Oceania Research and Action Agenda

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Executive summary

Climate change is increasingly recognised as a threat to mental health, compounding risks for poor mental health outcomes and destabilising the conditions needed for good mental health. While research at the intersection of climate change and mental health has proliferated in recent years, the field remains disconnected, uneven and siloed, slowing urgent progress to address the mental health impacts of climate change.

Connecting Climate Minds (CCM) is a Wellcome-funded initiative to cultivate a collaborative, transdisciplinary climate change and mental health field with a clear and aligned vision. Over the last year, we have convened experts across disciplines, sectors and countries to develop regional and global research and action agendas. These agendas set out 1) research priorities to understand and address the needs of people experiencing the mental health burden of the climate crisis, and 2) priorities to enable this research and translate evidence into action in policy and practice.

This report presents the research and action agenda for climate change and mental health in Oceania, which encompasses Aotearoa New Zealand, Australia and Pacific Island countries.

Oceania is facing an increase in the frequency and severity of a range of climate hazards, including drought, floods, cyclones, bushfires, heatwaves and sea-level rise. Outside of the direct effects of these hazards, the impacts on mental health and wellbeing are often mediated through social, environmental and cultural determinants – including compromised livelihoods and housing, cultural loss, deterioration of relationships and social structures, and food and water insecurity – as well as insufficient action from governments and awareness of future impacts.

While there is a growing amount of research in Australia, including the establishment of Australia's Mental Health and Climate Change Research Network in 2019, there is significantly less published research from the Pacific countries and Aotearoa New Zealand. Pacific islands are on the frontlines of the climate crisis and lack baseline mental health data, and research led by and for Pacific peoples. This reflects the ongoing impact of colonisation, which maintains an inequitable distribution of the determinants of mental health and wellbeing, as well as influencing how research is conducted.

Throughout the CCM initiative, a total of 21 priority research themes emerged covering a wide range of topics, including:

- The unique nature of climate impacts on mental health (including repeated, chronic and compounding climate hazards);
- Psychological and emotional responses to climate change and its consequences for mental health outcomes, including the psychological impact of increased climate change awareness;
- Mediating factors and secondary impacts, such as: government (in)action; violence and conflict; migration; the built environment; structural inequalities and inequities; and interactions between physical and mental health;
- Co-beneficial actions around: integrated mental health and climate policies; education and communication; disaster prevention, preparedness, response and recovery (PPRR);

locally-led and co-created initiatives; and nature-based solutions and nature-based social prescribing;
- Climate-informed and tailored mental health interventions, and mental healthcare delivery and access in the context of climate change; and
- The diverse geographies and cultures in the region and specific priority groups, including: people with pre-existing mental health challenges; people working on the frontlines of climate and environmental change; children and young people; and rural and remote communities.

Progress in this region requires challenging dominant Western paradigms and elevating Indigenous ways of knowing, being and doing. This should include more holistic understandings of mental health and wellbeing and striving not for climate action but climate justice.

In terms of priority actions for implementing the research agenda, we found a strong emphasis on co-designed and co-led research, utilising participatory, action-oriented, strengths-based approaches to deliver relevant and just research outcomes. Translating evidence into action in policy and practice will require strengthening bidirectional relationships between researchers and policymakers and ensuring representation of priority groups in decision-making processes.

We hope this research and action agenda will be used as a tool to build relationships and foster trust between researchers and people facing the mental health impacts of climate change, with reciprocity embedded in research processes. We want this work to lead to individuals and communities feeling empowered and involved in the decisions and actions that support their mental health, amplifying the diversity of knowledge systems from across the Oceania region and recognising the fundamental connection between human and planetary wellbeing.

Introduction

Context

Climate change and mental health are two of our greatest global challenges, and awareness of the intersection between mental health and the climate crisis has grown rapidly in recent years.[1] Climate change exacerbates mental health challenges by increasing exposure to extreme heat and the traumas of extreme weather events[2], destabilising the conditions needed for good mental health and wellbeing (e.g., water and food insecurity, forced migration, polluted air, loss of treasured environments)[6], disrupting access to healthcare[3], and increasing psychological distress through awareness of climate threats and insufficient climate action.[4] People living with mental health challenges are also particularly vulnerable to the stressors of the climate crisis, such as increased risk of physical heat stress and death during heatwaves.[5, 6, 7]

In response to the mounting mental health toll of the climate crisis, research in the climate and mental health field has grown rapidly. Nevertheless, key evidence gaps exist in many regions, including the mental health burden attributable to climate change, the pathways and mechanisms underlying these impacts, the co-benefits of climate action for mental health and the best interventions or solutions to support mental health in a changing climate. Climate change and mental health research remains frustratingly disconnected across disciplines, sectors, and geographies, and is unevenly focused on certain topics and global regions.[8] Moreover, siloed decision making slows the translation of evidence to aligned action across climate and mental health policy and practice.[9, 10] A more inclusive, connected agenda is urgently needed to generate the evidence to truly understand, monitor and respond to the interconnections between climate change and mental health.

Connecting Climate Minds

Connecting Climate Minds (CCM) is a Wellcome-funded project launched in 2023 to develop an inclusive agenda for research and action in climate change and mental health. The project has two key, intertwined aims. The first is to develop an aligned and inclusive agenda for research and action that is grounded in the needs of those with lived experience of mental health challenges in the context of climate change, to guide the field over the coming years. The second is to kickstart the development of connected communities of practice for climate change and mental health in seven global regions (designated by the Sustainable Development Goals), equipped to enact this agenda. We aim to combine the strengths of a global perspective and regional focus, and bring together diverse disciplinary perspectives into a shared vision that can ensure research is effective at addressing priority evidence gaps and informing changes in policy and practice at the intersection of climate change and mental health.

CCM extends the substantial work already being undertaken through Australia's Mental Health and Climate Change Research Network. This transdisciplinary research network was founded by the Oceania Regional Convenor, A/Prof Fiona Charlson, in 2019 and partners with industry, government, universities and community organisations to co-design research and deliver evidence-based findings to support policy development, interventions and practice changes.

Through bringing together experts across diverse disciplines, sectors and countries, the CCM team has facilitated the development of a lived experience-informed research and action agenda for the climate change and mental health field in Oceania.

Objectives of the research and action agenda

The research and action agenda is designed to focus future efforts to help those who are experiencing, or will experience, the compounding mental health challenges of climate change. It aims to support those who are already responding to these challenges – through communities, research, policy and practice – by building a more connected and collaborative climate change and mental health field. It also aims to empower experts across disciplines and sectors to join and make progress in this area by identifying clear priorities and fostering a more inclusive and transdisciplinary field.

The agenda addresses these aims through three core objectives, which are to:

1. Identify priorities for research that can inform action to meet the needs of people experiencing and responding to the mental health impacts of climate change in Oceania.
2. Identify what is needed to appropriately conduct research and translate evidence to action in policy and practice in Oceania.
3. Build understanding among researchers, funders, and policy experts across disciplines and sectors of their role in furthering climate change and mental health research and equip them with these clear and actionable priorities.

Importantly, these objectives strongly align with those of Australia's Mental Health and Climate Change Research Network.

Additional, locally specific objectives of CCM Oceania were to:

- Leverage existing capacity and capabilities in this network, and
- Ensure cross-pollination of the processes, outcomes and learnings between the two networks.

The regional agenda will be integrated with six other regional agendas to Inform a **global research and action agenda** for climate change and mental health. This will ensure that global research efforts and investment in climate change and mental health are grounded in regional-level priorities. Importantly, the global agenda will also integrate insights from agendas developed with and for some of the most affected groups globally, namely Indigenous Peoples, youth and small farmers and fisher peoples.

Use of the terms climate change and mental health

Climate change, mental health and their intersection are complex and wide-ranging fields. For the purpose of this agenda, we define the scope of these 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 often involve significant levels of psychological

distress. This includes, but is not limited to, anxiety, depression, post-traumatic stress, psychosis, suicidal thoughts and substance misuse.

By **experiences of the effects of climate change**, we mean: 1) experiencing direct impacts of climate hazards, such as more frequent and intense heatwaves, wildfires/bushfires, drought, floods or storms (e.g., typhoons, hurricanes, cyclones), and 2) experiencing 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 because of climate change.

Mental health challenges in the context of climate change include:

- How climate change may lead to worsening pre-existing mental health challenges,
- How climate change may contribute to the prevalence or impact of existing mental health challenges,
- How climate change may impact treatment access or effectiveness for those with mental health challenges, and
- How climate change may lead to new mental health challenges.

The convening work of CCM presents a key opportunity to build our understanding of diverse perspectives, framings and terminologies in Oceania, which we have sought to reflect within the research and action agenda. This includes framing mental health alongside wellbeing to encompass more holistic understandings relevant to the communities in this region; this is discussed further in the 'Framing of key concepts' section.

Background to Connecting Climate Minds

Regional Community of Practice

In Oceania, CCM is led by a Regional Community Team (RCT), responsible for convening diverse expertise across the region and building regional capacity to create and enact the research and action agenda. The structure of the RCT is outlined below.

Regional Community Convenor (RCC)

Purpose: Responsible for developing and delivering project activities in the region, including convening and supporting a regional community of diverse expertise.

Members: University of Queensland (UQ) and Queensland Centre for Mental Health Research, Australia

Associate Professor Fiona Charlson, Dr Ans Vercammen, Dr Suhailah Ali, Remy Shergill, Stacey Pizzino

Co-convenors

Purpose: Bringing additional breadth of expertise across disciplines and countries (i.e. organisations spanning climate expertise, stress neuroscience and mental health expertise, in different sectors), providing technical advice and review, and supporting project delivery.

Members: Dr Rebecca Patrick (University of Melbourne, Australia), Professor Zoltán Sarnyai (James Cook University, Australia), Professor Jemaima Tiatia-Siau (Waipapa Taumata Rau, University of Auckland, Aotearoa New Zealand)

Lived experience advisory group (LEAG)

Purpose: Advisory board of experts with lived experience of mental health challenges in the context of climate change and/or belonging to vulnerable population groups and living with climate hazards. Drawing on their unique expertise and wisdom, LEAGs provide vital community-centred perspectives and guidance that inform the overarching approach and outputs of the project.

Members: Grace Vegesana (Australian Youth Climate Coalition, Australia), Jama'l Talagi-Veidreyaki (350 Niue/Pacific, local consultant and researcher, Niue), Daniel Angelo Di Fluri (batyr, Australia), Tiana Jakicevich (Te Ara Whatu, Aotearoa New Zealand), Jessie Panazzolo (Lonely Conservationists, Australia)

Youth ambassador (YAs)

Purpose: Youth advisors (aged 18-29) with lived experience of mental health challenges in the context of climate change and/or belonging to vulnerable population groups and living with climate hazards. YAs bring unique youth-centred perspectives to the development and implementation of project activities.

Members: Lavetanalagi Seru, Pacific Islands Climate Action Network, Fiji

Methodology

We produced this research and action agenda through a robust and inclusive methodology to capture, combine and refine a rich diversity of perspectives while fostering connection across a growing community of practice.

The CCM core team developed this methodology in consultation with the RCT, a Global Advisory Board and Wellcome. Methods and materials were adapted regionally to ensure a balance of global standardisation with regional appropriateness and flexibility. Continuous sharing between regions of processes, learnings and challenges facilitated the iterative development of the methodology. The process for developing the regional research and action agendas is shown below.

Figure 1: Research and action agenda development methodology

Pre-dialogue scoping

Global scoping and framing

We performed a global-level scoping review of current reviews, key papers and policy reports relating to the climate change and mental health field. We undertook a mapping of the research categories covered by and used to structure previous reviews of the field, followed by a second mapping of the recommendations for action on climate change and mental health proposed by reports written to inform policy and practice. The results were used to frame the dialogues and research agenda to align with the current field, while responding to key gaps.

Regional scoping

The aim of the regional pre-dialogue scoping was to gain an initial understanding of the lived experience needs, different cultural contexts and variations in how the links between climate change and mental health were conceptualised in the region. To gather this information, we employed three methods: (1) a rapid literature review, (2) key informant interviews, and (3) perspective gathering from the wider community of stakeholders. Full details of these methods are outlined in Appendix 1.

Dialogue methodology

Overview

We held two virtual dialogues (3 hours each) with experts across disciplines, sectors and countries in the Oceania region (see Appendix 2 for agendas). The dialogue discussions were designed by the global team, amended to be locally appropriate and facilitated by members of the RCT, who are themselves research, policy and lived experience experts. Many facilitators actively contributed to the discussions and therefore played a role in both data collection and

production. The first dialogue identified regional needs and generated research priorities. The second dialogue gathered feedback on draft research priorities, identified how to enact research in the region and translate evidence to action in policy and practice, and explored the diversity of regional perspectives and understandings of key relevant concepts. Data generated in the dialogues included: Google Jamboard notes written by participants, Zoom chats, notes made by dedicated notetakers and transcripts of all discussions.

Participant selection

Potential participants were identified through existing research and practice networks and professional connections of the RCT. Additional participants were recruited from existing respondents via the global CCM website and through cold-emailing relevant individuals identified from web searches of relevant stakeholders.

Dialogue agendas

Minor amendments were made to the dialogue agendas provided by the global team based on discussions with the co-convenors. The dialogues were held in English. Although the region is home to many cultures and language groups, English is widely used and understood across the Pacific.

Full details of the methods used across Dialogue 1 and 2 are outlined in Appendix 3.

Survey methodology

Two online surveys were distributed to participants and the wider Community of Practice:

- A **pre-dialogue survey** prior to Dialogue 1 to inform dialogue design and to solicit perceptions on regional climate impacts, climate-related mental health impacts and research priorities.
- A **post-dialogue survey** after Dialogue 2 to obtain a second round of feedback on research priorities and to identify relevant methods, metrics and datasets to address these priorities.

Full details of the survey methodology are outlined in Appendix 4.

Analysis methodology

Research agenda

The Climate Cares Centre conducted a global landscaping exercise of relevant existing climate change and mental health reviews and identified **four broad research categories** as areas of critical need for further work globally. This framework was used as the basis for structuring discussions within dialogues to generate research priorities and formed the global coding framework for analysis.

Participants in Dialogue 1 (see Appendix 2 for agenda) were led through a structured discussion to surface their views on the emerging and likely mental health consequences of current and future regionally-relevant climate hazards, and opportunities for mental health benefits of

climate action. Participants then **generated draft research themes** based on identifying where evidence would usefully inform responses in policy and practice.

The regional research agenda is based on the Dialogue 1 breakout sessions, which focused on mapping attendees' insights on research gaps and needs across the four research categories: impacts, risks and vulnerable groups; pathways and mechanisms; mental health benefits of climate action (adaptation and mitigation); and mental health interventions/solutions/actions in the context of climate change.

The analysis was conducted by the core members of the Oceania RCC using the Framework Method – a matrix-based approach that allows qualitative researchers to undertake deep interrogation of transcripts and written notes. The analyst team populated a matrix based on the global coding framework by creating nuanced summaries with key quotes drawing from the notes and transcripts of the break-out discussions. This was an iterative process of reading, establishing initial codes, deriving themes, cross-referencing the themes against the provided global coding framework and adapting the latter as needed. Full details of this process can be found in Appendix 5.

Action agenda

The action agenda is based on the Dialogue 2 breakout sessions, which focused on (a) creating knowledge through research and (b) fostering evidence-based policy and action. For both of these discussion topics, the participants reflected on four distinct elements: (1) the desired state of research/policy; (2) opportunities or enablers; (3) challenges; and (4) key partners and stakeholders. We employed a similar thematic analysis as for the research agenda (refer to Appendix 6).

Coding frameworks for the research agenda and action agenda can be found in Appendix 5 and 6.

Participants

Dialogue and survey participants were a diverse group across geographical spread, gender, sector and discipline.

In total 50 participants attended Dialogue 1 and 32 participants attended Dialogue 2. The tables below provide a breakdown of participant characteristics.

Geographical spread

	Dialogue 1		Dialogue 2	
Country	Number	Percentage	Number	Percentage
Australia	30	61%	20	65%
Cook Islands	2	4%	0	0%
Fiji	1	2%	1	3%

Japan	0	0%	1	3%
Kiribati	1	2%	0	0%
New Zealand	10	20%	5	16%
Niue	1	2%	1	3%
Palau	1	2%	0	0%
Papua New Guinea	0	0%	1	3%
Samoa	1	2%	0	0%
Solomon Islands	1	2%	1	3%
Vanuatu	1	2%	1	3%

Expertise

	Dialogue 1		Dialogue 2	
Expertise	Number	Percentage	Number	Percentage
Climate Change	26	25%	16	26%
Mental Health	37	36%	24	39%
Health	27	26%	15	25%
Other	12	12%	6	10%
I do not know / Prefer not to say	0	0%	0	0%

Discipline

	Dialogue 1		Dialogue 2	
Discipline	Number	Percentage	Number	Percentage
Activism	18	11%	11	11.10%
Community	17	10%	10	10.10%
Education	27	16%	17	17.20%
Expert through my own lived experience	13	8%	7	7.10%
Funding	2	1%	1	1%
Healthcare	18	11%	11	11.10%
Non-governmental Organisation	17	10%	10	10.10%
Policy	14	8%	8	8.10%
Research	35	21%	19	19.20%
Other	6	4%	5	5.10%

Gender

	Dialogue 1		Dialogue 2	
Expertise	Number	Percentage	Number	Percentage
Men	13	27%	8	26%
Women	34	69%	21	68%
Non-Binary	1	2%	1	3%
I do not know / Prefer not to say	1	2%	1	3%

Additional details of the sample can be found in Appendix 7.

Ethics, data collection and storage

This study has been reviewed and given an ethical favourable opinion by the Imperial College Research Ethics Committee (study title: "Global Dialogues to set an actionable research agenda and build a community of practice in climate change and mental health"; study ID number: 6522690).

The approved documents were ratified by the University of Queensland under application 2023/HE001097 entitled "Global Dialogues to set an actionable research agenda and build a community of practice in climate change and mental health." This included the initial application, which covered the broad project activities, and an amendment to cover the post-dialogue survey.

Details on data collection and storage can be found in Appendix 8.

Current state and emerging needs for climate change and mental health in Oceania

As the climate crisis escalates, more people globally are experiencing related mental health consequences. However, the current evidence base doesn't fully capture these experiences. To develop research themes that ultimately meet the needs of those experiencing and responding to the interconnections between climate change and mental health, it is vital to know: 1) what do people from different backgrounds, contexts and sectors – particularly those with lived experiences of mental health challenges in the context of the climate crisis – report as their experiences, needs and resiliencies, and 2) what evidence do people making decisions and taking actions on the ground need in order to adequately respond?

This section sets out the context of the research agenda, exploring the current state of evidence on mental health and climate change in Oceania, and key insights and emerging needs from the region.

Current research on climate change and mental health in Oceania

Epidemiological research from Australia documents the mental health impacts of climate change, particularly linking extreme weather events and chronic hazards to mental health outcomes (such as post-traumatic stress disorder [PTSD], anxiety, depression, mortality in people with mental health conditions, and psychological distress).[11, 12, 13, 14, 15, 16] Other studies have examined emotional responses to environmental threats and changes, such as eco-anxiety and solastalgia[17, i], and have made links to climate action and pro-environmental behaviours.[21, 18, 19, 20, 21] Some studies have focused on farmers and rural residents as communities that face

[i] 'Solastalgia' is a term coined by environmental philosopher, Glenn Albrecht, to describe the distress caused by environmental change; he defined it as "the pain or sickness caused by the loss or lack of solace and the sense of isolation connected to the present state of one's home and territory."

increased risks. [22, 23, 24, 25]

There are emerging research initiatives and agendas centred on the health and wellbeing impacts of climate change on Aboriginal and Torres Strait Islander communities, which is viewed in a holistic context and emphasises the importance of Indigenous knowledge systems in addressing the ongoing effects of colonisation on Country and peoples' relationships with Country.[24, 26, 27]

There is limited published literature addressing the specific intersection of climate change and mental health from the Pacific Islands and Aotearoa New Zealand. A Delphi study conducted to gain perspectives on this issue from Pacific experts found themes of: mental health as a hidden and stigmatised concern; the importance of culture, spirituality, family, community, connections to ancestors and the environment, and resilience; and linkages made to livelihoods, workforce, government, education, migration and the impact of disasters.[28] These findings are echoed in qualitative research and perspective articles highlighting how colonialism, racism and other injustices interact to influence health and wellbeing, and the importance of climate justice.[25, 29] Some studies have applied psychological methods to understand distress in relation to climate change and environmental concerns and wellbeing.[30, 31, 32]

A recent viewpoint article explored the use of solastalgia in Pacific research and the appropriateness of this term for Indigenous and Pacific communities; they found that to date, there has been no research on solastalgia conducted *by* or *with* Indigenous Peoples, and that the term holds limited utility in the Pacific region. It fails to capture Pacific experiences of land loss due to climate change events, where loss of land equates to a loss of culture, identity, wellbeing and kinship.[33] A seminal literature review on climate change, mental health and wellbeing for Pacific peoples outlines the importance of centring Pacific conceptions of place, and the invasive influence of Western scientific frameworks in relation to Pacific peoples' ways of knowing and holistic worldviews.[34]

Framing of key concepts

The overall scope and focus of CCM has been guided by the framing of climate change and mental health outlined in the introduction. 'Climate change', 'mental health', and their intersections and related terms, along with other relevant key concepts, are also understood and defined in diverse ways in Oceania. Identifying, acknowledging and honouring the ways these terms are understood and used in different settings is critical to help foster connections, awareness and recognition across disciplines, cultures and communities. This section highlights regionally relevant understandings, as generated through a mapping activity in Dialogue 2, designed to reveal the diversity of perspectives around key concepts and other discussions throughout the project.

Mental health

Mental health was frequently conceptualised in a holistic sense, emphasising mental wellness/wellbeing and positive, empowering framings rather than medicalised, disorder-based models. Western, individualist mental health concepts were often contrasted with relational, collective and planetary wellness, recognising the interconnections between people and the environment. Many participants from the Pacific discussed the need to develop conceptual understandings and definitions of mental health and wellbeing from Pacific perspectives, with

existing Western frameworks not necessarily applicable in Pacific contexts. Connection to place, culture and family was described as an integral part of wellbeing; therefore, ensuring each nation's autonomy, dignity, cultural traditions and self-determination is an important part of facilitating wellbeing. The lack of appropriate language around mental health in the Pacific, including translations for mental disorders and symptoms, was noted as a barrier for seeking and accessing support, and contributing to discrimination and prejudice. The need for strengths-focused solutions was highlighted, as well as sharing information and resources, capacity-building and more investment in mental health supports for all, including peer-led services and psychosocial interventions.

Climate change

Climate change was discussed in the context of climate hazards as well as broader awareness of the issue. There was frequent discussion around repeated exposures to events and their cumulative impacts. It was noted that the framing of 'natural disasters' can cause people to fear the environment and disconnect from nature. Participants also mentioned the need to place climate change within a structural and systemic context (for example, colonialism, white privilege, class, etc). There was also discussion around the term 'climate change' being too broad, specifically in Pacific contexts, and the need to contextualise it so people can relate to it in different communities (for example, people seeing impacts on crops and pests but not linking this to climate change).

Other concepts

Climate justice was a prominent theme discussed throughout the dialogues, recognising that the impacts of climate change are not equally distributed, and that those who contribute least to its causes are often most adversely affected. There was discussion of industries and countries that caused climate change, including paying for adaptation and resilience efforts of Indigenous communities. Other suggestions included not burdening young people and ensuring accountability of governments and other decision makers. Climate justice was also discussed in relation to empowerment and for all people to have a say, especially in matters that affect them - "nothing about us without us" (a quote from a Dialogue 2 participant in the spectrum mapping exercise).

Regional needs for mental health in a changing climate

While the climate crisis affects every part of the world, current and future hazards are unevenly distributed and variable. For instance, coastal communities may face increasing rises in sea level, coastal erosion, and storm surges, while Inuit communities face melting sea ice. Different parts of the same country or region may face different levels of threat to droughts, bushfires, floods or extreme heat. Understanding the predicted climate hazards and their timescales for different communities and regions is vital to appropriately target support for mental health.

This section outlines the key climate exposures facing Oceania over the next 15 years, as modelled by climate experts at the Red Cross Red Crescent Climate Centre. We also present findings from the pre-dialogue scoping, dialogues, surveys and expert consultations to explore perceptions of: 1) mental health risks associated with these climate exposures, 2) whose mental health may be most at risk, 3) the pathways through which climate exposures might produce or exacerbate existing mental health challenges, 4) climate adaptation and mitigation actions that

may benefit mental health, and 5) mental health actions/solutions that can help respond to these mental health impacts.

Climate hazards

Oceania is highly vulnerable to the effects of climate change. Oceania frequently experiences droughts, wildfires, floods, landslides, storms and extreme temperatures, as made evident by the international disaster database EM-DAT. The region is facing an increase in the frequency and severity of a range of climate hazards, including the following, modelled to approximately 2030 as compared to historical baseline (generally 1986-2005):[35, 36]

- **Extreme heat** across Australia, with Northern Australia, in particular, experiencing an increase of more than 25 hot days per year above 35°C (high confidence); [ii]
- **Droughts and bushfires**, including an increase in fire weather in Australia and an increase of aridity over the Pacific Islands (medium confidence);
- **Heavy precipitation events,** with the frequency and intensity of extreme rainfall increasing in the western tropical Pacific (high confidence);
- **Sea level rise,** contributing to increased coastal flooding and shoreline retreat along sandy coasts throughout Australia, Aotearoa New Zealand and neighbouring Pacific Islands (high confidence); and
- **Tropical cyclones,** though models generally project a decrease in frequency yet an increase in intensity of Category 4-5 tropical cyclones (low confidence).

In addition to these hazards, dialogue participants also noted changes in ecosystems and weather patterns, and environmental degradation, including coral bleaching.

What mental health outcomes appear to be impacted?

In the pre-dialogue scoping and throughout the dialogues, there was frequent discussion of mental health-related experiences and symptoms such as pre-traumatic stress, trauma, stress and burnout. Emotional responses were also commonly discussed including distress, sadness/despair/hopelessness and fear, as well as emotions specifically related to climate and environmental changes, such as climate anxiety/grief/anger and solastalgia. There was also some discussion of diagnosable mental health conditions, including depression, anxiety, PTSD and substance abuse, as well as mental health presentations/admissions in emergency departments.

Who is particularly affected?

The following groups (listed alphabetically) were identified as being particularly at risk of experiencing mental health challenges due to climate change.

- Children and young people
- Coastal residents, and people living in low-lying and atoll islands

[ii] Within the IPCC and other major sources of climate projections, confidence levels are given on a scale of low, medium, high. The ranking refers to the robustness of the evidence available and the agreement between climate models.

- Communities directly impacted by climate-events (particularly repeated events) or chronic environmental changes
- Culturally and linguistically diverse communities
- Elderly people
- Extended families providing for family members affected by climate events
- Homeless people
- Indigenous Peoples
- LGBTQ+ community
- Māori and Pasifika peoples that have migrated
- Marginalised and socio-economically deprived communities/areas with limited resources (e.g., lower-income Pacific Island nations, remote regions)
- Neurodiverse people
- People with disabilities
- People with livelihoods impacted by climate change (e.g., tourism sector)
- People with pre-existing mental and physical health conditions
- People working in industries that contribute to climate change; areas where the fossil fuel industry has the largest social footprint (e.g., Queensland and Western Australia)
- People working on the frontlines of climate and environmental change (e.g. first responders, climate/environment/health professionals, activists)
- Regional and rural communities, including farmers/farming families
- Women

There are numerous risk factors to mental health and wellbeing as well as barriers to receiving appropriate support; conversely, there are many protective factors and facilitators that promote mental health and wellbeing. These are outlined in Table 2 below.

Table 2: Risk factors, barriers, protective factors and facilitators to mental health and wellbeing in the context of climate change

Risk factors and barriers	Protective factors and facilitators
Social isolation	Strong relationships and social connection
Mental health stigma	Community support, collective activities and shared resources
Systemic issues (such as capitalism resulting in socioeconomic disparities)	Having a plan, agency and autonomy in responding to climate change
Complexities around how different families, cultures and communities understand mental health and wellbeing in terms of language and models	Indigenous ways of knowing, being and doing, including learning from historical Pacific knowledge and experience of climate events

Difficulties accessing mental health support, particularly in rural and remote areas as well as for people working in the climate and environment sector	Faith and ministry*
Lack of clear communication about climate risks and disaster response Lack of mental health services and baseline resources*	Stable family home Social infrastructure (such as access to green spaces)
Dependence on external programs*	Maintaining cultural connections, including in the context of migration

*Specific to the Pacific

What are the pathways and mechanisms linking these climate hazards to mental health outcomes?

Impact on social determinants of mental health

A prominent theme linking a variety of climate hazards, including extreme weather events (e.g., floods, fires, cyclones), chronic impacts (e.g., droughts, sea-level rise) and environmental changes (e.g., coastal erosion, biodiversity loss) to mental health and wellbeing more broadly (rather than specific outcomes) was the impact on social determinants. This included:

- Impacts on livelihoods (e.g., for farming communities and businesses);
- Damage and loss of housing and schools;
- Cultural losses (e.g., damage to sacred sites which are central to identity and purpose, losing familial grounds and family remains, psychological and spiritual disconnect from the land/deterioration of connection to place, and inability to carry out cultural practices); and
- Social disruption, conflict and violence (e.g., multiple exposures to climate events leading to community breakdown and social disconnection, and increased stress contributing to family violence).

Displacement and relocation

There was frequent discussion from Pacific participants around displacement and relocation, including:

- The process and impact of leaving (e.g., how lack of agency and disempowerment can worsen mental health outcomes and solastalgia/grief from moving away from traditional lands); and
- The process of resettlement (e.g., stress and anxiety from having to start again, having [in]sufficient resources and being under other people's authority and power).

Food and water insecurity

Food and water insecurity was also highlighted. This included how increased salinity, changes in coastal ecosystems and water restrictions impact crops, fishing and home gardens, which can lead to physical health impacts as well as stress and a sense of loss.

Particularly affected groups

For people working on the frontlines of climate and environmental change, mental health outcomes were mediated through facing climate change and its impacts directly, including working with impacted communities (e.g., assisting with relocation and distributing water during dry seasons).

For regional and rural communities, people noted: anxiety and apprehension about summer in terms of the drought and bushfire season; a sense of loss/solastalgia around the changing landscape for farmers; and access to mental health services being disrupted by extreme weather events.

There was also discussion around fear and uncertainty about future impacts, particularly affecting young people, and exposure via media, including efforts to raise awareness. One participant from Dialogue 1 noted how this can potentially drive anxiety: "You just start to wonder, where is everyone going to live safely in 30, 50 years' time?"

Multiple exposures to climate events

In terms of multiple exposures to climate events, people also described communities barely coming out of recovery mode before another disaster hits, previous mental health issues being exacerbated, burnout and reduced capacity to cope.

(In)action and lack of support

Finally, there were themes around climate (in)action and lack of sufficient support, including:

- Lack of and insufficient action from governments on climate mitigation and adaptation (e.g., 'band-aid fixes' rather than prevention and preparedness);
- Funding and support timelines not matching what is needed for recovery (e.g., lack of timely compensation and rehousing);
- Concerns around climate justice and climate equity;
- Lack of consideration of cultural processes (e.g., when evacuating people following disasters in the Pacific, leading to conflict between evacuees and communities receiving them); and
- Inequitable support across genders (e.g., in Australia, more support available for men in times of drought, with potentially false assumptions that women – particularly mothers with school-based communities – have inbuilt support structures).

What climate adaptation and mitigation actions have benefits for mental health?

Our initial scoping revealed a wide acknowledgement of the intricate connection between human health and wellbeing and the state of our environment, in which it is implicit that actions that benefit the planet, benefit people. This understanding reflects Indigenous wisdom and a

more holistic understanding of mental health as outlined in the 'Framings of key concepts' section above.

Community-led, localised actions

Discussion frequently highlighted the importance of community-led, localised actions (e.g., village and district-level disaster plans in the Pacific). Participants spoke about how empowering people with knowledge and resources to develop these responses can foster agency and autonomy, while building resilience and addressing the needs and requests coming from communities. Participants also discussed incorporating psychosocial planning into disaster preparedness plans for families and communities, as well as multi-hazard risk assessments and warning systems at the local and regional levels to improve preparedness. People contrasted the responses from cities, services and councils, describing them as often being paralysed and unable to respond to disasters, therefore adversely impacting mental health.

Promoting infrastructure that connects communities and nature

There was discussion around the role of research in bringing to life alternative models of living that are more ecological and equitable than current systems (e.g., capitalism, consumerism). The benefits of nature contact and green space were also highlighted, noting some limitations with existing research (e.g., studies excluding people with comorbidities, the need to ensure equitable access to nature and the need to design spaces that meet the needs of different people). Participants discussed having green spaces that address impacts such as heat island effects while being resilient to climate change, and constraints such as costs to councils for maintenance and water use. One participant spoke about working with a bushfire community in Tathra (a town in New South Wales [NSW], Australia) and the challenge of nature reconnection following traumatic events.

It was noted that the resources to mitigate against or adapt to the effects of climate change are unequally distributed, especially in relation to the extent many of the most affected communities (e.g., low-lying atolls in the Pacific) have contributed to climate change.

What mental health actions can help respond to these mental health impacts?

Tailored interventions

Participants highlighted the need for tailored interventions, including for different individuals or groups, at varying intensity levels and for a range of modalities. Priorities included:

- Co-designing resources (e.g., with young activists);
- Nature-based social prescribing;
- Collective spaces for storytelling and sharing emotions regarding climate change (e.g., Climate Cafes); and
- Interventions to reduce burnout and increase hope for people working on the frontlines (e.g., Acceptance Commitment Therapy).

Holistic, longitudinal support

Participants noted how current Western interventions often have a post-trauma framing, developed around having one experience and moving on, and are therefore not suited to people experiencing repeated events and continued traumas. Frameworks are required that incorporate pre-traumatic stress and ways for people to cope continuously. Participants also

suggested looking to Indigenous wisdom, models and frameworks, and the need to treat people holistically.

Improved and varied support delivery mechanisms

In terms of the delivery of mental health support, participants highlighted the need for: peer support networks; distributed care systems; increased access to integrated primary and community mental healthcare; expanded roles of allied health professionals; and how to support people responding to mental health impacts to manage their own parallel experiences. There was mention of systems approaches, including applying an ecosystem approach to mental health service delivery and evaluation.[37] This approach includes looking at the process as well as outcomes, assessing economic benefits of interventions and evaluating existing initiatives (e.g., Psychology for a Safe Climate climate-aware practitioner training).

Pacific participants highlighted how existing support systems are not prepared for the increasing intensity and frequency of events. They also mentioned the need to incorporate psychological first aid (PFA)/mental health support in responses to climate hazards, which are sometimes more focused on physical health (as was seen following a drought in Kiribati). A participant from Samoa described how when PFA does exist, it's more surface level and doesn't acknowledge trauma; there is a need for higher intensity interventions rather than just immediate care.

Coordination and capacity building

Participants spoke of the need to understand how to build mental health expertise in the region: what would be the most effective for time and resources, what methods work (e.g., combining Indigenous with Western frameworks), what works in relation to acute disaster response? Participants also highlighted the lack of coordination and information sharing across interventions addressing specific mental health needs; after hazards, this can result in a duplication of efforts and reduced trust, emphasising the need for different providers to work together. There was also discussion around the need to normalise/de-stigmatise mental health service use. On the other hand, in reflecting on discussions from the Dialogue 1 breakout rooms, a mental health professional from the region described how there was a large focus on the shortage of mental health workers across the Pacific, and how it's important not to over-professionalise these responses: "so many of the answers are already in community, in spirituality, in faith, in activism, in governments just doing better".

Further contextual information on regional needs

During the dialogues, there was discussion around existing systemic issues and barriers that could compound the mental health impacts of climate change. This includes how Western systems have become a hazard in themselves, particularly in how they impact Indigenous Peoples. An Aboriginal health researcher mentioned how Aboriginal people in the community where they work were unable to practise cultural burning, which can help reduce the risk of bushfires. Colonisation systematically and violently dispossessed Indigenous Peoples from their lands, disrupting their use of fire and largely excluding them from colonial land management institutions today.[38] Caring for Country, a local term that encompasses Indigenous management of land, is not only important to climate adaptation but also deeply connected to the health and wellbeing of Indigenous Peoples.[39]

Our scoping of the literature similarly reflected this idea, including work focused on and led by Māori researchers, which recognises the colonial systems and structures that maintain an

inequitable distribution of the determinants of health and wellbeing, resulting in disproportionate impacts of climate change on Māori communities.[40, 41, 42] Reflecting on the "incongruity of attempting to solve global ecological crises within the same philosophical, ideological, and material frameworks that have created these problems", scholars working in this space argue for a broader conception of planetary health grounded in Indigenous epistemologies, which centre relational, eco-centric norms and values, emphasising the inseparability of human and environmental wellbeing.[43]

Australian participants noted practical barriers to accessing mental healthcare and community services for rural and regional residents, including the cost of travel to regional centres. Increases in the cost of living were highlighted (which is applicable across the region), adding additional pressures to people's mental health. Participants also discussed how poor and dated infrastructure, including inadequate heating and cooling, contribute to physical health and wellbeing problems; infrastructure that fails us health-wise under normal conditions will be highly insufficient in extreme conditions.

One of the most prominent evidence gaps from both the dialogues and the literature was the underrepresentation of research from specific regions and communities, including the Pacific, Aotearoa New Zealand, and Aboriginal and Torres Strait Islander communities in Australia. There was a great deal of discussion during the dialogues around *how* research is conducted, which is highly relevant to why there is a lack of research from communities who have been historically marginalised and extracted from, and the need to facilitate research led by these communities. This will be discussed further in the Action Agenda.

Research agenda

Priority research themes

Background to research categories and priority research themes

This research agenda presents an aligned vision to guide the climate and mental health field in Oceania. Research priorities have been generated through consultation with experts across disciplines, sectors and geographies in the region and iterated with experts regionally and globally. The priority research themes represent areas where targeted research investment could create a full picture of impacts, their mechanisms and solutions across both mental health and climate actions. We outline why these have been identified as priorities and how they can be addressed by combining expertise across disciplines and sectors.

Research priorities are presented within four overarching research categories that were identified as areas of critical need for further work globally and that map the climate and mental health research space at a high level, based on an initial review of global literature. Note that some priorities span multiple categories.

- **Impacts, risks and vulnerable groups**: improving our understanding of the extent to which mental health is affected by climate change and for whom. For example: what mental health outcomes are impacted or at risk; the prevalence, severity, economic and societal costs of these impacts; and who is most vulnerable to these impacts.

- **Pathways and mechanisms**: improving our understanding of how climate change affects mental health and, in particular, whether there are factors specific to climate change that increase mental health risks or create new experiences of mental health challenges. This includes considering biopsychosocial or environmental pathways and mechanisms.
- **Mental health benefits of climate action (adaptation and mitigation)**: understanding and quantifying when and how climate adaptation and mitigation actions, across sectors, can also have win-win benefits for mental health.
- **Mental health interventions/solutions/actions in the context of climate change**: identifying the most effective mental health interventions/solutions/actions to support mental health in the context of climate change, across diverse sectors. This encompasses providing support to people already experiencing negative mental health impacts and reducing risk or severity of future negative impacts.

We hope that these priorities will act as an inspiration to guide the direction of the research community of practice, provide investment targets for funders, and focus the generation of evidence to best enable policymakers and practitioners to address the emerging and predicted mental health needs in response to climate change in Oceania.

There were a total of 21 priority research themes identified for the Oceania region. Please note that, as outlined in the Methods section, the overarching themes represent a diverse array of more specific research questions that fall squarely under a unique research category. In the table below, despite being cross-cutting, the themes have been classified in a specific research category based on the weight of research questions per category. For instance, Theme 1a includes some research questions about pathways and mechanisms as well as interventions, but most of the research questions about the mental health and wellbeing implications of climate hazards in the region were in relation to impacts, risks and vulnerable groups. The theme is therefore captured within the first research category. For further details of the specific research questions (n = 181) that fall within these research themes, please refer to Appendix 10.

A note on the use of the term 'mental health and wellbeing' throughout the research themes: rather than using only 'mental health,' this language was chosen to reflect the holistic understandings put forward by participants (as discussed in the 'Framing of key concepts' section). This does not reflect a collapsing of mental health and mental wellbeing constructs, nor is it simply a matter of terminology; rather, we are attempting to reconcile Western scientific frameworks with the diverse forms of knowledge found throughout the Oceania region. As described by Tiatia-Siau, Tupou and Fookes,[38] "the concept of mental health relies heavily on the varying cultural understandings of "health and well-being" embedded within Pacific peoples' experiences and beliefs". This is also relevant to other Indigenous Peoples in Oceania, including Aboriginal and Torres Strait Islander peoples, for whom the term 'social and emotional wellbeing' represents "a complex, multidimensional concept of health that includes but extends beyond conventional understandings of mental health and mental disorder."[44] To decolonise and reindigenise research means to value Indigenous ways of knowing, being and doing as equal to Western ontologies and epistemologies. By framing mental health alongside wellbeing, we aim to broaden our scope beyond Western health frameworks to be inclusive of culturally relative definitions linked to different ways of knowing.

Priority research themes

Research category	Priority research theme (n = number of research questions)
1. Impacts, risks and vulnerable groups	a. Understanding the mental health and wellbeing implications of climate hazards, in particular where it relates to repeated, chronic and compounding events. Climate hazards include singular or repeated extreme weather events (e.g., cyclones, heatwaves, flooding, bushfires) as well as chronic impacts (e.g., drought, sea-level rise). **(n = 14)** b. Understanding how divergent views about climate change/climate action precipitate or exacerbate interpersonal conflict and the subsequent impacts on mental health and individual/community wellbeing (e.g., in communities highly economically reliant on extractive industries). **(n = 3)** c. Understanding the mental health and wellbeing impacts of climate change on people with pre-existing mental health challenges (e.g., assessing whether pre-existing mental health needs are adequately addressed in disaster prevention, preparedness, response and recovery plans, and the effects of mental health service disruptions due to climate change). **(n = 9)** d. Understanding climate-related migration and its impacts on mental health and wellbeing, and mediating factors (e.g., social cohesion, and cultural connection and knowledge). **(n = 4)** e. Understanding the unique challenges and opportunities for mental health and wellbeing in rural and remote communities in the context of climate change (e.g., impacts on farming communities; access to mental healthcare; and holistic, culturally appropriate, community-based support). **(n = 13)**
2. Pathways and mechanism	a. Understanding the mental health and wellbeing implications of government (in)action on climate change (or actions that contribute to climate change, such as fossil fuel expansion) and conversely, opportunities to use mental health impacts of inaction as an argument/leverage for action on climate change. **(n = 2)** b. Understanding the relationship between climate impacts (e.g. extreme heat, climate disasters) and violence (e.g., stress leading to increased family, domestic and group violence) and the implications for mental health and wellbeing. **(n = 6)**

	c. Understanding the interactions between systemic factors and structural inequalities and inequities – such as gender inequality/patriarchy, colonialism, racism and capitalism – and mental health outcomes in the context of climate change. **(n = 6)** d. Understanding the interaction between physical and mental health in the context of climate change (e.g., how the physical health impacts of food and water insecurity or heat affect mental health and wellbeing). **(n = 2)** e. Understanding the impacts and potential co-benefits of the built environment on mental health and wellbeing in the context of climate change (e.g., inadequate heating and cooling, climate resilient housing, sustainable urban environments). **(n = 6)**
3. Mental health benefits of climate action (adaptation and mitigation)	a. Understanding the mental health and wellbeing impacts of integrated mental health and climate change policies across sectors. **(n = 2)** b. Identifying and evaluating responsible, inclusive and effective climate change education and communication strategies that promote and support mental health and wellbeing (e.g., building competencies, literacy, agency and resilience rather than instilling fear and apathy; focusing on a strengths-based rather than vulnerability-based framework; and tailoring communication for culturally diverse communities, neurodivergent people, or people with a disability). **(n = 13)** c. Understanding and evaluating the impact of climate hazard prevention, preparedness, response and recovery on mental health and wellbeing. This includes understanding the role of mediating factors (e.g., social determinants, characteristics of the target population) and delivery modes (e.g., social media, involvement of faith communities and church groups, and culturally informed processes). **(n = 17)** d. Identifying and evaluating locally-led and co-created climate mitigation and adaptation initiatives and their mental health and wellbeing outcomes (e.g., comparing community-led to externally-led psychosocial support, local climate resilience plans). **(n = 10)** e. Identifying and evaluating nature-based solutions and nature-based social prescribing as potentially co-beneficial interventions for mental health and climate change (e.g., understanding best practice, developing

	theoretical frameworks, and ensuring tailored and equitable access). **(n = 4)**
4. Mental health interventions/solutions in the context of climate change	a. Understanding and responding to the psychological impacts of climate change awareness from personal or vicarious experience (e.g., understanding phenomena such as eco-anxiety, solastalgia and grief; how these experiences vary between individuals and culturally; and how they relate to mental health and wellbeing outcomes). **(n = 24)** b. Understanding and responding to the mental health and wellbeing implications of working on the frontlines of climate and environmental change (e.g., activists, academics, educators, professionals, and field workers). **(n = 3)** c. Understanding and responding to the unique challenges and opportunities for children and young people in the context of climate change, the implications for their development and the impacts on their current/future mental health and wellbeing (e.g., impacts of traumatic childhood experiences including climate hazards; high rates of eco-anxiety/strong climate emotions; effects of socio-ecological uncertainty on future planning/prospects; supporting mental health during engagement in climate action; and parental and peer support). **(n = 12)** d. Understanding and responding to challenges and opportunities in relation to mental health and wellbeing in the context of climate change in diverse geographies and cultures. This includes: the development of conceptual frameworks that integrate Indigenous ways of knowing, being and doing; culturally appropriate language, interventions and supports; and navigating existing barriers including workforce capacity and access to quality mental healthcare in the Pacific. **(n = 13)** e. Understanding the requirements for appropriate/effective mental healthcare delivery and access in the context of climate change (e.g., managing impacts of reduced service accessibility during and following climate hazards; climate literacy, training needs and wellbeing of service providers; community-based support; and reorienting systems towards mental health promotion and prevention). **(n = 11)**

Overview of themes for impacts, risks and vulnerable groups

Why were these themes chosen as priorities?

Robust epidemiological research that clearly describes and quantifies the mental health impacts of climate change is a key tool for advocacy, policy development and tracking of progress. Central to deriving epidemiological estimates is the need for contextually appropriate and validated measures of mental health outcomes, which have been quite heterogeneous to date.[12]

The emerging and diverse impacts of climate change and the risks they pose to mental health were widely discussed throughout all stages of participant engagement. Participants noted an observable shift from isolated disasters to overlapping and compounding events which are likely to result in long-term and cumulative mental health impacts across the Oceania region. The range of climate-related experiences is varied across the region, including direct exposure to acute (e.g., flood and fire) and chronic (e.g., drought and sea-level rise) climate hazards but also indirect exposure (e.g., witnessing climate hazards occur elsewhere, or awareness of loved ones being directly affected), and existential threats; increasingly, multiple events may be experienced at any one time (Theme 1a).

Multiple participants highlighted that the divisive discourse surrounding climate change potentially impacts mental health and wellbeing. This was linked to interpersonal conflict between those with differing beliefs and attitudes (e.g., climate activists vs. those working in the fossil fuel industry) and cognitive dissonance for those who are economically dependent on extractive industries despite being aware of the long-term damage to health and wellbeing (Theme 1b).

Many potentially vulnerable populations remain overlooked by current research activities, including the specific populations identified as being of particular interest within the Oceania region (i.e., migrants, rural and remote communities, people living with pre-existing mental illness). It is equally important to understand the factors that predict resilience of individuals and communities in the face of climate-related stressors and climate change.

Participants noted that people living with a pre-existing mental illness were a group particularly vulnerable to the mental health and wellbeing impacts of climate change, and that this group's needs are currently poorly understood and not considered sufficiently in research and policy. Potential exacerbations of functional impairment and disorder severity due to compounding stresses and mental health service disruptions were highlighted. There is a need to assess whether pre-existing mental health needs are addressed in disaster PPRR plans (Theme 1c).

Location-specific issues were raised. Across the Pacific, forced migration, displacement and relocation as a result of climate change are affecting mental health and wellbeing. The impacts are far-reaching and include disruption of social cohesion, and cultural connection and knowledge, which are known mediators of mental health and wellbeing (Theme 1d). The psychological impacts on rural and remote communities (particularly farmers) who are experiencing climate change and also have related challenges, such as access to mental healthcare, were also highlighted as a priority (Theme 1e).

What are examples of methodologies, metrics and datasets that could be used to address these?

Participants felt there was much to be learned from other research areas, such as how people living with severe mental illness and experiences of suicidality are coping and continuing into unthinkable futures.

It was noted that routine service (administrative) data could be suitable for capturing climate change and disaster impacts within health services. Whilst this might capture data for the most severe and less prevalent end of the mental disorder spectrum, it would miss much of the disease burden.[45] Participants noted an absence of relevant datasets in the region from a mental health perspective. A recent paper has noted that increasing efforts to create accessible mental health databases that can be linked with the multiple available environmental databases is critical; proposed methods include time series and case-crossover designs.[46] Potentially viable datasets include national mental health survey data (e.g., the Australian Mental Health Surveys), locally specific datasets (e.g., cross-sectional surveys in the Northern Rivers area of NSW following flooding in 2017) or non-mental health specific datasets such as the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) datasets. Ultimately, it is likely that new data collection would be needed, and there are institutions within the region who are well placed to do so. These could be linked with meteorological data (e.g., temperature data from the Bureau of Meteorology). It is unlikely that one singular indicator would be capable of providing a comprehensive picture of the mental health impacts of climate change.[48]

In addition to the measurement of mental health outcomes, participants noted the importance of measuring the economic costs and potential savings of interventions. There are precedents that could guide further research and action. For instance, the Victorian Healthy Homes Program was a randomised controlled trial designed to measure the impact of an energy efficiency and thermal comfort home upgrade on temperature, energy use, health and quality of life (particularly mental health). Analysis indicated that a relatively minor upgrade (average $2,809) had wide-ranging benefits over the winter period.

Overview of themes for pathways and mechanisms

Why were these themes chosen as priorities?

The causal pathways and mechanisms through which climate change impacts mental health are complex and poorly understood. Consideration of other exposures that might act as confounders, mediators or effect measure modifiers in the relationship between climate change and mental health, and understanding the mechanisms that connect climate change to mental health at multiple levels (e.g., individual, community, etc.), will identify optimal leverage points that could be addressed by interventions.[47, 49]

The mental health and wellbeing implications of government (in)action on climate change (or actions that contribute to climate change such as fossil fuel expansion) have been highlighted in recent research among young people.[8] Participants acknowledged the importance of identifying and quantifying the mental health and wellbeing impacts (and related economic costs) of government decision-making in relation to climate change mitigation (Theme 2a).

In addition to interpersonal conflict due to differing viewpoints on climate change (Theme 1b), climate impacts themselves (e.g., extreme heat) are contributing to conflict and violence (and impacts on mental health and wellbeing) more broadly, with potential vulnerabilities among

some population groups (e.g., women) (Theme 2b). Participants also highlighted the need to understand the intersectionalities between a range of systemic factors and structural inequalities that contribute to or interact with climate change and influence mental health outcomes (e.g., gender inequality, colonialism, racism and capitalism) (Theme 2c).

The interaction between physical and mental health is well-recognised. This is likely to become even more significant as climate change impacts a range of physical health outcomes known to be associated with mental health and wellbeing. Examples noted were the physical impacts of food and water insecurity and heat (Theme 2d). Other factors that are anticipated to be of particular significance for mental health in the face of climate change are those related to our built environment. Access to safe housing, for example, will be challenged by multiple climate impacts (e.g., flooding and heat) and is a major predictor of mental health and wellbeing (Theme 2e).

What are examples of methodologies, metrics and datasets that could be used to address these?

The CCM dialogues did not identify many examples for this research category, though there may be existing work to draw from within the region. For example, the Pacific climate change migration and human security project (lead by IOM Fiji) has developed a regional framework for climate mobility.

The literature also reveals that climate change does not represent a standalone exposure but is likely to interact with several other environmental, social, economic and political determinants of mental health. Methods for complex systems thinking approaches to climate change and mental health could be appropriate and useful.[49] Systems thinking has been proposed as a promising framework for the study of climate change and mental health because of its ability to address distal relationships at different levels, characterised by complex feedback loops, changes over time and space, nonlinear dynamics and stochasticity.[49]

Overview of themes for mental health benefits of climate action [adaptation and mitigation]

Why were these themes chosen as priorities?

The intricate and integral connection between human health and wellbeing and the health of our environment was reflected in deeper discussions during the two dialogue meetings. Participants advocated for the integration of climate/environmental and health policies, in recognition of the potential for co-benefits to be generated (Theme 3a). Participants also highlighted the importance of communities being literate on climate change issues and mental health issues in order to understand the linkages and design solutions that work at local levels, with outcomes that matter to the people affected. Developing best practice for inclusive and effective climate change communications that promote and support mental health and wellbeing was therefore identified as a key priority (Theme 3b).

Furthermore, it was argued that co-created and community-led climate mitigation and adaptation actions are likely to result in better individual and community wellbeing outcomes, based on the lived experiences and expertise shared by participants. The discussions were framed within a holistic understanding of mental health and wellbeing as being tied to social cohesion and resilience within the community (rather than considering wellbeing solely at the individual level). There is a need to fund more work in this space and to conduct systematic

evaluations of these approaches using frameworks that recognise this more holistic understanding of mental health and wellbeing (Theme 3d).

As the region has seen an increase in climate hazards (e.g., the Black Summer bushfires in 2019/20, flooding on the East coast of Australia in 2022, and extreme rainfall from cyclone Gabrielle in Aotearoa New Zealand in 2023), discussions also centred on the need to better understand how PPRR affected the mental health and wellbeing of people and communities. The lack of psychosocial planning in disaster preparedness was identified as a critical gap, and more work is needed to understand mediating factors (e.g., tailoring strategies to different populations) and modes of delivery (e.g., the role of social media, leveraging existing communication channels through community groups) (Theme 3c). Outside of disaster contexts, nature-based solutions were raised as having considerable potential to generate co-benefits. The potential is currently unrecognised due to a lack of theoretical frameworks and poor conceptualisation of the mechanisms of action. Participants noted that the development of these frameworks should draw on Indigenous and Pacific ways of knowing, being and doing, centring a holistic worldview in which people are not just connected to the environment: they are the environment, encompassing deep ancestral and spiritual connections. More research is also needed to progress towards mainstreaming social/green prescribing, which is in its infancy in the region (Theme 3e).

As noted previously, climate justice was a prominent theme throughout the dialogues. When considering what research is needed on the mental health benefits of climate action, it is imperative that we apply a climate justice lens. The focus on shifting away from top-down approaches towards community-led research also has the potential to ensure that interventions are adopted longer-term and achieve the types of outcomes that really matter to the people involved. When considering the desired state of research in this space, participants highlighted that it's imperative that we work towards better integration of Indigenous ways of knowing, being and doing, with Western knowledge systems ('two-way science'). This is particularly relevant to these research topics, which – as noted previously – fundamentally reflect the integral linkages between the health of our ecosystems and the people that depend on them. This understanding is deeply ingrained in Indigenous ways of knowing, but often lost in Western scientific, more reductionist thinking.

What are examples of methodologies, metrics and datasets that could be used to address these?

Healthcare organisations and workers are increasingly knowledgeable about, and actively promote, sustainability across their practices in recognition of the intrinsic connection between human wellbeing and the health of the Earth's systems. One dialogue attendee highlighted, for example, that Climate Action Nurses have issued a number of position statements, including on planetary health and the need for climate action to be grounded in the principles of social justice, health equity, and environmental wellbeing. Recent publications have started examining climate change capacity-building in the (mental) health system, including an analysis of, and call for, the formalisation of planetary health education for nursing students[48] and a review arguing that lessons learned in recent natural disasters should be translated into education resources that better prepare nurses for climate crisis nursing.[49] In more general terms, the inner development goals were noted as a capability framework to guide capacity development in this area; they represent five dimensions and 23 skills deemed crucial for leaders advancing the Sustainable Development Goals.

Case studies of nature-based solutions and nature-based social prescribing exist, though many have not been documented in the academic literature. For instance, Outdoor Health Australia (formally the Australian Association for Bush Adventure Therapy) represents an "emerging sector supporting health, healing and resilience for Australians during a time of rapid social and environmental change." The organisation is the result of decades of collaboration between outdoor and nature-based practitioners, researchers and policymakers. Their policy unit advocates for government-funded research and intervention trials to support the translation of human-nature-health research into effective health interventions. They also aim to promote and build understanding across all levels of government about the affordability, accessibility and efficacy of nature-based interventions for wellbeing.

Dialogue participants argued that qualitative methods can be very powerful tools to capture the impact of novel policies that integrate health and climate adaptation/mitigation goals. Case studies, narratives and arts-based story-telling approaches can also be used to engage the public and influence policymakers. One example, noted by a dialogue participant, of an arts-based approach that aims to engage a group often left out of the conversation is a collaborative project entitled Bleeding Hearts and Morning Glory. Developed by neurodivergent artist Guy Fredericks (represented by Studio A), Dr Chloe Watfern, and MAG&M, the work is a socially engaged exhibition that encourages people with intellectual disabilities to participate in conversations about climate change, Caring for Country, tending local gardens, and working with community groups focused on climate solutions. The work will be exhibited in NSW, Australia in 2024. Another example of an arts-based community initiative is Creative Recovery which leverages art's unique capacity to build social cohesion, which in turn helps communities be prepared for disasters, supports effective responses and promotes recovery. In Aotearoa New Zealand, The Workshop carries out research to assist clients to communicate in ways that will build public support for policies and practices aimed to inclusivity and sustainability, by crafting engaging narratives. For instance, they created a "toolkit for encouraging collective action", building on the premise that effective communication on climate action can both improve people's understanding, motivate them to be agents of change, and inspire a more hopeful psychological outlook.

Overview of themes for mental health interventions/solutions in the context of climate change

Why were these themes chosen as priorities?

Tailored interventions will be needed to meet the distinct and diverse needs of individuals and communities grappling with mental health in the context of climate change, whether this relates to acute, sub-acute or chronic impacts. Dialogue participants and other experts we consulted recognised that climate awareness, even in the absence of direct personal experience, can have significant impacts on a person's mental health and wellbeing. Eco-anxiety, ecological grief, solastalgia and other related emotional experiences were noted as important areas of further study, especially since little is known about how these concepts and their measurement may (or may not) translate to contexts other than the Western paradigm in which they were developed. There is a need for research that explores these experiences in culturally appropriate and safe ways (Theme 4a).

Dialogue participants also raised several questions on how we can best support individuals to cope with these "sub-clinical" manifestations to ensure that they do not evolve into functionally

impairing symptoms, and how we can train and educate people (including teachers, parents and the mental health workforce) to support themselves and others to cope. Particular challenges were noted when considering children and young people, who have shown high rates of eco-anxiety. More work is needed to develop educational resources for young people to engage safely in climate action, as well as interventions that promote psychosocial skills to cope and adapt to climate change (Theme 4c).

Concerns were also raised on the effects of climate change on those working on the frontlines in healthcare settings or environmental/conservation capacities. Burnout was listed as a key issue, including among climate activists. Furthermore, our scoping work highlighted that this issue needs to be viewed in the context of other psychosocial impacts such as the several years of COVID-19 measures, compounded by the cost-of-living crisis, as well as quite negative "doom-and-gloom" reporting, which together take a toll on workers. Yet there is almost no data on the extent of this problem or on the types of preventative strategies and interventions that might be effective (Theme 4b).

Stigma around mental health and help-seeking is persistent, especially in rural and remote areas. A first step towards effective interventions is to develop and share culturally contextualised language around mental health to increase literacy and reduce stigma, discrimination and prejudice. These topics particularly emerged in discussions around Pacific mental health and highlighted a need for conceptual frameworks that recognise the sources of wellbeing for Pasifika peoples, including cultural and spiritual practices, and relationships to place (Theme 4d).

The question around mental health interventions also inspired wider debate around the delivery of healthcare services in the context of climate change. Early conversations during the scoping work already highlighted a need for more training, capacity-building and education of the healthcare workforce and community leaders across the region. This was echoed in the dialogue discussions, where questions were raised around the tools and resources that healthcare workers need to better support climate-affected communities, especially in the context of multiple exposure scenarios, and how they can do so while accounting for their own wellbeing. Dialogue participants from across the region articulated that there are significant gaps in access to services and availability of trauma-informed and climate-informed services. More research is needed to evaluate existing interventions and to co-design and evaluate novel, more targeted interventions, including culturally safe approaches. This is a key area for further development, in addition to services that are proactive, rather than reactive, contributing to the prevention of mental health problems in the context of climate change (Theme 4e).

Finally, dialogue participants emphasised that mental health is promoted through social connections, talking and sharing, and getting involved with the local community. A more holistic understanding of health is needed, where individual and community wellbeing are integrated, and support must be offered and evaluated at multiple levels (individuals, families, communities). Medicalised terminology (e.g., "intervention", "treat[ment)") was critiqued as unhelpful; instead, several participants advocated for a strengths-based framing. This also recognises that there is a need for diverse wellbeing support that goes beyond clinical interventions. Genuine and ongoing engagement of communities will be essential for research and the effective delivery of mental health and wellbeing support in the context of climate change (Theme 4f).

Co-created, community-based intervention research requires committing to a process of understanding people and context, conducting situation analyses, identifying Indigenous

knowledge, and then responding to gaps. This type of research will benefit from working with local champions, helping to build capacity at the local level for a more sustainable model of delivering mental healthcare. It also taps into existing strengths and helps to challenge the vulnerability/deficit model, which was seen as particularly problematic and stigmatising by dialogue participants.

What are examples of methodologies, metrics and datasets that could be used to address these?

In terms of methodologies, an intersectional lens is needed, as the psychological impacts of climate change are diverse and influenced by lived experience. Evaluation of mental health interventions should also be based on multiple evidence sources, mixed methods and valuing lived experience (including case studies, storytelling, role plays etc.); it does not always require large quantitative datasets. Rather, triangulating different studies and methods would enable researchers to gain a deeper understanding of how and why interventions work. Participants also emphasised the need for methodological approaches that draw on critical perspectives (e.g., decolonial methods), liberatory methodologies (e.g., queer, feminist, intersectional and youth approaches to participatory action research) and community psychology. One specific example is Lucy McLean's thesis which is in part an auto-ethnographic exploration of eco-anxiety. In it, the author considers the ethics of therapeutic intervention and what that might look like in practice. This reflection engages with the tensions that exist in how we define eco-anxiety within a mental health system focused on binary conceptualisations of psychological experiences ("normal" vs "abnormal"). The author draws on queer theory to unsettle potential harmful structures in a bid to help ease eco-anxiety without re-individualizing the problem or undermining the severity of its source. Pacific methodologies have been in existence, and newer approaches are also being developed, including: veivosaki-yaga, a culturally sensitive approach to collecting group discussion, which has yet to be applied in mental health and climate change contexts; and Mental Health Talanoa Research and Resources, the result of a year-long collaborative research project with Pacific peoples and the wider community, which aimed to improve mental health literacy across Pacific communities in Australia.

An example of a community-led wellbeing approach, supporting people working on the frontlines tackling environmental change can be found in Jessie Panazzolo's initiative, Lonely Conservationists. Its mission focuses on the themes of community, communication and mental health to end the stigma associated with seeking help with experiences in their personal life or career as an environmentalist. Among a range of resources (books, workshops, talks etc.), the website features stories submitted by conservationists, sharing the challenges they have encountered, and offering a community that actively listens and shares the burden. The website also links to published papers highlighting the mental health burden of conservation work.

Other existing initiatives focus on mental health and wellbeing in the context of chronic impacts like drought which has affected many Australian communities. The Australian Red Cross has established a Drought Resilience Program which currently runs across NSW, Victoria, Queensland and South Australia. The program has a range of offerings including workshops and training for organisations and service providers as well as community members, wellbeing support and practical assistance at community events, outreach directly to community members, a mentoring program and through the creation of guidance and resources. Research conducted as part of the program has led to the draft of a community-led Model of Resilience, Relief and Recovery Planning in Queensland. The Rural Adversity Mental Health Program (RAMHP) in NSW focuses on people in climate-sensitive sectors like primary production and

agriculture, as well as offering support to other priority populations at greater risk of mental ill health. The program is delivered through coordinators employed by Local Health Districts who are embedded within the communities, and who deeply understand the challenges faced by rural and remote communities.

Dialogue participants pointed out existing mental health and wellbeing frameworks that can offer guidance for developing interventions in the context of climate change in culturally safe ways. The Fonofale model of health and wellbeing created by Fuimaono Karl Pulotu-Endemann in 1984, embraces and interweaves values and beliefs from Sāmoa, the Cook Islands, Tonga, Fiji, Niue and Tokelau. The components of the model include cultural values and beliefs, seen as a shelter for life, with family forming the foundation. Connecting culture and family are four interrelated dimensions: spiritual, physical, mental and 'other' (factors that directly or indirectly affect health). The Social and Emotional Wellbeing (SEWB) framework describes the foundation of physical and mental health for Aboriginal and Torres Strait Islander people, taking a holistic view of health that recognises connection to land, sea, culture and spirituality as core components of wellbeing. From this perspective, healing is conceptualised as a collective and relational process, involving social, emotional, mental, environmental, physical and spiritual elements.

Action agenda

As the climate change and mental health field in Oceania builds and the evidence base grows, it is crucial to avoid perpetuating existing challenges, including: 1) disconnections across disciplines and between researchers and policymakers; 2) unequal focus on topics and geographies; and 3) siloed decision making for climate and for mental health. This action agenda sets out a shared vision as a rallying focus of the mental health and climate change field in Oceania. This includes guidance on how to best support the growing community of practice, how to translate evidence to action, and the principles that should guide this approach. Enacting this agenda will require transdisciplinary effort and coordinated action across research, research funding, policy and practice. This action agenda aims to guide this work by setting out the challenges that must be addressed, opportunities that can be harnessed and priority actions to work towards a thriving climate and mental health field.

Regional vision for mental health in a changing climate

Vision statement

Participants expressed desire for a future state of the world where people are empowered and well-resourced through sound investments that enable them to look after their own communities and their environment; mental health and wellbeing considerations are an integral component of climate and environmental policy and vice-versa; awareness about climate and mental health issues is widespread in the community; collective action has achieved positive outcomes for human and non-human life, and people have not just "overcome" challenges, they are thriving; Indigenous rights are safeguarded, and Indigenous knowledge systems are valued and integrated with Western ways of knowing.

Figure 2: Word cloud composed of keywords representing proposed headlines from a dialogue visioning exercise[a]

a. Centred around the concepts of mental health and climate change, the visioning exercise brought forward themes around equity, engaged and supported families and communities, valuing Indigenous knowledges, and a positive, holistic understanding of wellbeing.

Figure 3: Word clouds composed of statements from a dialogue visioning exercise[b]

b. Word clouds represent dialogue participants' statements in response to questions about their commitments (I will…) and what they wanted to see emerge out of this community (I want…).

Creating an enabling environment for research at the intersection of climate change and mental health

The identified research priorities will only be of value if they are enacted. The climate and mental health field is relatively new and rapidly growing, and now is the time to ensure that it is designed to deliver a mentally healthier future in the context of the climate crisis. In a field that spans multiple disciplines and sectors, each with different cultures and ways of working, and on a topic with low awareness in many countries, what is needed to support capacity-building efforts? What principles must guide the field, and what are the challenges and opportunities in the region to create an environment that would enable such research?

This section presents a synthesis of dialogue discussions and survey results on what is needed to implement the research agenda and foster an enabling research environment for climate change and mental health.

A desired state of climate change and mental health research in Oceania

The Oceania region desired research that:

- **Is co-designed and co-led** using participatory and action-oriented methods to promote relevant and just research outcomes. Drought Innovation Hubs funded by Future Drought Fund, for example, promote drought resilience through a co-design approach engaging farmers and impacted communities to translate research to action.
- **Utilises qualitative methods,** as well as triangulating with mixed methods and multidisciplinary approaches.
- **Fosters an evidence base that is future-focused and strengths-based** (e.g., identifying areas of resilience).
- **Includes priority communities,** including youth, Indigenous Peoples, persons with disabilities, rural and remote residents, people with lived experience, and climate migrants.
- **Embraces multiple ways of knowing and integrates Indigenous knowledge**, and the need to utilise systems thinking approaches which included holistic and Indigenous ways of knowing as a framework for understanding the nexus of mental health and climate change. This includes considering the terminology we use as it reflects specific epistemologies, e.g. for Aboriginal and Torres Strait Islander peoples, the term social and emotional wellbeing is preferred over the term ‘mental health’, reflecting the holistic manner in which the complex interrelationships between the individual, land, culture, spirituality, ancestry, family and community are understood.
- **Recognises the intellectual property of data** and ensures reciprocity with engaged communities as part of the research process (i.e., data sovereignty).

Challenges holding back research

Participants highlighted an array of challenges, including:

- **Disconnections bidirectionally between researchers and policymakers as** well as siloed decision-making and limited collaboration across disciplines.
- **Exclusion of priority groups**, such as young people, from research and decision-making processes.
- **Implementation challenges**, such as overburdened public officials and bureaucracy that slows down research progress, geographical terrain that can hinder access to affected communities (e.g., remote terrain), and a lack of capacity across the mental health and climate change space.
- **Limited funding** for research that intersects climate change and mental health, and **funding restrictions** preventing evaluation of existing programmes and wider involvement from non-academic stakeholders.
- **Gaps in baseline and population level data** on mental health in the Pacific region, which limit comparison with current trends.
- **Research fatigue** in some regions with communities distrusting the research process and research feeling transactional. As one participant stated: "There's this kind of inherent feeling within communities that research is just done on them but not necessarily for them and sometimes it's quite hard to see what the outcomes are or what outcomes there will be from that research".
- **Poor reciprocity and data sovereignty** for communities engaged in research: "The research is done, but nothing is done with the research."

Opportunities and enablers

The Oceania region identified several opportunities to enhance research related to climate change and mental health, including:

- **Leveraging the CCM community of practice** as a potential regional mechanism to scope, review and share research progress, and pursue research recommendations.
- **Incorporating traditional knowledge** and engaging with Indigenous Peoples.
- **Drawing on strong traditions of sharing and reflecting** through narrative and arts-based practices.
- **Encouraging collaboration** to assist with addressing diverse issues regionally while concurrently **providing opportunities to pool resources, collective knowledge sharing and unique perspectives.** As one participant stated: "People working together is critical to this, rather than individual therapy and individual solutions. The problem is political and systemic, therefore interventions need to happen at this level."
- **Leveraging current policy development** (e.g., National Health and Climate Strategy in Australia) to **ensure research is policy-relevant** and aligns with decision-making needs.
- **Strengthening the capacity of Indigenous researchers** and engaging with priority groups within research mechanisms (e.g., empowering and providing supportive platforms for

youth voices). Identifying and engaging with community champions could help to facilitate this engagement.
- Designing a school **curriculum that incorporates links between climate change and mental health** to increase awareness within the region.

Relevant potential partners

A vast breadth of stakeholders was identified within the Oceania regions due to the cross-cutting nature of climate change and mental health. This is exemplified by a list of suggested stakeholders, as listed below.

- Activists
- Communities impacted by climate change
- Funders
- Indigenous Peoples
- Regional partners
- Civil society organisations, including faith-based organisations and non-government organisations
- Health and clinical practitioners and networks
- Education groups and associations
- Universities and research institutions
- Environmentalists
- Disaster agencies
- All levels of government

The concept of place/country/nature as a stakeholder is important within the Oceania region due to the spiritual and cultural connections for Indigenous Peoples (i.e., as a determinant of health).

Further examples of suggested stakeholders valuable for implementing a research agenda are outlined below.

- Green Climate Fund
- Lowitja Institute
- Pacific Islands Association of NGOs (PIANGO)
- Empower Pacific and UNICEF as stakeholders proving mental health and psychosocial support (MHPSS) training
- Falease'ela Environment Protection Society

Priority next steps/recommendations to investors and actors

The priority next steps identified below are drawn from perspectives provided by the CCM Oceania Regional Community of Practice in the dialogues and surveys. These ideas have been operationalised through internal discussions within the RCC to outline necessary elements to achieve the desired goals.

- **Secure the sustainability and growth of the Oceania mental health and climate change Community of Practice** as a critical mechanism to connect mental health and climate change researchers and stakeholders, and implement the regional research and action agenda.
    - Steps required include: financial investment to support key structures and activities (e.g., coordination, communications, strategy development, policy engagement, grant writing support, education and awareness, workshops/webinars/public engagement/networking events); identifying frameworks and models of good practice that sustainably support transdisciplinary research-focused networks; and activities that support cross-pollination across Regional Communities of Practice (e.g., PhD and travel scholarships, mentorship, international exchanges/placements).
- **Prioritise co-designed and co-led research** that engages priority groups (e.g., youth, climate migrants, Indigenous Peoples, persons with disabilities, people with lived experience, rural and remote communities), and integrates multiple/different ways of knowing and doing (e.g., Indigenous knowledges).
    - Steps required include: removing barriers to non-academic research partners receiving research funding; providing platforms for priority group voices; identifying and nurturing 'community mental health and climate change champions'; investing in shared spaces (virtual or in-person) for research and knowledge sharing (an example of this is the Living Lab Northern Rivers); and training and capacity building for academics to mainstream best-practice in co-designed research.
- **Scope and describe the full range of existing initiatives that address the mental health challenges associated with climate hazards** (e.g., climate mitigation and adaptation actions), with a view to identify and evaluate optimal approaches and best practices.
    - Steps required include: mandating evaluations into all funding (research and programmatic); retrospectively mapping and evaluating pre-existing and existing mental health support services for climate hazard impacted communities to search for models of best practice; creating academic-community partnerships to facilitate knowledge sharing of 'lessons learned'; and training stakeholders in evaluation methods.
- **Develop and embed climate change and mental health within educational programmes** and curricula to increase awareness and develop knowledge within Oceania.
    - Steps required include: collaborating with practice, policy and other stakeholders to guide the integration of mental health and climate change content; conducting curriculum reviews and learner needs assessments; developing interdisciplinary units (e.g., planetary health) in health science courses; and developing tools and

content on climate and mental health that can be integrated into existing education programs.

- **Invest in and support the delivery of research and programs that respect communities and cultures,** uphold rights and minimise harms such as community and stakeholder research fatigue and mistrust in research processes.
    - Steps required include: ensuring best practice protocols are followed (e.g., Indigenous Data Governance that protects Indigenous Data Sovereignty); embedding reciprocity in research design; improving data accessibility (e.g., open access, centralising data sources); and adhering to cultural conceptual frameworks of mental health and climate change.

Note that these priority next steps will simultaneously lead to much needed capacity building across the region.

Translating a growing evidence base into action that can respond to the mental health impacts of climate change

The current evidence base on the interconnections between climate change and mental health compels action in policy and practice to protect escalating mental health needs and promote co-beneficial climate actions. How can current evidence and new insights created through implementing this agenda best translate into changes to policy decisions and practices across both climate and mental health regional spaces?

This section presents a synthesis of dialogue discussions and survey results, setting out the challenges and opportunities to translate evidence generated through research into policy and practice.

A desired state of climate change and mental health to action in Oceania

The Oceania region described effective research to action pathways involving evidence-based policy on mental health and climate change embedded at all government levels and across ministries. This pathway is facilitated through a bidirectional relationship between researchers and policymakers with appropriate support (e.g., funding, legislation). This includes ensuring research knowledge is appropriately translated to policymakers and that research is informed by the data needs of policymakers with inbuilt evaluation processes that engage stakeholders with measurable indicators. Policy needs to be embedded within legislation with clear linkages between global and regional policies (e.g., commitments made at the global level translated and adapted regionally).

Participants expressed a desire for evidence-based policy that is inclusive, future-focused, sustainable and long-term (i.e., not tied to election cycles). Self-determination (i.e., rangatiratanga in Māori) and sovereignty were highlighted as valuable features of an effective evidence-to-action pathway compelling just policy design. Community representation within the decision-making process is important to the Oceania region with participants stating: “nothing about us without us” and “the people ‘growing’ the evidence should be part of the decision making.” There should be representation of priority groups at the policy level to ensure

the perspectives of Indigenous Peoples and other groups are integrated within policy design. Policy guidelines also need to be accessible (i.e., translated into local languages) and well-communicated to facilitate effective implementation into practice.

Challenges holding back translation of evidence

Participants highlighted numerous challenges that prevent actions to protect mental health from the climate crisis, including:

- **Ineffective policy mechanisms**, which limit progress and policy implementation (e.g., disconnection and siloed decision-making, short funding cycles tied to elections, misaligned political agendas, and getting the correct balance between simple and complex actions).
- **Limitations in funding and resources** (e.g., human), which impede equitable opportunities to contribute to policymaking and the sustainability of existing actions.
- **Denial of climate change, misinformation and scepticism**; dialogue participants highlighted this as problematic when navigating conservative governments.
- **A lack of diversity at the policy level**, meaning those involved in decision-making processes are not representative of all groups and ages. Participants expressed concern about how intergenerational inequities impact decision-making, stating: "Many of the people actively engaged in climate policy are of a generation that are unlikely to be significantly impacted".
- **Reactive policy making,** meaning decision-making actions are in response to events rather than strategic and proactive; for example, compensation rather than resilience building, and mental health interventions focused on treatment post-disaster rather than prevention (e.g., psychological resilience being addressed pre-event).
- The importance of **climate change and mental health not being embedded within cultural and social norms** within Oceania, creating challenges to overcome the status quo (e.g., success measured in economic terms, profits valued over people). This prevents effective translation of evidence to policy and practice.
- **Personal risks related to the suppression of climate action** (e.g., policymakers unable to give frank and fearless advice on climate matters, criminalisation of peaceful protests which undermine democratic processes to ensure policy accountability) that can contribute to the mental health burden associated with climate change.

Opportunities and enablers

There are opportunities within the Oceania region to strengthen bidirectional links between research and policy via structures that cross-cut ministries and increase flexibility between policy development and implementation. This could include:

- **Leveraging existing policy development mechanisms** to ensure research evidence is implemented (e.g., David Pocock's Duty of Care bill and the National Health and Climate Strategy in Australia).
- Improving evidence-based action through **stronger links between global health policy stakeholders** (e.g., World Health Organisation) and the region, together with support from

major regional stakeholders (e.g., government actors from Australia, Aotearoa New Zealand) who have the leverage and resources to enact change.
- **Utilizing existing forums**, such as the Pacific Islands Forum Meetings, as opportunities to integrate mental health within climate policy.
- **Using social change approaches** to challenge and shift social norms related to climate change and mental health.
- **Enabling research to action progress via knowledge sharing** (e.g., pathways to synthesise and disseminate research, evaluations and programmes). This also includes ensuring research knowledge is accessible across stakeholders and targeted to relevant audiences (e.g., translated into local languages, utilising 'policy speak') via appropriate communication channels. For example, talanoa style conversations are an important factor for engagement and enable progress within the Pacific. Communication would also be facilitated by outreach to communities and ensuring digital connectivity within the region.
- **Building capacity and strengthening services** via education and upskilling programs as well as engaging private stakeholders (e.g., via employee assistance programs).

Relevant potential partners

As highlighted earlier, a vast range of stakeholders were identified in Oceania. As one participant described: "… it needs to be integrated across all levels of society … we shouldn't be talking about partners and stakeholders." This reflects the cross-cutting nature of climate change and mental health within the region and is exemplified by the array of suggested stakeholders listed below.

- All levels of government
- Regional partners
- Universities and research institutions
- Industry and private business
- Civil society organisations including faith-based, arts and non-government organisations
- Health and clinical practitioners, networks and professional bodies
- Funders
- Priority groups, including youth, Indigenous Peoples and frontline communities

Specific examples of suggested stakeholders valuable for translating evidence into action are outlined below.

- World Health Organisation
- United Nations
- Pacific Community (SPC)
- Pacific Islands Forum Secretariat
- Climate Change Authority, Australia
- Australian Centre for Disease Control
- National Health, Sustainability and Climate Unit, Australia
- Prevention United
- Climate and Health Alliance

- Public Health Association of Australia
- Australian Psychological Society

Priority next steps/recommendations to investors and actors

The priority next steps identified below are drawn from perspectives provided by the CCM Oceania Regional Community of Practice in the dialogues and surveys. These ideas have been operationalised through internal discussions within the RCC to outline necessary elements to achieve the desired goals.

- **Leverage current policy mechanisms** to aid evidence-based action on mental health and climate change. This effort should seek to integrate mental health and climate change into policies across sectors (e.g., disasters, social services) and all levels of government.
    - Steps required include: creating a roadmap for how mental health can be equitably embedded within all health and climate initiatives; advocating for appropriate representation on reference groups and advisory committees; monitoring policy implementation and impact; and advocating for mental health legislation needed to support the implementation of climate and health policy.
- **Strengthen bidirectional relationships** between researchers, practitioners and policymakers to ensure research is policy and practice-relevant and that policymakers are aware of current and upcoming research evidence.
    - Steps required include: improving coordination and communication across the region (e.g., Community of Practice, digital connectivity, community outreach, translation to local language, accessible policy guidelines); establishing interdisciplinary and intergovernmental collaborative bodies which are able to address the cross-sectoral nature of mental health; developing and implementing education and awareness raising among policymakers and healthcare professionals about the diverse mental health impacts of climate change (beyond that of climate distress and climate anxiety); and bipartisan engagement.
- **Create knowledge sharing pathways** to synthesise and disseminate research findings, evaluations, and program activities and learnings.
    - Steps required include: ensuring research knowledge is accessible to stakeholders and targeted to relevant audiences (e.g., translated into local languages, utilising “policy speak”) via appropriate communication channels (e.g., talanoa style conversations are an important factor for engagement and enable progress within the Pacific); facilitating communication through outreach to communities and ensuring digital connectivity within the region; and investing in knowledge brokers (champions) to overcome cultural gaps between researchers and decision makers.
- **Engage priority groups** (e.g., youth, Indigenous Peoples) within decision-making processes.

- Steps required include: representation at the policy level to ensure inclusive and just policymaking; consideration of multiple/different ways of knowing and doing; and engagement on fair and equitable grounds that does not overburden specific groups (e.g., providing compensation for time).

Note that as with the priority next steps for implementing the research agenda, these steps will also assist with capacity building across the region.

Discussion: strengths, limitations and next steps for the research and action agenda

Strengths

The CCM project has culminated in the production of this research and action agenda, elucidating the needs of communities throughout the Oceania region which have not previously been heard or captured in the literature. This has extended the substantial work already being undertaken through Australia's Mental Health and Climate Change Research Network. A key strength was the assembling of a diversity of experts across disciplines, sectors, gender, age and geography (with many small island states represented), and the convergence of knowledge in a safe space, where individual experiences and different ways of being, knowing and doing were valued. This included engaging with the participants in a diverse array of ways to cater for the needs and learning styles of all involved. One member of the Lived Experience Advisory Group expressed how CCM demonstrated care about the intersection of research and the wellbeing of the people involved. Importantly, the Oceania RCT actively pursued meaningful engagement and collaboration of lived experience expertise to guide this work. Many participants had lived experience of these issues and were active across multiple sectors. There was a differing level of awareness of the intersectionality of mental health and climate change among participants, and the dialogues became an important vehicle for awareness raising and knowledge sharing across the region. The connections made and lessons learned during CCM have fostered new relationships, and participants particularly valued the sense of community, noting the lack of an existing platform in this space.

Limitations

Despite the clear successes and achievements of CCM, there were noteworthy limitations. There was considerable tension between the urgency to develop a research and action agenda and the time required to establish meaningful relationships and stakeholder consultations. This was particularly evident when engaging with groups frequently subjected to extractive research processes (e.g., Indigenous Peoples). Both the global team and the RCC are deeply committed to eradicating harmful research through decolonising and trauma-informed research practices. The relatively prescriptive processes and time constraints of this project presented a challenge with implementing these principles consistently and comprehensively. This extended to challenges with balancing the need for standardisation with local contextualisation and the need to ensure use of local terminologies and cultural understandings. To decolonise and reindigenise research means to value Indigenous ways of knowing, being and doing as equal to Western ontologies and epistemologies. Yet, the framing of 'mental health' in itself (as defined in CCM)

comes from a medicalised perspective and does not accurately reflect or incorporate Indigenous understandings of this concept. For Aboriginal and Torres Strait Islander peoples, for instance, the term social and emotional wellbeing is preferred over the term 'mental health'. This is not simply a matter of terminology, but indicative of a more fundamental difference in beliefs and perceptions of lived realities. In this Indigenous perspective, mental health cannot be reduced to symptoms of disordered thoughts or emotions being present or absent; it reflects in a holistic manner the complex interrelationships between the individual, land, culture, spirituality, ancestry, family and community.

Although we involved participants from some geographically isolated parts of the Oceania region, there was still a lack of representation from across the Pacific in the dialogues (9 out of 22 Pacific countries represented). Despite efforts to engage with the wider community of researchers and practitioners, there were no Aboriginal or Torres Strait Islander participants at the dialogue meetings; though we did consult with an Aboriginal health researcher. This is not an uncommon challenge and can be partly attributed to the heavy burden placed on a small number of scholars and experts as representatives of Indigenous perspectives in research and policy settings. Once Indigenous people have more prominent positions in academic and other public institutions, they tend to be asked to take part in initiatives requiring Indigenous involvement, which takes valuable time away from their paid employment. Furthermore, in Australia, the dialogues took place around the time of a national referendum to change the Constitution to recognise the First Peoples of Australia by establishing a body called the Aboriginal and Torres Strait Islander Voice, which did not pass. This was an exceptionally difficult time for many Indigenous people, who would have chosen to focus on community and on healing.

This work successfully sought to bridge disconnected and siloed expertise which is required to effectively progress a mental health and climate change research agenda; however, ongoing work is required. For instance, identifying climate experts working at the intersection of mental health (or even health in general) was much more challenging than recruiting mental health experts working on climate change issues as part of their practice. This may be due to limited awareness among STEM-focused researchers and policy experts, although recent high-profile developments such as the first-ever Health Day at COP28, are likely to change this.

Challenges of virtual convening, such as technology and internet connectivity, were a barrier for some participants, especially those based in remote islands or countries with less developed communication infrastructure. Furthermore, cultural preferences and traditions differ across the region, and this impacts the effectiveness of technology-mediated convening. For instance, it was evident that in-person meetings that facilitate talanoa may be preferred tools for Pacific dialogue participants, noting that there is also now discourse around e-talanoa.[50]

Next steps

In the "I will…/I want…" exercise during Dialogue 2, participants expressed a commitment to continue their current work in the mental health/climate change space, doubling down on their existing engagement, potentially buoyed by the opportunity to connect with others in this mission. The idea of collaboration, between researchers and also across sectors, was a common thread. The community that has emerged through CCM was valued, and participants expressed

a desire for “ongoing meaningful engagement with other members” with a view to creating real impact.

Participants also indicated a desire to take the information and lessons from the dialogues back to their personal and professional communities, to share and to actively advocate for more research and policy change. One researcher shared: “I will take the interdisciplinary learnings from these sessions back to my research group and incorporate them into our research programs”; another indicated they would integrate this thinking into the psychology curriculum at their institution “...to start building the next gen [sic] of researchers in this area.”

We hope this research and action agenda provides a clear roadmap for researchers, funders and policy experts across disciplines and sectors to progress climate change and mental health research in Oceania. By laying out a robust set of research priorities alongside what is needed to conduct this research and translate evidence into policy and practice, we hope readers feel empowered to join our growing Community of Practice to collectively work towards safeguarding the mental health and wellbeing of people throughout Oceania.

Conclusion

By bringing together experts across diverse disciplines, sectors and countries, CCM has developed a robust research and action agenda for the climate change and mental health field in Oceania. The processes and outputs of CCM Oceania have provided a unique and unprecedented opportunity to accelerate research in the region. It has expanded an existing research network which was previously limited to Australia to establish a highly diverse and invigorated Community of Practice with reach into the far corners of the Oceania region. This Community of Practice and the potential for interdisciplinary collaboration has been met by much enthusiasm within the region and is a proactive step towards de-siloing climate change and mental health research and practices. Further, the research insights provided across this project (i.e., 21 priority research themes encompassing almost 200 research questions) clearly indicates the deliberations occurring across the region and emphasises the timeliness of CCM. Fundamental to this effort is co-designed and participatory research that engages priority groups, integrates different ways of knowing and doing, and ensures reciprocity. To achieve these goals, research funders need to invest in developing capacity across the Oceania region and strengthening bidirectional relationships between researchers and policymakers. Decision makers need to ensure priority groups are represented within decision-making processes, so that the policy relevance of research and translation of research knowledge into meaningful and just outcomes.

Hearing from the Regional Community of Practice

'I will' statements listed in this document.

On the need to be inclusive, to truly consider the people that are commonly left out of discussions and decision making, yet that are the most vulnerable: "[...] if migration is to be focused on, there are, of course, many groups that are needing to be counted. The undocumented, the asylum seekers, the refugees. Where do they fit into this? Because already you and I know that they are a core group that needs to be taken into account and they are certainly part of the Pacific Oceania family if you like."

On the need to focus on the grass-roots level: "We've come to realise [...] that working with the more ethnic minority groups or people whose voices just disappear or just aren't recorded in research, oftentimes it's better to look at it as... Rather than looking at it as evidence-based practice, looking at it as *practice-based evidence*, so definitely from the ground up."

On the need to learn from (research) mistakes: "The traditional scientific research paradigm is actually really flawed when it comes to this kind of research. Because we can learn as much from programmes that fail as ones that succeed, sometimes more. And yet, the research paradigm is that need of results or non-results are discarded and never published. [...] That's what we do in our practice, we build on what we know and try things."

On the role of healing: "My role in the hospital setting is to provide psychological support for people who are also experiencing either acute or chronic physical conditions and one of the things we often talk about, especially for our Indigenous Peoples here, is reconnecting with other land or area that they come from as a way to provide them with that spiritual or that ancestral sense or that aspect of healing. [...] I don't think we need research to show it but, however you define that, culture being a very strong protection factor. [...] the loss of access to culture or cultural resources. I don't think that is specific to just sea-level rising. I think you are seeing it all throughout the pain."

On CCM giving hope: "For me personally, living, studying and working in a remote area, I often feel very isolated, as I do not have a 'lab group' or colleagues interested in climate change and mental health, so I enjoyed the networking and feeling a part of something bigger, or feeling a part of a group which cares about this topic passionately."

On the potential for CCM: "I look forward to seeing what happens with CCM in the future and hope to continue to be involved if I can. I imagine there will be research partnerships/collaboration potential, dissemination of training (to all kinds of stakeholders, including health professionals, teachers, etc.), influence on policy, etc. Lots of potential and great to have the collective space to come together to make more possible, rather than working on this in isolation."

Glossary of terms

For a glossary describing relevant concepts and key words for the Connecting Climate Minds research and action agendas, please download from here.

Oceania specific terms:

Oceania	Aotearoa New Zealand, Australia and Pacific Island countries
Talanoa	Talanoa, a concept deeply embedded in oral traditions, holds significance across several Pacific Island countries such as Sāmoa, Tonga, Cook Islands, Fiji and Tokelau. In the languages of these nations, Talanoa encompasses the essence of 'speaking,' 'engaging in dialogue,' 'deliberating' and 'sharing narratives and stories.'[51, 52, 53]
Prevention, preparedness, response and recovery (PPRR)	PPRR refers to a conceptual framework used within the region (primarily Australia and Aotearoa New Zealand) consisting of disaster prevention/mitigation, preparedness (e.g., early warning), response (e.g., search and rescue, emergency relief) and recovery (rehabilitation, reconstruction).[54]
NSW	New South Wales (state in Australia)

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Appendix

Appendix 1: Pre-dialogue scoping methodology

The aim of the regional pre-dialogue scoping was to gain an initial understanding of the lived experience needs, the different cultural contexts, and variations in how the links between climate change and mental health were conceptualised in the region. The insights derived were intended to be relatively brief and high level, suitable to present to the dialogue participants as preparation and context-setting for the first meeting. To gather this information, we employed three methods: (1) a rapid literature review of regional published research on the intersection between climate change and mental health, (2) key informant interviews, and (3) an online form to gather perspectives from the wider community of stakeholders (for details, see **Appendix 11**).

The review drew from an existing scoping review conducted by Dr Ali and Dr Charlson,[12] where online databases were searched for studies related to mental health and climate change; additional searches were also carried out using region-specific terms. A total of 26 articles were included, covering Australia, Aotearoa New Zealand and some Pacific countries, including peer-reviewed and grey literature.

The key informant interviews targeted individuals who were able to provide a high-level overview and a sense of collective issues related to mental health challenges in the context of climate change because of their breadth of expertise and their long-standing professional engagements in areas of particular relevance to climate change and/or mental health. Three experts were consulted, representing professionals in climate action, farming and planetary health research with a focus on the Pacific. The stakeholders were all physically based in Australia.

The perspective-gathering exercise was aimed at reaching civil society and community groups connected to climate change and mental health. Respondents were free to articulate (in a free-text format) their perspectives and reflections on the relationships between climate change and mental health, stemming from professional or personal experience, being part of, or working with communities affected by climate change and/or mental health challenges. The online form was shared on the project's regional social media pages and via the newsletter, as well as via personal contacts with relevant groups and organisations with specific links to mental health and/or climate change issues. Responses (n=28 in total) came from Australia (75%), Aotearoa New Zealand (11%); single responses were received from Fiji, New Caledonia, Federated States of Micronesia, Marshall Islands and Samoa. The text responses were analysed thematically.

Appendix 2: Dialogue agendas

Dialogue 1

Time (mins)	What	How
0-20	**Welcome and introductions**	
20-35	**Visioning Exercise**	Visioning Exercise: "Headlines" on Climate Centre Good Games platform Participants share what they are hoping to get from being part of Connecting Climate Minds, and why they are invested in this topic *Imagine we are in 2030 and the CCM project has received an important prize for its achievements in bringing CC/MH together in your region and making change for climate and mental health together through research and action. You are interviewed by a journalist as you are celebrating winning the prize.* Create / vote on and review Headlines created on the Good Games Platform
35-50	**Scene setting**	Brief context to the links between climate change and mental health What are we hearing in the region that we can come together and respond to: sharing highlights of pre-scoping Presentation on Connecting Climate Minds and Q&A
50-95	**Breakout session 1: Regional needs**	Host sets scene for breakout discussion Share climate hazards overview for the region **Breakout groups**

		Facilitator to lead the group in a discussion on the mental health challenges arising from climate change in the region. Questions posed to participants were: ● *From your perspective, what are the climate hazards that concern you the most in terms of mental health and wellbeing?* ● *For each hazard, discuss the following:* ○ *Who is being impacted? Are there any groups more at risk?* ○ *What are the mental health and wellbeing outcomes associated with this hazard?* ○ *How does this hazard specifically affect mental health and wellbeing; what are the mechanism e.g. housing, livelihoods etc* ○ *Encourage people to look at different types of mechanisms e.g. social, biological, cultural, environmental* ○ *Climate adaptation/mitigation actions - what is being done, what can be done?* ○ *Actions that are being/could be taken to improve or promote mental health and wellbeing in this context* Brief plenary highlights
95-105	**Break**	
105-110	**Sneak preview**	The cartoon artist shares one first draft reflecting some of the content of the session so far. Host invites participants to share in the chat how the image resonates.
110-160	**Breakout session 2: Evidence gaps and research priorities**	**Breakout groups** [same participants, facilitator and note-taker as first breakout session] Looking back at the hazard table from Breakout session 1 as a starting point, participants are guided to start thinking about **where more research is needed**. Hosts invite 2 or 3 facilitators to share some brief reflections
160-170	**Cartoon reflection on dialogue output**	Participants individually review each cartoon, and share their reflections. This can range from: suggestions for changes to make it more accurate, to sharing how it relates to our reality, or any other insights.
170-180	**Wrap-up and next steps**	Host shares a high level recap of the session, thanks everyone and celebrates this first coming together of the regional community.

		Participants complete brief survey to provide feedback on the dialogue

Dialogue 2

Time (mins)	What	How
0-5	**World Map Exercise**	Host asks participants to place a "star" icon where they currently are and then take the "heart" icon and place it where they would like to visit one day or a place they have been and really loved/feel especially connected to.
5-15	**Welcome and introductions**	
15-30	**Sharing updates**	Presentation on global and regional progress and outcomes of dialogue 1, including vision, priority research themes.
30-50	**Priority Research Theme Feedback**	**Jamboard shared on screen.** Host introduces priority research theme activity and asks people to consider the following questions: ***Research questions*** ● *Is this a valuable theme? Would you add or change anything?* ● *Share any ideas on datasets, metrics or methods that could be applied to help address this.* ***Research topics*** ● *What would be most helpful to know about this topic to understand and respond to it?* ● *What would you want to know first?* Music plays and participants work independently on Jamboard at their own speed.

50-55	**Scene setting for breakouts**	Host sets the scene for the breakout discussion. Interested in the 'how', which includes the principles and desired outcomes for research, policy and practice in the region. The discussion will enable targeting of action and investment to both implement the research agenda in the region, and to ensure evidence on the climate and mental health nexus is translated into policy and practice
55- 90	**Break out 1**	Eight breakout groups. The first 4 on the theme ***"Creating knowledge through research"*** (e.g. How can we best implement the research agenda?) and the other 4 on ***"Fostering evidence-based policy and action"*** *(e.g. How can we translate the growing evidence base to action in policy and practice?).* Each group uses a Jamboard to discuss: 1) What does this look like when it is done well? 2) What opportunities & enablers exist? 3) What challenges must we overcome? 4) Who should our partners and stakeholders be? Brief plenary highlights
90-100	**Break**	
100-105	**Draw your feelings**	Host welcomes everyone back and invites all who'd like to join to grab a piece of paper and a pen/marker (or digital) - and draw how they are feeling today. Anyone willing is invited to show their image - share some reflections.

105-125	**Spectrum Mapping**	Host introduces and explains the activity. **Share screen of Jamboard.** Designed to reveal the diversity of perspectives and options around different concepts and to organize them into a meaningful spectrum. This activity aims to illuminate the group's range of perspectives and to organize those perspectives into a continuum. **Question:** *What do these concepts mean to you?* Focusing on one board at a time, host asks everyone to silently generate a point-of-view around that concept and write it on a sticky note on the Jamboard. People can add more than one. Once the sticky notes are posted, the host works with the group to sort them into a horizontal range of ideas. Sticky notes that express similar perspectives or options should go next to each other. Sticky notes that seem to be outliers should stand alone; they may sometimes end up defining the limits of the range. Repeat with the remaining concepts. At the end, ask for observations and insights on the lay of the land. And if any perspective or option has been excluded. If so, add it and re-sort as necessary.
125 - 155	**Break out 2**	Host introduces the second round of breakout rooms and provides a 2-minute summary of the Jamboard contributions from the first breakout. Original 8 groups reconvene and expand and add to their initial thoughts. Groups are allowed to continue on the theme they were already discussing or switch to the other theme.
155- 175	**I will … I want…**	Host asks everyone to personally reflect about how they will contribute to this space, and share an "I will" statement in the chat, but only press enter when told to do so. After a minute, host invites everyone to press enter at the same time to make statements appear. This is repeated with a statement about "Out of this community I would like to see…".

175	**Wrap up and next steps**	Host shares a high level recap of the session, thanks everyone and outlines next steps. Participants complete brief survey to provide feedback on the dialogue

Appendix 3: Dialogue methodology

Participant selection

For our region, potential dialogue participants were identified through existing research and practice networks such as the UQ Mental Health and Climate Change Research Network, the Climate and Health Alliance and professional connections of the Regional Community Team. Additional participants were recruited from respondents who had signed up to become part of the community of practice via the global CCM website, and through cold-emailing relevant individuals identified from web searches of relevant research institutes, non-profit organisations and government departments. Confirmed participants also recommended colleagues to us, whom we then contacted directly.

Dialogue agendas

Minor amendments were made to the dialogue agendas provided by the global team, and those edits were based on discussions with the co-convenors. In Dialogue 1, some amendments were made to the facilitator instructions for the breakout sessions, e.g., by simplifying the instructions and providing regionally relevant examples in the hazards identification table and the research theme development table, across each of the four research categories. We had seven breakout groups (each with one facilitator and one note taker); three groups were intentionally composed of participants from the Pacific and Aotearoa New Zealand to facilitate discussion of issues specific to the sub-regions. In Dialogue 2, the breakout groups were organised based on the participants' indicated preference for the research-focused or policy-focused discussion topics. We amended the jamboard for feedback on the research topics, which was not organised according to research categories, as the topics were generally cross-cutting and we wanted to leave open the opportunity to specify research questions that could address any of the categories under a specific theme. Participants received an overview of the 21 research topics on the first two pages of the jamboard and were asked to skip to the topic that appealed to them most or with which they had the most experience. Participants were not required to comment on multiple topics, although they could do so if they wished. For the breakout sessions, facilitators shared their screen (showing the breakout jamboard), and participants were welcome to add information directly onto the jamboard or to verbalise their thoughts (which was captured in the audio recording and later transcribed). Finally, for the spectrum mapping exercise, the three concepts that were selected, based on discussion among the co-convenors. were 'mental health,' 'resilience' and 'climate justice,' as these reflected central concepts that emerged in Dialogue 1 and also reflected key discussion points in the academic literature in the region.

The dialogues were held in English. Although the region is home to many cultures and language groups, English is widely used and understood across the Pacific. At the invitation stage, we also sought feedback from prospective participants on accessibility needs. No additional accessibility changes were made. During Dialogue 1, a mental health professional was on hand in a separate psychosocial support (virtual) room to provide any assistance (this was not used during the meeting). Facilitators had completed at least basic training in psychosocial support or psychological first aid. Participants received additional regionally specific information for support services.

Finally, a small number of invitees who were unable to attend Dialogue 1 expressed interest in contributing post hoc. Two individual consultations were scheduled to discuss the topics of the breakout sessions. This information was combined with the dialogue materials for analysis.

Appendix 4: Survey methodology

The pre-dialogue survey was intended to gather demographic information about the participants, their awareness of, and personal or professional experience with climate change and/or mental health issues. Accessibility requirements were also asked to ensure that dialogues could be designed to suit the needs of participants. The post-dialogue survey was intended to (a) collect additional feedback on the draft research topics after they had been reviewed on the basis of discussions held during Dialogue 2, and (b) collect feedback on the project as a whole. Both surveys were implemented on Qualtrics and the link was distributed via email.

The pre-dialogue survey was sent to dialogue participants only, while the post-dialogue survey (sent out after Dialogue 2) was sent to both dialogue attendees and the wider regional community, composed of individuals who had expressed interest in receiving project updates. Survey recipients were also asked to forward the post-dialogue survey to others within relevant networks. For those who had not attended the dialogue(s), the invitation to complete the survey included a Participant Information Sheet and a digital consent form. The dialogue participants had already consented as part of the dialogue process.

Appendix 5: Research agenda methodology

The development of the regional research agenda is based on the Dialogue 1 breakout sessions, which focused on mapping insights across the four research categories: impacts, risks and vulnerable groups; pathways and mechanisms; mental health benefits of climate action (adaptation and mitigation); mental health interventions/solutions/actions in the context of climate change (Breakout 1), and, secondly, the identification of research gaps and needs within this framework (Breakout 2).

The analysis was conducted by the core members of the Oceania RCC using the Framework Method – a matrix-based approach that allows qualitative researchers to undertake deep interrogation of transcripts and written notes. The analyst team populated a matrix based on the global coding framework by creating nuanced summaries with key quotes drawn from the notes and transcripts of the break-out discussions. This was an iterative process of reading, establishing initial codes, deriving themes, cross-referencing the themes against the provided global coding framework and adapting the latter as needed. In broad terms, the process was as follows:

1. Read the breakout room notes and transcripts of the recordings, as well as additional information shared with us after the dialogue by individual participants who either emailed after the dialogue with further comments or informants who were consulted post hoc.
2. Applied the global coding framework as an initial guide to organise the statements of the participants. As needed, statements were re-formulated as a research question before being added to the coding framework.
3. Added additional research categories to the coding framework as novel ideas emerged. Ultimately, only one additional category was retained ("Education and awareness raising"; this category captures research on capacity building among healthcare providers and support workers, researchers, funders and other stakeholders, public awareness of climate and mental health, and other communication and education challenges and opportunities). Statements that did not fit the framework, but that were deemed informative for context, were noted and retained in a separate document.
4. The final coding was reviewed by at least two analysts, and additional themes were reviewed and retained by consensus.
5. To further reduce and synthesise the content (the number of statements/potential research questions exceeded 300), we grouped individual research questions that expressed linked ideas, even if they fit under different pre-specified research categories. These groups represented cross-cutting themes that were not restricted to a single research category.
6. The creation of these research themes was reviewed by the team of analysts and refined by consensus.
7. Research themes (rows) and categories (columns) were combined into a table, with the individual research questions represented in the cells of the table, to fully represent the breadth and depth of the insights (Appendix 10).
8. The preliminary list of research themes was further refined in discussion with the global team to ensure that the themes were clearly articulated, accessible to non-experts, and sufficiently distinct. Selection of priority research themes adhered to a globally developed structure and selection criteria (e.g., potential to answer greatest regional emerging needs and evidence gaps, potential to inform decision making in policy and practice, research feasibility; for full detail refer to Appendix 12).
9. Research themes were then shared with Dialogue 2 participants who gave feedback in response to the following prompts:
    a. "What would be the most urgent thing within this topic to understand and respond to?"
    b. "Please share any ideas on datasets, metrics or methods that could be applied to help address this."

    Participant feedback was used to modify the research themes and underlying questions by adding new questions to the research themes, merging similar concepts into a single research question, and making changes to the formulation of the research themes where required.

10. The amended themes were then shared with dialogue participants and a wider sample of experts in the post-dialogue survey. Participants provided free text responses to the question '*Is there anything you would like to change, remove or add to this research theme?*' and were given the option to suggest additional research themes. As with previous rounds of comments, novel research questions were added to the relevant research themes and identified under a given research category. Several direct suggestions for refining the formulation of the research themes themselves were incorporated.
11. A final list of priority research themes was generated based on incorporation of survey feedback, consultation with the Regional Community Team and regional experts, the CCM core team, Global Advisory Board, and Wellcome.

The additional statements and comments that did not fit the requirements of research questions were retained for context, but not included in the research themes/categories table. These statements covered epistemological and ontological questions related to climate and mental health research (i.e. questions related to what can we acquire knowledge about and how we determine validity, scope and methods of acquiring knowledge), as well as questions that address the current and ideal state of research and how this might be translated into policy. Therefore, these insights were considered in the second part of the analysis, in combination with the findings from the breakout sessions of Dialogue 2.

Coding framework for the research agenda

Research Category	Sub-categories
1. Impacts, Risks and Vulnerable Groups This category is about improving our understanding of the ways in which mental health is affected by climate change. For example, what mental health outcomes are impacted or at risk, the prevalence, severity, economic and societal cost of these impacts, and who is more vulnerable to these impacts. This category also includes the	*Cross cutting considerations to keep in mind for all sub-categories:* *Timeframe* *Geographical variation*
	1.1. Research that focuses on the **prevalence, severity and nature** of the experience of different mental health outcomes/challenges/experiences affected by different aspects of climate change. This may include research to understand the emergence of climate-specific mental health experiences and their relationship to already defined mental health challenges.
	1.2. **Quantifying the fraction of mental health burden** (including mortality) caused by climate change.

ways we can go about getting this improved understanding of mental health impacts of climate change - the methods and metrics we need to assess and monitor mental health in ways that are relevant to climate change, contextually appropriate, comparable etc.	1.3. Understanding the **risk factors to mental health** that are caused or affected by climate change as well as **protective factors**.
	1.4. Identifying **population sub-groups** (e.g. demographics, livelihoods, life stage, pre-existing mental health challenges) who experience **increased vulnerability** to mental health challenges caused by climate change, and conversely those experiencing **resilience** to these effects (i.e. vulnerable groups).
	1.5. **Quantifying the cost** (e.g. economic, social) of the additional mental health burden caused by climate change and insufficient climate action.
	1.6. Methods research to identify the **most appropriate ways to assess and monitor the mental health impacts of climate change** [including adapting pre-existing scales, creating new ones, determining appropriate mental health metrics and indicators for inclusion in global processes like Lancet Countdown]. This can also include the need for cross-cultural validation and development of culturally appropriate metrics.
2. Pathways and mechanisms This category is about improving our understanding of *how* mental health is affected by climate change. We are interested in research themes that can help identify, categorise and understand the range of ways that climate change or climate action may act to affect mental health. This can include considering pathways and mechanisms that are biological, psychological, societal or environmental in nature, and may be direct or indirect. Note that mechanisms can	<u>*Cross cutting considerations to keep in mind for all sub-categories:*</u> *What factors are linked with increased vulnerability or increased resilience for the associated mental health outcomes.*
	2.1. Categorising and understanding the **societal mechanisms** by which climate change negatively impacts mental health [e.g. changes to livelihoods, disruption to cultural practices, food and water insecurity, forced migration, political factors]
	2.2. Categorising and understanding the **environmental mechanisms** by which climate change negatively impacts mental health [e.g. air pollution, reduced exposure to biodiversity]
	2.3. Categorising and understanding the **psychological mechanisms** by which climate change negatively impacts mental health [e.g. how temperature affects cognitive changes relevant to symptoms of mental health challenges].

include mechanisms to the development, maintenance, and/or resolution of mental challenges, so this includes also mechanisms relevant to guide development or understand workings of interventions	2.4. Categorising and understanding the **biological mechanisms** by which climate change negatively impacts mental health [e.g. impacts of psychotropic medication on thermoregulation, neurodevelopmental factors].
	2.5. Understanding mechanisms whereby climate action or mental health **interventions benefit climate and mental health** (i.e. co-beneficial mechanism).
	2.6. Methods research to identify the **most appropriate ways to assess and monitor pathways and mechanisms** by which climate change negatively impacts mental health and wellbeing (e.g. systems mapping across disciplines)
3. Mental health benefits of climate action [adaptation and mitigation] This category is about how climate adaptation and mitigation actions, across sectors, can also have win-win benefits for mental health. This includes quantifying costs and benefits of climate action for mental health, understanding what is needed to support better alignment between climate action and mental health action, and identifying where this integration is already happening across strategies and policies.	3.1. **Identifying climate actions** that integrate or align with mental health benefits [co-beneficial climate actions, e.g. increased tree cover in cities]
	3.2. **Quantifying co-benefits of climate action** for mental health (including number of people experiencing the benefit, size of effect, economic considerations).
	3.3. Exploring how the mental health costs and benefits of climate action may **differ across population sub-groups** (e.g. demographics, livelihoods, life stage)
	3.4. Understanding the **governance structures/decision support tools** that enables alignment of action for climate change and for mental health across sectors
	3.5. Mapping and monitoring the integration of mental health within **adaptation and mitigation policies** across sectors [e.g. National Adaptation Plans, energy, transport, food, water, agriculture]
	3.6. Exploring opportunities for mental health to be integrated into **other climate priority areas** i.e. loss and damage and climate finance.
	3.7. Determining best approaches for climate action (e.g. emissions reductions or climate adaptation) **within the mental health sector** (ensuring psychiatric facilities can be kept cool in heat waves; green space projects in mental healthcare facilities)
	3.8. Methods research to identify the **most appropriate ways to assess and**

	monitor mental health benefits of climate action [e.g. place-based approaches, methods for attributing and quantifying co-benefits, methods for assessment of the mental health implications of decisions in other sectors]
4. Mental health interventions/solutions in the context of climate change This category is about identifying the most effective mental health interventions/solutions to support mental health in the context of climate change. This might be about providing support to people already experiencing negative mental health impacts, or about reducing risk or severity of future negative mental health impacts. This includes learning from knowledge held by different disciplines, communities and cultures, understanding how existing mental health interventions are affected by climate change, identifying and evaluating existing interventions that are relevant to the context of climate change, and developing new interventions. Interventions are relevant at all levels (individual, family, community, systems) and across sectors.	<u>*Cross cutting considerations to keep in mind for all sub-categories:*</u> *LEVEL (e.g.)* *Individual, Family, Community, Systems* *MECHANISM (e.g.)* *Biological, Psychological, Social, Environmental* *SECTOR (e.g.)* *Education, Healthcare, Public Health* *Effectiveness considerations include impacts across different population groups, and implementation considerations might include providers, cost and time.*
	4.1. Understanding different **ways of knowing, being and doing** in different cultures and communities that can build individual, community and ecological resilience
	4.2. Understanding how **existing mental health interventions are affected** by climate change
	4.3. Identifying and evaluating mental health interventions that are **already designed for or relevant to the context of climate change** and/or integrate climate change considerations
	4.4 Amending, implementing and evaluating relevant **mental health interventions from other settings** to be appropriate for climate-related impacts?
	4.5. Co-designing, implementing and evaluating **novel interventions** that meet climate-related mental health needs

	4.6. **Comparing** cost-effectiveness, implementation considerations, and effectiveness across interventions for a particular setting and particular population group to determine "best buys"
	4.7. Identifying, developing and evaluating approaches to **awareness-raising and capacity building** to upskill workforces to recognise and respond to the mental health impacts of the climate crisis (e.g. mental health professionals, emergency responders)

Appendix 6: Action agenda methodology

The development of the action agenda is based on the Dialogue 2 breakout sessions, which focused on discussing (a) creating knowledge through research and (b) fostering evidence-based policy and action. For both of these discussion topics, the participants reflected on four distinct elements: (1) what the desired state of research/policy is, (2) what opportunities or enablers exist, (3) what challenges need to be overcome, and (4) who the key partners and stakeholders are. We employed a similar thematic analysis as for the research agenda:

1. Read the breakout room notes (transferred from Jamboard to Excel sheets) and cross-reference the written notes with transcripts of the recordings to ensure that all statements were captured.
2. Applied the provided coding framework as an initial guide to organise participants' statements, i.e. linking statements to the aforementioned high-level topics.
3. Thematically analysed the statements to identify recurring themes under each high-level topic. The initial analysis was conducted by one analyst and subsequently reviewed independently by at least 1 other analyst. The final themes were agreed by consensus.
4. A description of each theme was generated and example statements were selected that illustrate the core meaning of the theme. A table was generated to represent the high-level topics with the underlying themes.

Coding framework for the action agenda

Action Category	Sub-category
1. Creating an enabling environment for research at the intersection of	1.1 **Desired state of research** • This code captures *what good looks like* for climate change and mental health research in the region that implements the research agenda.

climate change and mental health	• What are the features of the kind of research that is desired or valuable? Are there specific attributes or milestones that would signify this state of research?
	1.2 **Opportunities and enablers** • This code captures opportunities to progress the climate and mental health research field in the region towards the desired state, and factors that would enable progress. May be general or specific, and may link to what is required to overcome the challenges outlined in the next code.
	1.3 **Challenges holding back research** • This code captures challenges that are stopping the climate and mental health field in the region from currently being in the desired state, or are predicted to emerge in trying to create investment in and implementation of the research agenda.
	1.4 **Partners/stakeholders** • This code captures any key individuals, organisations or stakeholder types identified as being particularly important to engage for implementation of the research agenda in the region and securing required investment.
	1.5 **Priority next steps/recommendations to investors and actors** • This code captures the concrete next steps that need to be taken as priorities to create the conditions in the region to implement the research agenda. • This section will be used in the agenda to inform potential investors and key actors/decision makers where the priorities should be for next steps.
2. Translating a growing evidence base into action that can respond to the mental health impacts of climate change	2.1 **Desired state of evidence to action in policy and practice** • This code captures *what good looks like* for action on climate change and mental health in the region based on current and future evidence. • What are the features of the kind of pathways for translating evidence into action that are desired or valuable? Are there specific attributes or milestones that would signify that evidence-based action is occurring?
	2.2 **Opportunities and enablers** • This code captures opportunities to progress evidence-based action on climate and mental health in the region towards the desired state, and factors that would enable progress. May be general or specific, and may link to what is required to overcome the challenges outlined in the next code.
	2.3 **Challenges holding back action**

	• This code captures challenges that are stopping desired actions to protect mental health from the climate crisis in the region, or to enable co-beneficial climate action. The code may also include challenges that are predicted to emerge in trying to ensure that current and future evidence translates into change on the ground and at all levels of policy and practice.
	2.4 **Partners/stakeholders** • This code captures any key individuals, organisations or stakeholder types identified as being particularly important to engage for translation of evidence into relevant action and securing required investment.
	2.5 **Priority next steps/recommendations to investors and actors** • This code captures the concrete next steps that need to be taken as priorities to translate the emerging evidence base on climate and mental health into action in policy and practice. • This section will be used in the agenda to inform potential investors and key actors/decision makers where the priorities should be for next steps.

Appendix 7: Participant overview

Dialogues

Dialogue participants were a diverse group across geographical spread, gender, sector, and discipline. For the first dialogue, we aimed to recruit ~50 participants, but given the expected availability and attrition rates (no-shows), we sent invitations to a much larger number (n=129; 25 declined, 43 did not respond and 1 response was incomplete and lost to follow-up). For the second dialogue, we invited all existing dialogue participants but anticipated that a substantial proportion would not be available due to scheduling conflicts and also focused on recruiting new participants, using the same approach as for Dialogue 1.

Of the 60 people who agreed to participate by completing the consent form and pre-dialogue survey, 50 actually participated in Dialogue 1. We recruited an additional 10 participants who had expressed interest in Dialogue 1 but had not been able to attend (n=3), and new participants (n=7), for a total of 32 participants in Dialogue 2. All participants provided prior written informed consent.

Pre- and post-dialogue survey

We received 64 responses to the pre-dialogue survey. Women were over-represented in the respondents (n=46); the remaining respondents identified as men (n=16), non-binary/other gender (n=1) or did not disclose their gender (n=1). Respondents were based in Australia (n=37), Aotearoa New Zealand (n=12), Fiji (n=3), Solomon Islands (n=2), Kiribati (n=2), Cook Islands (n=2), Niue (n=1), Palau (n=1), Papua New Guinea (n=1), Samoa (n=1), Tuvalu (n=1), and Vanuatu

(n=1). Most respondents were active across multiple sectors[iii], but most commonly in research (n=25), non-governmental and community organisations (n=21), advocacy and activism (n=21) or education (n=20). Thirteen respondents identified as having lived experience. Other represented sectors were policy (n=17), healthcare (n=14), funding (n=4), and "other" (n=9). The participants held a wide range of expertise across many disciplines, including:

- Mental health
- Mental health policy
- Social and behavioural science
- Climate justice
- Health equity
- Public health
- Psychology
- Sustainable development
- Climate adaptation and resilience
- Climate finance
- Climate mitigation
- Climate policy
- Health
- Psychiatry
- Determinants of health
- Healthcare
- Epidemiology
- Global mental health
- Media studies
- Health economics
- Human rights

Additional expertise, represented by the participants included Aboriginal mental health and wellbeing, Indigenous knowledge systems, addiction studies, arts and culture research, Pacific child health/child protection, climate change communication, climate migration, disaster risk management, ecology and biological science, feminist theory and praxis, LGBTQI+ rights, rural and farming community health, energy systems and renewable energy transition, and youth mental health.

We received 23 responses to the post-dialogue survey, of which 15 had attended at least one of the dialogues. Women (n=16) were again over-represented among respondents; the other respondents identified as men (n=3), non-binary/other gender (n=1) or did not provide details (n=3). Respondents were based in Australia (n=14), Aotearoa New Zealand (n=2), Fiji (n=1), Papua New Guinea (n=1), Samoa (n=1), and Solomon Islands (n=1); three did not provide information on their location. Several of the respondents were professionally active across multiple sectors, but the most well-represented sector was research (n=14), followed by

[iii] The numbers of people in each sector therefore exceed the total N for the survey as most people identified as working, or having worked in at least one, but often multiple sectors.

education (n=12). Participants also worked in healthcare (n=9), non-governmental or community organisations (n=6), advocacy and activism (n=4), policy (n=3), and/or had expertise through lived experience (n=7). As was the case with the pre-dialogue survey, we were able to access a wide array of relevant expertise (see list above), as well as additional expertise in outdoor health/bush adventure therapy, climate-related migration, mental health nursing, community engagement and outreach, and social work.

Appendix 8: Data collection and storage

Dialogues

Dialogues were conducted virtually on Zoom. Dialogues and breakout groups were recorded and transcribed by third party providers (Way with Words and Absolute Translations), and Zoom chat comments were saved. In dialogue 1, Word documents were used to capture notes from breakout discussions. In dialogue 2, Jamboard was used to capture notes and for participants to directly contribute comments.

Surveys

Survey distribution and data collection was carried out using the online platform Qualtrics. All survey data was collected by Imperial College London and anonymous data shared with [RCC] for analysis.

Data storage and sharing

Data was stored and managed by Imperial College London using a secure server. Data will be stored by Imperial College London for 10 years after study completion.

UQ was a Joint Data Controller for the data provided to this project for Oceania and responsible for securely storing and sharing data with Imperial College London and with regional analyst teams.

In accordance with local data storage requirements, as specified in the study protocol ratified by UQ, all research data (e.g. survey responses, interview notes, dialogue transcripts) were stored on a secure server. The Research Data Manager (RDM) system is a robust, world-leading system designed and developed at UQ, ensuring that data is securely stored in line with best-practice. Only members of the convening team and select members from the global team had secure access to this data. Other information that was used in the management of the project (e.g. spreadsheets containing publicly available details on dialogue attendees, invitation lists, dialogue agendas and other documents shared by the global team) were stored on Google drive.

Appendix 9: Climate hazards in Oceania

Observed climate-related hazards in Oceania and projected changes[39, 40]

To guide informed discussions on the current and potential mental health consequences of current and future climate change in the region, it was vital to ensure a grounding in climate science. The Red Cross Red Crescent Climate Centre (RCCC) conducted a mapping of previous and projected climate hazards across the region to inform the dialogues and research agenda. The following is a summary of the climate-related hazards that Oceania has experienced over

the last 30 years, and their projected increases due to climate change modelled to approximately 2030 as compared to historical baseline (generally 1986-2005).

It is important to emphasise that the data gathered for the past and future periods differ not only in spatial resolution but are also based on different underlying principles. The former are through observations or documented occurrences such as those reported by national weather services and are aggregated at a country-scale. The latter are from climate modelling-based studies and assessment reports published by the Intergovernmental Panel on Climate Change (IPCC), which are at a more granular spatial scale. For the same reason, the categories of climate-related hazards in the past and future periods may at times not be identical, but are generally comparable or related. For instance, flooding that is reported as a relevant climate hazard in the last 30 years here is not a direct output of global climate models (GCMs). Instead, the underlying meteorological variable (rainfall) from the simulations of GCMs are used for deriving indices that can be considered as a proxy for potential flooding in a future warming climate.

Oceania

The region of Oceania is highly vulnerable to the effects of climate change. Oceania frequently experiences droughts, bushfires, floods, landslides, storms and extreme temperatures in recent years, as made evident by the international disaster database EM-DAT (https://www.emdat.be/). Note that the limited number of extreme events recorded (e.g. floods, landslides and extreme temperatures) may be due to the missing records in the EM-DAT data for various reasons, such as poor or limited network of satellite and surface observations over the region, or limited reporting from national meteorological services. In addition, the spatial aggregation of the data to country-scales makes it difficult to map the occurrence of the past hazards to human settlements. The total number of people affected as reported in EM-DAT therefore may not always be truly representative of the frequency of occurrences of the underlying climate hazard. For instance, a country in Oceania may have experienced frequent heatwaves, but if these events were not recorded or in uninhabited regions, the total number of occurrences discussed below may be an underreporting.

Previous Droughts

While data showed droughts and wildfires were not of the most frequent natural hazards across this region, Australia witnessed the highest number of droughts and wildfires with 10 events occurring in between 1991-2022, affecting[iv] nearly 1.2 million people (Figure 1, top) on average during this period. New Zealand, the Marshall Islands and the Solomon Islands experienced 3 droughts and wildfires within this period, collectively affecting about 11,000 people on average.

Previous Floods

Australia, Papua New Guinea and New Zealand were particularly prone to floods and landslides with Australia experiencing 41 floods between 1991-2022, affecting about 8,000 people on average (Figure 1, middle). Floods also affected some 25,000 people in Papua New Guinea and 18,000 people in the Solomon Islands during this period.

[iv] Note, EM-DAT definition of “total affected” accounts for “the total of injured, affected, and homeless people.”

Previous Extreme (Hot) Temperatures and Storms

Australia experienced some of the most extreme (hot) temperatures and storms in Oceania, with near 40 occurrences affecting about 188,000 people on average between 1991-2022 (Figure 1, bottom).

Note, EM-DAT definition of "total affected" accounts for "the total of injured, affected, and homeless people".

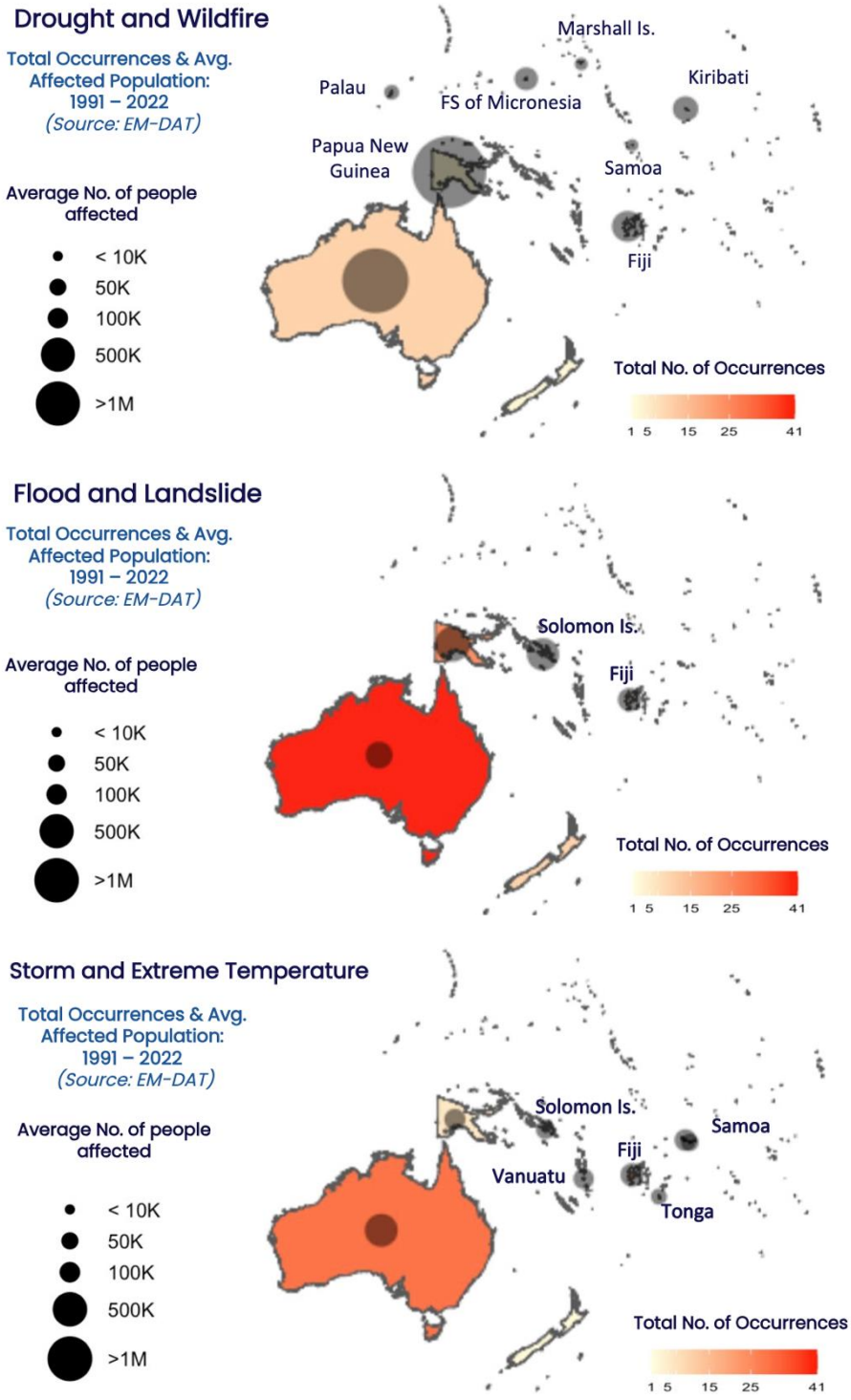
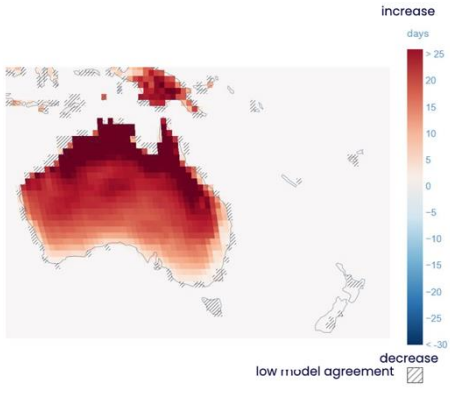


Figure 1. Number of reported droughts and wildfires (top), flood and landslides (middle) and storms and extreme temperatures (bottom) between 1991-2022. Red legend depicts the total number of occurrences of each category of hazard between 1991-2022, the black circle size is representative of the average affected population in that period.

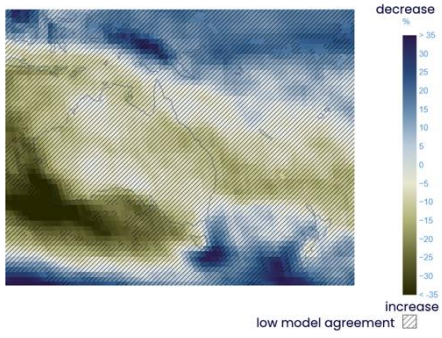
Future Projections

Future projections are based on the middle of the road emissions scenario (SSP2-4.5 Shared Socio-economic Pathway) from the Coupled Model Intercomparison Project - Phase VI (CMIP6) multi-model GCMs ensemble provided in the IPCC, 2021. While not the worst-case emissions scenario, SSP2-4.5 assumes that the 2015 Paris agreement commitments are not achieved and 2°C global warming is not avoided.

- Mean and extreme temperatures: Future projections show a strong increase in extreme heat across Australia (high confidence) with this increase in hot temperature mediated by the warming of the ocean (Figure 2a). Northern Australia is projected to be particularly affected by the high increase in the number of hot days above 35°C, as this expanse will experience an increase of more than 25 hot days above 35°C in 2030 compared to 1986-2005 (high confidence).
- Droughts and wildfires: Projections displaying the average change in droughts for 2030 relative to 1986-2005 show an increase in fire weather in Australia and an increase of aridity over the Pacific Islands (medium confidence) (Figure 2b).
- Heavy precipitation events and flooding: The frequency and intensity of extreme rainfall will increase in the western tropical Pacific around 2050 and Papua New Guinea will experience a projected increase in extreme rainfall (high confidence) (Figure 2c). However, the projections are less clear for large parts of Australia, New Zealand the Pacific Island nations, with low to medium confidence in both frequency and intensity. Sea level rise: Relative sea level rise is projected to continue in the 21st century-, contributing to increased coastal flooding and shoreline retreat along sandy coasts throughout Australasia (high confidence).
- Tropical cyclones: In Oceania, more specifically the Pacific Islands, models generally project a decrease in frequency yet an increase in intensity of Category 4-5 tropical cyclones. Although the spread (indicating the range of change across models) is wide, the median increase is projected to be around 3% relative to 1986-2005 (low confidence).

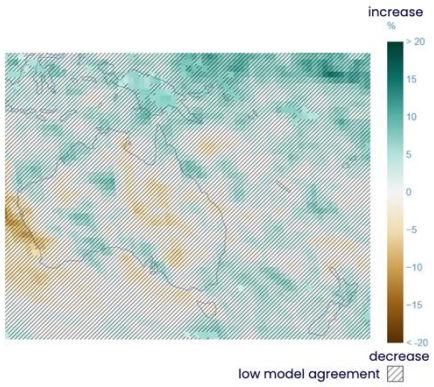


a)



b)

c)



Appendix 10: Research agenda

	RESEARCH CATEGORIES				
RESEARCH TOPICS	**Impacts, risk, and vulnerable groups**	**Pathways and mechanisms**	**Mental health benefits of climate action**	**Mental health interventions in the context of climate change**	**Education and awareness raising**
	Identifying and quantifying compound effects of multiple/repeated climate disaster exposures at the individual level, at the interpersonal level and community level. That is, how does the accumulation of climate-related trauma affect coping?	How do vulnerable populations and communities recover from trauma in the face of compounding and cumulative climate impacts?	How do we minimise the impact of climate change on mental health as part of resilience programs?	Assessing current approaches to counselling in the context of repeated exposures to climate events and pre-traumatic stress	Can we develop effective psycho-education around repeated exposure to potentially traumatic climate events?
	What is the full range of trauma responses to cumulative climate risk exposures? It's important to understand how people are impacted differently by the different impacts of climate change.	What factors are needed to prompt collective psychosocial resilience and post-trauma growth?		How do we best support people at the community-level?	

	What are the mental health impacts of the more chronic and cumulative impacts of climate change (as opposed to acute extreme weather events)?				
	What effect will cumulative and compounding climate impacts have on mental health services?				
	What is the impact of air pollution from fires or prescribed burning on mental health on vulnerable groups?				
	Can we measure impacts by linking meteorological data (temperature, humidity, rainfall, pressure, cyclones, etc.) with objective health records such as doctor's visits, hospital admissions for mental health reasons?				

	Quantifying (including economically) the psychological impact direct climate-related mental health impacts.				

1. The mental health and wellbeing implications of climate hazards, in particular where it relates to repeated, chronic and compounding events. Climate hazards include singular or repeated extreme weather events (e.g., cyclones, heatwaves, flooding, bushfires) as well as chronic	What are the mental health issues affecting survivors of sexual and gender -based violence in the aftermath of disasters? [and how best to respond?]				

impacts (e.g., drought, sea-level rise).					

2. The mental health and wellbeing implications of government (in)action on climate change (or actions that contribute to climate change, such as fossil fuel expansion) and conversely, opportunities to use mental health impacts as argument/leverage for action on climate change.	How can we identify and quantify the mental health and wellbeing impacts of government decision-making (including inaction) in relation to fossil fuels and rhetoric on climate action? [Note: measured in psychological and economic terms]				Can poor mental health/wellbeing consequences of government inaction be used to communicate to governments the importance of halting fossil fuel expansion?

3. Understanding the impacts of integrated mental health and climate change policies across sectors in terms of benefits for people's mental health and wellbeing.			Can integrating the mental health impacts of climate change into related public policy be impactful?		
			How are policy decision making processes (e.g. inclusion of public voices and forums) and dissemination platforms impacting the wellbeing of those affected by the policy?		
	What is the experience of solastalgia and its association with the mental health of communities where there have been significant environmental or landscape changes?	How does pre-traumatic stress, including from previous direct or indirect climate exposures and no prior exposures, influence population mental health during seasons or conditions of increased climate risk events (e.g., bushfire season)?		Can promoting a more granular understanding of the emotional responses to climate change support better wellbeing, as opposed to perpetuating anxiety and despair (e.g. anger as a constructive response)?	How effective is training/education on coping strategies in the context of climate change?
	What emotions is "climate anxiety"	How are the vicarious impacts (witnessing,		Certain psychological responses are normal and	How do we equip teachers/educators

	actually composed of (e.g., grief, anger etc) and how are different emotions/reactions related to climate action/PEB?	knowledge and/or awareness) of climate change influencing mental health and wellbeing?		adaptive. They can help with coping and action; can talking about climate and grief/distress as normative responses lead to better wellbeing outcomes?	(and others involved in caring for people) with the skills to support the emotional and psychological aspects of teaching about climate change? Including caring for their own emotional and psychological needs.
	How can we better understand and quantify the full extent of the psychological impact of climate anxiety (e.g. screening, measurement tools, understanding impact to functioning, economic impacts)?	How does the inability to conduct Aboriginal cultural practices which safeguard Country impact wellbeing?		Which coping strategies are most effective for both people and environmental outcomes?	Does normalising the emotional reactions & responses through education promote good mental health/prevent mental ill health?
	Do western-framed concepts [e.g. eco-anxiety, solastalgia, ...] resonate across Oceania?	What is driving the psychological distress? Is it fear of the future? Government inaction? Clear conceptualisation may lead to solutions that go beyond mental health services.		Can climate cafes support mental health?	How can we address the uncertainty and change as well as offer tools for coping and taking action?
	What is the difference between clinical mental			Is collective action, community rallying more	

	health issues and appropriate levels of climate emotions given the situation? This would best be addressed through longitudinal studies, and with most at-risk populations.			effective against feelings of helplessness (e.g. compared to individual level mental health support)?	
	What role does media/social media play and what's needed to safely remain aware?			Are traditional mental health tools for anxiety etc such as Cognitive Behaviour Therapy (CBT), appropriate for responding to climate anxiety? For example, traditional tools are focused on 'irrational' fears, whereas a fear of climate change is completely rational and CBT or positive affirmations may not be helpful.	
	What is the weight that women carry when deciding whether to have a family or not, which may feel contradictory to their instincts and how can they cope with that?			Can we develop therapeutic tools that take into account power, systems, privilege, disadvantage, intersectionality, and activism?	

4. Understanding and responding to the psychological impacts of climate change awareness from personal or vicarious experience (e.g., understanding phenomena such as eco-anxiety, solastalgia and grief; how these experiences vary between individuals and culturally; and how they	Does the term solastalgia adequately describe the feelings and thoughts that Indigenous people have about their environment?			Investigate ACT (Acceptance and Commitment Therapy) work as a tool for these types of thoughts? It is rarely used in a clinical space at the moment.	

relate to mental health and wellbeing outcomes).					
	How does accessibility of communication about climate risks and disaster responses impact the mental health of neurodiverse and linguistically diverse communities?	How and why do people feel powerless under government action and policies, regardless of current messaging?		How do we take a strengths-based (or positive psychology) approach to promoting wellbeing through connection with our environment?	How do we communicate about climate change, including links with mental health, in a way that is accessible and suitable to different audiences (e.g. CALD communities, different age groups)?
	What is the impact of targeted communication needs on action-based groups such as Landcare and local environmental groups?	The problem is political and systemic, therefore interventions need to happen at this level. What are the benefits of people working together, as opposed to participating in individual therapy and individual solutions?		What is the impact and role of sustained positive messaging, e.g. utilising real-person motivators such as comedians to generate laughter and warmth? Humour is an under-researched wellbeing tool!	How do people around the region conceptualise climate change, and do they link observed local environmental changes to climate change?

					What novel and creative tools could be used to engage people on climate change, when they are not already thinking about it?
					What (if any) aspects or strategies for awareness raising on climate (and mental health) promote collective action-taking?
					Does improving mental health literacy and/or climate literacy promote (a) better health outcomes in relation to climate impacts; (b) more effective mitigation and adaptation?
					What are the informational needs in communities around adaptation and mitigation so

					that we can provide tailored resources?

5. Identifying and evaluating responsible, inclusive and effective climate change education and communication strategies that promote and support mental health and wellbeing (e.g., building competencies, literacy, agency and resilience rather than instilling fear and apathy; focusing on a strengths-based rather					How can these issues be included in learnings starting from early childhood? What is the effect of the use of sustainability competencies?

than vulnerability-based framework; and tailoring communication for culturally diverse communities, neurodivergent people, or people with a disability).					

	How is mental health impacted by the appropriateness and timeliness of disaster recovery and support (e.g. housing)?	What are the benefits/effects of dual approaches focused on both disaster preparedness and after-care/PFA, speaking about loss, and recovery (timelines)?	What is the potential role of faith communities and churches (especially in the Pacific) in promoting disaster risk reduction/preparedness and responses?	What are the most effective mental health interventions in post-disaster recovery?	What is the effect/effectiveness of public communication strategies/channels/ platforms focused on preparedness and resilience (when climate events occur)?
	How does social isolation impact mental health and wellbeing before and after a disaster?	How do government responses to climate hazards influence mental health outcomes?	Can multi-hazard risk assessments and warning systems at the local and regional level improve preparedness (and therefore mental health outcomes)?		
	How does this affect different groups of people in different ways?	What is the role of (social) media in this context?	How can we reduce inequity in disaster responses?		
	What is the interaction between mental health and preparedness for climate hazards?	What are the most effective communication channels and platforms for delivering wellbeing promoting prevention, preparedness, response and recovery?	How should disaster preparedness and responses ensure implementation processes are culturally informed in the Pacific?		

			What lessons from responding to COVID-19 can we apply in terms of communities responding to climate change?		
			How can we incorporate psychosocial planning into disaster preparedness for families and communities (e.g. evacuation plans), does it improve outcomes, and what language and skills are the best to include?		

6. Understanding the impact of climate hazard prevention, preparedness, response and recovery on mental health and wellbeing. This includes understanding the role of mediating factors (e.g., social determinants, characteristics of the target population) and delivery modes (e.g., social media, involvement of church groups and			Examine extending the PARA framework to include Repurposing for coastal communities (PARAR). This encourages a reframe from immediate response, defence and recovery to actively planning for options and solutions thus increasing resilience but only if coastal communities and gov and willing to invest in the huge amount that will be required to adequately 'repurpose', which is unlikely as they probably won't be alive long enough to see the benefits or 'repurposing' which would be long term (for more info on PARA framework, click on text)		

culturally informed processes).					
	What is the relationship between extreme heat and interpersonal conflict and violence?	Is increased stress in relation to climate impacts leading to more family violence in the Pacific?			How do we create awareness/education and identify the target groups [at risk of violence, or at risk of perpetrating violence]
	What is the relationship between climate impacts more broadly, and violence against specific vulnerable groups, e.g. women				

7. Understanding the relationship between climate impacts and violence (e.g., stress leading to increased family, domestic and group violence) and the implications for mental health and wellbeing.	What are the risk factors for climate triggered violence (could look at atrocity prevention [r2p] frameworks and early warning systems)?				
	What is the link between violence broadly defined (coercive and power abuse) and the impact of (climate/natural) disasters on violence against women?				

	Is there social, interpersonal and personal conflict for people in regions dependent on resource extraction, particular land use practices that are climate-unfriendly, particularly for young people, those working in the health sector, First Nations people and climate/environmental activists? How are people coping with those tensions?				
	Does divisiveness on climate change lead to stigmatisation and impact mental health and wellbeing (e.g. among activists and/or the resource sector)?				

8. How dissenting views about climate change/climate action precipitate or exacerbate interpersonal conflict and the subsequent impacts on mental health and individual/community wellbeing (e.g., in communities highly economically reliant on extractive industries).	What is the impact of fossil fuel industries (gas) presence in culture & economy (marketing, sponsorship, etc) on interpersonal and community wellbeing in energy states eg wa				

	What are the mental health impacts of climate (risk) exposures amongst people living with a pre-existing mental illness? Need to record experiences of people with mental health conditions during disaster response eg when moved to shelters or unfamiliar routines, access to medication		Are the needs of people with pre-existing mental health conditions addressed in disaster plans in the Pacific?	How could we use clinical trials to test interventions for coping with climate change events in communities which are experiencing compounding mental health challenges (e.g., LGBTQ+)?	Which inner or psychosocial skills do people need (to develop) to cope well/with resilience in the preparation and response phases?
	What are the implications/outcomes for people with pre-existing mental health conditions when mental health services are disrupted due to climate events (given services are already limited)?			What social/ecological/psychological factors support the prevention of episodes of mental ill health in those living with a mental health condition?	
	What are the practical needs for people living with mental health conditions in terms of disaster preparedness and response? For			How can we rethink and test theoretical frameworks used to design interventions and measure outcomes?	

	instance, "stocking" for emergencies is currently not available for some medications.				

9. The mental health and wellbeing impacts of climate change on people with pre-existing mental health challenges (e.g., assessing whether pre-existing mental health needs are addressed in disaster prevention, preparedness, response and recovery plans, and effects of mental health service disruptions	What do we currently know about (e.g. via literature review on peer-reviewed texts) climate change and intellectual disability?				

due to climate change).					
10. Understanding and responding to the mental health and wellbeing implications of working on the frontlines of climate and environmental change (e.g., activists, academics, educators, professionals, and field workers).	What is the prevalence/severity of poor mental health and wellbeing outcomes (including burnout) among environmental professionals, and how do individual or collective experiences and other factors influence these? E.g., does lack of action/effectiveness of environmental protection work contribute to increased burnout and suicidality? Additionally, how does this impact on recruitment and retention?			What types of interventions can prevent burnout among those actively involved in climate change or environmental action/research? E.g., does Acceptance and Commitment Therapy benefit people working in this space?	
				How and where do we best support the mental health and wellbeing of people working on the frontlines of climate and environmental change across different areas	

				of work (e.g., academics, educators, professionals, field workers) and sectors (e.g. water, infrastructure, energy, agriculture)? E.g. peer support, in workplaces, mental health practitioners, trauma-informed interventions.	
	Does uncertainty around the future lead to greater (climate) anxiety among young people? If so, what aspects (e.g. economic uncertainty, climate impacts, career prospects, general security) lead to anxiety?	How do adverse childhood experiences related to climate impacts affect mental health and wellbeing outcomes in later life? [need for longitudinal research/cohort follow-up]	What post-disaster responses can build resilience in children?	Co-designing interventions with young people to support their mental health and engagement in climate action	
	To what extent do positive social factors (e.g. stable, loving home) mitigate against the negative mental health/wellbeing impacts of climate change on children, especially in the Pacific?	How do the educational impacts of climate change affect mental health and wellbeing (e.g. non-attendance)?		How can we best support parents to equip their children to thrive in a changing climate?	

	What are the mental health effects of fossil fuel industries presence in schools on children, parents and educators (i.e. petro-pedagogy)?			How can parents support children's wellbeing as they learn about the world and climate change?	
				What interventions, including educational interventions, can engender hope while maintaining a factual/realistic stance about the threat of climate change among young people?	
				What is the benefit/impact of existing mental health supports/interventions for children with a 'climate aware' lens?	

11. Understanding and responding to the unique challenges and opportunities for children and young people in the context of climate change, the implications for their development and the impacts on their current/future mental health and wellbeing (e.g., impacts of traumatic childhood				What climate anxiety interventions are effective for children and young people? What opportunities exist in schools/media/services?	

experiences including climate hazards; high rates of eco-anxiety/strong climate emotions; effects of socio-ecological uncertainty on future planning/prospects; "safe" participation in climate action; and parental and peer support).					

12. Climate-related migration and its impacts on mental health and wellbeing, and mediating factors (e.g., social cohesion, and cultural connection and knowledge).	What are the mental health and wellbeing impacts of climate-related migration and related factors (e.g., loss of culture, connection, statehood) in Indigenous populations, including people living in low-lying islands or atolls?	How do climate migration processes and experiences, including leaving home and resettlement, affect the mental health and wellbeing of Pasifika people (e.g. agency, choices, empowerment)?		What are the best ways to maintain cultural connections, including sharing of traditional skills with children, when planning for relocations, given the protective effect that cultural connection has for wellbeing in the Pacific?	
	What are the impacts of loss of land and climate migration on sense of identity and developing sense of self in Indigenous context?				

	What are the specific challenges faced by rural, regional and remote communities in Australia when it comes to mental health and climate change, and how do we prepare these communities for climate impacts while protecting mental health?	How do the economic impacts of climate change on small business and private enterprises affect the mental health and wellbeing of communities in regional/rural areas?	(How) do community connections and local support networks (especially in smaller, rural communities) promote disaster preparedness and resilience?	What are the outcomes and impact of community-support programs (especially in rural and remote communities) offering different approaches to mental health, including treating people holistically?	
	What is the differential effect of heat stress in regional/remote areas of Australia vs urban areas, e.g. in terms of hospital admissions, and community responses?	How do the mental health impacts of climate change affect farmers differentially (e.g., by gender, having children/or not, culture, farming type or practices)?		How do we improve access to mental healthcare services and sustainably build workforce capacity for rural and regional residents or what other models of care might be available to address this issue (e.g. digital health), in the context of limited existing services and potentially increased demand due to climate change?	
	What are the psychological effects, including loss, grief, solastalgia, of climate impacts including drought on farming	Has normalisation begun to sink in for isolated/rural communities? This can be assessed using long-term mental impact/state of		Do peer-to-peer interventions in farming communities promote better wellbeing and mental health (or reduce feelings of loss, grief, solastalgia)?	

	communities?	mind monitoring.			
	What impact does fear associated with chronic and cumulative climate impacts have on mental health and wellbeing in farming communities?			Does moving away from deficit language to strengths-based frameworks promote better mental health? This may be particularly important for rural and agricultural communities.	

13. Understanding the unique challenges and opportunities for mental health and wellbeing in rural and remote communities in the context of climate change (e.g., impacts on farming communities; access to mental healthcare; and holistic, culturally appropriate, community-based support).				How do we integrate disparate interventions and funding provided by different sectors to a connected, ongoing and sustainable support system for mental health in rural and remote communities in the context of climate change?	

	How does community-led and self-organised disaster recovery affect mental health?		Does community-level engagement in implementing disaster risk reduction plans promote better outcomes?	What are the mental health outcomes of externally-led psychosocial interventions compared with community-led interventions?	
			How do we incorporate Indigenous knowledge, lived experience and knowledge within communities to improve disaster preparedness and response?	What are the best holistic evaluation frameworks for co-designed local adaptation/mitigation interventions that look at process as well as outcomes?	
			How can community-led research help to create suitable adaptation plans for people with a disability?	What is the role of public and communal institutions/organisations (e.g. libraries, museums, galleries, sports clubs, land and bushcare groups etc.) in supporting mental health in the context of climate change?	

			What are the mental health and wellbeing benefits of community-led and hyper-local (village and district level) climate resilience plans in the Pacific?	How can we "de-medicalise" mental health support in the context of climate change, including exploring the role of peer-led, community-distributed approaches as a way to prevent distress and mental health conditions?	

14. Identifying and evaluating locally-led and co-created initiatives for climate mitigation and adaptation, and mental health support in the context of climate change (e.g., incorporating Indigenous knowledges and lived experience into mitigation/adaptation initiatives, evaluating				Does involvement in [local climate mitigation and adaptation] activities improve mental health (i.e. even if no impact is seen on climate change per se)?	

mental health outcomes of disaster response and psychosocial support).					

15. Understanding the role of the built environment on mental health and wellbeing in the context of climate change, including the impact of housing conditions and sustainable housing on vulnerability to climate-related impacts.	How does the resiliency of the built environment to climate change impact mental health and wellbeing?	How does climate change interact with housing conditions (e.g. inadequate heating and cooling, mould, proneness to flooding) to influence mental health, including social and emergency housing?	What are the mental health benefits of sustainable housing?		What specific awareness raising and education interventions might assist people in poor housing to better prepare and adapt to climate events?
	How do the effects on connectivity and transport as a result of climate hazards impact mental health and wellbeing?		How can we design urban environments for planetary health (co-benefits for mental/physical and ecosystem health)?		

	What are appropriate conceptual frameworks and measurement tools for the understanding of 'mental health' in the Pacific in the context of climate change?	What is the impact of environmental changes on livelihoods, cultural heritage, families and communities in low-lying coastal areas of the Pacific?	Assessing current mental health support and needs in disaster response in the Pacific	What are effective strategies for providing mental healthcare given the limited access to mental health services and low workforce in the Pacific?	Developing and sharing culturally-contextualised language around mental health in order to increase literacy and reduce stigma
	How can connection to place, cultural identity and family be integrated into a conceptual understanding of mental health and wellbeing?			What are the most effective frameworks/methods for addressing mental health and wellbeing needs following disasters in the Pacific? E.g., comparing community-based approaches and (mental) health services	
	How do Indigenous Pacific worldviews influence how people perceive themselves in accordance with the world and how to interact with the world?			How can we tailor mental health interventions to reconnecting to sources of wellbeing for Pasifika peoples, including cultural and spiritual practices, and relationships to place?	
				What role can churches play in the Pacific in building awareness and	

				capacity to respond to mental health in the context of climate change?	
				How can we ensure that different providers of mental health support in the Pacific communicate and work together?	
				How can access to mental healthcare be improved across the Pacific, noting potential discrepancies between how governments view their health systems and actual accessibility of services?	

16. Understanding and responding to specific challenges and opportunities in relation to mental health and wellbeing in the context of climate change in diverse geographies and cultures. This includes: the development of conceptual frameworks that integrate Indigenous ways of knowing, being and				How can we assess and implement sustainability of care over time and diverse options for care in the Pacific? This will require looking at the client's extent of support for the impacts of climate change beyond family support to village-level and extended family.	

doing; culturally appropriate language, interventions and supports; and navigating existing barriers including workforce capacity and access to quality mental healthcare in the Pacific.					

	Understanding and measuring repeated trauma exposure and responses among frontline workers (e.g., first responders and healthcare workers).			How do we overcome the psychosocial impacts of lowered access to health and social services after a disaster?	What tools/resources/training do (mental) healthcare workers need to better support climate-affected communities, especially in the context of multiple exposure scenarios, while accounting for their own wellbeing?
				How can we best support delivery and access to mental healthcare in the context of climate change e.g. digital interventions, integrated care, community-based care?	
				How many mental healthcare workers are climate literate/can provide climate-informed services and how effective are current 'climate aware practitioner' training models?	
				How can mental health professionals help develop community resilience?	

				Are health systems prepared to deal with increases in mental health presentations?	
				What role can mental health nurses and allied health professionals play in mental health prevention and response in the context of climate change?	
				How do we build resilience in the healthcare workforce and first responders in climate risk/disaster settings?	
				How are people accessing wellbeing support and mental healthcare and what are the barriers to people who are not accessing care e.g. financial barriers for low income families?	

17. Understanding the requirements for appropriate/effective mental healthcare delivery and access in the context of climate change (e.g., managing impacts of reduced service accessibility during and following climate hazards; climate literacy, training needs and				How can mental health services reorient themselves to promote wellbeing in a proactive, health prevention way rather than being reactive?	

wellbeing of service providers; community-based support; and reorienting systems towards mental health promotion and prevention).					

			What nature-based solutions are effective in protecting mental health and wellbeing; why and for whom?	Which theoretical frameworks and interventions incorporate a more holistic understanding of human-nature connection (planetary health perspectives; Indigenous Pacific worldviews) and can be used to improve mental health and wellbeing?	

18. Identifying and evaluating nature-based solutions and nature-based social prescribing as co-beneficial interventions for mental health and climate change (e.g., understanding best practice, developing theoretical frameworks, and ensuring tailored and equitable access).			Benefits of nature contact for mental health: studies should include people with comorbidities; how to ensure green spaces are resilient to climate change; how to design spaces that meet the needs of different people; challenge of nature reconnection after traumatic events; ensuring equitable access	How can we incorporate nature-based solutions and nature-based social prescribing into mainstream medical and mental health training e.g. 'arts on prescription' programs that include connection to nature?	

19. Understanding the interactions between systemic factors and structural inequalities and inequities such as gender inequality/patriarchy, colonialism, racism and capitalism and mental health outcomes in the context of climate change.	How do gender inequities influence mental health outcomes in the context of climate change?	What is the relationship between gender roles and mental health outcomes in the Pacific?	How do systemic and structural factors e.g. colonialism, racism, patriarchy, influence climate (in)action [and associated mental health outcomes]?		
	How can we apply an intersectionality-lens to issues connected with climate change? For instance, recognising that outcomes are worse for low-socio economic countries etc.		How can research bring to life alternative ways of being and living that are more ecological and equitable than the current dominant systems (e.g. capitalism, consumerism)?		
			What social determinants are needed to empower people to co-transform underlying causes of climate change i.e. materialism, competition, extraction?		

20. The interaction between physical and mental health in the context of climate change (e.g., how the physical health impacts of food and water insecurity affect mental health and wellbeing).	How do the physical health impacts of extreme heat affect mental health and wellbeing?	What are the significant interactions between physical and mental health in the context of climate change? (e.g., salination of water, food security/nutrition and mental health)			
		What are the phenomenological and experiential aspects in the intervention? This is more important than metrics evaluation.		What are the impacts of existing interventions [in the climate change and mental health space] at the individual, community and health system level and what are/how can we establish best practices?	

21. Designing, implementing and evaluating climate-informed and tailored interventions to prevent or treat the mental health impacts of climate change across the individual, community and health system level.				What are the most appropriate theoretical frameworks and mental health outcomes to measure in designing interventions to address mental health in the context of climate change?	
				Developing tailored interventions (to individuals, families and communities) from low to high-intensity to support mental health in the context of climate change	
				(How) can we prevent the development of mental health conditions in the context of direct/indirect climate events? Psychological distress is warranted, but mental health conditions are preventable.	
				What is the impact of alternative therapies delivery options (i.e. Telehealth, BodyDoubles) and co-designed contingency	

				planning?	
				Designing and evaluating interventions that are culturally sensitive and appropriate.	

Appendix 11: Online (Google) form to gather regional community perspective for the pre-dialogue scoping exercise

Section 1 of 3

Connecting Climate Minds, Oceania: What is your perspective on climate change and mental health?

If you live in the Oceania region (Australia, Aotearoa New Zealand, Pacific Island countries) and are over 18 years old, we want to hear your perspective on climate change and mental health.

We are the Connecting Climate Minds Oceania Team and we're looking for community insights, perspectives and reflections on the relationships between climate change and mental health. *Please note: we are looking for general observations, key themes and high-level summaries rather than individual lived experience stories. These observations may stem from professional or personal experience, being part of or working with communities affected by climate change and/or mental health challenges.*

Why?

We want to make sure this project is informed by the needs of individuals and communities from all parts of society, from all around the Oceania region. The more diverse perspectives we gather, the more useful the project will be!

How to share your view

Please fill in this form to share your perspective. Alternatively, you can send a file to a WhatsApp number, +61493626143, or to **suhailah.ali@uq.net.au**.

For those wanting more guidance, here are some optional questions and topics to help you formulate your response:

- Whose mental health and wellbeing is affected by climate change? In what ways?
- What are the biggest climate impacts that are contributing to poor mental health or wellbeing?
- What makes people or communities strong or resilient to the impacts of climate change?
- Is there anything that is making it more difficult for people or communities to cope with the effects of climate change?
- Are you aware of any community-driven activities, programs or supports that promote good mental health and wellbeing in the face of climate change?
- What do you think your community needs now, and into the future, to be well, live good lives, and fulfil their full potential?

We understand this topic can be emotive and raise anger, anxiety, frustration, hurt, etc. While we want you to express your thoughts and feelings, abusive or offensive behaviour directed at this number will not be tolerated. We do welcome your feedback on the process, e.g. if you have any advice on how we can improve this perspective-gathering initiative.

Please note that this organisation cannot provide specific mental health support. If you are concerned about your own mental health or someone close to you, please seek assistance with a local health service or speak to your doctor.

Do you know someone who would like to send their ideas? Please share this survey with your networks to help promote this opportunity for people to have their say.

What happens with the information

We will not share information about you publicly without your explicit consent and we will never use your personal information in any publication. We aim to summarise the insights and perspectives in a short brief to be presented to the dialogue participants to help set the stage for the discussions, as well as incorporating the perspectives into the final report summarising the dialogue findings. We will send links to both documents to all who have contributed to this perspective-gathering initiative.

For more information: www.connectingclimateminds.org/oceania

Are you over 18?

* (required)

Do you live, work or were born in any of the following? *You may select more than one option.*

* (required)

Section 2 of 3

Your perspective

We're looking for community insights, perspectives and reflections on the relationships between climate change and mental health.

Alternatively, you can send a file (including Word, PDF, images, audio or video) to this WhatsApp number +61493626143 or to **suhailah.ali@uq.net.au**

Some optional questions and topics to help you formulate your response:

- Whose mental health and wellbeing is affected by climate change and in what ways?

- What are the biggest climate impacts that are contributing to poor mental health or wellbeing?
- What makes people or communities strong or resilient to the impacts of climate change?
- Is there anything that is making it more difficult for people or communities to cope with the effects of climate change?
- Are you aware of any community-driven activities, programs or supports that promote good mental health and wellbeing in the face of climate change?
- What do you think your community needs now, and into the future, to be well, live good lives, and fulfil their full potential?

Please use the text box below to share your perspectives.

* (required)

Long-answer text

Section 3 of 3

Would you like to stay updated on this project?

You can find more information at www.connectingclimateminds.org

Would you like to receive updates on the Connecting Climate Minds email?

* (required)

If you select 'Yes', the Connecting Climate Minds team will send you a small number of emails to keep you up to date with opportunities that arise within the project. You can always opt out.

Name (optional)

Short-answer text

Email or WhatsApp number (optional)

Short-answer text

Appendix 12: Criteria for selection of priority research themes

Priority research theme selection criteria was generated based on discussion with experts globally across sectors, disciplines, and by drawing on selection criteria used in other research priority setting exercises (e.g., the guide from NSW Health). Criteria was applied by consultation within the analysis team.

- Does the research theme answer an existing evidence gap?
- Does the research theme have potential to inform decision making in policy and practice?
- Does it reflect one or more of the following:
    - identified greatest mental health challenges linked to climate change in the region
    - identified greatest climate hazards in the region

    - evidence policymakers most need to address emerging needs / overcome barriers to action
    - alignment with what the experts by lived experience voiced as challenges in the region
- Could it be feasible to undertake this research?
- Is it framed to be understandable, specific and practical for the research community to meaningfully address? Could a researcher or a funder with relevant expertise understand this theme?
- Is it specific enough to be meaningful and guide focussed research (if too broad or vague it won't help target resources meaningfully)
- It helps funders invest in this area (consider what is regionally relevant here)

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