Global Research and Action Agenda for Climate Change and Mental Health

Image Attribution

The Threads that Connect Us

This artwork is a reflection of the kinship between People and Place, Humans and Earth. The messages are multilayered and interconnected, symbolising the essence of positive health and wellbeing (both human and non-human) as a collaborative pursuit, as is dis-ease. This message is conveyed by First Nations Peoples all over the world, and in Australia we say, "If Country is sick, so are we."

'The Threads that Connect Us' shares a story of kinship. "Every plant in the bush, from the smallest algae to the largest gum tree, is connected by intricate little threads called mycelium. These intertwined threads lead to a series of underground fungal matrix called the mycorrhizal network. The health and wellbeing of the bush relies on this living system... as do we... The knowledge of this living system has been passed down from generation to generation, over thousands of years. Through story, ceremony and traditional practices, we have cared for Country and for us, Country is all things. Country is the plants and animals, the river, the people, it's the living system of life. "

Kisani Upward, Gamilaraay/Wiradjuri Yinarr (Woman), PhD Candidate of the University of New England, Aboriginal Health and Wellbeing Researcher at the Djurali Centre for Aboriginal and Torres Strait Islander Health Research and Education, Chair of the Manna Institutes First Nations Advisory Group and member of the Connecting Climate Minds Indigenous Advisory Board.

Cartoons

The cartoons used throughout this report were created by Hameed "Ham" Khan and Eugenia Rojo of the Red Cross Red Crescent Climate Centre in response to discussions during Connecting Climate Minds dialogues and convening events.

Illustrations

The illustrations used throughout this report were created by Rebeka Ryvola de Kremer of the Red Cross Red Crescent Climate Centre.

Fostering Connection through Serious Fun

Dr Pablo Suarez, Innovation Lead at the Red Cross Red Crescent Climate Centre, was a visionary in fostering connection and creativity through "serious fun". Connecting Climate Minds sought to uplift voices and foster connections to illuminate a path for transformative action. Dr Suarez played a pivotal role in the vision of Connecting Climate Minds, including in the use of creative games and cartoonists through dialogues - the results of which illuminate this agenda.

RELEVANT LINKS

Glossary of key concepts used in the global research and action agenda

Appendix for detailed background information, methods and analysis

Foreword

From sharp rises in heat related deaths, to dramatic changes in the distribution of infectious diseases, to increases in global food insecurity and undernutrition, the evidence is clear that climate change is having a growing negative effect on human health.

However, the impacts of climate change on mental health have to-date largely been overlooked. For example, the Wellcome-funded Lancet Countdown that tracks progress on health and climate change estimates that only 5% of the academic output published in Europe on the health impacts of climate change reported mental health outcomes.

In 2023, to respond to this evidence gap and catalyse the development of research in this area, Wellcome was delighted to support the Connecting Climate Minds project. The project was led by Dr. Emma Lawrance and Professor Sir David Nabarro at Imperial College London, and we are very pleased to see the resulting global agenda for research and action that is published in this report.

Wellcome is a global charitable foundation dedicated to creating a healthier future for everyone through research, and our strategic priorities include mental health and the intersection of climate change and health. Our mission for mental health is to create a step-change in early intervention for anxiety, depression and psychosis. For climate and health, we are striving to put health evidence at the heart of climate change action.

The research and action agenda published here bridges these two strategic areas by providing a roadmap for future research on the intersection of climate change and mental health. It outlines critical research questions across a large portfolio of topics; spanning from understanding how extreme heatwaves may be affecting mental health through disrupting sleep, to how people taking certain psychotropic medications may struggle in a warming world.

The report builds on the experiences and expertise of people with lived experience of mental health problems and of communities most affected by climate change across the world and is grounded in the insights of 960+ experts from 90 countries.

We believe that this report will be a crucial resource for researchers interested in the intersection of climate change and mental health and we urge our funding partners, academics, and wider stakeholders to join us in turning these research priorities into action.

Alan Dangour, Director of Climate and Health, Wellcome
Miranda Wolpert, Director of Mental Health, Wellcome

Voices of the Connecting Climate Minds Community

As readers journey through this work, I hope they see and connect to the unique vulnerabilities and resilience of people amidst the battles of climate change, while recognizing the agenda as more than a document but also a call for their voices to be heard in research and policymaking. It's my desire that this work inspires meaningful, lasting change that honours the courage and meets the needs of vulnerable people.

Hope Lekwa, SustyVibes, Nigeria, Connecting Climate Minds Lived Experience Working Group

Young people have always been identified as vulnerable to the climate crisis because of their limited adaptive capacity and their increased risk to its future consequences. Through inclusive youth thematic dialogues that have informed this agenda, it is evident that young people are no longer passive victims of the climate crisis, they are active changemakers.

Jasmin Irisha Jim Ilham, UNICEF, Malaysia, Connecting Climate Minds Youth Ambassador for Eastern and South-Eastern Asia

There is an urgent need, now more than ever, to work together, through a collective and holistic approach, on evidence-based policies that help us address the interlinkages between mental health and climate change. Such policies should only be guided by a strong research and action agenda that ensures the implementation of a multi-sectoral, multi-stakeholder and multi-disciplinary approach that ensures that no one is left behind. This is what Connecting Climate Minds has brought us.

Dr Mohamed Eissa, World Health Organization, Egypt, Connecting Climate Minds Global Advisory Board

The current climate crisis is causing a range of problems across the world, which strongly affect people's mental health, although this has been largely neglected. [This] agenda plays a very important role in raising the issue, providing solid scientific evidence and proposing and presenting ways to address it. It is an important guide to promote public policies and civil society actions with the necessary urgency.

Professor António Mauro Saraiva, Planetary Health Brazil, Connecting Climate Minds Latin America and the Caribbean & Global Advisory Board

" *Climate change is disproportionately affecting the mental health of vulnerable communities. [This] agenda would be a guideline for the regional and local researchers and practitioners to explore the interconnections between climate change and mental health and set inclusive measures to lessen climate change-induced mental health risks.* "

Roufa Khanum, BRAC University, Bangladesh, Connecting Climate Minds Central and Southern Asia

" *[This] agenda is timely and integrates the collective efforts of researchers worldwide and elevates the experiences of global communities facing the dual challenges of climate change and mental health. This agenda is significant, providing a platform for the 'voiceless' and establishing a clear direction for future research and further investment.* "

Professor Jemaima Tiatia-Siau, University of Auckland, New Zealand, Connecting Climate Minds Oceania

" *This agenda is a trailblazer as the world navigates the effects of climate change on mental health. This initiative is a big step in provision of evidence-based information for stakeholders to come together for action in dealing with the mental health issues caused by the climate crisis!* "

Dr Mercy Wawira, AgriPsych Beam, Kenya, Connecting Climate Minds Sub-Saharan Africa & Small Farmers and Fisher Peoples Agenda

" *As humanitarians, we are witnessing a terrifying pattern: changing climate risks are impairing the mental health of those we serve, and of our own teams...[Connecting Climate Minds] will improve our collective ability to anticipate, diagnose, and provide proper support – harnessing the power of darkness to pursue illumination and transformative action.* "

Dr Pablo Suarez, Innovation Lead, Red Cross Red Crescent Climate Centre

This Agenda hopes to inspire the continuation of Pablo's vision, to foster joyful connection across disciplines and cultures to "connect what we know with what must be done", and create a safer climate for mental health.

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Executive Summary

The climate crisis negatively impacts mental health and increases the risk of poor health for people already living with mental health challenges.[i,1,2] Conversely, climate actions (such as climate adaptation and mitigation strategies) create opportunities to support good mental health.[2,3] The climate change and mental health research field needs a clear, inclusive and aligned vision, with research supporting practice and vice versa. This is the purpose of the Connecting Climate Minds Global Research and Action Agenda. This agenda outlines priority areas for climate and mental health research, highlighting the need for a truly transdisciplinary field. It is primarily targeted to help researchers and research funders to generate evidence for decision-makers, in ways that best respond to the needs of people living with the mental health consequences of climate change. It also provides a strategy for implementing and translating research into action, calling for active participation of all sectors (e.g., policymakers, practitioners, educators and civil society).

The agenda was developed through a global process that included a wide range of disciplines, knowledge systems, lived experiences, sectors, cultures and nations. It represents the perspectives of 960+ contributors from 90 countries gathered through dialogues, surveys and a global event. It synthesises insights from seven Regional Research and Action Agendas[4-10] developed by the Connecting Climate Minds Communities of Practice across the Sustainable Development Goal[ii] global regions, and from Lived Experience Research and Action Agendas developed with and for youth,[11] Indigenous communities,[12] and small farmers and fisher peoples.[13] These agendas should be consulted before applying this global agenda in these specific contexts.

The global agenda consists of two intertwined components:

1. **A research agenda,** to generate evidence that will support decision-makers responding to emerging challenges in mental health and climate change

2. **An action agenda,** to guide how research is conducted and ensure evidence translates into policy and practice

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The research agenda proposes priorities across four high-level categories identified as areas of critical research need. Each category contains a set of priority research topics and questions. Some may have been previously researched in some settings (but critically not others), and others reflect experiences heard in Connecting Climate Minds for which there is currently little to no research evidence. These categories and the top research question within them (selected via a global survey of experts) are listed below:

Category 1: Impacts of climate change on mental health and factors[iii] that may increase risk for or be protective against these impacts

Top question: What factors increase or reduce the risk of climate change-related impacts on mental health (e.g., gender, livelihood or early intervention)? Which factors are unique to the context of climate change and/or what known risk and protective factors for mental health challenges are compounded by climate change?

Category 2: Pathways and mechanisms[iv] through which climate change impacts mental health

Top question: How do pathways and mechanisms by which climate change affects mental health challenges - which may be psychological, social, cultural, environmental, behavioural, biological, political and commercial - interact with and compound one another?

Category 3: Mental health benefits and risks of climate action

Top question: What are the best-buy[v] interventions at national and local levels to enable sustained climate action and transformative societal change that also strengthen or leverage good mental health (e.g., building widespread psychological resilience and agency, cultivating social capital)?

Category 4: Mental health interventions in the context of climate change

Top question: What are the best-buy interventions to implement before, during and after extreme weather and climate events to protect mental health and respond to resulting mental health challenges?

Developing this agenda highlighted the ongoing need to establish foundational understandings in climate and mental health research. This includes developing shared understandings of key concepts, appropriate methods and metrics, and learning from existing knowledge and practices across disciplines and cultures. Enacting this agenda will require adaptation of research questions to local contexts and consideration of the unique vulnerabilities and strengths of different population groups; their expertise and leadership must be at the centre of research.

[iii] Mediating or moderating influences that vary the extent to which mental health is impacted by climate change that can act across the varied pathways and mechanisms.
[iv] Creating a causal understanding of how climate change and its impacts act to directly or indirectly affect mental health outcomes.
[v] Interventions considered the most cost effective and feasible for implementation (World Health Organization).

Agenda contributors emphasised that how research is done is almost more important than what research is done. They were wary of perpetuating existing harms (e.g., extractive research practices or mental health stigma) and envisioned a decolonised, connected global community. This will require investment to support capacity building and the development of networks to share learnings among those living with and responding to these impacts around the world; the value of which has been seen throughout Connecting Climate Minds.[14] Contributors also emphasised the need to centre different cultural perspectives[15] in how mental health is conceptualised, understood and practised in this field, including an understanding of the interdependence of mental health with the health of our environment.[16] As one Indigenous contributor stated, "when the land is well, we are well." The action agenda presents five key components of the desired vision for the climate and mental health field, which include:

1. **Improved research infrastructure, capacity, methods and data to support transdisciplinary, inclusive and comparable approaches to climate change and mental health research**

2. **Transdisciplinary approaches that combine and equally value multiple forms of expertise**

3. **Inclusive, non-extractive and co-creative approaches**

4. **Political and policymaking environments that enable integrated climate and mental health policies, practices and frameworks**

5. **Awareness of climate change and mental health impacts among key actors (e.g., researchers, research funders, policymakers, practitioners, educators and civil society) and what actions they can take to better understand and respond to these impacts**

Connecting Climate Minds brought together contributors across many forms of expertise, who collectively called for this agenda to promote connection across sectors and disciplines. We urge readers to view the different parts of this agenda as interlinked and to contribute their diverse expertise to this growing transdisciplinary field. By working and acting together, we can better protect people's mental health from the compounding burdens of a changing climate and achieve mental health benefits from actions for a safer climate future. **We, the 960+ contributors to this agenda, hope you will join us.**

Introduction

The Intergovernmental Panel on Climate Change notes with very high confidence that "climate change has adversely affected the mental health of people in the assessed regions."[17] Climate change exposes millions to more frequent and severe weather and climate events. These experiences — such as extreme heat and flooding — can worsen existing mental health challenges and contribute to new ones.[2] Climate change also rapidly destabilises the conditions needed for good mental health, for example by driving food and water insecurity, forced migration, and disrupting access to treatment for mental health challenges.[2] Awareness of climate change and insufficient climate action can also lead to a range of psychological responses, such as climate distress.[18] While generally being healthy and rational reactions to living in the climate crisis, these responses may worsen or contribute to mental health challenges for some people.[19]

The additional mental health burden of climate change, air pollution and insufficient access to green space is estimated to reach over 47 billion USD per year by 2030, escalating to over 537 billion USD per year by 2050.[20] This intersection of climate and mental health has received growing attention in recent years, with recognition from the Intergovernmental Panel on Climate Change (IPCC),[21] the World Health Organisation,[1] the COP28 UAE Declaration on Climate and Health[22] and the Climate Change and Health Resolution adopted at the 2024 World Health Assembly.[23]

Despite the clear need to align climate and mental health policy and practice, tangible progress remains minimal. Out of 193 national climate action plans to cut emissions (known as Nationally Determined Contributions), only 3% mentioned mental and psychosocial health.[24] While there is sufficient evidence to act, often the data that could guide decision-makers is still missing, and existing evidence is not always translated into action.[25]

In recent years, the climate and mental health research field has grown rapidly but unevenly. High income countries dominate the research field,[26] certain topics receive more attention than others,[26,27] and widespread variation in methodological and conceptual approaches often limits comparability and synthesis of research findings.[28,29]

It is not novel to recognise the interdependence of the health and stability of the environments in which we live and our own physical and mental health. Cultures and healing practices around the world, including those of many Indigenous communities, have long embedded an understanding of the inseparable nature of the health of people and Land or Country.[30] Global mental health has emphasised the need to focus on creating the social and environmental conditions to prevent poor mental health and community-based approaches to support those living with mental health challenges.[31] Many of the risks to mental health posed by the climate crisis, and the corresponding solutions, are not novel, but the scale and pace of climate change makes them amplified and more urgent.
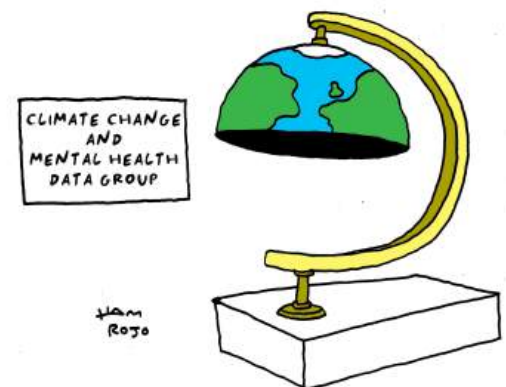
To date, there has been no aligning vision or roadmap to guide researchers and research funders on what research would make the biggest difference to people living with and responding to the mental health consequences of the climate crisis. Such an aligned vision for the climate and mental health field has been called for,[32] and can respond to the urgent need to connect research with action and bring together expertise across knowledge systems and disciplines.

Between 2023 and 2024, 960+ people across over 90 countries came together to produce this first Global Research and Action Agenda for Climate Change and Mental Health through the Connecting Climate Minds project (Appendix 2). The agenda has put lived experience in the centre of its creation, and we urge all readers to put lived experience at the centre of its implementation. We, the 960+ contributors, hope this agenda will be a call to action and a roadmap for the research community. Together, we can understand the mental health consequences of the climate crisis that the Connecting Climate Minds dialogues heard resonating globally, and the many co-beneficial solutions. We hope research funders will support the implementation of the agenda and that all relevant actors will play their part in ensuring a future that is safer for our climate and our mental health.

Global Research and Action Agenda Objectives

1. **Establish research priorities to: understand to what degree and how climate change is impacting mental health; support people affected by the mental health impacts of climate change; and enable climate actions that benefit mental health.**

2. **Showcase a clear vision for building the climate and mental health field, including principles for enacting the research agenda and translating evidence into policy and practice.**

3. **Build understanding among diverse researchers, funders, policy and practice experts about their roles in advancing a transdisciplinary climate and mental health field, and equip them with clear actions, including priorities for funding and resource mobilisation.**

Background Context

Climate change, mental health and the need for transdisciplinary research

For definitions of all key terms used in this agenda, see Glossary. Further elaboration on the background to Connecting Climate Minds, mental health, climate change and predicted climate hazards from a Red Cross Red Crescent Climate Centre analysis is available in Appendix 2.

Conceptualising mental health

Understandings of mental health span disciplines and cultures in complex and wide-ranging ways. For the purpose of this agenda, we define the scope of relevant terms as follows.

By **mental health challenges,** we mean thoughts, feelings and behaviours that affect a person's ability to function in one or more areas of life and involve significant levels of psychological distress. This includes, but is not limited to, anxiety, depression, post-traumatic stress, psychosis, suicidal thoughts and substance misuse.
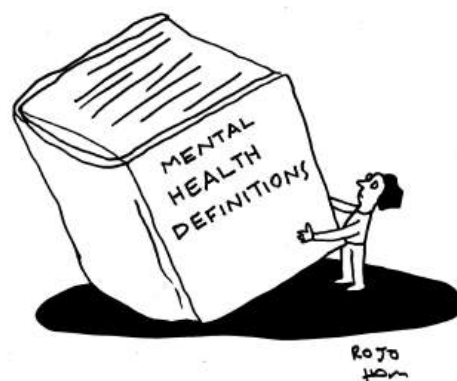
This agenda also encourages centering the understandings and expressions of mental health or illness that are relevant to each culture and context when applying the agenda. For instance, Indigenous communities often include emotional, spiritual, social and cultural health as indivisible from and core tenets of the concept of mental health.[33,34]

Conceptualising climate change

By **experiences of the effects of climate change,** we mean:

1) directly experiencing the impact of climate hazards, such as more frequent and intense heat waves, wildfires/bushfires, drought, floods or storms (e.g., typhoons, hurricanes, cyclones), and

2) experiencing climate change-related disruption to the social and environmental determinants of good mental health, such as being forced to move home, not being able to access food or water, losing livelihood or homelands, or disruption to cultural practices.

Contextualising transdisciplinary and systems-thinking approaches drawing on diverse expertise

The climate crisis amplifies existing challenges in understanding, conceptualising, measuring and responding to mental health. The climate change and mental health nexus intersects with and compounds other drivers of poor mental health (such as inequality, colonialism, extractivism, conflict, food insecurity, trauma and poor physical health). Many of the risks to mental health posed by the climate crisis, and the corresponding solutions, are not novel. For example, the mental health risk of exposure to a potentially traumatic event like experiencing a wildfire, or the value of community-based and led mental health support. Many conclusions of this agenda are shared with disciplines that tackle other mental health stressors or complex societal issues which require transdisciplinary responses. The climate and mental health field can learn from progress elsewhere.

Climate and mental health research must sit within the broader context of a 'polycrisis' that may affect mental health through cumulative stressors, using a systems thinking lens and a truly transdisciplinary approach.[35] Systems thinking has been described as an approach that helps us understand complex problems by looking at the big picture and recognising the interconnections among the various components of the system. It involves understanding the system's structure, the relationships among its parts and the dynamics of how it behaves over time. It seeks to identify the root causes of problems and address them in a holistic way.[35–37]

Building on this approach, all climate and mental health research should consider:

- **What is unique about the climate crisis** as a driver of poor mental health outcomes versus how climate change exacerbates existing mental health risks and trends?

- **What existing climate and mental health knowledge needs to be amplified or adapted?** For example, research exists on the impacts of extreme weather and climate events on mental health, though mostly in high income countries.[26] Academic evidence is lacking in the Global South where different contexts, understandings, experiences and responses around climate and mental health must be considered.

- **What existing knowledge is held in other research fields,** and what are the remaining research gaps in these fields that are needed to inform climate and mental health work?

Methods

This agenda's methodology draws on relevant work[39-43] and was co-developed by the Climate Cares Centre and Red Cross Red Crescent Climate Centre, with input from the Connecting Climate Minds Global Advisory Board, Regional Communities of Practice, Lived Experience Working Group, and Wellcome. It aims to balance global standardisation with local and cultural needs and perspectives. The agenda was developed through a number of stages (Figure 1, see Appendix 3 for details).
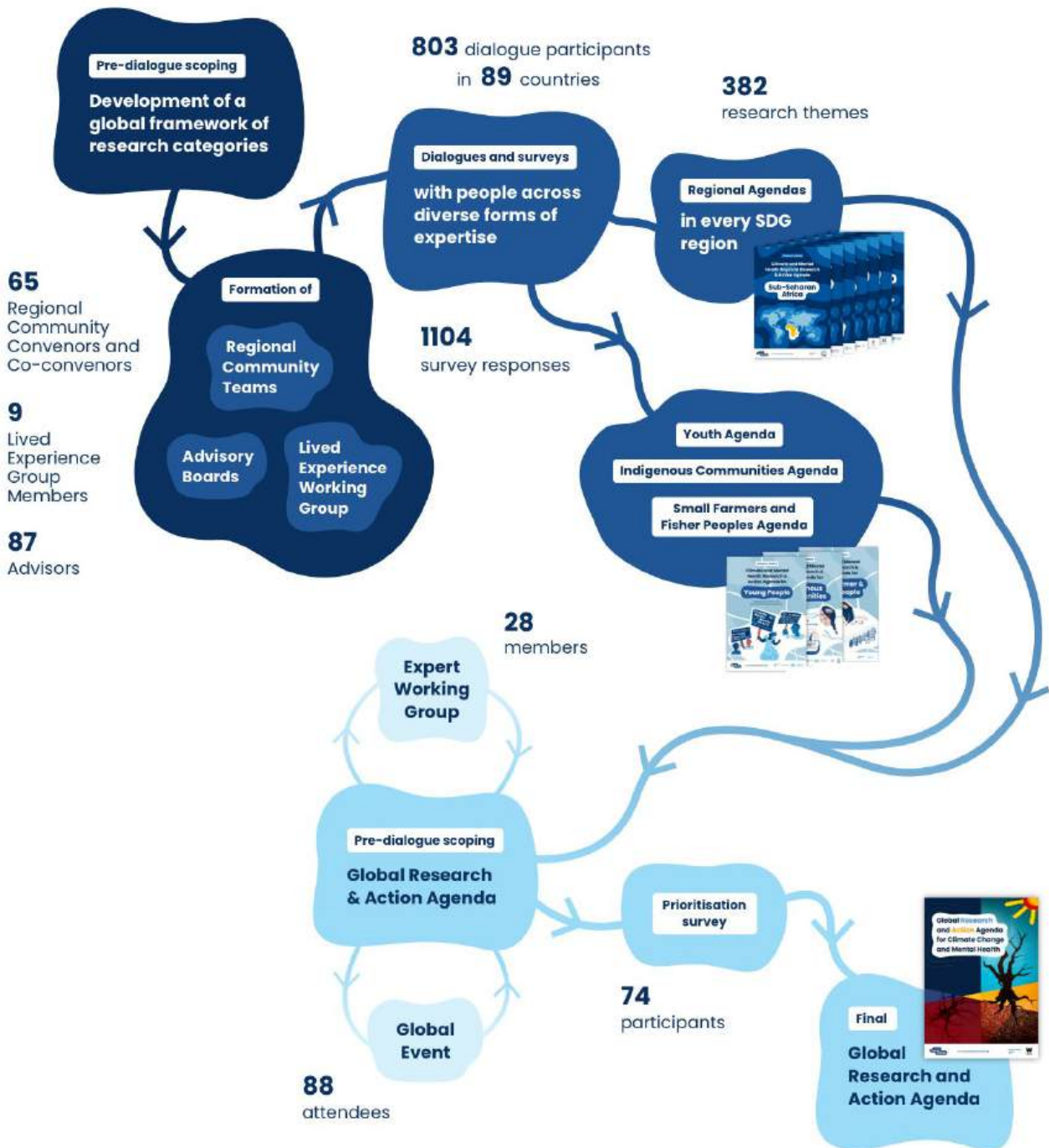
Figure 1: *Development of the Connecting Climate Minds research and action agendas, with numbers of contributors involved at each stage of the process. Note that not all numbers represent unique representatives, for example one person may have participated in multiple surveys. A minimum of 960 unique individuals participated in CCM dialogues, surveys and/or the development of the global agenda, although this is likely to underestimate the true number.*

The Global Research and Action Agenda for Climate Change and Mental Health

This agenda identifies the most urgent research priorities to address the needs of people experiencing and responding to the mental health impacts of climate change globally. It also identifies key principles of action to support and enable this research and to translate evidence into policy and practice (Figure 2). It is vital for researchers to understand how to appropriately enact this agenda (implementing research) and to ensure evidence meaningfully informs action (translating research to action). Conversely, policymakers and practitioners across climate and mental health must work with researchers and lived experience communities to inform their decision-making.
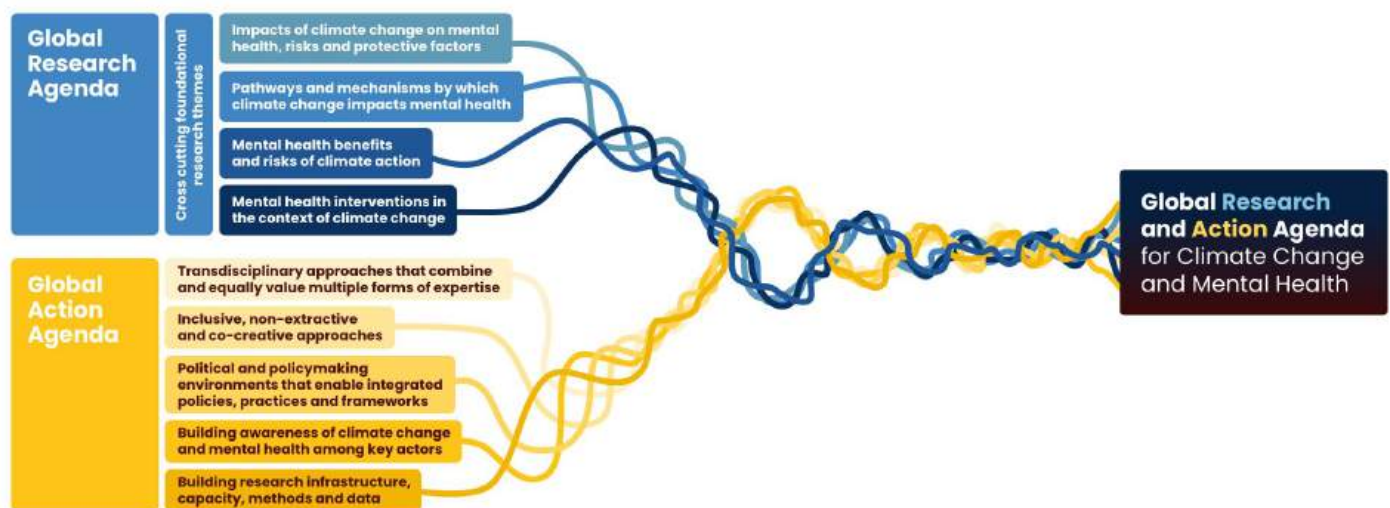
Figure 2: Overview of key priorities within the global research and action agenda.
Research and action to implement and translate evidence are intertwined.

This agenda is informed by the ten Connecting Climate Minds regional and lived experience agendas. It does not encompass the full details, nuance and contextualised understandings that they include. Appendix 5 presents an overview of how the global priority research questions relate to these agendas, and readers are urged to refer to the agenda(s) relevant to their context.

The Global Research Agenda

Overview

The research agenda has three levels (Figure 3):

Cross cutting all levels: Foundational research themes needed to inform all climate and mental health research. All research in this field can contribute to iteratively building the knowledge base for these foundational themes.

Level 1: High-level research categories of critical need for knowledge generation in climate and mental health globally (see Appendix 3 for details on how these were developed). These cover:

1. **Impacts of climate change on mental health and factors that may increase risk for or be protective against these impacts:** The nature of the effects of climate change on mental health, including which mental health challenges are worsened or at increased risk of developing, the prevalence, severity, economic and societal cost of these impacts, and what factors may increase the risk of or be protective against these impacts.

2. **Pathways and mechanisms:** How climate change affects mental health through psychological, social, cultural, environmental, behavioural, biological, political and commercial pathways and mechanisms.

3. **Mental health benefits and risks of climate action:** The benefits and risks to mental health of actions across sectors to reduce the impact of climate change on human or natural systems; such actions may include a combination of both mitigation and adaptation.

4. **Mental health interventions in the context of climate change:** Interventions, strategies, tools, resources, policies, practices or approaches to support mental health within the context of climate change. This includes providing support to people already experiencing climate change-related mental health challenges, and reducing the risk or severity of future negative mental health impacts (prevention).

Level 2: Priority research topics that provide concise summaries of key areas of research within each high-level category.

Level 3: Priority research questions, with illustrative examples.

While the research agenda presents distinct foundational themes, categories, topics and questions, these are interconnected. For example, building understanding of the biological mechanisms through which climate change impacts mental health must also consider the social and environmental context in which an individual lives. Understanding how climate change impacts mental health must be coupled with assessing how actions to respond to these impacts can target these pathways and mechanisms.
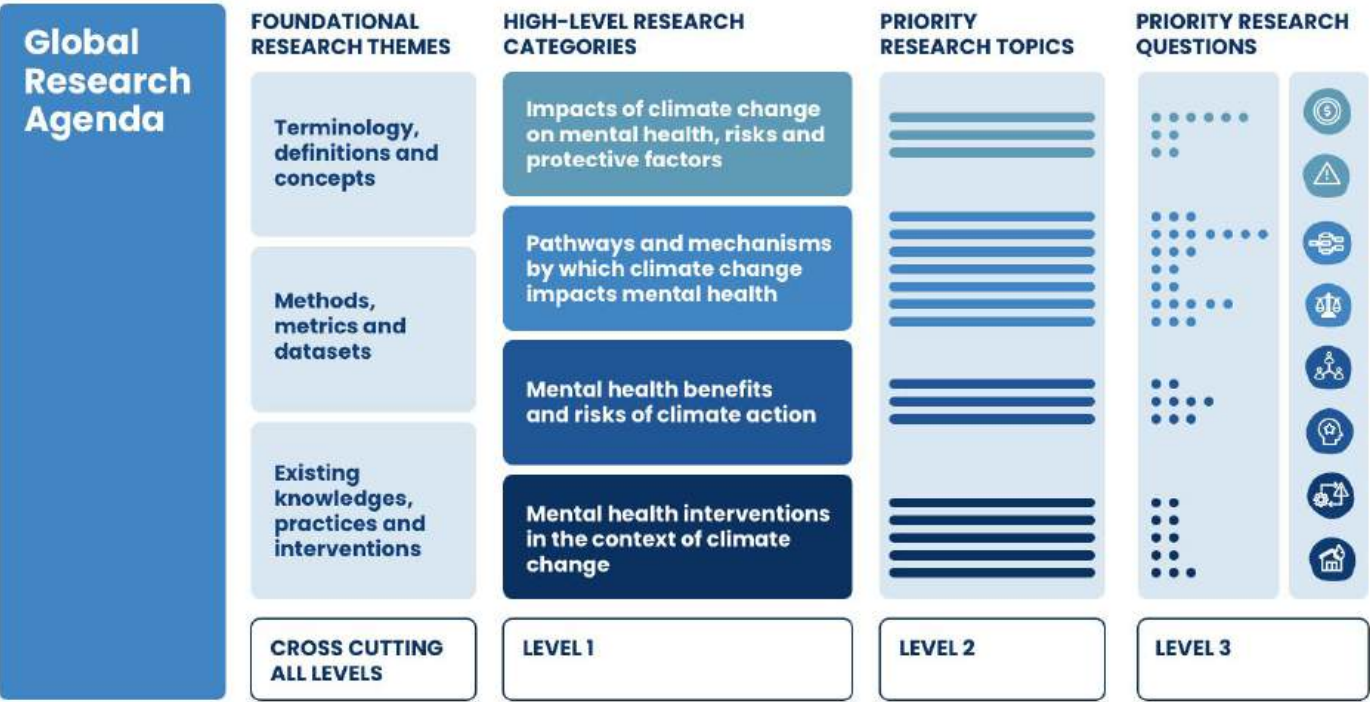

Figure 3: Overview of the global research agenda.

Foundational research themes

Three themes, outlined below, underpin all of the global research categories, topics and questions. Building this foundational understanding is critical to establishing an aligned, inclusive and transdisciplinary climate and mental health field. It must be done in inclusive and appropriate ways that acknowledge and value the diversity of understandings and experiences surrounding climate change and mental health.

0.1 Developing terminology, language, definitions and concepts for climate and mental health to inform standardised research, measurement and shared understandings across disciplines and settings, while acknowledging that terms are conceptualised in diverse ways across geographies and cultures.

For example:
- What frameworks need to be developed to consistently and appropriately measure climate change-related mental health challenges, globally and in diverse contexts? This includes identifying relevant key climate hazards and mental health outcomes, and pathways and mechanisms of impact.
- How can transdisciplinary working and knowledge-sharing enable both 1) standardised climate and mental health research and shared understandings, and 2) different knowledge and perspectives to coexist and be equally valued?
- How should climate anxiety be conceptualised and measured, including its relationship to different psychological responses to climate change (e.g. climate worry) and to other known forms of anxiety, while ensuring relevance across cultures and contexts?

0.2 Identifying and developing research methods, metrics and datasets to identify, understand and evaluate the mental health impacts of climate change, climate actions and climate change-related mental health support.

For example:
- What mental health indicators should be tracked globally, regionally and nationally to monitor the mental health impacts of climate change and benefits of climate action? How can these indicators be integrated into existing monitoring systems (e.g., the Lancet Countdown on health and climate change)? For which indicators is data currently available for reporting, and what data is needed to develop future indicators?
- What methods and metrics are needed to attribute mental health challenges to climate change, and when is such attribution feasible, useful and appropriate?
- What are key indicators of success in the climate and mental health research field? Indicators could include: papers published in the Global South, inclusion of mental health in relevant climate policies (e.g., National Adaptation Plans), funding for climate and mental health research, community-led research.

0.3 Identifying and evaluating existing knowledge, practices, interventions and solutions to understand and respond to the mental health impacts of climate change, including the expertise of those with lived experiences.

For example:
- How can traditional and Indigenous knowledge inform coping strategies that protect mental health, such as in response to climate change-related loss of land, culture or livelihoods?
- What can climate and mental health learn from other research fields?
- What existing evidence-based therapeutic approaches to reduce psychological distress, symptoms of mental health challenges and support psychological resilience are most relevant to the context of climate change?

Conceptualisations of climate change and mental health:

"*Young people's experience of 'climate change and mental health' is not simply an aggregation of the two categories, but rather, it is their lived and embodied experiences of growing up in a rapidly changing world.* "

– Youth Research and Action Agenda

Learning from other research fields:

"*The field of global mental health contributes a rich evidence base for psychological interventions developed, adapted, and implemented in diverse cultural contexts. We have a toolkit of interventions that are acceptable and increasingly accessible due to creative modes of delivery. These interventions and cross-cultural research knowledge are resources that should be applied as we explore the mental health effects of climate change around the world.* "

– Professor Pamela Collins, Connecting Climate Minds Advisory Board Mental Health Chair

Learning from existing interventions and solutions:

"*We've identified some plants and right now the community has built an ecological water treatment system [...] That's one of the coping strategies. So with these floods, they are able to have plants within the environment and they can construct a water filter system. That has really cushioned their mental health. They are able now to address those particular problems because they have ecological solutions within that community.* "

– Indigenous dialogue

High-level research categories, priority research topics and questions

Featured top priority research questions

The global research agenda contains 53 research questions. Using an online survey, 74 global experts across sectors and disciplines selected their 'top' priority questions; Figure 4 indicates the two research questions that were most often chosen for each high level research category. Despite the global distribution of this prioritisation survey, almost half of respondents were based in Europe and Northern America. Readers should bear in mind this regional bias.

Further details on the survey and regional data can be found in Appendix 4, including a weighted analysis that accounts for regional bias in survey responses.
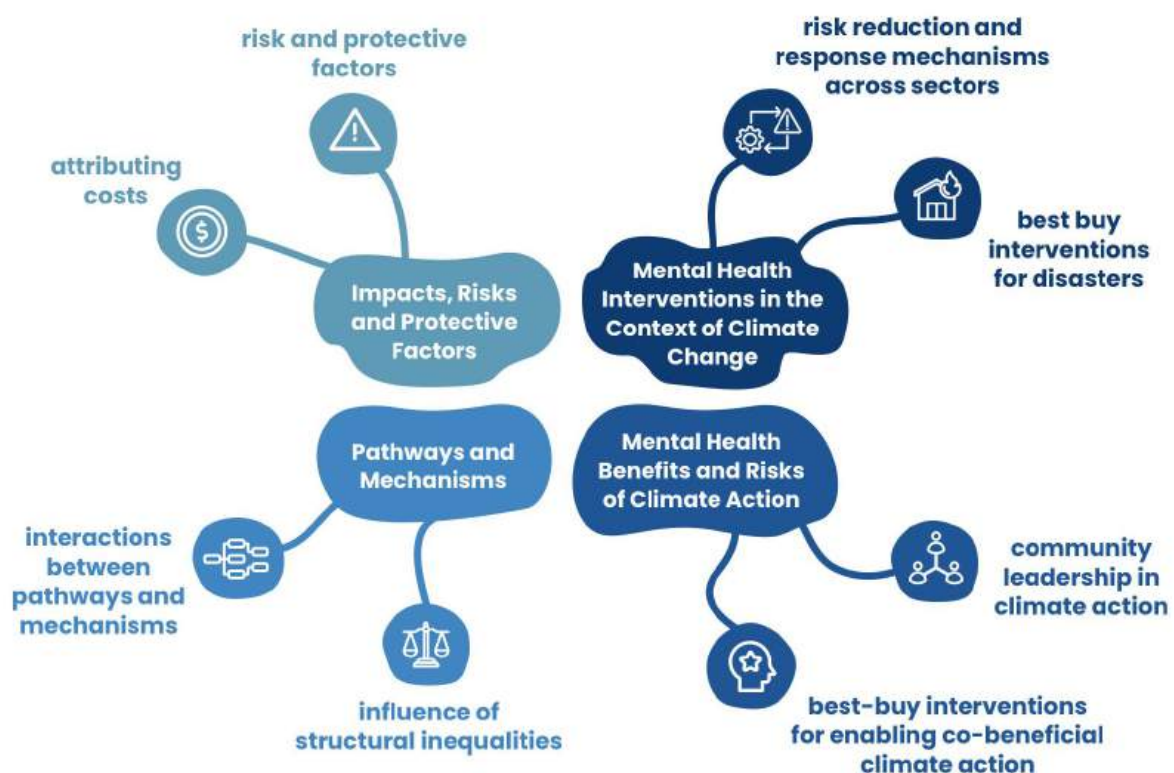
Figure 4: Top two research questions for each high-level research category

As well as these top priority research questions, surprising research topics and questions emerged through the Connecting Climate Minds dialogues that are not yet commonplace in the existing climate and mental health literature. For example, the mental health impacts of social isolation enforced by extreme heat was mentioned independently throughout multiple dialogues in different regions.

Research topics or questions that stood out to experts who took the survey as particularly interesting, surprising or novel are listed below. Regions where experts who raised each point are based are also listed.

- The emphasis on research that could quickly lead to improved policies, such as identifying best buy interventions, measuring effectiveness of interventions and understanding costs *(Latin America and the Caribbean; Europe and Northern America).*
- The emphasis on pathways and mechanisms (as a less studied area within the climate and mental health field to date), particularly their complexity and interconnectedness *(Latin America and the Caribbean; Sub-Saharan Africa; Europe and Northern America).*
- The importance of learning from Indigenous knowledge, such as Indigenous methods of coping with the impacts of climate change *(Sub-Saharan Africa).*
- Understudied but potentially high impact research areas such as transgenerational and/or epigenetic effects *(Europe and Northern America).*
- The potential for this research to influence large numbers of people with lived experience, such as by understanding relationships between climate impacts and psychotropic medications *(Europe and Northern America).*

Tables 1-4 present all of the research topics and questions within each high-level category. Research topics are listed in descending order, based on the average frequency of occurrence across the ten regional and lived experience agendas. Within each topic, the research questions are also listed in descending order of how frequently they appeared in the ten agendas (see Appendix 5).

Impacts, risks and protective factors:

" *The victim of this negative climate impact are stressed mentally. Due to this stress they not value futures, they are disappointed about the futures, and decided to do suicide and [inaudible]. So, the future is not bright, it is black rather than bright, this is one negative impact.* "

– Youth dialogue

Interactions between pathways and mechanisms & community leadership in climate action:

" *Families have no income and turn to cutting trees to make charcoal and get income. Cutting trees worsens climate change. This vicious cycle leads to depression, trauma, and hopelessness. Partnerships [in communities] that would help include planting drought resistant crops, given those physical things that cover climate change, they can become more productive, and this addresses the root causes of the depression.* "

– Small farmers and fisher peoples dialogue

High-Level Research Category One:

Impacts of climate change on mental health, and factors that may increase risk for or be protective against these impacts

Table 1: *Priority research topics and questions within high-level research category one*

PRIORITY RESEARCH TOPIC:

1.1. Risk and protective factors for climate change-related impacts on mental health challenges

PRIORITY RESEARCH QUESTIONS:

1.1.1 Risk and protective factors: What factors increase or reduce the risk of climate change-related impacts on mental health challenges? Which factors are unique to the context of climate change, and/or what known risk and protective factors for mental health challenges are compounded by climate change? This includes environmental, social, cultural, economic, commercial, psychological, behavioural and biological factors (e.g., living with pre-existing mental health challenges, gender, age, livelihood, colonialism, early intervention, among others).

⚠ **TOP QUESTION 1 FOR THIS CATEGORY**

1.2. Impacts of climate change on mental health challenges

(Note: Assessing 'impact' can encompass; examining current and predicted climate-related alterations to the nature, severity, incidence and prevalence of mental health challenges; examining the attribution of these effects to human-induced climate change; and identifying mental health challenges that are novel to climate change.)

PRIORITY RESEARCH QUESTIONS:

1.2.1 Extreme weather and climate events: What is the impact of different types of climate change-related extreme weather and climate events on mental health challenges (including compounding impacts caused by repeated, chronic, and/or different simultaneous or sequential events)?

1.2.2 Disruptions to determinants: What is the impact on mental health challenges of climate change-related disruptions to the conditions that foster good mental health ('determinants')? This includes: forced migration; conflict; food insecurity; water, sanitation and hygiene insecurity; disruptions to education, livelihoods and social connectedness, disruption to nature connectedness and biodiversity, and lack of access to healthcare or cultural, community and spiritual practices, among other disruptions.

1.2.3 Climate change-related awareness and perceptions: What is the impact on mental health challenges of psychological responses to awareness or perceptions of climate change and insufficient climate action, and/or fear of future climate change-related impacts, and what is the threshold at which such psychological responses (e.g., distress) disrupt daily functioning and can become a mental health challenge or compound pre-existing mental health challenges?

1.2.4 Cumulative impacts: What is the cumulative impact on mental health challenges of directly experiencing extreme weather and climate events, and/or disruptions to the conditions that foster good mental health, and/or climate change-related psychological distress (e.g., about climate awareness, insufficient climate action, and/or fear of future extreme weather and climate events)? This includes the context of repeated climate impacts and their psychological consequences causing cycles of disruption.

1.2.5 Long-term impacts: What are the long term impacts to mental health challenges of experiencing extreme weather and climate events, and/or of experiencing climate change-related disruptions to the conditions that foster good mental health ('determinants')?[vi]

1.2.6 Transgenerational impacts: What transgenerational impacts on mental health challenges in offspring may result from climate change-related experiences of the parents during the preconception period and perinatal development (i.e., before, during, after birth)?

PRIORITY RESEARCH TOPIC:

1.3. Assessing costs of climate change-related impacts on mental health challenges

PRIORITY RESEARCH QUESTIONS:

1.3.1 Attributing costs: What current and future economic, social, cultural and physical health costs are attributable to climate change-related impacts on mental health challenges, including the increased burden due to new cases or worsened symptoms?

TOP QUESTION 2 FOR THIS CATEGORY

Some of these research questions have been more thoroughly researched than others (e.g., understanding the impact of extreme weather and climate events on mental health),[26] although not for all relevant groups, events, outcomes and settings. Others remain minimally studied, such as protective factors against these impacts, longitudinal research on long-term impacts and quantification of economic and societal costs.[20,44] Climate and mental health research has disproportionately been conducted in high income countries,[26] so future research must ensure geographical coverage that is more representative of the world's population.

HEY – I DIDN'T KNOW YOU GUYS WERE GOING TO BE HERE

[vi] 1.2.5 has been identified as a separate research question from 1.2.1 and 1.2.2 because long term impacts were strongly emphasised as a particularly understudied area of research in climate and mental health.

High-Level Research Category Two:
Pathways and Mechanisms

Table 2: *Priority research topics and questions within high-level research category two*

PRIORITY RESEARCH TOPIC:

2.1. Psychological and cognitive pathways and mechanisms

PRIORITY RESEARCH QUESTIONS:

2.1.1 Psychological responses to climate awareness: How are mental health challenges affected by psychological responses to climate change-related perceptions, awareness, trust of information, communication and narratives, and their interaction with other psychological traits? E.g., Does low tolerance for uncertainty lead to poorer mental health outcomes in the context of climate distress?

2.1.2 Cognitive and affective changes: How are mental health challenges affected by climate change-induced cognitive problems and/or affective (mood/emotional) changes? E.g., heat-induced changes to memory, attention, irritability or aggression.

PRIORITY RESEARCH TOPIC:

2.2 Social and cultural pathways and mechanisms

PRIORITY RESEARCH QUESTIONS:

2.2.1 Breakdown of interpersonal relationships: How are mental health challenges affected by climate change-related breakdown of interpersonal relationships, social connection and community cohesion? E.g., deaths in communities due to extreme weather and climate events, interpersonal and domestic conflict, gender based violence.

2.2.2 Disruption to living and working conditions: How are mental health challenges affected by climate change-related disruption to living and working conditions such as education, livelihoods, health systems and access to care?

2.2.3 Disruptions to culture and identity: How are mental health challenges affected by climate change-related disruptions to culture, identity, community, spiritual practices and relationships with nature? E.g., loss of traditional lands and historic memory.

2.2.4 Influence of mental health stigma: How are climate change-related mental health challenges compounded by mental health stigma, discrimination and cultural perceptions?

2.2.5 Climate change-related displacement and migration: How are mental health challenges affected by climate change-related forced and chosen migration, relocation and displacement?

2.2.6 Climate change-related careers: How are mental health challenges affected by participation in climate change-related careers, governance and decision-making? This includes impacts of being excluded or underrepresented in climate decision-making, as well as involvement in psychologically difficult work.

2.2.7 Influence of structural inequalities: How are climate change-related mental health challenges compounded by historic and current structural inequalities, inequities and colonialism?

⚖ TOP QUESTION 2 FOR THIS CATEGORY

2.2.8 Influence of other crises: How are climate change-related mental health challenges compounded by previous and/or ongoing crises? E.g., pandemics, economic crises and conflict.

PRIORITY RESEARCH TOPIC:

2.3 Environmental pathways and mechanisms

PRIORITY RESEARCH QUESTIONS:

2.3.1 Food, water and sanitation insecurity: How are mental health challenges affected by climate change-related food insecurity and water, sanitation and hygiene insecurity?

2.3.2 Disruption to natural environments: How are mental health challenges affected by climate change-related disruption to natural environments? E.g., impacts of reduced access to green or blue space or biodiversity loss.

2.3.3 Disruption to built environments: How are mental health challenges affected by climate change-related disruption to built environments, including indoor and outdoor conditions? E.g., indoor air temperatures in homes and workplaces, worsened air quality due to heat and humidity or wildfire smoke, climate change-related infrastructural damage.

PRIORITY RESEARCH TOPIC:

2.4. Behavioural pathways and mechanisms

PRIORITY RESEARCH QUESTIONS:

2.4.1 Disruptions to sleep: How are mental health challenges affected by climate change-related disruptions to sleep? E.g., during periods of extreme heat or anomalously high temperatures.

2.4.2 Climate change-imposed behaviour changes: How are mental health challenges affected by climate change-imposed behaviour changes? E.g., reduced physical activity or imposed social isolation during extreme heat.

PRIORITY RESEARCH TOPIC:

2.5. Biological and pharmacological pathways and mechanisms

PRIORITY RESEARCH QUESTIONS:

2.5.1 Climate change-related physical health impacts: How are mental health challenges affected by climate change-related impacts on physical health? E.g., climate change-induced malnutrition, safe water scarcity/dehydration or increased spread of infectious disease.

2.5.2 Hormonal and/or physiological changes: How are mental health challenges affected by climate change-related impacts on hormonal and/or physiological pathways and mechanisms? E.g., the effect of climate change-related stress on cortisol levels, changes in blood flow with higher temperatures, changes to gut bacteria or increases in chronic inflammation.

2.5.3 Neurobiological changes: How are mental health challenges affected by climate change-related impacts on neurobiological pathways and mechanisms, including known impacts of climate change on the brain? E.g., related to neurochemical changes, potential changes in blood brain barrier permeability, neuroimmunity, circadian rhythm, and other structural and functional brain changes.

2.5.4 Genetic and epigenetic changes: How are mental health challenges affected by climate change-related impacts on genetic and epigenetic pathways and mechanisms? E.g., the effects on risk of poor mental health in offspring from exposure of parents to climate change-related impacts during the preconception period and perinatal development (i.e., before, during, after birth).

2.5.5 Psychotropic (or other mental health-related) medications: How does the use of psychotropic (or other) medications prescribed for mental health challenges influence physiological responses to extreme weather and climate events, with a particular focus on heat and thermoregulation? How are mental health challenges impacted by climate change-related disruption in access to or efficacy of these medications?

PRIORITY RESEARCH TOPIC:

2.6. Political and commercial pathways and mechanisms

PRIORITY RESEARCH QUESTIONS:

2.6.1 Political factors: How are mental health challenges affected by climate change-related political factors, such as insufficient climate action from political and industry leaders?

2.6.2 Extractive practices: How are mental health challenges affected by perpetuation of extractive practices as part of fossil fuel extraction or certain climate actions? E.g., mineral mining for electric vehicles.

PRIORITY RESEARCH TOPIC:

2.7 Interactions and mediating factors across pathways and mechanisms[vii]

PRIORITY RESEARCH QUESTIONS:

2.7.1 Interactions between different pathways and mechanisms: How do pathways and mechanisms by which climate change affects mental health challenges interact with or compound each other? How can these interactions best be accounted for in research and modelled in a conceptual framework for climate and mental health? This includes psychological, social, cultural, environmental, behavioural, biological, political and commercial pathways and mechanisms.

TOP QUESTION 1 FOR THIS CATEGORY

2.7.2 Risk, protective, mediating and moderating factors: What are the risks and protective factors and/or mediating and moderating factors for the relevant pathways and mechanisms, and how do they confer their effect? E.g., What are psychological traits that predispose people to climate change-related mental health challenges and how do they operate? How does humidity influence the effects of heat on symptoms of mental health challenges, and what other factors must be accounted for in assessing the relationship between heat and mental health outcomes?

2.7.3 Climate attribution of pathways and mechanisms: How can the impact on mental health challenges by psychological, social, cultural, environmental, behavioural, biological, political and commercial pathways and mechanisms be attributed to climate change, versus other influences on mental health? When is it necessary, feasible and appropriate to make this distinction?

[vii] Topic 2.7 has been presented last for clarity, see Appendix 5 for true ordering based on the number of Connecting Climate Minds research and action agendas in which each research question was raised.

These pathways and mechanisms are likely to interact in complex ways. Many research questions in Table 2 cut across multiple research topics but are listed in the category where they best fit (despite interconnected pathways and mechanisms). For example, food and water insecurity may impact mental health through psychological (e.g., loss of livelihoods for farmers, stress of feeding family) and biological (e.g., malnutrition) pathways and mechanisms.

This category focuses on pathways and mechanisms by which climate change worsens mental health outcomes. However, understanding these pathways and mechanisms can also inform action to protect mental health. For example, breakdown of communities and social isolation can act as a pathway through which climate change worsens mental health, whereas building strong communities and social cohesion is a pathway that interventions can act on to protect mental health.

Interacting pathways and mechanisms through which climate change-related livelihood loss can affect mental health:

" *Every season is different (unpredictable). The harvest is going down every year. They start cutting trees for charcoal as a coping strategy but it makes it worse. A lot of depression, hopelessness and a feeling of not knowing what to do. A lot of trauma. Many talk about suicide and fatigue from farming – connected to lack of sleep. Body changes from depression. They isolate from their friends as not coping well. They cope using substances.* "

– Small farmers and fisher peoples dialogue

Mental health consequences of climate change-related disruptions to education:

" *My country is currently experiencing excruciating impacts of climate change across society, and the environment is not conducive to learning. And it exacerbates existing mental health issues. As a student, it limits the possibilities, wellbeing, and educational capacity in the classroom.* "

– Youth dialogue

High-Level Research Category Three:
Mental health benefits and risks of climate action

The term 'climate action' is defined here as actions to reduce the impact of climate change on human or natural systems, which may include either or both mitigation and adaptation (refer to **Glossary**). Climate action can happen across global, regional, national, local, community and individual levels and across sectors (e.g., as part of processes such as the UN Climate Change Conference COP (Conference of Parties), national climate mitigation and adaptation plans (Nationally Determined Contributions and National Adaptation Plans), decarbonising housing or transport systems, disaster preparedness, collective action in schools or workplaces, individual actions to reduce carbon footprints, activism, etc.).

Table 3: *Priority research topics and questions within high-level research category three*

PRIORITY RESEARCH TOPIC:

3.1. Benefits and risks of climate action for mental health challenges (including identifying, understanding and quantifying these effects)

PRIORITY RESEARCH QUESTIONS:

3.1.1 Climate mitigation: What are the potential benefits and risks to mental health of different climate mitigation policies and actions at individual, local, national, regional and global levels, and across sectors? E.g., transitions to renewable energy, increasing active transport, adoption of a plant-based diet, nature-based solutions.

3.1.2 Climate adaptation: What are the potential benefits and risks to mental health of different climate adaptation policies and actions at individual, local, national, regional and global levels, and across sectors? E.g., adoption of drought-resistant agricultural practices, strengthening community-level support, increased tree cover in cities.

PRIORITY RESEARCH TOPIC:

3.2 Governance mechanisms to integrate mental health considerations into climate policies and actions

PRIORITY RESEARCH QUESTIONS:

3.2.4 Community involvement and leadership in climate action: How can community involvement and leadership in climate change-related decisions facilitate the integration of mental health into climate action? E.g., impact on awareness, uptake and efficacy of climate policies that have co-benefits for mental health. What are the benefits and risks to individual and community mental health of involvement in climate action?

TOP QUESTION 2 FOR THIS CATEGORY

3.2.3 Transdisciplinary collaboration and knowledge sharing: How can collaboration and knowledge sharing across disciplines, sectors and communities support the development and implementation of climate actions that integrate mental health considerations, and vice versa? E.g., involving mental health policy experts in climate policy development and implementation.

3.2.2 Barriers and levers: What are the barriers and levers for integrating mental health considerations into climate action at all levels and across sectors, and vice versa? E.g., commercial and political power dynamics and siloed structures which may reduce integration, growing interest and awareness in the climate change and health intersection.

3.2.1 Climate financing: What climate financing mechanisms are available or required to integrate mental health considerations into climate action at all levels and across sectors? E.g., leveraging public and private climate financing for mitigation and adaptation to benefit mental health outcomes, ensuring mental health is part of climate and health funding.

PRIORITY RESEARCH TOPIC:

3.3 Motivating, enabling and sustaining climate action, particularly in ways that can support mental health

PRIORITY RESEARCH QUESTIONS:

3.3.1. Best-buy interventions for enabling co-beneficial climate action: What are the best-buy interventions at national and local levels to enable sustained climate action and transformative societal change that also strengthen or leverage good mental health? E.g., building widespread psychological resilience and agency, cultivating social capital.

TOP QUESTION 1 FOR THIS CATEGORY

3.3.2 Communication strategies: How can communication and information sharing strategies best report on climate change in ways that protect mental health and mobilise climate action that is co-beneficial for mental health? E.g., the media.

3.3.3 Awareness of mental health co-benefits: Does awareness of improved mental health as a co-benefit of climate action motivate individual, collective or political action, or does it increase public support for climate policies?

High-Level Research Category Four:
Mental health interventions in the context of climate change

The term 'interventions' is used here as an umbrella term to capture responses, strategies, tools, resources, policies, practices or approaches aimed at addressing climate change-related mental health challenges. This includes both clinical and non-clinical mental health support and positions mental health as embedded in community and wider systems, not just the individual.

Table 4: *Priority research topics and questions within high-level research category four*

PRIORITY RESEARCH TOPIC:

4.1 Current mental health interventions affected by or responding to climate change

PRIORITY RESEARCH QUESTIONS:

4.1.1 Existing interventions: What interventions exist to support climate change-related mental health challenges across sectors, disciplines, countries, cultures and communities, and how can these be rapidly evaluated, adapted and/or implemented across contexts? E.g., existing interventions in education or community settings, learning from Indigenous and traditional practices of mental health support, evidence-based psychological and pharmacological therapies.

4.1.2 Climate-related influences on intervention access, suitability and efficacy: What are the consequences of climate change and associated mental health needs on the accessibility and suitability of existing mental health interventions, and how are these being or will these need to be adapted to ensure continued access and efficacy? E.g., access to care, medication, workforce capacity, talking therapies, community-based support.

PRIORITY RESEARCH TOPIC:

4.2 Community-led interventions to prevent and address climate change-related impacts on mental health challenges

PRIORITY RESEARCH QUESTIONS:

4.2.1 Community participation and leadership in climate-related mental health support: What is the role and efficacy of community and peer participation and leadership in climate change-related mental health interventions? E.g., mental health post-disaster support provided through community health workers and peer support networks using task-shifting models.

4.2.2 Behaviours, beliefs and attitudes: What individual and community behaviours, beliefs, spiritual systems, faiths, attitudes and practices influence the acceptability and efficacy of different climate change-related mental health interventions? How can this understanding appropriately inform intervention development, adaptation and delivery?

PRIORITY RESEARCH TOPIC:

4.3 Capacity building and awareness raising of climate change-related mental health and interventions

PRIORITY RESEARCH QUESTIONS:

4.3.1 Capacity building: What are the capacity-building needs of relevant actors to respond to climate change-related mental health challenges, and what are effective methods to build this capacity? E.g., with researchers across disciplines, policymakers across sectors, health providers, educators, communities.

4.3.2 Awareness raising: What strategies effectively and appropriately raise awareness of climate change-related mental health challenges and available interventions? E.g., with researchers, research funders, policymakers, practitioners, educators and communities, through dissemination routes such as public health messages during heatwaves, working with the media, entertainment industry or with schools.

PRIORITY RESEARCH TOPIC:

4.4 Identifying effective modes of delivery for mitigating mental health risks of climate change and responding to climate change-related mental health challenges

PRIORITY RESEARCH QUESTIONS:

4.4.1 Effective approaches for risk reduction and response across sectors: What are the evidence-based interventions for governments, health systems, educators and civil society to effectively mitigate climate change-related mental health risks and respond to climate change-related mental health challenges? How can these be effectively delivered? E.g., public health messaging, capacity-building programmes in community health centres.

TOP QUESTION 2 FOR THIS CATEGORY

4.4.2 New technology and low-technology approaches: What are effective and context-appropriate ways to deliver climate change-related mental health interventions using new technologies and/or low-technology approaches? E.g., telemedicine/online counselling, gaming, artificial intelligence products, low technological applications such as messaging applications, offline technologies and low data solutions.

PRIORITY RESEARCH TOPIC:

4.5 Leadership, governance, and financing mechanisms for mental health interventions in the context of climate change

PRIORITY RESEARCH QUESTIONS:

4.5.1 Best-buy interventions for disasters: What are the best-buy interventions to implement before, during and after extreme weather and climate events to protect mental health and respond to climate change-related mental health challenges? What financing mechanisms are available or required to support their design, evaluation and implementation? E.g., evidence-based recommendations for prevention, preparedness, response and recovery (PPRR).

TOP QUESTION 1 FOR THIS CATEGORY

4.5.2 Transdisciplinary collaboration and knowledge sharing: How can experts across disciplines, sectors and communities effectively collaborate, share knowledge, co-create and implement mental health interventions appropriate for climate change at local, national, regional and global levels? E.g., Community of Practice platforms to share best practice, interventions developed by lived experiences experts.

4.5.3 Frameworks and governance structures: What existing and new policy frameworks and governance structures can facilitate the development and implementation of mental health interventions appropriate for climate change? E.g., leveraging disaster response, National Adaptation Plans, Nationally Determined Contributions.

Beliefs, behaviours and attitudes:

"*When we are allowed to be Māori, we are allowed to be well. We are now starting to look to our culture for sustenance rather than the dominant world cultures.*"

- Maori traditional healer in Aotearoa New Zealand, Indigenous dialogue

"*A lot of the problems in the so-called West [are] because of the isolation that people feel because it's very individualistic and not communal or ubuntu-based like Africa is. It's a whole new area of enquiry that needs to evolve out of Africa of how do we look at these things in a unique way, that has substantial advantages over the traditional Western perspective.*"

- Sub-Saharan Africa dialogue

Community participation and leadership in climate change-related mental health support:

"*In a situation like climate change where it's rapidly changing, where the impacts are rapidly changing and is overarching a lot of scope, it's important we get the communities engaged, so the health systems will be supported and be more resilient.*"

- Central and Southern Asia dialogue

Application of the Global Research Agenda

Adapting global priority research topics and questions to local contexts

Application of the research agenda will vary across geographies, timescales and populations. Appendix 6 outlines 1) population groups, 2) mental health challenges, and 3) extreme weather and climate events that were highlighted through the Connecting Climate Minds process that priority research topics and questions should be applied to, and will need to be adapted to. This field is a nascent and highly dynamic research landscape; priorities for research will continue to evolve and be refined over time as the knowledge base builds, partly in response to this agenda, and as climate impacts are experienced in new and changed ways.

Applying the research agenda will also require bringing together expertise across relevant disciplines, either to learn from existing knowledge held in these disciplines or to generate new transdisciplinary knowledge. Figure 5 outlines illustrative examples of research questions/themes that require understanding from mental health research, from climate change research, and that are unique to the intersection.

Mental health research fields

Understanding how mental health challenges are affected by childhood trauma and/or parental exposure to trauma being passed on via epigenetic mechanisms (Research question 2.5.4)

Knowledge unique to climate change and mental health

Understanding the relationship between climate awareness and psychological responses with mental health challenges (Research question 2.1.1)

Climate change research fields

Understanding how to attribute mental health impacts to human-induced climate change (Foundational theme 0.2)

Figure 5: Example research questions that require understanding from mental health research, from climate change research, and that are unique to the intersection.

A vision for implementing and translating climate and mental health research

Contributors to this agenda emphasised that how research is done matters, at least as much as what research is done. This action agenda outlines how climate and mental health research can be better implemented, and how to link this research with action to ensure evidence is translated into policy and practice.

It sets out:
- A vision for climate and mental health research, grounded in the reflections of the Connecting Climate Minds community and structured into five components (Table 5, Figure 6).
- Challenges currently holding back progress to achieving this vision (Table 5).
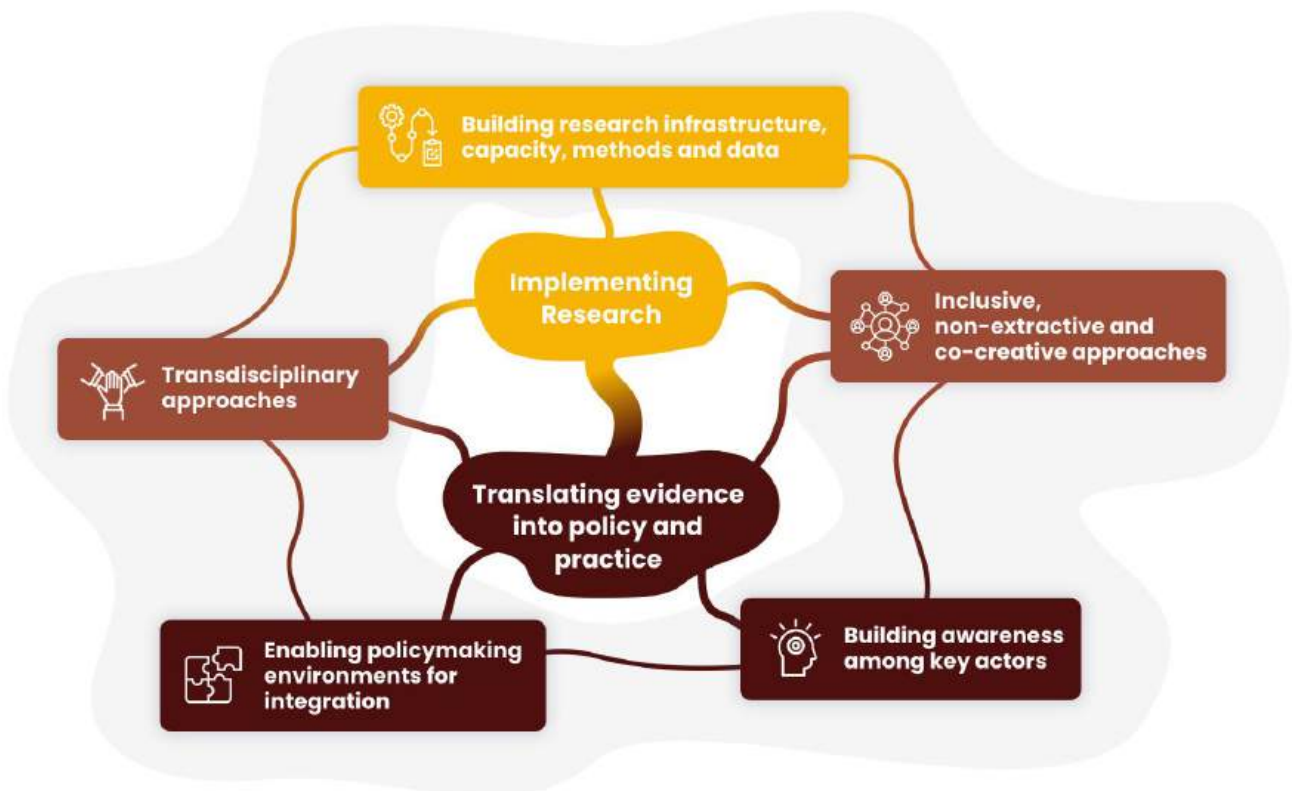- Example actions that key actors can take to achieve this vision.

Figure 6: *Key components of the vision for climate and mental health research. These components are interconnected (e.g., one action may contribute towards multiple components of the vision) and aim to improve implementation and translation of research.*

'Key actors' is used to refer to: researchers and research funders across disciplines, policymakers and practitioners across sectors, educators and civil society (encompassing community groups, community-based organisations, non-governmental organisations, etc).

Table 5: *Five key components of the vision for climate and mental health research, and challenges holding back progress*

VISION:

Research infrastructure, capacity, methods and data

Consistent climate change and mental health methods and metrics exist, enabled by robust, available and appropriate data, with shared understandings of key climate change and mental health concepts. These are developed and applied with consideration of diverse wisdoms across disciplines, cultures, contexts and communities, reflecting both the need for comparison across contexts and the importance of adaptation to local understandings. Researchers across disciplines are supported to build systems thinking skills and engage in climate and mental health research as a primary focus or as an important component of work in their relevant discipline, and to do so in ways that support their own wellbeing. Such approaches enable inclusive, accessible, culturally sensitive, and policy-relevant research to be prioritised and implemented.

CHALLENGES HOLDING BACK PROGRESS TOWARDS THIS VISION:

- **Lack of consistent and standardised methods, metrics and terminology** for climate change and mental health. There is a tension between the need for standardisation for comparison and for adaptation to local contexts that reflect cultural and linguistic diversity in how climate change-related mental health challenges are conceptualised, understood and experienced. Good quality and consistent data is often unavailable and inaccessible, particularly for mental health population and surveillance data.

- **Lack of data sharing:** Weak and fragmented health and research information systems can impact data management, knowledge sharing and collaboration, and big gaps remain particularly for global mental health data. Security issues regarding public sharing of national and global data on climate change and mental health may also lead to lack of trust among potential participants.

- **Lack of research and institutional capacities** in climate change and mental health across relevant knowledge and skills, personnel and funding, including to enable people from diverse backgrounds to come into the space. Lack of capacity may be worsened by burnout as a response to psychologically difficult work in climate, mental health and related fields without appropriate support. Politicisation of climate and mental health issues may also prevent researchers from getting involved or being able to secure funding.

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HEARING FROM THE CONNECTING CLIMATE MINDS COMMUNITY:

"We need to learn from the community how they express their understanding of what's going on. It may not be the same as us, as researchers."
– Central and Southern Asia dialogue

"By recognising and valuing these interconnected dimensions held by some Indigenous communities for what Western paradigms call mental health and/or mental wellbeing, we can move beyond the limitations of such dominant frameworks, fostering culturally responsive approaches that aligns with the rich tapestry of Indigenous wisdom and knowledge."
– Indigenous Research and Action Agenda

VISION:

Transdisciplinary approaches that combine and equally value multiple forms of expertise

Deep, sustained relationships across disciplines, sectors, communities and contexts are built at 'the speed of trust' (i.e., with appropriate investment of time and continuous relationship building that is responsive to needs). These relationships and approaches enable diverse narratives and understandings to coexist and learn from each other. Embedded systems thinking enables climate and mental health to learn from and connect what is already known (e.g., in other research fields, other responses to societal challenges that require urgent and collective responses, and community-based knowledge and practices). Such approaches underpin how knowledge is generated, shared and translated into action.

CHALLENGES HOLDING BACK PROGRESS TOWARDS THIS VISION:

- **Disconnections** between key actors and silos within these groups.

- **Research funding structures** that may inhibit participation from multiple disciplines, cultures and/or countries being valued equally. Investment in sustainable field building for climate and mental health is critically needed, but is held back by challenges in funding research networks and in quantifying their impact.

- **Research funding timescales** with short-term funding and/or one-off funding limiting the building of trust and sustained relationships forming and surviving.

- **Restrictive scopes and limited resources** that hold back dissemination of transdisciplinary research, such as the siloed scope of many academic journals, and limited funding, career incentives or allowances, time and channels for knowledge sharing.

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HEARING FROM THE CONNECTING CLIMATE MINDS COMMUNITY:

"We need collaborative research that is transdisciplinary, cross-sectoral, international and multigenerational; it must be anchored in equity, justice and a deep commitment to applying research findings and lessons learned to inform policies and practices."
– Eastern and South-Eastern Asia Research and Action Agenda

"Systems for academic advancement are not well aligned with transdisciplinary research or translational science, further preventing collaboration. These reward systems need to be overhauled to encourage transdisciplinary and inclusive climate-mental health research."
– Europe and Northern America Research and Action Agenda

VISION:

Inclusive, non-extractive and co-creative approaches

Research elevates, empowers and centres community and lived experience leadership, supported by research and funding structures that enable — and mandate — these approaches. Research considers and practically implements ways to avoid perpetuating the harms caused by the extractive, colonial and unjust roots of both the causes and consequences of climate change (which currently perpetuate existing inequities and vulnerabilities and compound mental health impacts of climate change). Research ensures clear and tangible benefits for involved communities.

CHALLENGES HOLDING BACK PROGRESS TOWARDS THIS VISION:

- **Extractive research practices** 1) at the community level (e.g., lack of research impact or benefit for communities, lack of ownership and data sovereignty for involved communities) leads to participant fatigue, distrust in research and limited pathways to impact; and 2) by Global North researchers and institutions towards Global South researchers and participants, rooted in historical and current injustices.

- **Exclusion of lived experience voices, groups most affected by climate change and of Global South expertise** in research and the development of policies and interventions.

- **Inequity and inaccessibility of funding,** with processes that often favour Global North researchers and institutions, including in definitions of climate change and mental health concepts and terminology.

- **Compounding challenges** in areas with limited access to advanced technology, electricity and internet outages, infrastructure, competing pressures and priorities, and mental health stigma.

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HEARING FROM THE CONNECTING CLIMATE MINDS COMMUNITY:

"To decolonise and reindigenise research means to value Indigenous ways of knowing, being and doing as equal to Western ontologies and epistemologies."
– Oceania Research and Action Agenda

"Youth should also be involved at decision-making levels designing agendas and research. They should be in the room to make their voices heard. Yet, this also needs to come from adults and decision makers realising they need to provide this space for young people to even participate."
– Youth dialogue

VISION:

Political and policymaking environments that enable integrated climate and mental health policies, practices and frameworks

Researchers are equipped with the skills to advise and learn from policymakers, inform evidence-based climate and health public narratives, and leverage growing momentum in the climate and health space to ensure that mental health is embedded in discourse and action. Policymakers from relevant sectors are able to connect across existing siloes to integrate mental health into relevant climate and health policies, practices and frameworks (and vice versa).

CHALLENGES HOLDING BACK PROGRESS TOWARDS THIS VISION:

- **Siloed decision making, governance mechanisms and budgets** between sectors and government structures (e.g., across climate change and mental health) holding back research, multi-sectoral collaboration and integrated policies.

- **Lack of political will or prioritisation** of climate change, mental health and the intersection. This may be exacerbated by competing priorities, crises, conflicting interests or politicisation of climate change, as well as mental health stigma in some contexts.

- **Reactive policy making** around climate change and mental health (rather than being proactive and strategic), with urgency of the issues outpacing research and action.

- **Under resourced systems with little capacity** to integrate additional considerations (e.g., health systems).

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HEARING FROM THE CONNECTING CLIMATE MINDS COMMUNITY:

"Realising demonstrable progress requires dedicated leadership, resources and political will alongside sustained, inclusive participation from all sectors of society."
– Northern Africa and Western Asia Research and Action Agenda

"Mental health is an under-prioritised issue for many governments. This relates to an overall lack of political will for action on climate-mental health, perhaps due to stigma, political risk and/or pressure, or the siloed nature of government preventing ministries from taking action."
– Europe and Northern America Research and Action Agenda

VISION:

Awareness among key actors of climate change and mental health impacts and what actions they can take to better understand and respond to these impacts

Key actors are aware of the multiple aspects and impacts of the climate change and mental health intersection and are equipped with the knowledge, tools and capacity to respond effectively, appropriately and collaboratively. Climate change and mental health communication and awareness raising (e.g., terminology) is culturally contextualised, aligns with community understandings and actively works towards de-stigmatisation of mental health in the context of climate change.

CHALLENGES HOLDING BACK PROGRESS TOWARDS THIS VISION:

- **Lack of awareness, understanding and education** on the intersection of climate change and mental health across key actors, including the different ways these issues manifest across cultures and communities.

- **Attitudes and beliefs** around mental health and climate change (e.g., stigma, scepticism and denialism), and social, cultural and religious norms that may not align with enabling research and implementing climate change and mental health solutions.

- **Lack of clarity** in the climate change and mental health field and/or mental health practitioners concerning the distinction and relationship between the wellbeing space (e.g., emotional responses to climate change) and clinical mental health considerations.

- **Disproportionate media attention** that certain constructs (e.g., climate anxiety) receive, can make it challenging to convey the multiple aspects of the interconnections between climate change and mental health to the public, policymakers and funders.

HEARING FROM THE CONNECTING CLIMATE MINDS COMMUNITY:

"Addressing the topic of mental health is something very serious. You can't keep saying it anywhere, anytime, anytime. And even associating it with the issue of climate change is even more complex....People are always saying, 'We need to talk about it.' Until recently, we couldn't even talk about suicide, for example. We couldn't even talk about depression."
– Latin America and the Caribbean dialogue

Recommendations for action

Key actors all have a role to play to implement this agenda. Example practical actions are outlined below. Some of these may be unique to the climate and mental health field. Others are applicable across research fields, but included as they emerged through Connecting Climate Minds as foundational for field building in climate and mental health.

Researchers should:

- **Prioritise inclusion of communities and groups most affected by climate change and its mental health consequences** in research teams and projects, to improve alignment between research aims, outcomes and benefits to communities. Build these relationships over time and be led by the needs of these communities. Support civil society to translate research findings into action, for example by ensuring relevance and accessibility of research to communities.

- **Convene experts to establish conceptual frameworks for climate and mental health and consistent indicators, metrics and methods** to measure the mental health impacts of climate change and of climate action, that are appropriate for different local contexts and that can be disaggregated across relevant population groups.

- **Build, maintain and seek funding for relevant networks (and platforms)** to share best practice, elevate existing knowledge (e.g., held in communities) and improve shared understandings across disciplines of relevant climate and mental health concepts, terminology, methods and dissemination, that allow multiple forms of knowledge and narratives to exist in parallel.

- **Leverage existing areas of research interest, data and capacity** where mental health impacts of climate change could be integrated (e.g., growing interest in climate change and physical health and in impacts of heat exposure, food security) and build relationships with decision makers to elevate awareness of the full scope and importance of the climate and mental health field and ensure equal status between physical and mental health in climate and health work.

- **Establish (in partnership with communities) open data security, privacy and sharing protocols** which encourage data sharing and increase trust in research for potential participants, translated into multiple languages. Link with existing principles and protocols for data collection, management and sharing, such as data sovereignty[45,46] and the Findable, Accessible, Interoperable and Reusable (FAIR) guiding principles[48].

Research funders should:

- **Collaborate with other funders from different disciplines,** such as health and environmental funders (e.g., establishing or joining cross-issue networks, leveraging existing funding structures that do prioritise transdisciplinary climate and mental health research).

- **Fund platforms** where relevant aggregated data for both climate change and mental health (and on subgroups), research methodologies, literatures, initiatives, potential emerging interventions and organisations are placed and updated annually and can be tailored to specific contexts.

- **Fund capacity- and field-building initiatives.** This includes the development and maintenance of transdisciplinary climate and mental health research networks to enable collaboration and shared learning (e.g., across Global South and Global North), establishing conceptual frameworks and consistent climate and mental health metrics, capacity building in countries with less climate and mental health research to date and in establishing the impact of such connective and capacity-building activities.

- **Increase access to and inclusivity of funding** across geographies and types of expertise relevant to climate and mental health, including access to in-country and direct civil society funding, to allow true ownership of the research.

- **Mandate inclusion of communities and community-based organisations** in climate and mental health research funding applications, with clear and tangible benefits back to the communities involved based on their stated desires and needs.

Policymakers and practitioners should:

- **Integrate mental health and psychosocial considerations into relevant climate and health policies, practices and frameworks (and vice versa).** This includes, but is not limited to, National Adaptation Plans and Nationally Determined Contributions, disaster risk reduction and preparedness activities, climate-informed mental health surveillance systems, climate change and health vulnerability and adaptation assessments, heat action plans, inclusion of climate considerations in mental health system planning. Identify and learn from evidence-based case studies where this is already happening, and highlight these as examples of what works (e.g., Connecting Climate Minds case studies).

- **Connect across decision-making silos** to explore how climate and mental health funding and strategic decisions across sectors can take into account relevant costs, trade offs and benefits of climate action for mental health (e.g., ensuring appropriate support for people moving out of the fossil fuel industry to other careers, accounting for the mental health benefits of reduced fossil fuel use through improvements to air pollution and reduction in climate risks).

Educators should:

- **Incorporate climate change and mental health into relevant educational curricula** (in schools, universities and continuing professional development) across various disciplines to encourage systems thinking and collaboration (e.g., medicine, public health, climate and environmental science, policy, psychology), to build capacity to recognise and respond to the mental health impacts of climate change. These programs should be robustly evaluated in terms of their impact and appropriateness.

Civil society should:

- **Empower the co-creation of climate and mental health research and practice** by exploring ways to connect with other community-led organisations or NGOs working on climate change and/or mental health, and through platforms such as the Connecting Climate Minds **Global Online Hub Collaboration Area** and **Regional Communities of Practice.** Share knowledge on best practice and current solutions being implemented by civil society with others through participation in such networks/platforms.

- **Work with researchers to incorporate relevant evidence and research outputs into advocacy efforts and relevant work on the ground.** This includes incorporating mental health considerations into climate and health or climate mitigation and adaptation activities being led by civil society (and vice versa).

- **Lead on effective climate and mental health monitoring and communication mechanisms** to gather information on quickly moving challenges on the ground and have that data feed into research priorities and policy and practice processes.

Resources developed through Connecting Climate Minds can help guide and inspire those seeking to enact this agenda, and include:

Case studies showcasing existing climate and mental health research, interventions and policies.

Lived experience stories from around the world.

Toolkits for researchers, humanitarian decision makers and on lived experience engagement.

Conclusion and Call to Action

The Connecting Climate Minds *Global Research and Action Agenda for Climate Change and Mental Health* seeks to bring together and encourage a diversity of expertise in our collective understanding and response to the interconnected challenges affecting our climate and our mental health. It sets out an inclusive and aligned vision for the climate and mental health research field, where research supports practice and vice versa. By outlining priority areas for research, it aims to help researchers and research funders generate evidence for decision-makers, in ways that best respond to the needs of people living with the mental health consequences of climate change. It also provides a vision for implementing and translating research into action, highlighting the need for investment in building a truly transdisciplinary field where research benefits the communities involved. While targeted primarily at researchers and research funders, the agenda ultimately seeks to serve those already living with mental health challenges created or worsened by the climate crisis. Together, the contributors seek a future that protects mental health in a changing climate while enabling climate actions that promote the thriving of all people.

No one agenda can speak to the needs of all communities, and this agenda must be implemented alongside consideration of local needs, cultures and contexts. The priorities for research and action in this field will also evolve as the evidence base builds, and as the climate crisis escalates.[viii]

Connecting Climate Minds contributors emphasised that how that research is done and used to create meaningful change is equally important as what research is done. The action agenda seeks to outline both the appropriate ways to conduct climate and mental health research, and how to translate current and future evidence into action in policy and practice.

Through Connecting Climate Minds, the contributors propose a vision where connected networks of diverse researchers, policymakers, practitioners and those with lived experiences (groups which overlap) can learn and act together, and draw on the strengths of diverse disciplines and knowledge systems. This can only be enabled by supportive research structures and funding.

There is an opportunity at the heart of the climate and mental health nexus to create a virtuous cycle, where action for a safer climate benefits from and enables an environment of good mental health. For a world where no-one is held back by mental health challenges, we need investment in understanding and responding to the mental health implications of a changing climate, including through co-beneficial climate action. We need everyone with relevant expertise to account for the climate and mental health nexus in their work. This agenda will only make a difference if it's implemented. We urge you to join the 960+ voices in this agenda and work towards a better world for both the climate and our minds.

[viii] For a summary of the strengths and limitations of this Agenda and the processes of its creation, please see Appendix 3. Predicted climate hazards can be found in Appendix 2.

Contributors to this Agenda

The *Global Research and Action Agenda for Climate Change and Mental Health* was directly developed and drafted in collaboration with 136 experts (listed below). These experts, spanning 42 countries, provided input through written drafts, verbal consultation, at the Connecting Climate Minds Global Event, through the prioritisation survey, and/or as the leads of the regional and lived experience research and action agendas developed in seven Sustainable Development Goal regions and globally with youth, Indigenous communities and small farmer and fisher peoples (which this report syntheses). Contributions made explicitly to the development of the global agenda are listed.

For a full list of all contributors who informed and developed the regional, youth, Indigenous communities and small farmer and fisher peoples research and action agendas, refer to the agendas. When we use the term 'contributor' throughout this agenda, we refer to the 960+ contributors across all Connecting Climate Minds agendas, as this global agenda represents a synthesis of their insights and perspectives.

Project leadership was provided by: the Climate Cares Centre at Imperial College London; the Red Cross Red Crescent Climate Centre; SustyVibes; Force of Nature; the Climate Mental Health Network; The University of the West Indies; St Luke's Medical Center; Claretian University, Jordan Health Aid Society International; The Planetary Health Alliance; The University of Queensland and BRAC James P Grant School of Public Health.

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