized populations and addressing structural inequalities.
3. **Broaden research scope** to focus not only on impacts but also on solutions, implementation, scalability, and the governance mechanisms required to drive action.
4. **Incorporate diverse knowledge systems**, including indigenous and traditional knowledge, to make interventions culturally relevant and scientifically robust.
5. **Take a holistic approach to climate and health** by looking across sectors, levels, and domains to understand how health is impacted and how solutions can be implemented across multiple areas of life, from energy and transportation to food systems and public health.

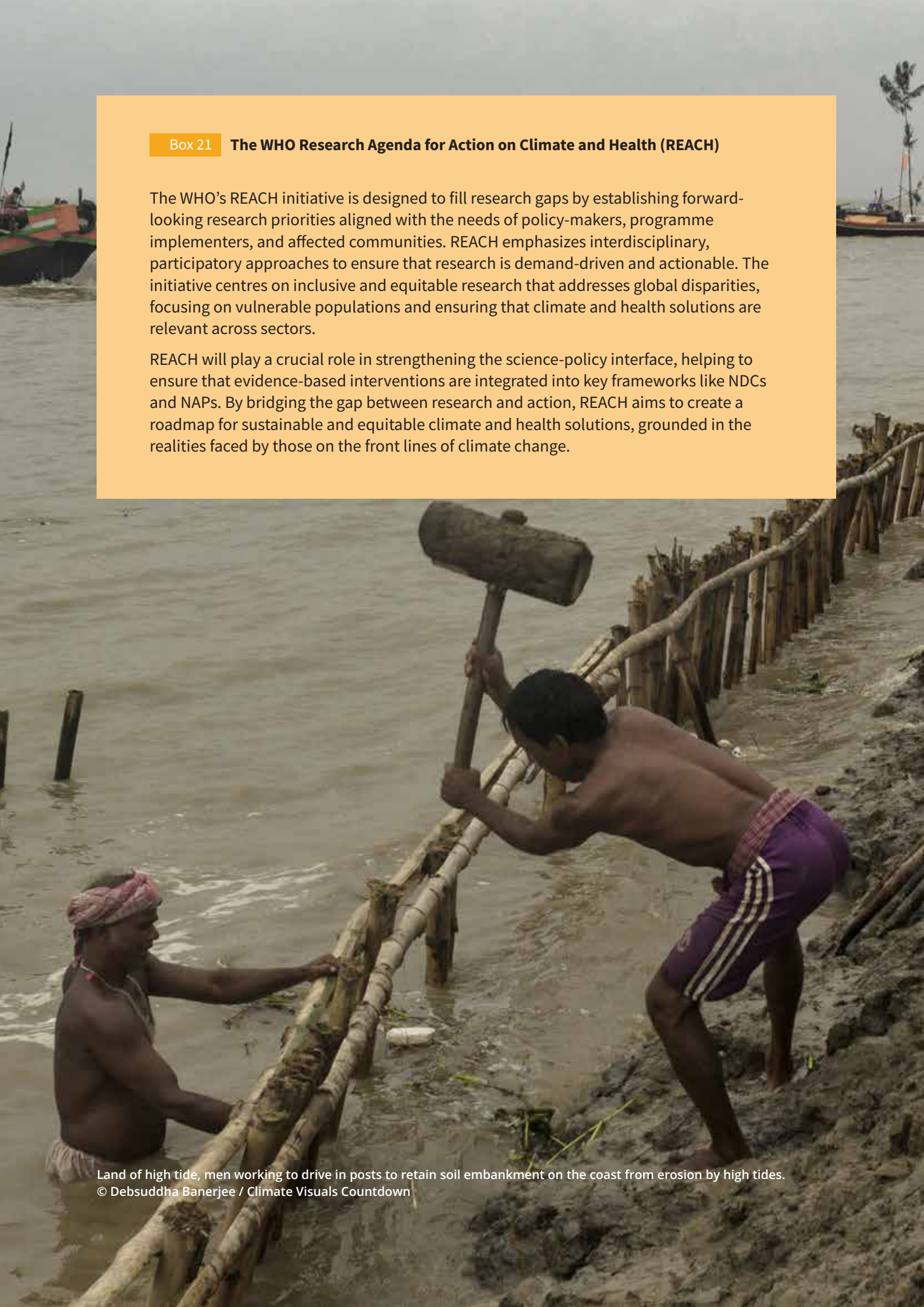
Communities, policy-makers and leaders can be supported in climate and health research initiatives through engagement with the REACH initiative and its outcomes (see Box 21).

10 Data disaggregation refers to the breakdown of information into more granular components that can more accurately describe the diversity of experiences. This may include presenting data by sex, gender, age, ethnicity, sexuality, and disability status.

Box 21 **The WHO Research Agenda for Action on Climate and Health (REACH)**

The WHO's REACH initiative is designed to fill research gaps by establishing forward-looking research priorities aligned with the needs of policy-makers, programme implementers, and affected communities. REACH emphasizes interdisciplinary, participatory approaches to ensure that research is demand-driven and actionable. The initiative centres on inclusive and equitable research that addresses global disparities, focusing on vulnerable populations and ensuring that climate and health solutions are relevant across sectors.

REACH will play a crucial role in strengthening the science-policy interface, helping to ensure that evidence-based interventions are integrated into key frameworks like NDCs and NAPs. By bridging the gap between research and action, REACH aims to create a roadmap for sustainable and equitable climate and health solutions, grounded in the realities faced by those on the front lines of climate change.



Land of high tide, men working to drive in posts to retain soil embankment on the coast from erosion by high tides.

Conclusion

Addressing the health impacts of climate change requires urgent, transformative actions across all sectors. Climate change is a direct threat to human health, and while the effects are felt globally, they disproportionately impact the most vulnerable populations. Meeting the goals of the Paris Agreement is crucial for safeguarding health, achievable through collective action that prioritizes equity, resilience, and inclusivity. By aligning health and climate policies, and centring human well-being as the core objective of climate solutions, we can mitigate and adapt to the lived experience of the climate crisis and unlock significant co-benefits for society, including improved health outcomes, social equity, and economic stability. This is not just the remit of the health community and governments; the private sector, communities and all sectors can take actions for people, place and planet to ensure a just, sustainable and liveable planet for all generations

Summary of key messages and critical asks

Key messages	Critical asks
Health is the argument for climate action.	
1. Our health is not negotiable. End fossil fuel reliance and ensure people-centred adaptation and resilience.	- Prioritize health in national climate plans to accelerate the Paris Agreement goals. - Make human health and well-being the top measure of climate success to catalyse progress and ensure well-being. - Commit to the climate and health agendas agreed through the WHO and the UNFCCC. - Ensure policy-makers, the private sector and economic leaders understand the immense costs of climate-related health impacts on populations and markets. - Account for the health impacts and costs of climate change in climate commitments including the NDCs and L&D frameworks.
PEOPLE: The lived experience of the climate crisis is health – health, well-being and equity must be at the heart of climate action.	
2. Unlock human development and put people at the heart of climate action. Prioritize equity, human rights, and a just transition to ensure everyone benefits from climate action.	- Drive health-focused climate mitigation, adaptation and L&D to unlock human potential, including through climate-aware education, training, jobs, and fostering climate strategies that ensure the well-being of present and future generations' health, economies and security. - Put equity, justice and human rights at the core of climate action by delivering a just transition that is inclusive, resilient and holds health as the top measure.
3. Build future-proofed health systems. Invest in low-carbon climate-resilient health systems and a fit-for-purpose, well-supported global health workforce.	- Invest in and deliver low-carbon, climate-resilient and environmentally sustainable health systems to promote health, mitigate the climate impact of the health sector, and protect and promote populations from climate and all health challenges. - Invest in growing, employing and upskilling the health workforce to respond effectively to the health impacts of climate change. Build the health sector's capacity to directly address climate change. - Mobilize the health workforce to initiate mitigation, adaptation, and resilience in the health sector, while guiding and supporting actions in other health-determining sectors.

Key messages	Critical asks
PLACE: Realize the co-benefits of stewarding environments for health and the critical opportunity and savings of investing in prevention.	
4. Cities are key to unlocking climate and health co-benefits – delivering wins for health and climate through clean energy, zero-emissions transport, infrastructure design, effective waste management, and climate preparedness.	- Prioritize prevention, health promotion and well-being in climate mitigation by addressing health determinants, ensuring access to clean energy, zero-emission transport, active mobility, healthy and low-carbon food systems, and effective waste management. - Centre health and equity in urban climate and clean air policies, regularly monitoring and evaluating their health co-benefits. - Focus adaptation programmes on key health determinants by expanding green spaces, improving air quality, controlling vector-borne diseases, and improving heat mitigation and water management. - Build climate-resilient urban infrastructure, including housing, transport, water, and sanitation systems to protect public health from climate impacts. - Leverage partnerships across government, the private sector, the scientific community and residents to innovate, share knowledge, and prepare for climate risks, with improved data systems for decision-making and early warnings.
5. Nature and biodiversity are the foundation of our health and food systems. Protecting and restoring natural systems is fundamental for healthy lives, sustainable food systems, and livelihoods.	- Advocate for biodiversity policies and NbS that protect ecosystems and essential services like water, food, medicine, and climate regulation, prioritizing conservation, sustainable use, and restoration. - Apply a One Health approach to address the links between human, animal, and ecosystem health, tackling issues like infectious diseases and antimicrobial resistance. - Engage health workers in prescribing NbS to improve physical and mental health. - Incorporate indigenous knowledge and leadership in biodiversity conservation, ensuring equal partnership and respecting indigenous rights. - Promote sustainable, culturally appropriate, regenerative and diverse food systems that protect the environment, support livelihoods, and reduce harmful agricultural practices, like excessive pesticide and antibiotics use. - Support sustainable fisheries management to protect aquatic ecosystems and ensure long-term viability.

Key messages	Critical asks
PLANET: Reshape financial and governance systems for people and planet.	
6. Transform financial systems and the economy away from extraction towards a well-being and circular economy.	- Reform fiscal policy to ensure fossil fuels are efficiently priced by ending fossil fuel subsidies and introducing a corrective tax. - Recycle the accrued economic benefits from climate-health actions to finance the strengthening of health systems and the transition to renewable, resilient and sustainable infrastructure, energy, food and other systems. - Substantially increase funding for health-focused climate adaptation and mitigation by shifting financial flows toward evidence-based interventions that deliver climate and health co-benefits while generating economic returns. - Transition from growth-centric and extractive economic systems towards a well-being and circular economy that prioritizes health, and resilience and sustainability. - Ensure the NCQG on Climate Finance and Loss and Damage Fund arrangements are substantial, fairly funded, and centre health.
7. Lead with bold governance that serves the many and empower and resource communities.	- Place health at the heart of UN climate talks. - Ensure that health is a core component of climate change processes and policies at international, national, and local levels, with a cross-sectoral approach, including in the NAPs, NDCs, LT-LEDS. - Implement a Health in All Policies approach to address the root causes of climate vulnerability. - Foster international and cross-sectoral collaboration on climate-health challenges, ensuring equitable participation. - Empower and resource communities, especially indigenous peoples and frontline communities, to lead climate and health initiatives. - Enhance cross-sectoral cooperation to ensure climate actions protect and promote people's health. - Increase funding and focus on interdisciplinary and intersectional research to unearth climate change health monitoring, evaluation, and solutions. - Restrict fossil fuel industry interactions in national policy spaces and international fora such as the COP.

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