

Research and Action Agenda on Climate Change and Mental Health for Small Farmers and Fisher Peoples

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Foreword

The CMHN team is grateful for the opportunity to engage with small farmers and fisher peoples on research related to climate change and mental health. A common thread in our outreach was that these issues are of concern to a range of stakeholders in farming and fishing communities, yet there is a need for better access to research and information that is actionable for people who are navigating multi-layered challenges related to climate change in these communities. The necessity of engaging this population stems from the strong impact of climate change on the mental health of small farmers and fisher peoples. We saw through this project the diverse nature of small farmers and fisher peoples whose intersectional identities cross other thematic focus areas of the Connecting Climate Minds project, such as young people and Indigenous populations. The people we connected with and learned from were not homogenous; they came from a range of cultures, identities, and life experiences. While this project was a small step in meaningfully engaging this population on climate change and mental health, we leave with certainty that much more action and research with small farmers and fisher peoples is needed in this area.

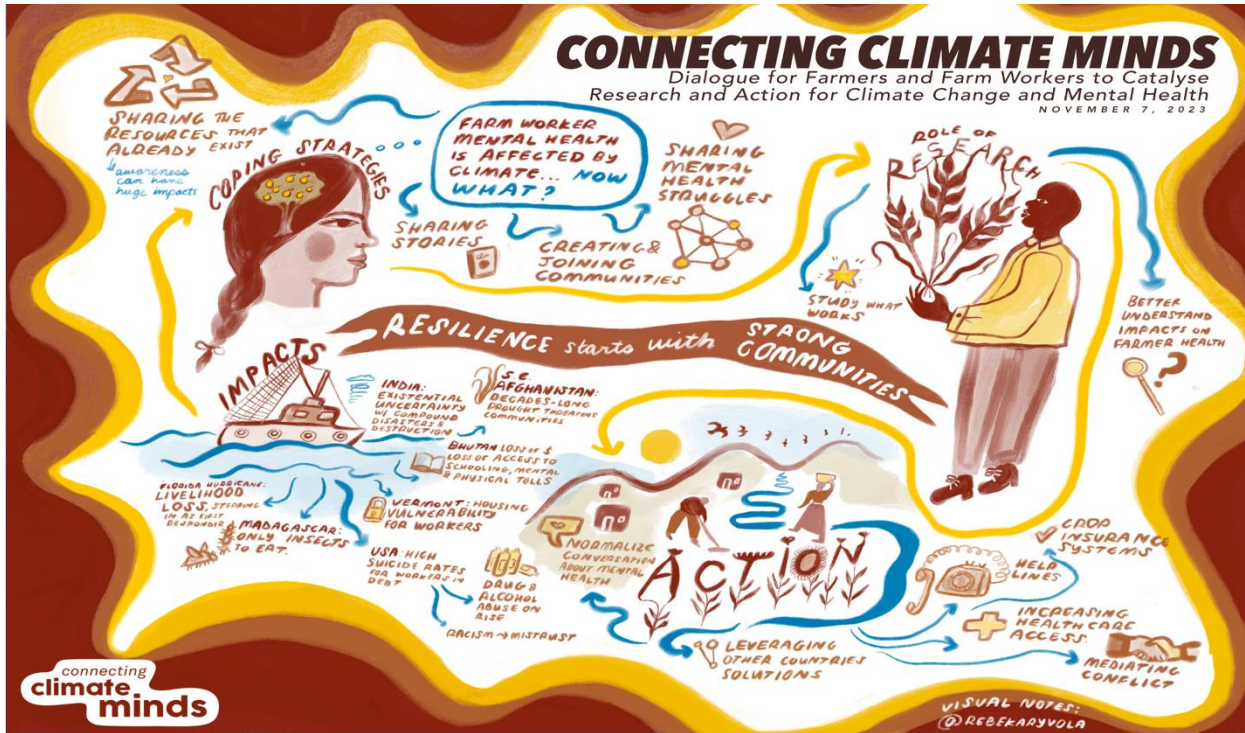


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Executive summary

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 health¹. Globally, small farmers and fisher peoples face heightened and exacerbated climate change impacts on their mental health due to a range of factors, such as the impact of climate hazards on their livelihood, work conditions and their inherent connections to the land and sea. From rising suicide rates of farm workers in areas of drought in India to amplified anxiety related to crop production across the world,² the toll on these populations remains high, necessitating further research in this area.³ Emerging research highlights that compounding hardships that come from tending to the land, the uncertainty caused by extreme weather conditions and shifting seasons, and slow-onset changes may significantly increase the risk of mental health impacts on small farmers and fisher peoples.⁴ As such, research at the intersection of climate change and mental health in relation to small farmers and fisher peoples is growing across the world, contributing to an expanding body of evidence focused on meeting the needs of these populations. While research in this area continues to emerge, what remains nascent is the translation of research into actionable information for these communities and the application of these learnings into community-based solutions.

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 in transdisciplinary dialogue to develop regional, thematic 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. We hope this work will help to focus the efforts of funding, policy, and practice communities working toward a future where no one is held back by climate-related mental health challenges.

This report presents the research and action agenda for climate change and mental health for small farmers and fisher peoples. The methodology used is described alongside key findings and action recommendations moving forward. Core to this research was identifying research themes – such as questions on the intersection of mental health and regenerative farming and the mental health impacts of crop loss due to flooding – and emerging intervention areas, such as farmer hotlines and community gardens. The report concludes with a set of recommended actions for diverse stakeholders to engage with these populations in research and action. We hope these findings demonstrate the value of meaningfully involving people with lived experiences in research and help garner greater awareness of the heightened need for mental health responses for small farmers and fisher peoples amidst climate change.

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 events⁵, 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 healthcare⁶, and increasing psychological distress through awareness of climate threats and insufficient climate action.⁷ 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.^{8, 9, 10}

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 for many communities and topic areas, 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.¹¹ Moreover, siloed decision making slows the translation of evidence to aligned action across climate and mental health policy and practice.^{12, 13} 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.

Through bringing together a diverse array of small farmers and fisher peoples, the CCM team has facilitated the development of a lived experience-informed research and action agenda for the climate change and mental health field for this population. The insights from engagement with small farmers and fisher peoples around the world has surfaced emerging mental health needs related to the climate crisis, and the opportunities for farmers and fisher peoples to be supported in taking climate action that can also support their mental health.

Objectives of this workstream and agenda

This document was prepared based on a series of virtual dialogues (described in further detail in the following section) with small farmers and fisher peoples. The sub-thematic small farmers and fisher peoples dialogue had two complimentary aims. The first was to incorporate small farmers and fisher peoples' voices, ideas, and aspirations into the overall CCM research and action agenda. The second was to inform the broader field of research and practice concerning the mental health of farmers and fisher people in relation to climate change. This dialogue served as a safe space for understanding and validating the climate and mental health impacts on small farmers and fisher people of diverse backgrounds, disciplines, and geographies. The dialogues also aimed to expand the participation of community members, including small farmers and fisher peoples, in research and policy processes. This focused area of the project leveraged participatory-based research approaches to identify available mental health resources and unmet needs within the context of climate change for these groups.

The objectives of this workstream in the CCM project were:

- To introduce small farmers and fisher peoples to the CCM project (top-level information on structure and overall aims).
- To inspire small farmers and fisher peoples participation in setting research and action agendas on climate change and mental health through an open, empowering and creative space that places them at the centre of the dialogue.
- To facilitate a dialogue with these populations and their non-governmental organizations and academic allies about their lived experiences and needs to inform future research and action on this issue.
- To develop a research and action agenda informed by the lived experience of small farmers and fisher peoples that addresses the following goals:
 1. Identify priorities for research that can inform action to meet the needs of small farmers and fisher peoples experiencing and responding to the mental health impacts of climate change.
 2. Build understanding among those with lived experience, 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.

By putting the insights and expertise of small farmers and fisher peoples at the center of the dialogues, we aimed to create empowering spaces that not only supported the development of an inclusive global research and action agenda but also contributed to positive mental health, especially for the participants with lived experience of mental health challenges in the context of climate change.

Small farmers and fisher peoples dialogue methodology

We produced this research and action agenda through a robust, inclusive and transdisciplinary methodology to capture, combine and refine a rich diversity of perspectives. The Climate Mental Health Network adapted the structure of this dialogue from the methodology developed by the CCM core team in consultation with Regional Communities of Practice, a Global Advisory Board and Wellcome. Methods and materials were adapted for each population of particular focus (small farmers and fisher peoples, Indigenous communities, youth communities) to ensure a balance of global standardisation with context appropriateness and flexibility. These agendas were produced in parallel with seven regional research and action agendas and will inform the creation of a global research and action agenda (see Figure 1 below).

Figure 1: Research and action agenda development process



Pre-dialogue scoping and recruitment

The Climate Mental Health Network identified an outreach list of over 40 international organisations working with small farmers and fisher peoples across the world. We hosted over 15 informational calls and learning sessions with practitioners working in this area to socialise the project and gauge interest for participation. Some of the small farmers and fisher peoples’ groups with whom we engaged include:

- Asian Farmers Association (Asia);
- BRAC Bangladesh (South Asia);
- Conscious Food Systems Alliance (Global);
- EverGreening Alliance (Global);
- Farmers for Climate Solutions (Global);
- Farmworker Justice (North America);
- Food and Agriculture Organization of the United Nations (Global);
- Food Tank (Global);

- Good Food Farming (EU);
- Health In Harmony (South Asia);
- Slow Food (Eastern Europe and Central Asia);
- Soil Food and Healthy Food Communities (sub-Saharan Africa);
- Solidaridad Network (South America);
- Susty Vibes (Sub-Saharan Africa);
- University of Guelph, Canada (North America);
- University of Minnesota Land Extension (North America); and
- World Farmers Market Coalition (Global), among others.

Our team also received outreach support from the CCM Regional Communities of Practice who helped connect us with relevant participants. CCM team members contacted key lived experience networks that were known to include small farmers and fisher peoples across regions, particularly in sub-Saharan Africa and South Asia. The project was advertised on the Climate Mental Health Network social channels, such as LinkedIn, and was shared on CCM social channels, such as X (formerly twitter).

The process of recruitment was done relationally with significant time committed to sharing about the research process, providing additional information when required and creating space for feedback on the ways the dialogue would be delivered.

Participants were provided honorarium for their time engaging in this dialogue that supported transportation, wifi and time costs for engagement.

Dialogue methodology

The dialogue was a 90-minute session that provided small farmers and fisher peoples with the opportunity to share perspectives and insights on climate change and mental health. Breakout rooms and reflective sessions were used to learn about participants' experiences. The sessions also explored participants' vision and perspectives on research priorities for climate change and mental health, and priorities for action and interventions (an understanding of both successful and not successful approaches, what people need but don't have access to, and an understanding of the barriers to accessing or creating interventions).

The dialogue with small farmers and fisher peoples aimed to create an inclusive process that created space for the diverse lived experience and wisdom of participants to emerge. The facilitating team used a semi-structured facilitation guide that allowed for emergent topics to arise naturally.

The dialogue was co-facilitated with the Conscious Food Systems Alliance (CoFSA) who helped with recruitment and breakout group facilitation.

Data generated in the dialogues included: Zoom chats, notes made by dedicated notetakers, and transcripts of all discussions.

The dialogue agenda can be found in Appendix 1.

Analysis methodology

All research data was thematically analysed to identify key themes that arose out of the qualitative data provided by participants. The flow of analysis followed a familiarisation with the dialogue transcripts and language used during the dialogue. It then involved a coding process that helped to elicit key themes and patterns. The themes identified were then reviewed by the internal team, resulting in a defining of key themes. The findings were then written up in the analysis outlined in this report.

Coding frameworks for the research agenda and action agenda can be found in Appendix 2.

Survey methodology

We distributed a **pre-dialogue online survey** prior to the dialogue to inform dialogue design and to solicit perceptions on climate impacts, climate-related mental health impacts, and research priorities among small farmers and fisher peoples.

Participants

Dialogue participants were a diverse group across geographical spread, gender, sector, and discipline. In total 28 participants attended the dialogue. The tables below provide a breakdown of participant characteristics.

Table 1: Geographical spread of participants

Country	Number	Percentage
Afghanistan	1	3.6%
Bangladesh	7	25%
Canada	3	11%
India	2	7%
Italy	1	3.6%
Kenya	1	3.6%
Nepal	1	3.6%
Nigeria	6	21%
Philippines	1	3.6%
United States of America	5	18%

Table 2 : Gender of participants

Gender	Number	Percentage
Men	10	37%
Women	16	59%
I do not know / Prefer not to say	1	4%

Survey participants:¹

Pre-dialogue survey: 28

Ethics, data collection and storage

This study has been reviewed and given an ethical favorable opinion by the Imperial College Research Ethics Committee (ICREC) ethics committee at Imperial College London (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).

This dialogue followed the ethics protocol aligned with the overarching CCM project. This included an ICREC approved consent process. Please see farmers consent form in annex.

Details on data collection and storage can be found in Appendix 3.

Current state and emerging needs for climate and mental health for small farmers and fisher peoples

As the climate crisis escalates so too will the related mental health consequences faced by small farmers and fisher peoples. However, current evidence only scratches the surface of the range of experiences encountered by these groups on the frontlines of climate change. Existing research has documented strong associations between rising ambient temperatures,¹⁴ extreme droughts¹⁵ and climate catastrophes¹⁶ on farming populations, as well as increasing threats to wellbeing and sustainable development. In the article, *Striving for Balance and Resilience: Ontario Farmers' Perceptions of Mental Health*, Bondy and Cole (2020) highlight that farmers views on the mental health impacts of climate change are under-researched.¹⁷ A systemic review of small farmer mental health interventions worldwide found that "while some geographic regions had a substantial body of literature, knowledge gaps remain including the prevalence of mental health outcomes, how they are impacted by risk and protective factors and which intervention strategies are most impactful in farming communities."¹⁸ With well-documented impacts and a need for more understanding of intervention strategies relevant to these communities, this research aims to highlight the lived experiences of farmers at the intersection of climate change and mental health. Similarly, fishing communities across the world are seeing increases in anxiety, depression and stress due a range of factors associate with climate change, such sustained job insecurity, pollution (i.e., oil spills) and competition with large-scale fishing projects.¹⁹ There is a need for more research on vulnerable sub-populations within these groups and greater understanding of the links between physical and mental health impacts of climate change on small farmers and fisher peoples. While the current state of mental health and climate change for small farmers and fisher peoples is characterized by urgency for action and a need for more robust data, there is a substantial body of literature and action in this area that needs

¹ Please note numbers are approximate and do not account for duplicate or incomplete responses.

to be bolstered across the regions of the world.

This following section sets out the context of the research undertaken with these groups, presenting a synthesis of what we heard through dialogue, expert consultations and a literature review as key emerging needs for mental health in the context of climate change.

Current research on climate-related mental health challenges for small farmers and fisher peoples

Globally, small farmers and fisher peoples face heightened and exacerbated climate change impacts on their mental health due to a range of factors, such as linkages with livelihood, work conditions and inherent connections to the land and sea. From rising suicide rates of farm workers in areas of drought in India to amplified anxiety related to crop production across the world, the toll on these populations remains high, necessitating further research in this area.³ Emerging research highlights that compounding hardships that come from tending to the land, the uncertainty caused by extreme weather conditions and shifting seasons, and slow-onset changes may significantly increase the risk of mental health impacts on small farmers and fisher peoples.⁴ As such, research at the intersection of climate change and mental health in relation to farmers and fisher peoples is growing across the world, contributing to an expanding body of evidence focused on meeting the needs of these populations. Nonetheless, much of the data and exploration into these sub-groups is nascent and not commensurate with the scope of challenges documented. Moving forward, evidence on culturally relevant and context appropriate interventions that involve direct partnership with impacted communities is needed.

Overarching research categories

To guide this project, the CCM team conducted a global literature review which identified four overarching research categories as areas of critical need for further work globally and that map the climate and mental health research space at a high level. These categories were used as a lens to examine the current state of climate-related mental health and to organise the priority research themes across the research and action agendas.

- **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 biological, psychological, societal 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 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.

During this dialogue, we were able to uncover findings across three core research categories relevant to this project:

- Impacts, risks and vulnerable groups;
- Pathways and mechanisms; and
- Mental health interventions/solutions in the context of climate change, including climate adaptation actions that have co-benefits to mental health.

Key findings from the small farmers and fisher peoples’ dialogue

Key overarching findings include:

- The mental health impact amongst small farmers and fisher peoples related to climate change is high. Livelihood loss, existential uncertainty due to compounding disasters, housing vulnerability for farm workers and migrant laborers, and loss of access to public services, such as school and medical care, all lead to mental health challenges.
- Helplines, crop insurance systems and increased access to mental healthcare were identified as important interventions that would support small farmers and fisher peoples’ mental wellbeing.
- Farmers wanted research to focus on what already works (interventions/solutions) and to better understand how mental health is impacted by overlapping burdens caused by climate change.

Impacts, risks and vulnerable groups

Small farmers and fisher peoples outlined significant climate-related mental health impacts and risks. Groups particularly vulnerable to climate change and mental health impacts were highlighted, such as farmers living away from their family, women and those facing food insecurity. Anxiety, depression and suicidality were named by participants as impacts they have faced and/or see in their communities.

Table 3: Key findings regarding impacts, risks and vulnerable groups

Context	Finding	Representative quotes from the dialogue
Vulnerable groups	Key groups identified as especially vulnerable to	<i>“Farmworkers living in isolated conditions away from family.”</i>

	<p>mental health impacts related to climate change include:</p> <ul style="list-style-type: none"> • Children (from farming and fishing families) • Elderly farmers • Migrant and rural farmers and fishers away from family and community • Parents (from farming and fishing families) • Those facing food insecurity • Women (from farming and fishing families) 	<p><i>“No other way to earn and can’t help their children go to school. No income to send their children to school. Mental stress for women. A woman said her blood pressure went up, can’t eat or sleep.”</i></p> <p><i>“Families facing acute insecurity of food and water impacts their mental health.”</i></p> <p><i>“Any restrictions for women and the access to such resources. In Afghanistan: the situation for women is mostly suffering. Limited access to the information because all of the women are at home. Limited access to humanitarian aid. Women’s education is banned; working for NGOs is banned; children and women face acute food insecurity. Even with empty stomachs they are going to school. This is the big challenge. It very much affected the mental health of women and children. Women cannot go outside of the home even for the collection of water.”</i></p>
<p>Mental health impacts</p>	<p>Mental distress and mental health issues highlighted by participants ranged from anxiety to suicidality.</p>	<p><i>“I live in the largest mangrove forest in the world and face many cyclones annually. Many farmers lose crops and money. When crops are destroyed people are mentally disturbed and don’t know how to manage.”</i></p> <p><i>“The major mental health impact I have observed and also experienced is anxiety and</i></p>

		<p><i>depression from loss of farm crops.”</i></p>
<p>Uncertainty, hopelessness and despair, leading to depression and suicidality</p>	<p>Depression, despair and hopelessness were shared as frequent experiences of farmers, and the impact of these emotions leads to mental health challenges. Suicide was also mentioned as an occurrence resulting from climate impacts.</p>	<p><i>“Farmers giving up, losing hope, their way of life. For some, it’s their reason to be and the feeling of hopelessness.”</i></p> <p><i>“What concerns me most is that most of these farmers are in despair and devastated, many get discouraged about farming, and there is a food shortage as a result.”</i></p> <p><i>“Despair and uncertainty for the future. Worn down by repeatedly having to recover. How do we respond when things are happening so often?”</i></p>
<p>Compounding impacts</p>	<p>The compounding nature of climate impacts and the increased frequency of extreme weather hampers ability of farmers and fisher peoples to adequately recover.</p>	<p><i>“With one disaster on top of another and the rate of that happening. And the sense that people get a sense of ‘is there anything we can really do?’ Amongst farm worker families–powerlessness to contribute to positive change and to find good solutions. The problem is so big, so is it really worth trying?”</i></p> <p><i>“Being repeatedly hit with new disasters with increased frequency. Despair and uncertainty for the future is there and many are worn down by repeatedly having to recover.”</i></p>
<p>Overall health</p>	<p>Overall health concerns, including comorbidities,</p>	<p><i>“People also have health problems due to extreme weather: stroke; dehydration; heat strike, pollution, respiratory problems - this affects the results of farming.”</i></p>

were highlighted as contributing factors to mental ill health.

Pathways and mechanisms

A range of pathways and mechanisms for mental health in relation to climate change for small farmers and fisher peoples arose out of the dialogue. The true extent to which the mental health of these communities is impacted by climate change will require extensive research. Nonetheless, qualitative findings suggest a strong link between climate impacts and mental ill health. The mechanisms for these impacts are diverse and extensive, as farmers and fisher peoples’ livelihoods and workplaces are oriented toward time in outdoor environments and the means of their production is reliant on environmental forces. The social, economic, and environmental mechanisms for climate-related mental health impacts were emphasised by participants; these included impacts on crop production, community displacement due to climate hazards and working conditions in extreme weather.

Table 4: Key findings regarding pathways and mechanisms

Context	Finding	Representative quotes from the dialogue
<p>Consequences of extreme weather events (flooding, hurricanes, heatwaves) on livelihoods, food security and communities/infrastructure</p>	<p>The compounding and amplified impact of increasing extreme weather and its consequences on farming and fishing communities impacts mental health.</p>	<p><i>“A fisherman in Florida was struck by a hurricane last year and was able to save boat but there was no port (destroyed) – the stress of losing business, losing friends and family was there.”</i></p> <p><i>“I visited a province in Afghanistan and asked about drought (four decades) where many people don’t have clean water to drink. UN agencies are digging wells for communities. Families facing acute insecurity of food and water impacts their mental health.”</i></p>

<p>Loss of homes and crops/livestock</p>	<p>Loss of property, livestock and crops (and resulting familiar challenges) was identified as a determinant of mental health challenges amidst climate change. The resulting mental and practical barriers to farming then increase food insecurity, which demonstrates the cyclical impacts between climate and mental health.</p>	<p><i>“The 2022 floods in Nigeria, a farmer lost crops. Felt impact this year. Some people couldn’t farm this year because they were scared. Lots of hunger, mental instability. Government policies were not helpful.”</i></p> <p><i>“I come from a family where we farm livestock and climate matter (rain) often causes our livestock, especially the goat-kids, to die. So it brings a lot of anxiety and makes us anxious during this period.”</i></p>
<p>Financial impacts and economic pressures</p>	<p>The financial crises arising from climate change experienced by farmers is a major concern for mental health. For instance, flooding impacts finances, which then impacts mental health.</p>	<p><i>“Farmers are having a financial crisis because of late crop cultivation and damage to crops. Stress with family leaving. The family was harvesting cash crops and dependent on it but then a flood came and destroyed it. The family’s income was less and impacted the whole family.”</i></p>
<p>Collective uncertainty</p>	<p>The impact of widespread collective uncertainty amongst small farmers and fisher peoples is a major concern, especially prolonged and</p>	<p><i>“Farmers tend to have more wealth than farmworkers - the latter have less benefits. Regularly don’t have any kind of assistance. Uncertainty of what’s to come is deeply troubling.”</i></p> <p><i>“Farmers face a number of uncertainties, climate has compounded effects. In India,</i></p>

	<p>chronic uncertainty.</p>	<p><i>the cyclone season is from June to November. Coastal communities get flooded and crops get drowned. For farmers it is a major concern. The great distress often leads to suicide."</i></p>
<p>Food and water insecurity</p>	<p>Drought and the impacts of climate change on water and food quality and access were discussed as pathways for mental health challenges.</p>	<p><i>"Drought has been around for decades with impacts especially to women. With drought-there is no water in SE Afghanistan. The community depends on wheat and rice for cultivation but due to drought they lost money, animals, and products."</i></p> <p><i>"In Eastern Madagascar a farmer friend lost everything. Villages suffering hunger. One month gathering and eating only insects."</i></p>
<p>Beliefs around climate change and lack of awareness</p>	<p>There is a need for more awareness around climate change broadly and its impacts on mental health. Greater awareness can lead to increased availability of resources and an uptake in access to mental health support.</p>	<p><i>"I have concern people don't know what is happening with climate change. They notice heat and floods but don't know what is causing the climate change. My concern is the little knowledge about climate change amongst farmers. By advocating on mental health and climate change farmers will be more advanced knowing what they should do. If you are one step ahead, then you can make changes now. My only concern is what knowledge farmers have about climate change."</i></p> <p><i>"Farmers don't use existing resources. I think that people are entitled and need to be respectful and go through procedures and don't go and instead try to fix on their own. Need to try to educate people about climate change and mental health first because everything is free but the farmers aren't using it fully."</i></p>

		<i>“Seasonal workers – most not aware of mental health. Climate change and mental health are global problems but we need local solutions”</i>
Compounding social injustices, including colonialism	The ongoing impacts of colonisation, extractive capitalism and systemic racism across the world contribute to compounding burdens related to mental health and climate change faced by these communities.	<i>“Exposure of the challenges you face in a colonized territory - it’s not the same as farming in a “wealthy situation”. Racism that piles up into the mental health of farmers of color and farm workers - mostly are farmers of color”</i>
Farming conditions	Workplace conditions related to climate were identified as a source of stress that leads to physical and mental harm.	<i>“Another issue for farm workers is harvesting in hard conditions... Research is needed on physical stress.”</i>

Mental health interventions/solutions in the context of climate change, including climate adaptation actions that have co-benefits to mental health

Participants stress the need for extensive and place-based solutions to mental health challenges in the context of climate change. In particular, the financial implications of climate change on farmers and the accompanying mental distress that follows was noted as a critical point for effective intervention. Psychoeducation and community support pathways in places where health provisions, especially for mental health, are limited appeared to be important for participants. The use of hotlines for farmers was described as an accessible form of intervention and a necessity in post disaster situations. To ensure usage of diverse support offerings, education programs are needed to help farmers and fisher peoples’ understand what is available to them. The ongoing and sustained stress and uncertainty farmers experience was seen as a key point of intervention; solutions should be tailored to these populations in response to the complex, ongoing nature of their challenges.

Additionally, several activities referenced by participants highlight the co-benefits of climate action to mental health. For instance, hotlines that provide psychoeducation, alerts and real-time support to small farmers and fisher peoples, particularly in rural areas, during crises was identified as something actively being used by groups supporting these populations.

Table 5: Key findings regarding mental health interventions/solutions in the context of climate change, including climate adaptation actions that have co-benefits to mental health.

Context	Finding	Representative Quotes
<p>Community-led action, including education</p>	<p>Community gardens, rural mental health workers and psychosocial education were noted as effective community-oriented interventions that have co-benefits.</p>	<p><i>“At the Farmworker Association of Florida, we developed community gardens as a way to have access to ethnic, affordable food, which workers are unable to get in the farms they work for. Mentally it was helpful for farm workers - being without stress.”</i></p> <p><i>“Training para-therapists or community health workers to increase accessibility, like community influencers.”</i></p> <p><i>“Psycho-education is needed - livestock dying because rivers are drying.”</i></p>
<p>Disaster hotlines</p>	<p>Hotlines and phone numbers for support were identified as useful interventions to provide mental health support in rural areas and places with limited infrastructure.</p>	<p><i>“Two freezes which froze all of the buds off of the trees (e.g. no peaches and apples impacted). It wasn’t until the flooding in the summer that started to receive calls on the hotline.”</i></p> <p><i>“I am part of a group of the farm and ranch assistance network in the US to support farm workers addressing mental health issues and reduce suicide. We offer a hotline that farmers call in English and Spanish. Disaster calls rise when repeatedly hit with new disasters with increased frequency.”</i></p> <p><i>“Collaboration between private funding</i></p>

		<p>sources and government, such as incorporating technology into mental health to send out calls to farmers, through their not futuristic phones. Established a partnership with a local mobile provider to increase the coverage.”</p>
<p>Co-beneficial action and coping strategies</p>	<p>Adaptive farming practices, body and mind regulation practices, and partnerships in communities were noted as effective strategies that support coping and co-beneficial action.</p>	<p>“Access to adaptive farming that helps to cope with policies that prioritize sustainable agriculture.”</p> <p>“Finally – there is a need for us to develop a healthy coping strategy. Feeling occasionally stressed is normal, but when constant... We need deep breathing, talking with a trusted friend, and healthcare provider. Often collaborate with health workers.”</p> <p>“Families have no income and turn to cutting trees to make charcoal and get income. Cutting trees worsens climate change. This vicious cycle leads to depression, trauma, and hopelessness. Partnerships that would help include planting drought resistant crops, given those physical things that cover climate change, they can become more productive, and this addresses the root causes of the depression.”</p>
<p>Financial and insurance</p>	<p>Insurance and crop protection schemes combined with mental health support are an important intervention area for small farmers and fisher peoples.</p>	<p>“In Rwanda (and other African countries), mobile banking is crucial - small subsidies are transferred to phones. No formal banking systems especially in areas where there is no access to (formal) financial institutions.”</p> <p>“They need financial support and formal banking systems - government should help in that direction”</p>

Research Agenda

This research agenda presents an aligned vision to guide the climate and mental health field for small farmers and fisher peoples. 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.

Priority research themes

Table 6: Priority research themes for small farmers and fisher peoples

Research category	Priority research theme
Impacts, risks and vulnerable groups	1. Understanding the nature, prevalence and severity of mental health needs in small farming and fishing communities experiencing escalating climate hazards.
	2. Identifying which factors most influence mental health outcomes related to crop or livestock loss and/or destruction of farms due to extreme weather and climate disasters.
	3. Quantifying the economic cost of climate-related mental health impacts on small farmers and fisher peoples.
	4. Understanding how the ongoing and compounding experiences of the climate crisis affect small farmers and fisher peoples' anxiety and stress, and at what point these experiences become debilitating and impact personal, familial and social functioning such that they constitute a mental health challenge.
	5. Identifying the most pressing climate-related mental health and physical health comorbidities amongst farmers and their interactions.
Pathways and mechanisms	1. Assessing how the multi-level impacts of flooding affect small farmers and fisher peoples' mental health.
	2. Understanding the ways in which climate change is amplifying displacement for small farmers and fisher peoples, and how this affects mental health.
	3. Understanding the relationship between loss of livelihood and mental health amongst small farmers and fisher peoples.
	4. Understanding the mental health impacts of individual and

	<p>collective uncertainty related to climate change experienced by small farmers and fisher peoples globally.</p> <p>5. Exploring how farmers' beliefs and perceptions of climate change impact their mental health outcomes, their individual capacity to engage in mental health solutions to climate challenges and their participation in climate action.</p> <p>6. Understanding how farming conditions, particularly long exposure to extreme heat, impact the mental health of farm workers.</p> <p>7. Understanding the extent to which sustained financial hardship and/or inability to recover from loss and damages caused by climate change impacts the mental health of small farmers and fisher peoples.</p> <p>8. Understanding how food and water insecurity caused and/or amplified by climate change impacts the mental health of small farmers and fisher peoples.</p>
<p>Mental health interventions/solutions in the context of climate change, including climate adaptation or mitigation actions that have co-benefits to mental health</p>	<p>1. Assessing the mental health benefit of crop insurance schemes for small farmers, particularly in the context of climate change.</p> <p>2. Exploring how to improve food sovereignty (the right to healthy and culturally appropriate food produced through ecologically sound and sustainable methods and the right to define one's own food and agriculture systems) in climate-related crises and understanding whether this would benefit the mental health of small farmers and fisher peoples.</p> <p>3. Understanding how rural health workers trained in mental health can better support the unique mental health challenges of farmers in the climate crisis.</p> <p>4. Identifying methods to effectively measure the impact of hotlines on small farmers' mental health and understanding the best interventions that can be delivered over the phone to support farmers affected by climate hazards.</p> <p>5. Identifying the most helpful peer support skills to support small farmers affected by climate change with limited or disrupted access to formal mental health services.</p> <p>6. Understanding which mental health interventions complement adaptive and regenerative farming practices.</p> <p>7. Understanding which mental health interventions offer the best early detection and response to suicidality experienced by small farmers and fisher peoples.</p>

Action agenda

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.

Below is a summary of key actions and priority next steps to implement the research agenda and to translate evidence generated through research into policy and practice.

NGOs and educators should:

- Integrate theory and practice on the mental health impacts of climate change on small farmers and fisher peoples into existing workstreams. Mental health can be integrated into existing efforts that support these groups, such as through education, public awareness and workplace health programs.
- Explore collaborative opportunities that create shared understanding of climate impacts on mental health with people that have lived experience to understand emerging challenges, opportunities for action and what small farmers and fisher peoples' needs are related to mental health.
- Co-create and advocate for specific policy recommendations that support small farmers and fisher peoples' mental health and wellbeing in rural and urban areas.
- Support peer connection amongst small farmers and fisher peoples in different places.
- Establish networks of small farmers and fisher peoples to share experiences and build resilience.

Funders should:

- Commit more resources, financial and technical, toward research and action on small farmers and fisher peoples' mental health.
- Explore collaboration opportunities between the agriculture and mental health sectors, serving as a bridge builder between groups working in silos.
- Provide financial and technical support for mental health services in rural areas.

Researchers in mental health, climate change and beyond should:

- Deepen the evidence base on what already is working to support small farmers and fisher peoples' mental health in the face of climate change.
- Explore multidisciplinary, collaborative research that involves participatory and relational approaches to knowledge generation.

- Partner directly with farming and fisher communities most affected by climate change impacts.
- Identify what supports small farmer and fisher peoples' resilience amidst climate change.

Campaigners and policymakers should:

- Elevate small farmers and fisher peoples' mental health in regional and global forums, highlighting the amplified impact on these groups.
- Ensure agricultural policies, climate policies and mental health policies account for and centre the impacts on small farmer and fisher peoples' mental health and wellbeing.
- Uplift stories from people in diverse contexts about their experiences navigating mental health and climate change impacts.
- Incentivise and invest in evidence-based co-beneficial action (when available), such as climate-smart farming practices that are potentially beneficial for mental health, such as sustaining farming practices known as agroecology.

The participants we engaged in this project expressed a strong interest in being meaningfully engaged in research and intervention development, expressing hope that by being involved they can contribute to positive change for themselves and their communities. Researchers working with these sub-populations can engage in co-creation practices that centre diverse lived experiences as part of any research or solution created. The act of engaging in research was seen as a positive experiential intervention on its own.

Discussion: strengths and limitations

There are several strengths and limitations encountered in this research related to engaging with small farmers and fisher peoples.

Key challenges that arose during this work include:

- **Digital divides:** Most the world's small farmers and fisher peoples live in areas where digital connectivity is limited and familiarity with online forms of engagement, such as Zoom, is nascent. As such, a challenge encountered was accessing participants who do not have strong access to digital modes of engagement. Future research with these groups should engage in-person formats and go above and beyond to reduce digital barriers for participation, such as through supporting data plans financially.
- **Translating academic language into accessible formats:** Much of the academic language around climate change and mental health is not easily understandable for small farmers and fisher people. Translation work is needed to ensure that research requests are clear. Doing so will encourage deeper interactions that can benefit both research participants and researchers. In this project we worked to simplify content wherever possible and constantly challenged ourselves to move away from technical jargon towards accessible language.
- **Navigating non-homogeneity of these subgroups:** The vastness of these sub-groups creates challenges in choosing who to include and exclude in this research. The team chose to create criteria for participation based on the scale of farming and fishing operations, such as not including monocrop producers or larger scale fishers. This choice was made as a way to gather targeted insights from those most likely to experience amplified and compounding burdens related to climate change and mental health. Within small farmers we kept an expansive view enabling a wide and diverse range of participants to engage in this research.
- **Building trusted relationships under short time frames and the value of established intermediaries:** Historical distrust with institutional actors and research meant that the team had to engage trusted actors within farming communities to be able to engage participants most relevant to the project. Taking the time to build relationships with intermediaries, understanding their needs for supporting engagement and creating mutually supportive plans helped to mitigate this challenge.

Key strengths that arose during this work include:

- **Centring the importance of small farmers and fisher peoples mental health:** Participants supported the nature of this project, expressing the need for more discussion and action in this area. It was clear that mental health must be positioned amongst other intersecting challenges these groups faced and must be considered alongside overlapping needs and stressors that are often compounded by climate hazards.

- **Creating global communities of practice and mutual support:** Connecting participants from across the globe to explore these topics together led to community building and a sense of shared belonging.
- **Peer learning and validating experiences that often feel unseen and unappreciated:** The opportunity to share experiences, listen and learn from each other, and contribute to research and action created a form of mutual care and support. Participants appreciated the opportunity to share their lived experiences and be validated in the challenges they encountered.
- **Further awareness on the importance of mental health impacts of climate change:** In the pre-dialogue phase of this work, we were able to bring conversations of mental health to small farmers and fisher peoples networks that only lightly engage with the topic. We were given feedback that if more information was available in this area practitioners, such as researchers, community-based implementors, and health workers, in the field would be able to engage more deeply on these topics.

Key next steps

The findings from this dialogue will be shared back with participants and the results will be embedded into an overarching global research and action agenda for climate change and mental health.

Conclusion

This research and action agenda contributes to a wider area of work and study on the mental health impacts of climate change on small farmers and fisher peoples; yet more extensive study and funding is needed to truly understand the complex interplay between people's lived realities and directions for action that benefit mental health and the planet. We found that the centring of the stories and lived realities of small farmers and fisher peoples elicited important insights into the unprecedented toll of climate change on mental health for these groups. It was evident that people from these groups want to be deeply engaged with and involved in research and action; those in positions of power and decision making have an opportunity to centre lived experiences and wisdom in all efforts to improve the mental health of small farmers and fisher peoples.

Moving forward, the focus areas for research and action outlined in this agenda can help mobilise greater attention and resources to understand and respond to the compounding burdens faced by groups who help sustain the global food system and that are most attuned to the changes taking place on land and at sea. The findings reveal the potential for a wellspring of insight and wisdom from these groups if they are engaged intentionally and thoughtfully as collaborative partners rather than research subjects.

Who produced this report

Authorship team

This report was written by Lian Zeitz at the Climate Mental Health Network with feedback and editing from the Climate Cares team at Imperial College London, including Emma Lawrance, Jessica Newberry Le Vay, and Didi Thompson. Sarah Newman from the Climate Mental Health Network supported outreach, recruitment, and material review.

This is the independent work of the authors with the support and input of the Connecting Climate Minds team.

Acknowledgements

We are grateful to the participants who joined us and contributed to the dialogue: Lailuma Kakar, Antonio Tovar, Pamidimukkula Gulabi, Md Shahinur Islam, Ihuman Patience, Soyed Zhadul Alom Opu, Okoye Amarachi Blessing, Kaniz syima, Pwausoko Kadmiel Madayi, Chuka Emmanuel, Alexandria Ward, Justice Cletus, Kezang Wangmo, Dr. Mercy W. Njeru, Ashok Pandey.

The authors would like to thank the team at the Conscious Food Systems Alliance (CoFSA), specifically Charlotte DuFour and Luz Navarro, for supporting recruitment and dialogue facilitation. We would also like to extend thanks to all participants in the dialogue who shared their time and insights with us.

Funding

Funding for this work was provided by Wellcome.

Conflicts of interest

The authors have no conflicts of interest to declare.

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](#).

Appendices

Appendix 1: Dialogue agenda

The dialogue followed the following structure:

	Activities	Time
1	Welcome by CMHN introducing CCM, dialogue guidelines/goals and logistics (e.g. closed captioning) <ul style="list-style-type: none"> - Safeguarding guidance / warning 	5 mins
2	Introduction: Finger on the pulse - few questions Invite participants to introduce themselves in the chat	5
3	Overview on the mental health impacts of climate change - special showcase of small farmers and farm workers case studies and stories.	5 mins
4	Breakout group #1: Mental Health and Climate Change	30 mins
	<p><u>Breakout rooms activities/questions</u></p> <p>Ask everyone same question</p> <p>Exploring the mental health impacts of climate change on farmers and farm laborers:</p> <ul style="list-style-type: none"> a. What are the mental health impacts that you feel and that you notice amongst family and community members? b. What concerns you most about the mental health impacts of climate change? <p><i>To be supported by a dedicated rapporteur that will take notes on the jam board</i></p>	
5	Larger group sharing and debrief: 1 min highlights about what was experienced.	5 minutes

6	Resources and Interventions	30 mins
	<p><u>Break-out rooms activities/questions</u></p> <p><u>Divide in 3 groups</u></p> <p>a. What structures do you wish were in place to make the story around mental health and climate change different or better for you and your community?</p> <p style="padding-left: 40px;">i. Existing interventions: What resources do you have access to in your community? What makes that resource valuable and/or what is challenging about accessing those resources (are they accessible, free, and readily available or hard to access and costly).</p> <p style="padding-left: 80px;">Is there anything else you think is important to consider, free flow (all groups)</p> <p style="padding-left: 40px;">ii. Desirable interventions: Do you know of any interventions or approaches or desirable actions you wish can be employed to address climate mental health challenges?</p> <p style="padding-left: 40px;">iii. Linking research and practice: How can small farmers and farm workers benefit from more research on this issue and how can researchers best engage with communities?</p> <p><i>To be supported by a dedicated rapporteur that will take notes on the jam board</i></p>	
7	Group sharing and debrief of breakout #2: 1 min highlights about what was experienced.	5 mins
9	Next steps and closing remarks Draft of visual art shared.	5 mins

Appendix 2: Coding framework

1. Coding framework for research agenda

Research Category	Sub-categories
<p>1. Impacts, Risks and Vulnerable Groups</p> <p>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.</p> <p>This category also includes the 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.</p>	<p><u>Cross cutting considerations to keep in mind for all sub-categories:</u></p> <p><i>Timeframe</i></p> <p><i>Geographical variation</i></p>
	<p>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.</p>
	<p>1.2. Quantifying the fraction of mental health burden (including mortality) caused by climate change.</p>
	<p>1.3. Understanding the risk factors to mental health that are caused or affected by climate change as well as protective factors.</p>
	<p>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).</p>
	<p>1.5. Quantifying the cost (e.g. economic, social) of the additional mental health burden caused by climate change and insufficient climate action.</p>
<p>1.6. Methods research to identify the most appropriate ways to assess and monitor the mental health impacts of</p>	

	<p>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.</p>
<p>2. Pathways and mechanisms</p> <p>This category is about improving our understanding of how mental health is affected by climate change.</p> <p>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.</p> <p>Note that mechanisms can include mechanisms to the development, maintenance, and/or resolution of mental</p>	<p><u>Cross cutting considerations to keep in mind for all sub-categories:</u></p> <p><i>What factors are linked with increased vulnerability or increased resilience for the associated mental health outcomes.</i></p> <p>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]</p> <p>2.2. Categorising and understanding the environmental mechanisms by which climate change negatively impacts mental health [e.g. air pollution, reduced exposure to biodiversity]</p> <p>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].</p> <p>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].</p>

<p>challenges, so this includes also mechanisms relevant to guide development or understand workings of interventions</p>	<p>2.5. Understanding mechanisms whereby climate action or mental health interventions benefit climate and mental health (i.e. co-beneficial mechanism).</p>
<p>3. Mental health benefits of climate action [adaptation and mitigation]</p> <p>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.</p>	<p>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)</p>
	<p>3.1. Identifying climate actions that integrate or align with mental health benefits [co-beneficial climate actions, e.g. increased tree cover in cities]</p>
	<p>3.2. Quantifying co-benefits of climate action for mental health (including number of people experiencing the benefit, size of effect, economic considerations).</p>
	<p>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)</p>
	<p>3.4. Understanding the governance structures/decision support tools that enables alignment of action for climate change and for mental health across sectors</p>
	<p>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]</p>
	<p>3.6. Exploring opportunities for mental health to be integrated into other climate priority areas i.e. loss and damage and climate finance.</p>
	<p>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</p>

	healthcare facilities)
<p>4. Mental health interventions/solutions in the context of climate change</p> <p>This category is about identifying the most effective mental health interventions/solutions to support mental health in the context of climate change.</p> <p>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</p>	<p>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]</p> <p><u>Cross cutting considerations to keep in mind for all sub-categories:</u></p> <p>LEVEL (e.g.) <i>Individual, Family, Community, Systems</i></p> <p>MECHANISM (e.g.) <i>Biological, Psychological, Social, Environmental</i></p> <p>SECTOR (e.g.) <i>Education, Healthcare, Public Health</i></p> <p><i>Effectiveness considerations include impacts across different population groups, and implementation considerations might include providers, cost and time.</i></p> <p>4.1. Understanding different ways of knowing, being and doing in different cultures and communities that can build individual, community and ecological resilience</p> <p>4.2. Understanding how existing mental health interventions are affected by climate change</p> <p>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</p>

<p>of climate change, and developing new interventions. Interventions are relevant at all levels (individual, family, community, systems) and across sectors.</p>	<p>considerations</p>
	<p>4.4 Amending, implementing and evaluating relevant mental health interventions from other settings to be appropriate for climate-related impacts?</p>
	<p>4.5. Co-designing, implementing and evaluating novel interventions that meet climate-related mental health needs</p>
	<p>4.6. Comparing cost-effectiveness, implementation considerations, and effectiveness across interventions for a particular setting and particular population group to determine "best buys"</p>
	<p>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)</p>

2. Coding framework for action agenda

Action Category	Sub-category
<p>1. Creating an enabling environment for research at the intersection of climate</p>	<p>1.1 Desired state of research</p> <ul style="list-style-type: none"> This code captures <i>what good looks like</i> for climate change and mental health research in the region that implements the research agenda.

<p>change and mental health</p>	<ul style="list-style-type: none"> ● 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? <p>1.2 Opportunities and enablers</p> <ul style="list-style-type: none"> ● 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. <p>1.3 Challenges holding back research</p> <ul style="list-style-type: none"> ● 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. <p>1.4 Partners/stakeholders</p> <ul style="list-style-type: none"> ● 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. <p>1.5 Priority next steps/recommendations to investors and actors</p> <ul style="list-style-type: none"> ● 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.
<p>2. Translating a growing evidence base into</p>	<p>2.1 Desired state of evidence to action in policy and practice</p>

<p>action that can respond to the mental health impacts of climate change</p>	<ul style="list-style-type: none"> ● This code captures <i>what good looks like</i> 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?
	<p>2.2 Opportunities and enablers</p> <ul style="list-style-type: none"> ● 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.
	<p>2.3 Challenges holding back action</p> <ul style="list-style-type: none"> ● 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.
	<p>2.4 Partners/stakeholders</p> <ul style="list-style-type: none"> ● 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.
	<p>2.5 Priority next steps/recommendations to investors and actors</p> <ul style="list-style-type: none"> ● 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.

	<ul style="list-style-type: none"> ● 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.
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Appendix 3: 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, Google 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 CMNH for analysis.

Data storage and sharing

Data was stored and managed by Imperial College London using a secure server. CMNH was a Joint Data Controller for the data provided to this project for small farmers and fish erpeoples and responsible for securely storing and sharing data with Imperial College London and with regional analyst teams. Data will be stored by Imperial College London for 10 years after study completion.

Appendix 4: Consent form

The Connecting Climate Minds project is conducted by a global team coordinated by Imperial College London (e.lawrance@imperial.ac.uk). You can find out more information about our study team [here](#). This project is funded by Wellcome.

TIME INVOLVEMENT: The dialogue will take a total of about 120 minutes (130 minutes total). You will be asked to fill out an online survey that will take about 5-10 minutes to complete, and then to participate in a 120-minute virtual (Zoom) dialogue.

We are inviting you to take part in a small farmers dialogue and a series of short surveys. Thank you so much for expressing your interest in taking part. Before you can continue the survey, please confirm that you consent to take part in the Connecting Climate Minds project by selecting all the statements below.

- I confirm that I have read and understand the participant information sheet version 1 dated 13.09.2023 for Connecting Climate Minds and have had the opportunity to ask questions which have been answered fully.

- I consent to take part in Connecting Climate Minds
- I understand that my participation is voluntary, and I am free to withdraw at any time, without giving any reason and without my legal rights being affected.
- I understand I will not personally benefit financially if this research leads to an invention and/or the successful development of a new test, medication treatment, product or service.
- I consent for the responses I give in the small farmers dialogues and surveys (if applicable) to be analysed for the above study. I understand what I write may be quoted anonymously in a research publication.
- I consent to the dialogue being video and audio recorded, and for potential screenshots and photos to be taken during the dialogue which may be used on the project website and social media.

I give/do not give consent for information collected about me to be used to support other research by an academic institution, in the future, including those internationally (which Imperial College London have ensured will keep this information secure, not identifiable, and confidential)

- I give consent
- I do not give consent

I give/do not give consent to being contacted to potentially take part in further stages of the project. This might include being invited to share my experiences of being involved in the project, and/or being invited to share my experiences of mental health challenges relating to climate change for public storytelling purposes, either anonymously or publicly depending on my own preference. This would involve storytelling in formats that could be shared publicly via video or audio, in media that appears online and/or in person at events.

- I give consent
- I do not give consent

What is your name?

What is your email address?

All research data will be securely stored in line with Imperial College policies, lived experience team policies, and the GDPR Data Protection Act 2018. This project will involve data flows from XX to the UK and from the UK. Where personal data does not get transferred into the UK GDPR may not apply and the relevant region-specific legislation will govern data processing.

This study has been reviewed and given an ethical favourable opinion by the ICREC ethics committee. Further information can be obtained by emailing e.lawrance@imperial.ac.uk.

If you are happy to proceed, we would be grateful if you can please complete a short survey to inform us of this project and help us plan the global small farmer dialogue. If you are attending

the dialogue, once you have completed the survey, you will be able to access the Zoom link once you have completed the survey for the dialogue.

References

- ¹ World Health Organization (WHO). *Mental health and Climate Change: Policy Brief*. 1–16 (WHO, 2022).
- ² Bharadwaj, R., Karthikeyan, N. & Deulgaonkar, I. *Urgent preventative action for climate-related suicides in rural India*. (IIED, 2023).
- ³ Viswanathan, D. J., A. M, V. & Kumarasamy, H. Depression, Suicidal Ideation, and Resilience among Rural Farmers in a Drought-Affected Area of Trichy District, Tamil Nadu. *J Neurosci Rural Pract* **10**, 238–244 (2019).
- ⁴ Talukder, B., van Loon, G. W., Hipel, K. W., Chiotha, S. & Orbinski, J. Health impacts of climate change on smallholder farmers. *One Health* **13**, 100258 (2021).
- ⁵ Lawrance, E. L., Thompson, R., Newberry Le Vay, J., Page, L. & Jennings, N. The Impact of Climate Change on Mental Health and Emotional Wellbeing: A Narrative Review of Current Evidence, and its Implications. *Int Rev Psychiatry* **34**, 443–498 (2022).
- ⁶ Roland, J., Kurek, N. & Nabarro, D. *Health in the climate crisis: A guide for health leaders*. (World Innovation Summit for Health, 2020).
- ⁷ Hickman, C. *et al.* Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. *Lancet Planet Health* **5**, e863–e873 (2021).
- ⁸ Chen, S. X., Lee, M., McVea, D. A. & Henderson, S. B. Risk of mortality among people with schizophrenia during the 2021 heat dome. *BC Med J* **65**, 158–9 (2023).
- ⁹ Page, L. A., Hajat, S., Kovats, R. S. & Howard, L. M. Temperature-related deaths in people with psychosis, dementia and substance misuse. *Br J Psychiatry* **200**, 485–490 (2012).
- ¹⁰ Woodland, L., Ratwatte, P., Phalkey, R. & Gillingham, E. L. Investigating the Health Impacts of Climate Change among People with Pre-Existing Mental Health Problems: A Scoping Review. *IJERPH* **20**, 5563 (2023).
- ¹¹ Charlson, F. *et al.* Climate Change and Mental Health: A Scoping Review. (2021). *IJERPH* **18**, 4486
- ¹² World Health Organization (WHO). *2021 WHO Health and Climate Change Survey Report*. (World Health Organization, 2021).
- ¹³ Romanello, M. *et al.* The 2022 report of the Lancet Countdown on health and climate change: health at the mercy of fossil fuels. *Lancet* **400**, 1619–1654 (2022).
- ¹⁴ Carleton, T. A. Crop-damaging temperatures increase suicide rates in India. *Proc Natl Acad Sci USA* **114**, 8746–8751 (2017).
- ¹⁵ Abunyewah, M. *et al.* Drought impact on peri-urban farmers' mental health in semi-arid Ghana: The moderating role of personal social capital. *Environ Dev* **49**, 100960 (2024).
- ¹⁶ Shoko Kori, D. The psychosocial impact of climate change among smallholder farmers: a potential threat to sustainable development. *Front Psychol* **14**, (2023).

¹⁷ Bondy, M. & Cole, D. C. Striving for Balance and Resilience: Ontario Farmers' Perceptions of Mental Health. *Can J Community Ment Health* **39**, 101–118 (2020).

¹⁸ Hagen, B. N. M. *et al.* Research trends in farmers' mental health: A scoping review of mental health outcomes and interventions among farming populations worldwide. *PLoS ONE* **14**, e0225661 (2019).

¹⁹ Utete, B. Mental health in fishing communities: An overview of current knowledge and information gaps for fisheries. *Qeios* (2023).