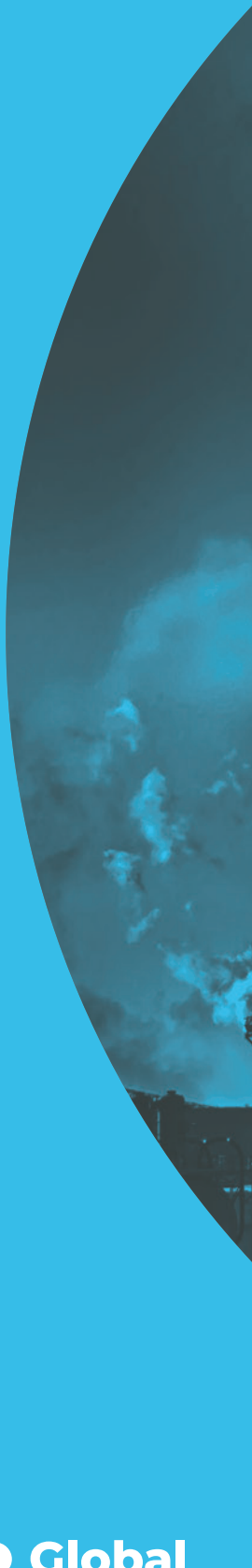
Climate & Health

Priorities and best practices



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Contents

Foreword

The accelerating climate crisis poses a profound and growing threat to human health globally. While our understanding of climate-related health risks has advanced significantly, the impacts remain unevenly distributed and deeply intertwined with social, economic, and political factors that shape our health.

As climate change intensifies, more people are exposed to risks like extreme temperatures, unsafe air and water, disrupted food systems, and the spread of infectious disease. These impacts fall hardest on vulnerable groups such as children, older adults, low-income communities, and those with chronic conditions. Conversely, implementing effective solutions to the climate crisis can create large, immediate benefits for public health. Moreover, the global health care industry has grown in its awareness of its own carbon footprint and is taking much needed action to reduce its emissions and bolster its resilience.

Despite the growing urgency of the evidence, political upheaval and inadequate funding impede much-needed progress. Even so, experts and institutions around the world are coming together to strengthen climate-ready health systems. From forecasting tools to local initiatives and new policies, practical solutions – many of them undertaken at the community level – are taking shape and showing the global community a way forward.

This report shares recent innovations and action to address the challenges climate change poses for human health, drawing on expert insight and real-world examples. It highlights practical lessons and approaches – from interagency coordination within governments to local action within community, from forecasting heat risks to climate smart malaria control – that show what's possible when innovation and collaboration come together. The aim is simple: to learn from what's working, adapt it to new contexts, and help drive meaningful action.

This report arrives at a key moment. The report is derived from knowledge exchanged in December 2024 and January 2025, a time of immense geopolitical strain with huge ramifications for addressing the health implications of climate change and the institutions needed to do so. It captures not just a snapshot of what has been achieved, but also what is at stake. As someone who has had the privilege to help shape climate-health policy from in the United States – inside and outside of government – I've witnessed firsthand how vital it is to go beyond just assessment and translate science into action.

As this report shows, despite all the upheaval, the work continues - often outside the spotlight, sometimes outside official institutions, but always with the purpose of protecting people and the health systems that serve them. The global climate-health community is proving that it will persevere, even amid political turbulence, and that knowledge, when shared, can be preserved and advanced even in uncertain times.

Let this report not only be a reminder of how far we've come, but also a catalyst for what must come next. The road ahead will require shared purpose, sustained effort, and deep collaboration - across borders, sectors, and communities. It is, above all, a call to come together to put human health and well-being at the forefront of climate change policy.

Dr. John M. Balbus

Former U.S. HHS Deputy Assistant Secretary for Climate Change and Health Equity

Principal, Climate Care Consulting, LLC

Executive Summary

'The climate crisis is a health crisis'. This was not always a self-evident truth; and its very acceptance, in some measure, is under threat of backslide.

This paper aims to chart the recent progress and latest thinking, and understanding, of the impact of climate change on human health; summarise the latest thinking from experts in the field; and document best practices of projects and policies, addressing different constraints to collective action; and share best practices and lessons from around the world.

It is also a systematic and timely attempt to disentangle the uncertainty that has befallen the international development sector in the first quarter of 2025, and the realignment - often in opposing directions - of government, and philanthropic efforts alike.

The first part of the paper summarises expert consultations and conversations on the challenges and opportunities ahead of the Climate and Health expert community.

There is much, and many, to extol. Particularly since the end of the COVID-19 pandemic, governments, international organisations, philanthropies, and civil society have developed our collective response to the crisis, from responsive financing mechanisms to creative community-based initiatives. Nonetheless, urgent needs still outweighing available funding, barriers to institutional collaboration and information sharing are slow to erode, and policy frameworks and human resources and expertise continue to be hard-pressed to respond to increasingly complex needs, to provide answers as the questions are still being written.

The second part highlights 10 innovative case studies, representing different stages of policy engagement, from supranational legislation to community-led action. Recommended by experts at the intersection of climate and health for their impact, creativity, and potential for replicability, they invite policymakers, experts, and the interested reader to consider, adapt, and adopt them.

Several learnings emerge from the cases. The breaking down of thematic and sectoral barriers, and improving collaboration, is an obvious shared call by contributing experts; the walls to bring down, however, go beyond those separating climate and health experts and policymakers, but a wide range of sectors including natural resources management, energy, infrastructure, education, and so from across the world, as would be apt for a planetary crisis.

Finally, the politics of this time are bringing their own challenges to these efforts, threatening the collaborative nature of the global response, but the very response itself. A surveying effort will prove necessary to systematically understand new policy and programmatic gaps; such a collaborative effort - for this cannot be the work of a single institution – could very well be the necessary impetus to reinvigorate the Climate and Health community in the short and medium term.

List of Acronyms

AAQD	EU Ambient Air Quality Directive
CDC	Centers for Disease Control and Prevention
C&H	Climate and health
ENCHE	European Network on Climate and Health Education
EPA	US Environmental Protection Agency
EPIDEMIA	Epidemic Prognosis Incorporating Disease and Environmental Monitoring for Integrated Assessment
FAO	United Nations Food and Agriculture Organization
GCCHE	Global Consortium on Climate and Health Education
GC7	Global Fund Grant Cycle 7
GHG	Greenhouse gas
GHHIN	Global Heat Health Information Network
HHS	US Department of Health and Human Services
ILO	International Labour Organization
IPCC	Intergovernmental Panel on Climate Change
LMIC	Lower-middle-income country
NHS	National Health Service (UK)
NIHHIS	US National Integrated Heat Health Information System (US)
NOAA	National Oceanic & Atmospheric Administration (US)
OCCHE	Office of Climate Change and Health Equity
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PMI	US President's Malaria Initiative
PREPARE	President's Emergency Plan for Adaptation and Resilience
SDGs	Sustainable Development Goals
SF4H	Seasonal Forecast for Health
SIDS	Small island developing states
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
VBD	Vector-borne disease
WASH	Water, sanitation and hygiene
WHO	World Health Organization
WMO	World Meteorological Organization

About this report

In December 2024, Global Nation hosted a roundtable discussion that brought together various US government departments as well as global philanthropic organisations. The roundtable was attended by more than 30 representatives across 16 organisations working at the intersection of climate change and health.

Amid concern over the likely future of programmes and policies implemented by the US government to tackle climate-related risks affecting health, we wanted to find ways to ensure that the most impactful work was captured and disseminated. The hope was that, in the midst of political change, we could support the resilience of networks, contacts and knowledge that can help the world tackle growing climate-related health threats that respect neither borders nor election results.

In recent years, the US has become the country with the strongest integrated risk-management approach to tackling climate risks to human health. An impressive knowledge and asset base has been built up at the federal, state and city levels which could serve Americans and provide a model for other countries. Sadly, as of April 2025, much of this base is being dismantled. Not only have entire teams working on this issue been dismissed but many of the data and reports that they had published have been scrubbed from the internet.

The current context makes this report – and others like it – even more important.

This report aims to capture the essence of the December 2024 roundtable discussions as well as to share examples of best practice when it comes to addressing climate risks to human health. It is designed for government, private-sector, multilateral and non-profit professionals working at the intersection of climate and health; as well as for members of the general public interested in learning about the range of creative ideas and successful interventions in this field.

The case studies provided in this report are examples of good practice, but they are not universal, nor are they representative of the huge amount of good work happening outside of the US and Europe. Our hope is that they are of use to practitioners seeking to find solutions and strengthen systems at this critical time.

Prologue

The process of drafting this report, collaborative par excellence, brought unexpected challenges. The termination of large numbers of climate professionals in the United States – with email exchanges abruptly interrupted by automated out-of-office responses – and the disappearance of their work, reports and the data they collected and generated, were unexpected hindrances to the research process. However, these obstacles also confirmed the importance of this work and validated its relative emphasis on US-centred cases and interventions; adding a dimension of documentation and preservation in addition to the original intent of highlighting examples of best practice.

For example, the US Department of Health and Human Services (HHS)'s Office of Climate Change and Health Equity saw all its staff put on administrative leave hours after Donald Trump's inauguration in January 2025, and their work erased from the department website. This situation has been replicated across the federal government. The Centers for Disease Control and Prevention (CDC) removed pages related to its Social Vulnerability Index – which ranks communities' vulnerability to natural disasters using Census Bureau data – but was forced by court order to restore a static version of the page. Numerous independent efforts to archive data and research removed from across US federal government websites are ongoing.

In a Research!America discussion broadcast in 2022, John Balbus, director of the Office of Climate Change and Health Equity (OCCHE), outlined the office's vision for 2025:

"....by 2025, to have every health system and the community in the U.S. as prepared as possible for disruptive acute and chronic climate impacts, especially on those most vulnerable. [We also aim to] have facilities prepared for severe weather-related disasters, and have hospitals and health systems tracking [their] greenhouse gas emissions and being on path to net zero by 2050."

The timing of this report is a reminder of the breadth of the challenge hindering the fight against climate change globally as well as the non-linear nature of progress. Several of the case studies highlighted in this paper underline the potential – and the necessity – for partnerships between the public sector, international organisations and the philanthropic and non-profit sectors. This will contribute to advancing the C&H agenda and help meet the growing needs and expectations of an increasingly vulnerable world.

Acknowledgements

The writers of this report are indebted to the many experts and professionals who contributed their thoughts and comments, and offered suggestions and input for case studies they wanted to see highlighted in this report and shared with the climate and health (C&H) community and the general public. We are also grateful for their research and data which formed the basis of case studies in this report.

They include:

- Children's Investment Fund Foundation (CIFF)
- US Department of Health and Human Services (HHS)
- United States Department of State
- US Department of the Interior
- US Environmental Protection Agency (EPA)
- European Commission
- Foundation S – The Sanofi Collective
- National Oceanic & Atmospheric Administration (NOAA)
- US Office of Science and Technology Policy (OSTP)
- Robert Wood Johnson Foundation (RWJF)
- Rockefeller Foundation
- Temasek Trust
- United States Agency for International Development (USAID)
- Wellcome Trust
- US National Security Council (NSC)
- US Domestic Policy Council (DPC)

As it warms: The state of play in climate and health

Alongside the direct impact of extreme weather events, climate change adversely affects human health the world over. Low-income countries and communities bear the brunt of its impact, yet it remains 'invisible, delayed, and difficult to quantify'[1].

However, there is still reason to hope. The scientific, policy and public understanding of the challenge and resolve to redress its impact have grown significantly in the last few years. We now have a much greater understanding of how unevenly the impacts of climate change are distributed across society and across the planet in general.

Cracking the coordination puzzle through political transition

It is a leitmotiv woven through this report: while we are in a better position to deal with the challenges in the field, thanks to pioneering cross-sectoral efforts, these have remained mainly localised; the next collaborative stage needs to be truly cross-boundary – across disciplines, geographies, and communities. This 'coordination puzzle' will only be solved if countries apply creativity and ambition to bring actors, assets and data together in novel ways. Furthermore, these solutions can only be scaled if international networks are built through the sharing of best practices.

While reimagining existing systems and working collaboratively is already a complex task, recent political transitions are putting important efforts at risk. It is not only the turnover of political leadership that creates challenges; some growing political movements are questioning the very basis of climate action, including the nexus of climate and health. Despite the grim outlook, many organisations and nations continue to prioritise the climate and health (C&H) agenda by tackling the impact of climate change and seeking to learn from one another in the process.

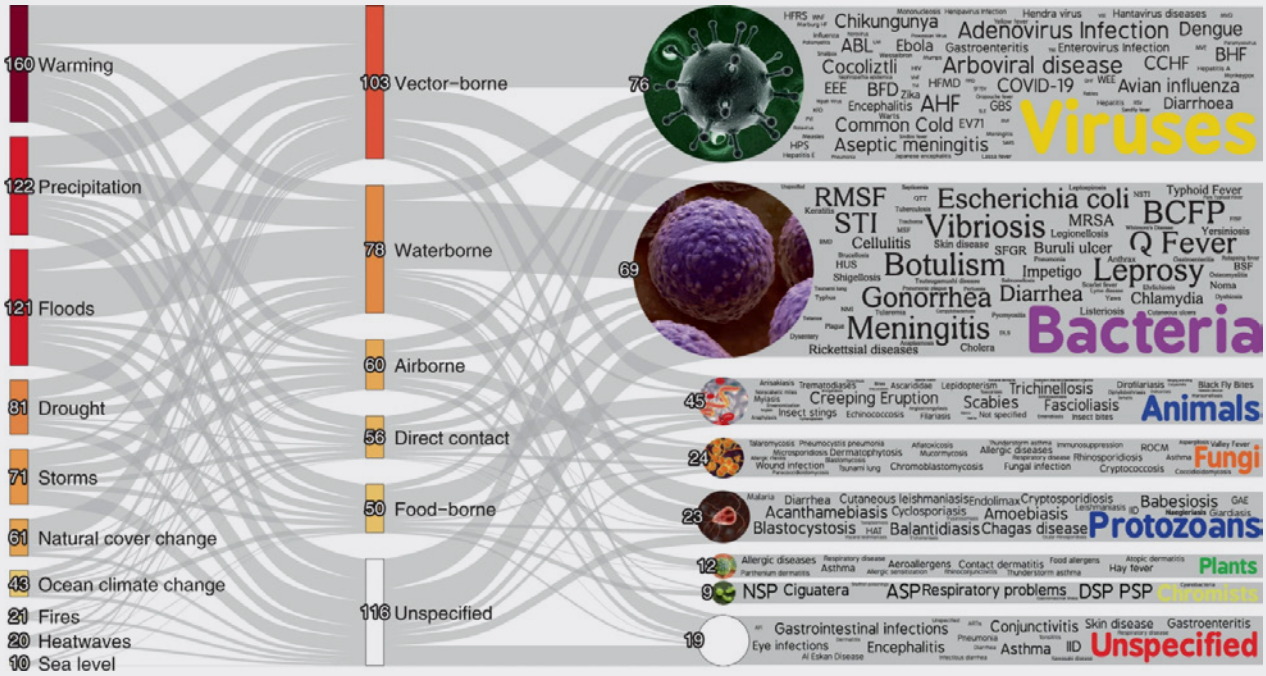
1 Case Study III, "The US National Integrated Heat Health Information System (NIHHIS) Heat Strategy".

The long road to recognising climate risks to human health

It is also a time inconsistency puzzle. Evidence shows that ancient civilisations recognised that any change in climate could lead to the outbreak of disease. Conversely, modern-day humans have stubbornly refused to acknowledge the impact that our actions have on the climate and subsequently, our health. Since the changing climate was first evidenced in the 20th century, it has taken us 50 years to recognise its relationship to health and another 30 to acknowledge the inseparability of the two.

The COVID-19 pandemic shook much of the world out of its torpor, forcing it to take notice. 'The climate crisis is a health crisis' became the mantra spoken by national governments, UN leaders and experts. But given that the painstaking work of building climate-resilient healthcare systems has only recently got underway, it is vital to look at the context and impetus of similar breakthroughs throughout history, and to draw lessons from their reception.

Figure 1: Pathogenic diseases aggravated by climatic hazards.



Source: Mora, C., McKenzie, T., Gaw, I.M. et al. Over half of known human pathogenic diseases can be aggravated by climate change. Nat. Clim. Chang. 12, 869–875 (2022).

In 1938, Guy Callendar calculated that global temperatures had risen by 0.3° over the previous 50 years. He was largely ignored. Almost 30 years later in 1967, Syukuro Manabe created the first computer model of the earth's climate, explaining the impact of greenhouse gases on

planetary warming. Again, his paper was barely acknowledged in the decade that followed but in 2015 it was voted the most influential climate change paper of all time, an accolade followed by Manabe winning the Nobel Prize in Physics in 2021.

Similarly, the impact of climate change on human health was not studied in any detail until the 1980s. However in 1985, White and Hertz-Picciotto published a paper that detailed the potential health impacts of climate change. These included malnutrition and thirst due to dwindling water supplies and agricultural output, increased spread of airborne and waterborne diseases caused by greater humidity, more incidents of cardiovascular diseases, and new, more aggressive strains of diseases. By mid-1988, NASA's Institute of Space Studies would state that 'humans (...) have altered the global climate in a manner that will affect life on earth for centuries to come'.

Several more decades would pass before the link between climate and human health was firmly established and accepted by international organisations and national institutions alike. The United Nations Framework Convention on Climate Change (UNFCCC) came into force in 1994 but included only a tangential mention of 'public health' on page 6. The 1997 Kyoto Protocol and its 2012 Doha Amendment made, surprisingly, no mention of health.

However, progress has been made in recent years. The World Health Organization (WHO) and the World Meteorological Organization (WMO) established their Joint Climate and Health Programme in 2014, building a joint office that represented an early example of institutional cooperation. The 2015 Paris Agreement mentioned in its preamble that parties should 'respect, promote and consider their obligations' on the right to health. Nevertheless, attention paid to the impact of climate change on health remained minimal until the 2020s when a range of climate disasters – floods in Pakistan, heatwaves in the Sahel, wildfires in the US and Dengue outbreaks in Latin America – grabbed headlines and focused minds.

In October 2023, more than 200 medical journal editors cosigned a call to the United Nations and its members asking them to 'treat the climate and nature crisis as one indivisible global health emergency'. The article highlighted the interdependence of natural subsystems. For example, water pollution leads to a rise in waterborne diseases that contaminate the soil with the subsequent runoff then damaging ocean ecosystems. In the same way, rising temperatures cause drought, wildfires and floods which destroy plant life and lead to soil erosion and inhibited carbon storage, ultimately resulting in further global warming. Two months after the call was published, the 2023 COP28 climate summit held in the United Arab Emirates was the first to include health impacts on its agenda.

Setbacks notwithstanding, it is a settling realisation that most advancements in understanding the health impacts of climate change and introducing ambitious policies to remedy them are but a few years old.

Making up for lost time – the climate health pioneers

Today, a growing number of countries – including the UK and Brazil – include institutionalised, systemic climate and health action in their national strategies. The previous US administration developed

a world-leading climate and health programme while many philanthropies – such as the Rockefeller Foundation, the Wellcome Trust, the Temasek Foundation and Reaching the Last Mile – have provide catalytic funding and knowhow to support innovative initiatives around the world.

Nevertheless, action to date remains insufficient in light of the sheer scale of the issue. The WMO reports that while 74% of national meteorological offices share data with health ministries, only 23% of these actually use that data.

Furthermore, effective responses to the health threats posed by climate change require far more input than that of meteorological offices and health ministries. Whether related to infectious diseases, extreme heat, floods, droughts or storms, responses to complex climate threats require effective coordination, planning and action from a wide range of stakeholders. This includes all government ministries – from finance and planning through to infrastructure and social services – as well as the private sector, civil society and individual citizens. All actors have a part to play in reducing the health risks associated with a rapidly warming planet given that conservative estimates predict at least 250,000 excess deaths per year between 2030 and 2050. (New World Bank figures indicate that the number may be 800,000 or higher).

The UN Secretary-General's July 2024 Call to Action on Extreme Heat was another watershed moment for C&H collective action, uniting the efforts of 10 specialised UN entities[2]. Addressing countries and communities, the Call to Action lists 22 points and measures under four harmonised priorities: caring for the vulnerable, protecting workers, boosting the resilience of economies and societies using data and science, and limiting temperature rise to 1.5°C.

Even more encouragingly, numerous thematic networks and working groups have been established across the globe in the years prior to organise and galvanise collective action and combine practitioner and academic expertise with public and non-profit resources.

For example, the Global Consortium on Climate and Health Education (GCCHE) – housed at Columbia University – brings together healthcare professionals - doctors, nurses, public and mental health practitioners - to focus on creating a climate-ready healthcare sector that can respond to the health impacts of climate change, with a focus on education. Within the consortium, networks like the Western Pacific Network on Climate and Health Education and the European Network on Climate and Health Education (ENCHE) carry out similar work at the regional level.

Several other organisations are working to strengthen healthcare responses to climate change-driven health conditions. Connecting Climate Minds seeks to align research and action at the intersection of climate change and mental health. By fostering international and interdisciplinary communities of practice, it aims to develop and collaborate on a thematic research agenda through seven regional groupings across the world.

2 Namely FAO, ILO, OCHA, UNDRR, UNEP, UNESCO, UN-Habitat, UNICEF, WHO, and WMO.

There is also the Global Heat Health Information Network (GHHIN), a forum of scientists, practitioners and policymakers focused on improving vulnerable populations' resilience to health risks associated with extreme heat. Building on three key principles – learn, act and advocate – it offers resources and information, advice, and advocacy tools and messages, with the aim of scaling up action and harmonising the collective understanding of and decision tools used to manage heat health risks.

Finally, in 2024 the Wellcome Trust and the Rockefeller Foundation announced their intention to establish and coordinate a C&H funders' coalition. The partnership's aim is to connect and promote collaboration among philanthropic, multilateral, public, private and other funders, and to organise action on specific C&H challenges that require cross-sectoral cooperation.

It is against this background that Global Nation undertook this exercise to capture what is working best in the public sector, within international organisations, and in the philanthropic and non-profit sectors, with the aim to share them with interested partners, governments and funders, and help further the conversation on best practices.

Priorities, challenges and examples of success

The experts consulted for this report – and notably the participants in Global Nation's December 2024 roundtable – were strongly aligned on the priorities for the C&H sector and the existing challenges.

The challenges that sparked most concern among experts were:

- **Finance**: While annual climate finance doubled between 2018 and 2022, it still accounts for only a fifth of the US$7.4 trillion required annually through to 2030. An additional concern is that mitigation projects, considered 'more easily investable' in the eyes of private finance continue to dwarf adaptation funding which was valued at US$76 billion in the same year and provided almost exclusively (92%) by the public sector. Yet health expenditure and the creation of climate-resilient health systems still fall primarily within the adaptation space.

- **The shifting policy and funding environment**: Funding cliff edges threaten to derail progress. Institutional constraints – including limited resources, workforce capacity and digital infrastructure – are key bottlenecks when it comes to fostering collaboration and scaling interventions. Specific funding and budget-line items need to be earmarked and dedicated to C&H to ensure resources are sufficient.

- Despite considerable efforts from experts, governments and institutions across the globe, **organisational silos and insufficient collaboration remain a challenge**. This not only the case in the climate and healthcare sectors, but also for many other connected sectors – as diverse as infrastructure or natural resource management – which often operate independently despite overlapping priorities. Barriers between government agencies and philanthropies must also be addressed.

- **Human resources and expertise require development**, particularly within the healthcare sector. There is a disparity between the information and resources available and their usage due to poor signposting and the lack of targeted training for health officials and healthcare professionals.

- **There are significant barriers to accessing and sharing information**, particularly across organisations and at local levels. This can undermine preparation, mitigation and response efforts.

To overcome these barriers, the experts consulted converged towards a set of priority actions:

- **Advocacy targeted towards increasing investment in climate and health system resilience** should be based on a clear business case that positions the tackling of health risks as the cornerstone of adaptation. Funding should be channelled into high-impact areas – including early warning systems, digital infrastructure, renewable energy for healthcare systems and capacity-building programmes – to foster adaptation and protect vulnerable populations from the growing impacts of climate change.

- **Equality, equity and environmental justice** should be considered guiding principles not only across C&H interventions, but across a wider range of policies. This will help combat the far-reaching, multisectoral impacts of C&H crises.

- **Data-based initiatives** – such as the disaggregation of vulnerability data, the development of digital tools for health systems, electronic health records, and the use of AI to diagnose chronic diseases – are also areas for development. At the other end of the policy scale, targets and impact measurements can also be used to hold governments accountable.

- **Robust institutional cooperation and data-sharing** are essential. Interdisciplinary programmes should be underpinned by integrated information systems (IIS) and whole-of-government approaches to improve the policy and decision-making landscape and enable better responses to emerging priorities.

- **Community-led approaches** should be supported. This includes everything from local and municipal administration to non-profits and local groups, to ensure interventions are tailored to local needs and effectively address local health inequalities. Examples include regional urban heat-mapping initiatives and resilience hubs that facilitate localised adaptation, mitigation and response activities.

Ten examples of best practice were selected for this report. These case studies address different elements and constraints to collective action and are all notable in their impact and creativity; highlighting the value of operating across silos and implementing new approaches and tools to deal with existing problems. Most importantly, the initiatives were selected for their potential to be replicated and/or scaled across multiple geographies.

The full case studies can be found in the second half of this report. They include:

- **Legislation**: The updated **EU Ambient Air Quality Directive** (AAQD) of October 2024. In addition to being the world's most ambitious legislation on air quality, the data-driven process used to reach this updated directive and the multinational nature of EU decision-making offer lessons for other countries and regional organisations.

- **Strategies**: The multiplicity of weather strategies and institutions in charge of them can be confusing for the public and for first responders. The **UK's Adverse Weather and Health Plan** seeks to consolidate adverse weather and health plans while **USAID's Global Health Climate Action Plan** represents the synthesis of the US government's international engagement at the C&H juncture; bringing other United States Government (USG) offices' international engagement into its global strategy.

- **Interagency coordination**: The **US National Integrated Heat Health Information System's (NIHHIS) Heat Strategy** offers a blueprint for integrating the capacities of multiple agencies. It also emphasises the importance of working at the community level to collect data, generate risk assessments, and encourage local participation.

- **Systems and processes**: The **US President's Malaria Initiative (PMI) Climate Framework** is an excellent example of programmatic adaptation. Founded in 2005, the PMI recognised the growing impact of climate change on its work with changing weather patterns increasing the spread of malaria. Accordingly, it endeavoured to increase response timeliness. The National Oceanic & Atmospheric Administration's (NOAA) One Health Framework is also an exemplary case of intra-agency and inter-agency organisation around thematic areas that serve as organisational frameworks to structure research interests, programme priorities and actionable science solutions.

- **Guidance**: A Seasonal Forecast for Health (SF4H) is a simple and dynamic information and guidance document that can be created at little cost, providing that the underlying data is easily accessible. The **US Department of Health and Human Services' Office of Climate Change and Health Equity (HHS-OCCHE)** published a 'A how-to guide for creating a Seasonal Forecast for Health' to help communities develop their own SF4H.

- **Financing**: Launched by the **Global Fund to Fight AIDS, Tuberculosis and Malaria**, the **Gates Foundation** and **Foundation S – the Sanofi Collective**, the new **Climate and Health Catalytic Fund** is a blueprint for climate-health financing vehicles; enabling response efforts as well as long-term investments in climate-responsive health systems.

- **Community engagement**: Among numerous inspiring community-led projects, the **Connecting Climate Minds** initiative stands out as an innovative model for addressing ill-understood or unexplored challenges, building its own research base and developing inclusive community-led agendas.

Case studies

Integrating the global response to climate as a health crisis requires reviewing priorities and interventions at every level – from legislation to implementation, and from interagency coordination to community-based engagement.

This section highlights 10 case studies across those different levels of engagements. They have been selected for their ambition, creativity, achieved or expected impact, and potential for replicability. They represent innovation within the climate and health (C&H) field and serve to provide ideas and inspiration to practitioners.

Issue	Case studies
I. Legislation	European Commission, Updated EU Ambient Air Quality Directive (AAQD), October 2024
II. Strategy	Proportion of respondents agreeing with the statement: "My taxes should go toward solving global problems."
III. Interagency coordination	The US National Integrated Heat Health Information System (NIHHIS) Heat Strategy
IV. Systems and processes	NOAA One Health Approach to Infectious Disease Forecasting: Vibrio and Dengue The US President's Malaria Initiative (PMI) Climate Framework
V. Guidance	HHS/OCCHE Climate and Heath Outlooks The 'How-to guide for creating a seasonal forecast for health (SF4H)'
VI. Financing	The Global Fund, Climate and Health Catalytic Fund, January 2025
VII. Community engagement	Climate and Mental Health: Connecting Climate Minds

I. Legislation

Updated EU Ambient Air Quality Directive (AAQD), October 2024

Challenge

Air pollution is responsible for an estimated 300,000 premature deaths per year in the EU and is the leading environmental cause of health impacts. It disproportionately affects vulnerable populations: children, the elderly, people with pre-existing conditions and socioeconomically disadvantaged people. In addition to its environmental and ecosystem impacts, the yearly costs of air pollution are estimated at a staggering €231–853 billion in health impacts and €8 billion in lost workdays.

Previous EU air quality directives were successful in significantly improving air quality and reducing the impact on human health, but evaluations revealed they still fell short of their targets. Additionally, more recent scientific evidence published by the World Health Organization (WHO) confirmed that several air pollutants produce adverse health impacts in humans at lower concentrations than was previously thought.

Description

Adopted in October 2024, the revised EU AAQD is one of the most progressive air-quality regulatory frameworks in the world. Aimed at aligning EU air quality standards more closely with WHO recommendations, it sets binding air-quality standards (limits and targets) for countries to achieve by 2030 that cover all major pollutants with a focus on particulate matter pollution (PM2.5) and nitrogen dioxide (NO2). These limits are twice as stringent as those of previous directives.

The legislation also mandates enhanced monitoring and measuring provisions for air pollution, provides clearer rules on stakeholder participation and access to justice and compensation linked to clean air, and harmonises public information across all EU member states.

Impact

The estimated impacts of the new AAQD include a 55% reduction in annual mortality (premature deaths) linked to air pollution and a 50% reduction in related morbidities (illnesses); as well as a 22% decrease in eutrophication and a 63% decrease in the acidification of ecosystems. The latter should lead to a reduction in crop losses and in damage to forests. The economic benefits are particularly impressive – the estimated annual cost of €5.6 billion to implement the directive would yield a return of €41.8–121.4 billion, depending on the method of valuation.

Replicability and lessons

Aside from the targets themselves, much can be learned from the European Commission's two-year-long process of identifying and selecting policy options. While it speaks to the effectiveness of intergovernmental negotiations on EU legislation, it offers lessons on stakeholder engagement as well as finding a balance between scientific evidence and political feasibility.

The new guidelines have benefited from an intensive participatory approach and iterative evidence gathering. Multiple stakeholder engagement exercises and case studies were critical to uncovering the governance and enforcement shortcomings in previous guidelines. For example, public surveys revealed that citizens do not have access to sufficient information on air quality and did not feel their increasing concerns on the health impacts of pollution were being addressed. Research also found that the implementation of remedial measures when air quality does not meet established standards has historically lacked enforcement mechanisms or binding penalties. These issues and others helped shape the new AAQD.

An extensive impact assessment considered 68 specific policy measures and proposed 19 potential policy options based on these. Distilled into three main routes to address environment and health shortcomings (I-1 – Full alignment, I-2 – Closer alignment, and I-3 – Partial alignment' with WHO recommendations by 2030), these were subsequently assessed against their expected environmental, social, and economic consequences, as well as cost. This allowed for the calculation of an overall benefit-to-cost ratio that was then submitted to political decision-makers.

Table 1: A comparison of AAQD policy options on level of alignment with the WHO Air Quality Guidelines (2030)

		Baseline	Policy Option I-3	Policy Option I-2	Policy Option I-1
Air Quality standard	**$PM_{2.5}$**	**25 µg/m3**	**15 µg/m3**	**10 µg/m3**	**5 µg/m3**
	NO_2	40 µg/m3	30 µg/m3	20 µg/m3	10 µg/m3
Exposed > WHO levels	**$PM_{2.5}$**	**333 million**	**267 million**	**243 million**	**226 million**
	NO_2	52 million	46 million	44 million	42 million
Is the standard achievable with available measures? [a]		**For > 99%** of $PM_{2.5}$ sampling points	**For > 99%** of $PM_{2.5}$ sampling points	**For > 94%** of $PM_{2.5}$ sampling points	**For > 29%** of $PM_{2.5}$ sampling points
Key economic impacts					
Mitigation costs	**Central**	**0**	**€ 3.3 bn**	**€ 5.6 bn**	**€ 7.0 bn**
	If corrected for 'border cell effect' [b]	0	€ 1.0 bn	€ 5.1 bn	€ 7.0 bn
Gross benefits	**Low** [c]	**0**	**€ 32.4 bn**	**€ 41.8 bn**	**€ 45.0 bn**
	High [d]	0	€ 93.8 bn	€ 121.4 bn	€ 130.8 bn
Net benefits	**Low** [c]	**0**	**€ 29.0 bn**	**€ 36.2 bn**	**€ 37.9 bn**
	High [d]	0	€ 90.4 bn	€ 115.7 bn	€ 123.6 bn
Benefit-cost ratio	**Low** [c]	**-**	**10:1**	**7.5:1**	**6:1**
	High [d]	-	28:1	21:1	19:1
Net GDP impact		**+/- 0 %**	**+ 0.26 %**	**+ 0.38 %**	**+ 0.44 %**
Key health impacts [e]					
Anual premature mortality compared to 2020 / baseline	**Due to $PM_{2.5}$**	**- 56.3 %**	**- 73.1 %** - 38 % vs baseline	**- 77.9 %** - 49 % vs baseline	**- 79.5 %** - 53 % vs baseline
	Due to NO_2	**- 80.9 %**	**- 83.3 %** - 12 % vs baseline	**- 84.0 %** - 16 % vs baseline	**- 84.7 %** - 20 % vs baseline

Source: Global Nation. Design based on [link]: European Commission, 'Commission Staff Working Document – Impact Assessment Report' accompanying the document 'Proposal for a Director of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (recast)', 26 October 2022.

II. Strategy

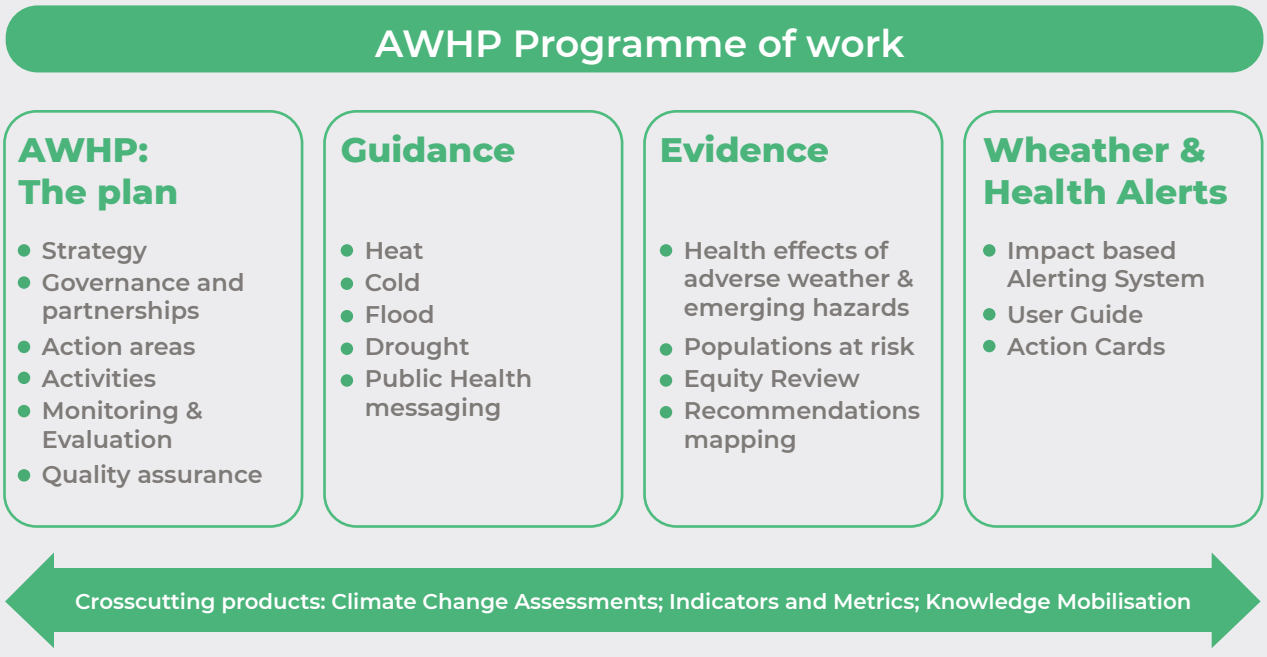
The UK Adverse Weather and Health Plan

Challenge

The top 10 warmest years in the UK since records began have occurred since the year 2000 with half of them in the last decade alone. The National Health Service's (NHS) 2025 Health and Climate Adaptation Report recognises the way in which climate change intersects with existing health and social inequalities, disproportionately affecting the most vulnerable populations and potentially widening health and other inequalities.

The multiplicity of government efforts to develop extreme weather strategies can lead to confusion on the part of first responders and the public, potentially resulting in missed opportunities to deploy the right response tools or to aggregate lessons learnt – particularly as climate-related challenges are rapidly evolving.

Figure 2: Overview of AWHP programme of work



Source: Global Nation. Design based on [Link]: UK Health Security Agency, 'Adverse Weather and Health Plan, 2024–2025 – second edition'.

Description

Prior to the launch of the Adverse Weather and Health Plan (AWHP), England's primary weather response strategies were the Heatwave Plan for England – first published in the wake of the 2003 European heatwaves which were estimated to be responsible for over 2,000 excess deaths in England and Wales – and the Cold Weather Plan for England, first published in 2011. The plans were aimed at 'raising public awareness and triggering actions by those in contact with people who are most at risk' in a bid to alleviate suffering and invest in preventative measures where possible to reduce pressures on the health and social care system.

In an effort to unify adverse weather and health plans under a single banner, the UK launched the AWHP in April 2023 'to protect individuals and communities from the health effects of adverse weather and to build community resilience'.

Outcomes

A key innovative feature of the AWHP is its emphasis on regular assessments and reporting, with annual midterm and year-end assessments. It is currently nearing the end of its second annual iteration.

Published in December 2024, the first AWHP annual report touted the launch of a number of auxiliary initiatives to support the unified strategy. These included releasing 35 guidance products and documents aimed at various stakeholders involved in preparing for and responding to adverse weather, improving early warning systems, and ensuring better community outreach and capacity-building and training.

Replicability and lessons

The multiplicity of government departments with overlapping responsibilities is a hallmark of large bureaucracies, and efforts to streamline programmatic priorities are a welcome step.

Additionally, the AWHP's emphasis on iterative improvements – demonstrated by the yearly updates and inclusion of additional hazards in successive plans, as well as the balancing of short- and long-term planning – are both laudable and replicable.

Climate and health as foreign policy: the USAID Global Health Climate Action Plan, 2023–2025

Challenge

Global health security as a part of national security has long informed US foreign policy and is notably expressed in its bilateral, regional and multilateral work to strengthen policies and frameworks to address global health challenges. Climate change is a particular threat to health, given that extreme weather events, rising global temperatures, and shifting disease patterns are intensifying. These all disproportionately affect vulnerable populations and exacerbate health disparities.

In this context, the United States Agency for International Development (USAID) has noted health outcomes' vulnerability to climate change in the countries where it operated, particularly in lower-middle-income countries (LMICs) and small island developing states (SIDS). This has led to the development of specific policies on Climate and Health(C&H). Given these challenges, the US government – notably USAID and the Department of Health and Human Services (HHS) – then recognised the urgent need for a strategic framework that integrates climate considerations into international health policies.

Description

The USAID Health Strategy 2022–2030's Adaptation strategy targeted a reach of 500 million people. Noting climate variability and change as a key determinant of human vulnerability, it focused on the health impacts of climate change, pledging to work with partners on 'prevention and treatment, including surveillance and early warning of climate sensitive, vector-borne diseases, heat-health action plans, air quality management, behavioural, clinical, and public health interventions and mental health services', and to **build the climate resilience of people, places, ecosystems and livelihoods that are vulnerable to the impacts of climate variability and change.**

Additionally, through its Global Health Security Program, USAID was committed to the USG's interdisciplinary One Health approach through its Global Health Security (GHS) programmes. The One Health approach encouraged efforts to promote human, animal and environmental health to reduce the risk of zoonotic diseases and improve the health of people and animals, including pets, livestock and wildlife. USAID's programs also noted that climate change presents major challenges to multiple aspects of GHS. For example, human and animal populations (wildlife and livestock) are moving

geographically as a response to changes in climatic conditions, bringing with them their pathogens and parasites and establishing new infectious disease spillover risk pathways, which pose new threats to global health.

Impact

The **Global Health Climate Action Plan 2023–2025** was developed by USAID in April 2023 with three main objectives:

- **To support the development and improvement of climate-based early warning systems for health**, including integrating climate data and early-warning data into routine information systems to aid decision-making around issues **such as for extreme heat and for malaria**, and to help prevent death and disease.

- **Investing in sustainable, low-emissions health systems and supply chains** to reduce supply-chain greenhouse gas (GHG) emissions through improving procurement standards, shifting from air to sea freight, and reducing packaging. It also encompassed the electrification of service delivery sites with renewable energy to ensure continuity of essential services during extreme weather events and reduce the risk of service disruption in disaster-prone regions.

- **Increasing the resilience of individuals, families, communities, and health systems to climate-related shocks and stressors** including increasing resilience capacities and social capital for people and communities and strengthening health systems to support increased flexibility, preparedness and responsiveness to inform decision-making. For example, the plan supported nutrition programmes that combat food insecurity in areas exposed to extreme weather events.

Replicability and lessons

The impact of USAID's Global Health Climate Action Plan should be assessed alongside other government bodies' global engagement on H&C; notably the State Department and HHS and the President's Emergency Plan for Adaptation and Resilience (PREPARE).

The strategy's emphasis on evidence-based assessment, capacity-building, collaboration and public engagement offered a blueprint for diplomatic efforts supporting C&H. The emphasis on a multisectoral approach supported by strong international collaboration on research, early warning and implementation is an effective model for bilateral engagement in the sector, customising interventions at the country level while operating through an international agenda facilitating the sharing of best practices and resources.

III. Interagency Coordination

The US National Integrated Heat Health Information System (NIHHIS) Heat Strategy

Figure 3: Infographic displaying the domestic and international locations of the National Oceanic & Atmospheric Administration (NOAA) Urban Heat Island (UHI) campaigns 2017–2024.

Source: National Oceanic and Atmospheric Administration (NOAA).

Challenge

Given that the impact of heat is often invisible, delayed and difficult to quantify, the issue is frequently overlooked at all levels of government. Recent heat events have threatened human health, animal health, environmental health, critical infrastructure and the economy. Yet heat-related illnesses and death are largely preventable with proper planning, education and action. As heat events increase in intensity, frequency, and duration, collective action is necessary to understand why heat impacts happen; who is most at risk; and what we can do to reduce risk, develop timely responses and build long-term heat resilience.

Solution

To develop its whole-of-government approach to dealing with heat, the US prioritised preparedness and resilience by better understanding heat risks, developing science-based solutions, and improving its capacity to respond both domestically and globally.

Created by the National Oceanic & Atmospheric Administration (NOAA) and the Centers for Disease Control and Prevention (CDC) in 2015, the main aim of the NIHHIS was to integrate and strengthen capacity, capabilities and resources across US federal agencies to coordinate a whole-of-government effort to address heat risk. NIHHIS grew from nine Departments and agencies at its inception to more than 30 by late 2024.

The Heat Strategy outlined goals to foster engagement, collaboration, support and joint activities among and with state, local, Tribal and territorial governments, and other non-federal partners to build a heat-resilient nation and promote heat resilience globally. The Strategy recognised that collaboration maximises effectiveness and the benefits to the public, including improved health and a more prosperous nation.

Impact

The goals defined by the Heat Strategy were (1) Communication, outreach and education; (2) Developing science-based services for heat resilience; (3) Improving and facilitating an integrated approach to develop solutions on the 'international, state, local, territorial, Tribal and individual' levels; and (4) Solidifying the Strategy to ensure its continuity as the primary integrated federal source for heat-related health information and solutions.

Inter alia, NIHHIS' work on extreme heat has included: setting up an Interagency Heat Communications Working Group; developing a Heat and Health Tracker to provide localised heat and health information; and developing a tailored toolkit to protect outdoors workers from heat-induced illnesses.

One of NIHHIS' flagship initiatives was the community-led Urban Heat Island (UHI) Mapping Campaigns; community-led initiatives to map the hottest parts of cities. Since 2017, over 80 UHI mapping campaign projects have been developed to help communities across the US map heat in their neighbourhoods. To facilitate this mapping, coalitions of community leaders and volunteers collected heat data during their hottest season to understand heat distribution across their cities. This helped them to make informed decisions on which neighbourhoods where most in need of cooling solutions.

Such community science field campaigns are much appreciated educational tools. They also offer an excellent opportunity to raise awareness about the many impacts of extreme heat and the factors that may produce uneven heat distribution throughout a community. Furthermore, the UHI campaigns represented an opportunity to teach

aspiring young scientists about how scientific field campaigns are conducted. Volunteers learnt about urban heat in a training session before attaching sensors to their vehicles and driving pre-mapped transects through their cities to collect temperature and humidity data linked to GPS coordinates.

Replicability and lessons

After raising awareness and generating an effective data product through local heat mapping, NIHHIS provided additional resources to help communities take action on heat. It guided communities in developing heat risk/vulnerability assessments, improving their heat governance using a heat governance maturity model self-assessment. It also assisted them in exercising plans for heat preparedness, response and resilience using heat tabletop exercises, developing long-term heat risk mitigation plans using the Plan Integration for Resilience Scorecard for Heat (PIRS for Heat), and identifying the most cost-effective interventions. Additionally, NIHHIS led to the naming of two Centers of Excellence in the United States, one in North Carolina and the other in California.

Internationally, the campaign has already lent itself to replicability and has been implemented in several countries, with previous international campaigns in Chile, Sierra Leone and Brazil. Future mappings – according to most recently available information – were planned for Salvador, Brazil; Nairobi, Kenya; and Dhaka, Bangladesh. This work also supports the Global Heat Resilience Service.

IV. Systems & Processes

The US President's Malaria Initiative (PMI) Climate Framework

Challenge

The PMI is a US government initiative started under George W. Bush in 2005 with the aim of controlling and eliminating malaria worldwide. It operated in 27 countries.

Realising that changing weather patterns could exacerbate the spread of malaria and potentially undo past efforts to control and eliminate it, the PMI required a framework to guide its interventions and make them more timely and responsive.

Solution

The Climate Framework was a 'background' initiative that supported PMI's programming and informed its investments and priorities. It encompassed both Mitigation and Adaptation measures, with a strong emphasis on making climate and weather data more accessible and supporting early warning systems.

The initiative operated in tandem with the PMI Strategy 2021–2026; the United States Agency for International Development's (USAID) Climate Strategy (2022-2030); and the Centers for Disease Control and Prevention's (CDC) Climate and Health Strategic Framework (also launched in 2024).

Outcomes

The framework's impact on adaptation was down to the gathering and dissemination of climate data for early warning systems and for future modelling of optimal timings for project deployment. Similarly, its mitigation efforts have focused on collecting and disaggregating data to identify areas at high risk of climate change which has led to changes in PMI's country planning.

The Ethiopia-based Epidemic Prognosis Incorporating Disease and Environmental Monitoring for Integrated Assessment (EPIDEMIA) is one example on how the Climate Framework approach can be applied. The tool successfully integrated malaria surveillance and climate data to generate forecasts and produce malaria early-warning reports up to 8–12 weeks in advance.

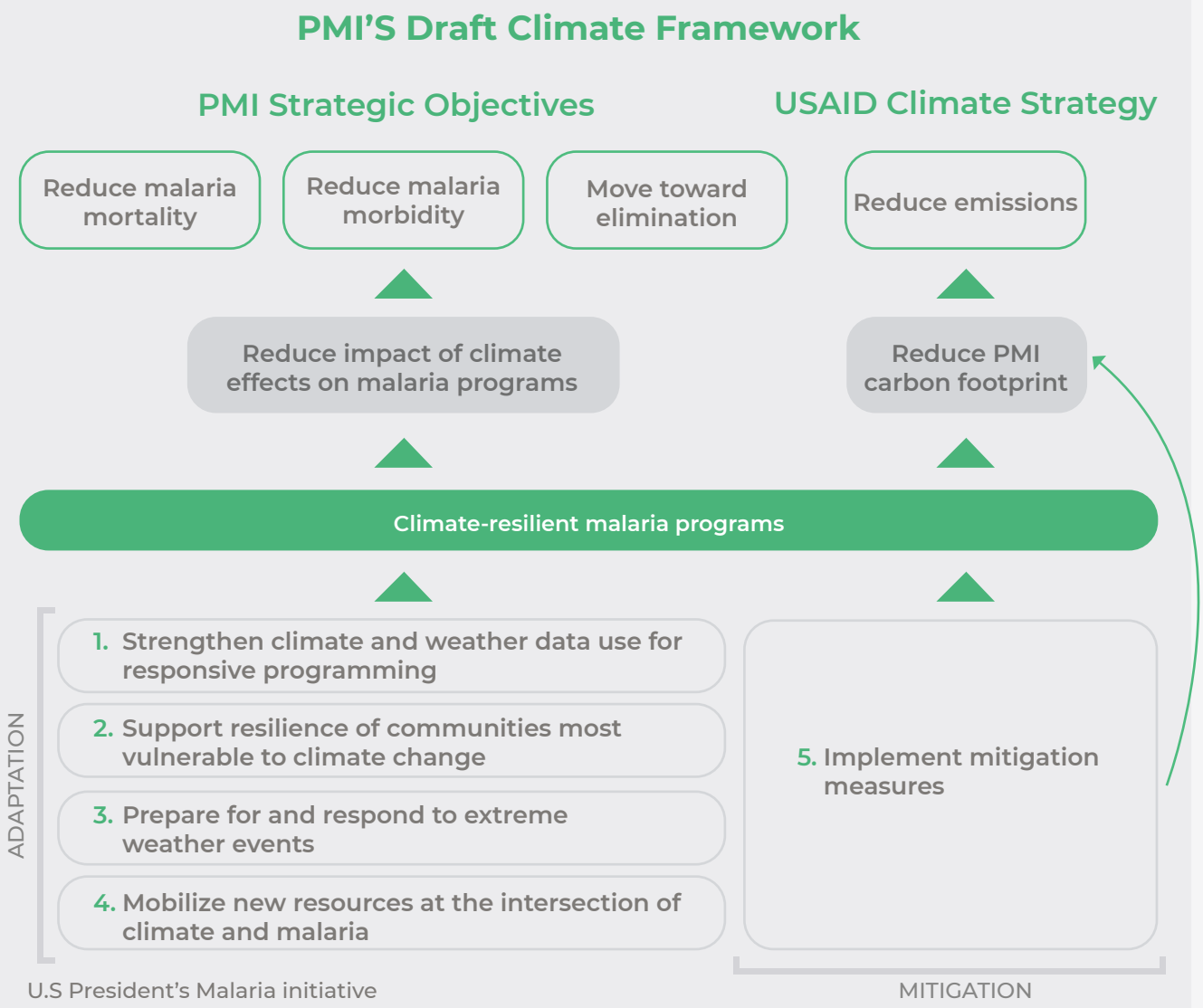
Replicability and lessons

Data collection, analysis and the internal review of projects should constitute an integral part of every climate strategy, but this isn't always the case. As climate threats increase, it can be useful to review long-term strategies using a mechanism to make them more responsive and adaptable. Early-warning systems that leverage Climate Information Services (CIS) can help reduce

the national malaria burden in affected countries. Additionally, targeted and concentrated surveillance can make it possible to control outbreaks of disease as they happen while also reducing the risk of novel outbreaks.

Rapid-response tools like EPIDEMIA also made it clear that robust national leadership and commitment, local technical expertise development for operation and implementation, and the integration of climate and health surveillance datasets to develop early-warning systems are all vital to replication. Countries planning to implement similar projects should draw on previous experiences to improve preparedness.

Figure 4: The PMI Climate Framework



Source: Global Nation. Design based on: PMI website

NOAA One Health approach to infectious disease forecasting: Vibrio and dengue

Challenge

Climate change, environmental stressors and rapid urbanisation are accelerating the spread of infectious diseases, particularly those influenced by temperature, precipitation and ecological shifts. Two particular pathogens – Vibrio bacteria that cause cholera and the dengue virus which causes dengue fever – have been expanding their geographic range in recent years, increasing public health risks and economic burdens.

Figure 5: NOAA One Health focus areas.

Source: NOAA website

Vibrio bacteria occur naturally in coastal areas. However, rising sea-surface temperatures and changing water conditions have led to an increase in cholera outbreaks and non-cholera Vibrio infections. In 2023, there were 700,000 cases of cholera worldwide and 4,000 deaths due to the infection. The US alone experiences 80,000 Vibrio infections, 500 hospitalisations and 100 deaths every year.

Dengue, a mosquito-borne viral disease, is on the rise due to climate change. In 2024 alone, there were 14 million cases and over 10,000 deaths recorded across the globe. The mosquitos that transmit dengue – Aedes aegypti and Aedes albopictus – are now expanding into new regions due to higher temperatures and shifting rainfall patterns.

Outbreaks are difficult to predict and control, particularly in regions with limited healthcare infrastructure. The reliance on reactive interventions underscore the need for proactive forecasting tools to mitigate the spread of both Vibrio and dengue.

Solution

To combat Vibrio and dengue among other growing threats, the National Oceanic and Atmospheric Administration (NOAA) adopted 'One Health', a collaborative, multisectoral and transdisciplinary approach to climate and health (C&H). Working at the local, regional, national and global levels, the main aim of the approach is to achieve optimal health outcomes by recognising the interconnectedness of people, animals, plants and their shared environment. Bringing together environmental observations, hydrodynamic and epidemiological modelling and satellite data, NOAA sought to develop early-warning systems for Vibrio and dengue in order to improve disease prediction, preparedness and response.

Vibrio forecasting and cholera prediction

Since 1998, NOAA and NASA have studied **the link between sea-surface temperatures and Vibrio cholerae (the bacteria that causes cholera) growth**. This has led to the development of short-term Vibrio forecasts, helping seafood regulators and public health officials anticipate outbreaks and create long-term Vibrio projections by tracking the bacteria's expansion into new regions due to climate change.

NASA and the UN Children's Fund (UNICEF) built on this research through their development of the **Vibrio Prediction Hub**, a cholera forecasting tool that uses satellite-derived environmental data to predict outbreaks. Initially deployed in Yemen with 85–92% accuracy, the model now provides a four-week lead time for cholera risk maps in Ethiopia, Ghana, Haiti, India and Sudan. The Hub has also supported situational analysis in Bangladesh, the Democratic Republic of the Congo, Mozambique, Pakistan and Ukraine; guiding water, sanitation and hygiene (WASH) interventions as well as the distribution of medical supplies.

Dengue forecasting in the Americas
NOAA has collaborated with the CDC and international partners to integrate vector population monitoring, epidemiological surveillance and climate modelling into early-warning systems for dengue and other vector-borne diseases (VBDs). It has also played a central role in the US' National Public Health Strategy to Prevent and Control Vector-Borne Diseases in People, the largest federal effort focused on VBD prevention.

A key outcome was **AeDES**, the first real-time monitoring and forecasting system for diseases borne by the Aedes mosquito, including dengue, Zika, chikungunya and West Nile virus. AeDES combines seven decades of climate data, four epidemiological models and multiple climate simulations to generate over 384 disease risk forecasts per run. This system has enabled health ministries to identify high-risk locations in advance and implement targeted mosquito control measures.

Impact

By integrating climate, epidemiological and environmental data, these forecasting tools offer earlier detection of outbreaks, allowing for more timely interventions and improved disease surveillance, intervention planning and outbreak mitigation.

The Vibrio Prediction Hub has helped multiple countries implement cholera response planning, WASH interventions and medical resource distribution ahead of outbreaks. AeDES has strengthened dengue control across the Americas, enabling health ministries to act before case numbers surge.

Replicability and lessons

The One Health approach offers a comprehensive, science-based strategy for addressing climate-sensitive infectious diseases. To facilitate replicability and long-term impact, connections with health ministries and meteorological services should be developed early in the process to help engender more cross-sector engagement; and strengthening connections with health professional students promotes cross-cutting collaboration and institutional commitments from local end-users, regional leaders and intergovernmental organisations.

V. Guidance

HHS/OCCHE Climate and Heath Outlooks and the 'How-to guide for creating a seasonal forecast for health (SF4H)'

Challenge

In 2020 and 2021 respectively, the US witnessed weather and climate disasters that were unprecedented in terms of their frequency, the areas affected, the number of fatalities and the diversity of the climatic events; which included, among others, Hurricane Ida in Louisiana, the western wildfires, cold waves and heatwaves.

These disasters also highlighted the relative vulnerability of underserved communities. A US Environmental Protection Agency (EPA) report published in 2021 confirmed that racial and ethnic minority communities were the most affected by climate change, being least prepared for or able to recover from natural disasters such as heatwaves, poor air quality and flooding. For example, Hispanics and Latinos were found to be overrepresented in weather-exposed industries such as construction and agriculture, while Black and African American individuals were found to be 40% more likely to currently live in areas with the highest projected increases in extreme temperature-related deaths.

The extreme vulnerability of certain areas prompted the creation of the Office of Climate Change and Health Equity (OCCHE) at the Department of Health and Human Services (HHS) which sought to join up work on climate vulnerability, health, and racial and geographic equity.

Solution

Established in August 2021, HHS OCCHE was tasked, inter alia, with identifying communities and populations disproportionately vulnerable to climate hazards, addressing health disparities exacerbate by climate impacts, and fostering innovation in climate adaptation and resilience for disadvantaged communities.

One key OCCHE product were the monthly Climate and Health Outlook reports, seasonal forecasts documents aimed at 'inform[ing] health professionals and the public on how our health may be affected in the coming months by climate events and provide resources to take proactive action'. These were accompanied by online interactive maps and county-level data on individual risk factors that may make people more vulnerable to negative health

Figure 6: Example of a 2024 Climate and Health Outlook document.

Climate and Health Outlook

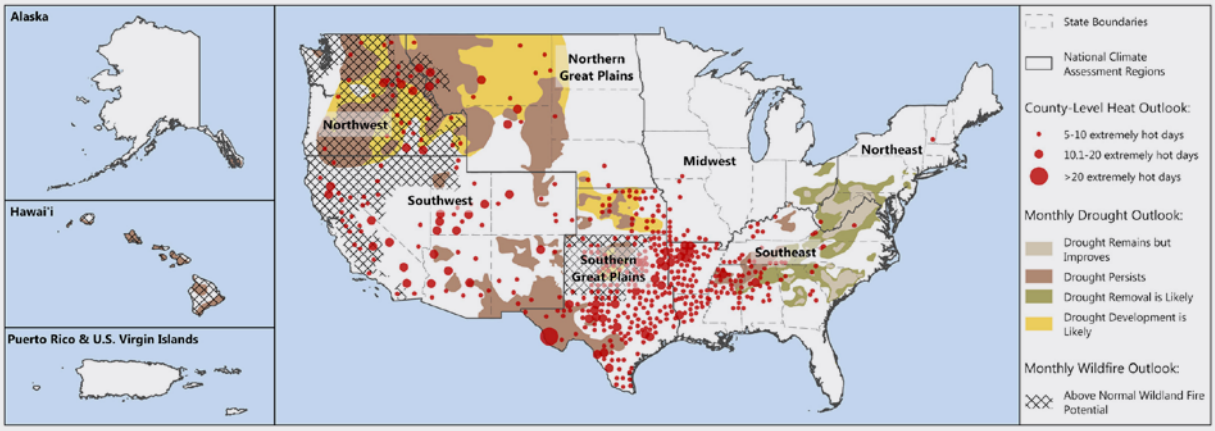
Your monthly climate forecast for health | August 2024

OASH | Office of Climate Change and Health Equity

Highlights for this edition:

- Forecasts for heat, drought, and wildfire along with discussion of populations at elevated risk for health impacts
- Guidance on protecting health from these climate hazards plus tornadoes, flooding, hurricanes, and vibrio
- A look at how the rate of heat-related illness is higher this year than last, how to protect farmwork ers from increasing pesticide exposure, and new heat & health resources

August Regional Climate Hazard Forecasts:



Northwest : 18 counties in ID, eight counties in WA, and six counties in OR are expected to have five or more extremely hot days * in August. Drought persistence and development and above normal significant wildfire potential **are forecast across most of ID, WA, and OR.

Southwest : 25 counties in CA, 14 counties in UT, 11 counties in AZ, eight counties in NV, eight counties in NM, and seven counties in CO are expected to have five or more extremely hot days in August. Drought persistence is forecast to persist in existing drought regions of CA, NV, AZ, UT, CO, and NM. Above normal significant wildfire potential is forecast for much of northern and central CA and parts of southern CA, northern NV, and northwestern UT.

Northern Great Plains : 12 counties in MT, three counties in WY, three counties in NE, and one county in SD are expected to have five or more extremely hot days in August. Drought persistence is forecast for the ongoing drought areas in MT, NE, ND, SD, and WY with development most likely for areas of rapidly drying topsoil including across MT, southwestern NE, and western ND and SD. Above normal wildfire potential is forecast for parts of western MT.

Southern Great Plains : 143 counties in TX, 50 counties in OK, and 32 counties in KS are expected to have five or more extremely hot days in August. Drought persistence is forecast for the existing drought areas with development most likely for northwestern TX, southwestern to central OK, and parts of KS. Above normal wildfire potential is forecast for parts of northern TX and all of western OK.

Southeast : 48 counties in AR, 30 counties in MS, 21 counties in LA, 18 counties in AL, 12 counties in TN, six counties in KY, five counties in GA, three counties in VA, two counties in SC, and two counties in NC are expected to have five or more extremely hot days in August. Drought removal and improvement is forecast for VA, NC, SC, and GA with different areas of drought removal, improvement, or persistence forecast in TN, AL, and MS, and persistence predicted for the existing drought area in KY. The Southeast is forecast to have normal wildfire potential. The Atlantic basin is highly likely to have an above-normal hurricane season.

Hawai'i and P acific Islands : All of the Hawai'ian islands are expected to experience equal chances of below, near, and above-normal temperatures in August. Drought persistence is forecast for ongoing drought areas of HI. Above normal wildfire potential is forecast for all of HI. The central Pacific is most likely to experience a below-normal hurricane season.

Heat Drought Wildfire Hurricane

Check out additional forecasts on our webpage .

Source: HHS - Office of Climate Change and Health Equity (OCCHE)

outcomes from climate hazards. Outlook reports provided updates on recent events, short- and medium-term forecasts (up to a few months) based on recent extreme weather events, protection guidance related to ongoing seasonal threats and informational deep dives.

The director of the OCCHE described the Outlook as "a seasonal forecast for health, so it takes the seasonal forecast from NOAA every month… and we overlay what that means for health. So, what [it means] in terms of where the heat is going to be bad, where drought is getting worse, where drought is getting better, where is the risk for wildfires, and the areas that might be affected by that".

Replicability and lessons

A Seasonal Forecast for Health is a simple and dynamic information vehicle and guidance document and a valuable tool that can be created at little cost provided that the underlying data is accessible. OCCHE published a 'How-to guide for creating a Seasonal Forecast for Health (SF4H)' to help communities develop tailored versions of the Outlook that are 'informative, actionable, and tailored to the intended audience'. The process consists of three simple steps:

Step 1: Identifying and assessing seasonal and sub-seasonal forecasts
Emphasising data availability, quality and relevance to the target audience, the guide also suggests that forecasts should be accompanied by a relevant threat profile and recommendations on how to stay safe.

Step 2: Identifying and accessing datasets for population risk factors/vulnerability
This enables the identification of populations that may be at increased risk of climate-related health impacts. By looking at social, environmental and health indicators at the local level, authorities looking to create a custom SF4H can identify underlying risk factors that may be compounded by extreme weather events.

Step 3: Developing presentation modes
This means designing content that will appeal to a broad audience by using simple language across different platforms including publications, online updates and interactive maps.

VI. Financing

Climate and Health Catalytic Fund – The Global Fund to Fight AIDS, Tuberculosis and Malaria, the Gates Foundation, and Foundation S – the Sanofi Collective, January 2025

Challenge

Climate-related crises are increasingly straining global health systems, particularly in countries still recovering from the COVID-19 pandemic. The Global Fund to Fight AIDS, Tuberculosis and Malaria – which allocates 71% of its 2023–2025 Grant Cycle 7 (GC7) resources to the 50 most climate-vulnerable countries – faces challenges in sustaining progress against the eponymous diseases.

At the 2023 United Nations Conference on Climate Change (COP28), the Global Fund reaffirmed its commitment to expanding climate-health financing. However, demand currently exceeds available funding, with over US$500 million in climate-related investments identified on the Global Fund's Unfunded Quality Demand (UQD) Register. Existing financing mechanisms remain insufficient to address the scale and urgency of these challenges, highlighting the need for a dedicated climate-health investment strategy.

Description

In July 2024, the Global Fund recommended establishing a new catalytic investment priority under GC7 to ensure climate-related health risks receive dedicated funding. In January 2025, in partnership with the Gates Foundation and Sanofi's philanthropic arm – Foundation S, it launched the **Climate and Health Catalytic Fund** to strengthen health-system resilience in response to climate change. The fund is designed to facilitate the rapid mobilisation of resources to vulnerable countries. It supports both immediate health needs and long-term adaptation efforts, laying the foundation for a broader investment framework to meet growing climate-health financing demands.

By creating a distinct funding stream, the Global Fund provides greater flexibility to respond to climate-related health threats, enabling countries to develop tailored interventions.

Key areas of focus include improving healthcare access in disaster-prone areas, expanding services for displaced populations, strengthening malaria prevention in climate-sensitive regions, and enhancing disease surveillance

systems to anticipate emerging threats. This initiative represents a shift in global health financing, integrating climate adaptation with disease control efforts to better protect vulnerable populations.

Impact

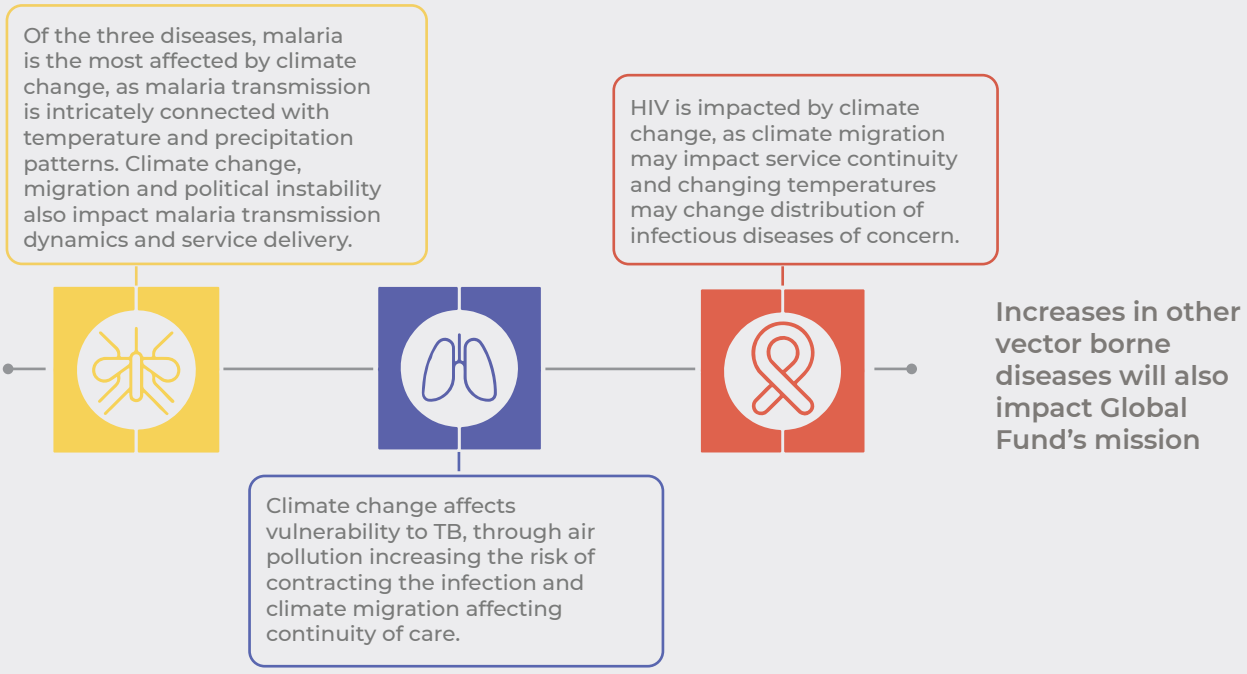
By establishing a dedicated funding stream, the fund ensures that countries facing climate-health crises receive the resources needed for effective interventions. The initial US$50 million investment acts as a catalyst for future donor engagement and expanded financial commitments, providing a model for integrating climate considerations into health financing.

The fund enables ministries of health, community organisations, and other stakeholders to implement locally led solutions for climate-induced health threats. The strengthening of disease prevention and control mechanisms enhances national health security and protects progress against HIV, TB and malaria.

Figure 7: Risk of infectious disease will increase due to climate change either directly or Indirectly

Climate change and malaria, HIV and TB

Risk of infectious disease will increase due to climate change either directly (e.g., vector borne) or indirectly (through disruption of services)



Source: Global Nation. Design based on [Link]: The Global Fund, "Thematic Update on Climate and Health", 50th board meeting, 14-16 November 2023.

Beyond immediate response efforts, the fund drives long-term improvements in climate-smart health systems. It supports climate-informed national healthcare strategies, including workforce training, early warning systems and sustainable health-facility infrastructure. Investments in clean energy and environmentally friendly healthcare solutions will reduce the carbon footprint of health systems while improving resilience to climate shocks.

This initiative establishes a framework for scaling up investments, ensuring health systems in climate-vulnerable countries are prepared for current and future challenges.

Key components

The Catalytic Fund's strategy focuses on three core areas: immediate climate adaptation, climate-resilient health system development and environmentally sustainable healthcare technologies.

The immediate climate adaptation component aims to strengthen healthcare access in disaster-prone regions, enhance malaria control and improve disease surveillance in high-risk areas.

The climate-resilient health system component integrates climate considerations into disease prevention and healthcare delivery. This includes enhancing early-warning systems, incorporating climate-smart approaches into HIV, TB and malaria programmes, and strengthening health supply chains.

The fund will initially target 10 to 15 of the most climate-vulnerable countries receiving Global Fund investment, ensuring resources are directed to where they are needed most.

Replicability and lessons

The Climate and Health Catalytic Fund represents both an immediate response to an urgent crisis and a strategic investment in long-term climate adaptation for health systems. By integrating climate considerations into its funding mechanisms, the Global Fund is setting a precedent for climate-health financing that could be replicated by other global health institutions.

By piloting climate-health financing under the current funding cycle, the Global Fund is building a knowledge base for scaling interventions in future funding cycles. This will make climate-health funding a permanent feature of global health financing strategies and ensure that future investments are informed by data and implementation insights.

The initiative also demonstrates how climate-health financing can be integrated into broader development strategies, aligning public and private investments to build stronger, more resilient health systems. By proving the effectiveness of targeted climate-health interventions, the fund encourages greater participation from private donors, multilateral institutions and philanthropic organisations.

VII. Community Engagement

Climate and Mental Health: Connecting Climate Minds

Challenge

The links between the Climate Crisis and mental health are numerous. Examples abound; from young people in the Caribbean fearing increasing hurricanes will prevent them from accessing mental health medication to farmers in South Asia reportedly contemplating suicide following multiple drought-induced crop failures. It is no surprise that exposure to extreme weather events and their repercussions – such as unemployment and food insecurity – leads to widespread psychological distress.

According to the World Health Organization (WHO), climate change will exacerbate the global burden of mental health conditions. An estimated one billion people are already affected by mental health conditions at a cost of US$1 trillion every year, yet mental healthcare accounts for only 2% of public health spending.

The 2023 Intergovernmental Panel on Climate Change (IPCC) report stated that it is highly likely that rising global temperatures will lead to an increase in mental health risks, including suicide; expressions of anxiety, depression and acute stress; and psychiatric hospital admissions. And as is often the case, the most vulnerable are the most at risk.

Description

Connecting Climate Minds was launched by researchers at Imperial College London in 2023 with support from the Wellcome Trust.

The project was born from the realisation that the field of climate change and mental health research – though growing – remains siloed and disconnected. The team of researchers aims to develop an ambitious and inclusive agenda for research priorities that will inform evidence-based policy and practice to safeguard mental health while facilitating climate action that is grounded in the needs of people with lived experience. By building an ecosystem of experts, researchers and responders armed with the right tools and working at the intersection of climate and mental health, Connecting Climate Minds hopes to enact this agenda.

Impact

Operating via regional communities of practice and developing localised 'research and action agendas', the project aims to outline research priorities and develop appropriate policies to serve those

who experience and respond to the mental health impacts of the Climate Crisis. The website already showcases tens of case studies from around the world that detail existing research, innovative ideas and relevant policy interventions for interested academics and members of the public. It has also created a set of toolkits for researchers, policymakers, NGOs, practitioners and humanitarians working on and responding to this crisis.

In July 2024, the project published a Global Research and Action Agenda, based on input from nearly 1,000 contributors across 90 countries.

Replicability and lessons

Overall, the project's focus on climate and mental health reflects the global growth of climate and health (C&H) engagement as we begin to understand the implications and repercussions of climate change. The development of thematic foci driven by the collaborative efforts of global experts looking to fill policy and research gaps deserves commendation, amplification and emulation.

Within this specific project, the creation of seven groupings and agenda was complemented by three community-based agendas – namely on Youth, Indigenous Nations and Peoples, and Small Farmer and Fisher Peoples – offering a blueprint for the extension of the project to additional agendas as needed.

Global Nation