

Ecological disruptions and psychological distress: Global evidence on the mental health consequences of climate change

Hikmat Ayoola Sodiq ^{1,*}, Juke Chika Obasi ², Ige Rachael Ojo ³, Justice Abugri ⁴, Oluwadamilola Jadesola Ajayi ⁵, Oluwaseyi Blessing Akomolafe ⁶ and Felix Oluwafunso Famotire ⁷

¹ Department of Public Health, Fountain University, Osun Osogbo, Nigeria.

² Department of Psychology, University of Ibadan, Nigeria.

³ Department of Biology, Abubakar Tafawa Balewa University, Nigeria.

⁴ Department of Community Mental Health, College of Health and Well-Being, Kintampo, Ghana.

⁵ Department of Communication Arts, Georgia Southern University, USA.

⁶ Department of Psychology, School of Health Sciences, Mapúa University, Manila, Philippines.

⁷ School of Health Information Management, Lagos University Teaching Hospital, Nigeria.

International Journal of Biological and Pharmaceutical Sciences Archive, 2025, 10(01), 008-022

Publication history: Received on 23 May 2025; revised on 29 June 2025; accepted on 01 July 2025

Article DOI: <https://doi.org/10.53771/ijbpsa.2025.10.1.0053>

Abstract

Climate change has emerged not only as an ecological and geopolitical crisis but also as a profound and growing threat to global mental health. A mounting body of interdisciplinary evidence indicates that both acute climate events such as wildfires, floods, hurricanes, and heatwaves and chronic stressors like rising temperatures, sea-level rise, and ecosystem degradation are associated with increased rates of psychological distress, anxiety, depression, post-traumatic stress disorder (PTSD), and suicidality. Additionally, novel psychological phenomena such as eco-anxiety, solastalgia, and ecological grief have been identified in populations facing existential environmental threats. This review synthesizes global research to elucidate the mental health consequences of climate change, with special focus on disproportionately affected populations, including Indigenous communities, children, the elderly, and climate migrants. The review explores neurobiological stress mechanisms, cultural and psychosocial disruptions, and structural inequalities that mediate vulnerability. Furthermore, it highlights key methodological limitations in current research, including the need for culturally sensitive tools, longitudinal studies, and robust climate-mental health metrics. It concludes by emphasizing the necessity of integrating mental health into national and global climate policy frameworks, proposing that mental health resilience and psychosocial adaptation must be central pillars of climate preparedness in the Anthropocene. Addressing the psychiatric and emotional burdens of a warming world is critical to sustaining public health, equity, and social cohesion in the decades ahead.

Keywords: Climate Change; Mental Health; Eco-Anxiety; Solastalgia; PTSD; Vulnerable Populations; Adaptation Strategies

1. Introduction

1.1. Background and Scope of the Climate Crisis

Climate change represents one of the most formidable global challenges of the twenty-first century, characterized by significant alterations in atmospheric composition, rising average temperatures, increased frequency of extreme weather events, and profound ecological disruptions. These changes are driven primarily by anthropogenic emissions of greenhouse gases such as carbon dioxide and methane, which have accelerated since the industrial revolution [1,2].

* Corresponding author: Hikmat Ayoola Sodiq; Email: sodiqhikmat@gmail.com

The Intergovernmental Panel on Climate Change (IPCC) reports that global temperatures have already risen approximately 1.1°C above pre-industrial levels, with projections indicating further warming ranging from 1.5°C to over 3°C by 2100 depending on emission trajectories [3]. This warming has precipitated rising sea levels, increased drought severity, intensified hurricanes, and widespread biodiversity loss, contributing to systemic environmental instability. The sheer scale and urgency of these environmental transformations place significant stress on ecosystems, economies, and human societies, particularly vulnerable populations who often bear the brunt of climate-induced hardships [2].

From an ecological perspective, climate change threatens to disrupt critical natural resources essential for human survival, including freshwater availability, arable land, and stable weather patterns. These disruptions extend beyond physical systems to affect social determinants of health such as food security, housing stability, and economic livelihoods, exacerbating existing inequalities both within and between countries. For instance, low-income communities and Indigenous peoples, who frequently rely directly on natural resources for subsistence, are disproportionately vulnerable to the adverse effects of climate change. The intersection of these ecological and social vulnerabilities highlights the comprehensive scope of the climate crisis, demanding integrative approaches that address both environmental sustainability and human well-being [4-6].

In addition to the tangible material impacts, climate change engenders profound uncertainty and anxiety about the future, provoking complex psychological responses at individual and collective levels. The global scale of the crisis, combined with media amplification and scientific warnings, contributes to a pervasive sense of threat that transcends geographical and cultural boundaries. As the climate crisis deepens, its multifaceted impacts are increasingly recognized as not only physical and economic but also psychological, thereby expanding the scope of climate change from a purely environmental issue to a critical public health challenge [7,8].

1.2. Emerging Intersection of Climate Change and Mental Health

The intersection between climate change and mental health is a rapidly emerging field that highlights the psychosocial dimensions of environmental disruption. Although mental health impacts of climate change have historically received less attention than physical health outcomes, recent interdisciplinary research reveals compelling evidence that climate-related events significantly affect psychological well-being. Acute climate-related disasters such as floods, hurricanes, and wildfires have been linked to increased prevalence of mental health disorders, including post-traumatic stress disorder (PTSD), anxiety, depression, and substance use disorders [9-11]. These acute events often result in immediate psychological trauma due to loss of life, displacement, destruction of property, and disruption of social networks, which can persist for months or years after the event.

In parallel, chronic climate stressors, including gradual environmental degradation, prolonged droughts, and persistent heatwaves, are implicated in more insidious psychological effects such as eco-anxiety and solastalgia. Eco-anxiety refers to the distress experienced due to apprehension about environmental doom and future uncertainties, while solastalgia describes the grief and loss associated with the transformation or degradation of one's home environment. These emerging constructs illustrate the broadening conceptualization of climate change impacts beyond physical harm, encompassing nuanced emotional and cognitive responses to ecological change [12,13]. According to Brophy et al. [14], eco-anxiety is increasingly prevalent among youth and marginalized populations who perceive themselves as both vulnerable and powerless in the face of climate threats, emphasizing the need for targeted mental health interventions.

Research also reveals that mental health outcomes of climate change are mediated by socio-economic and cultural factors, with marginalized populations facing compounded risks. Indigenous communities, for example, experience mental health consequences tied not only to environmental loss but also to threats to cultural identity and traditional ways of life. Furthermore, displacement due to climate-induced migration imposes psychological stress from loss of community, social isolation, and uncertainty. Hence, mental health is increasingly framed as a critical dimension of climate justice, highlighting the need for intersectional approaches that consider environmental, social, and psychological vulnerabilities simultaneously [15-17].

1.3. Objectives and Structure of the Review

This review aims to provide a comprehensive synthesis of the current evidence on the mental health impacts of climate change, drawing on multidisciplinary research from psychology, psychiatry, environmental science, and public health. The primary objective is to elucidate both the direct and indirect psychological effects of climate-related phenomena, ranging from acute disasters to chronic environmental changes, and to identify populations at heightened risk. By integrating empirical findings, theoretical frameworks, and methodological considerations, the review seeks to clarify the complex pathways linking climate change and mental health outcomes, thereby informing research, policy, and clinical practice.

The review is structured into thematic sections beginning with conceptual frameworks that explain how climate stressors impact mental health, followed by detailed exploration of acute and chronic mental health effects. Subsequent sections examine vulnerable populations disproportionately affected by climate change, biological and psychosocial mechanisms, and methodological challenges in existing studies. The latter part of the paper discusses resilience, coping strategies, and public health interventions aimed at mitigating mental health risks. Finally, the review concludes with policy recommendations and identifies critical gaps for future research. This organization aims to offer readers a holistic understanding of this evolving field, emphasizing the urgency of integrating mental health into climate adaptation and mitigation efforts worldwide.

2. Conceptual Frameworks for Understanding Climate-Linked Mental Health Impacts

2.1. The Biopsychosocial Model and Climate Stressors

The biopsychosocial model provides a comprehensive framework for understanding the multifaceted ways climate change impacts mental health by integrating biological, psychological, and social factors. Traditionally used in medicine and psychology to explain health outcomes, this model has recently been adapted to contextualize how environmental stressors associated with climate change trigger complex mental health responses [18,19]. According to Mpakosi et al. [20], the biological component involves the neuroendocrine and physiological stress responses activated by acute climate events such as heatwaves and disasters, which can dysregulate the hypothalamic-pituitary-adrenal (HPA) axis, leading to increased cortisol levels and heightened vulnerability to anxiety and depression. Psychologically, individuals exposed to climate stressors often experience trauma, uncertainty, and feelings of loss, which can exacerbate preexisting mental conditions or precipitate new psychiatric disorders.

From the findings of Lawrance et al. [9], the social dimension incorporates the contextual factors such as community cohesion, social support, economic stability, and cultural identity, all of which mediate the mental health outcomes of individuals and populations affected by climate change. For instance, communities with stronger social networks tend to demonstrate higher resilience and faster recovery post-disaster. Conversely, social isolation, poverty, and displacement intensify psychological distress and reduce access to mental health resources. These intertwined biological, psychological, and social pathways highlight why mental health impacts of climate change are heterogeneous across different populations and settings. Furthermore, researchers have emphasized that mental health interventions addressing climate-related stress must consider these interacting layers to be effective [21].

In applying the biopsychosocial model to climate change, it becomes clear that mental health impacts are not merely the result of exposure to environmental hazards but are deeply embedded in the broader socio-ecological context. For example, the same heatwave can cause varying mental health outcomes depending on an individual's physical health, psychological resilience, and socioeconomic environment [2,9,19]. Thus, climate stressors act as both direct triggers and catalysts that exacerbate underlying vulnerabilities. This comprehensive perspective helps explain why some groups, such as Indigenous peoples or low-income urban residents, suffer disproportionately from mental health issues linked to climate change [2]. Consequently, interventions must be multifaceted, addressing biological vulnerabilities, fostering psychological coping skills, and strengthening social infrastructures.

2.2. Climate Change as a Social Determinant of Mental Health

Emerging research increasingly recognizes climate change as a critical social determinant of mental health, influencing psychological well-being through complex, systemic pathways. Unlike traditional social determinants such as income or education, climate change shapes multiple determinants simultaneously—economic security, housing stability, access to healthcare, and community safety—thus exerting a profound and pervasive influence on mental health outcomes globally. According to Mahbod et al. [22], rising temperatures, unpredictable weather patterns, and frequent natural disasters disrupt livelihoods, increase food insecurity, and force migration, all of which contribute to psychological distress and elevated rates of anxiety and depression.

Climate change intensifies social inequities by disproportionately impacting marginalized communities that often lack the resources to adapt or recover. This unequal burden manifests in worsened mental health outcomes among low-income populations, racial and ethnic minorities, and rural communities, highlighting climate change's role in exacerbating existing social and health disparities. Researchers argue that recognizing climate change as a social determinant requires public health frameworks to shift towards intersectional approaches that incorporate environmental justice and equity considerations. Such integration allows mental health policies to address root causes rather than merely treating symptoms [9, 23-25].

Furthermore, according to the work of White et al. [26], climate change's status as a social determinant influences mental health not only through direct environmental exposures but also via anticipatory anxiety and perceived threats to future security. This pervasive psychological burden is especially apparent among younger generations, who face the prospect of living with long-term climate instability. Consequently, mental health challenges linked to climate change are increasingly framed within the broader context of societal structures, power dynamics, and the distribution of resources, making it imperative that public health responses adopt systemic, equity-focused strategies.

2.3. Definitions: Solastalgia, Eco-anxiety, and Ecological Grief

In recent years, new psychological constructs have been developed to better capture the unique emotional responses elicited by climate change, notably solastalgia, eco-anxiety, and ecological grief. These terms represent emerging facets of climate-related mental health that extend beyond conventional psychiatric diagnoses and reflect the complex relationship humans have with their changing environment [27-29]. Solastalgia, a term coined by Albrecht in 2005, describes the distress experienced when one's home environment is negatively altered, resulting in a form of "homesickness while still being at home" [30]. This concept has been particularly studied in Indigenous and rural populations experiencing land degradation and environmental loss, where cultural identity and place attachment are deeply intertwined.

Eco-anxiety refers to chronic or acute anxiety caused by concerns about climate change and ecological destruction, encompassing feelings of helplessness, fear, and uncertainty about the future. It is increasingly documented in youth and young adults, manifesting as both a clinical and subclinical phenomenon. Unlike typical anxiety disorders, eco-anxiety is directly linked to environmental awareness and anticipatory stress, reflecting a rational response to real-world threats rather than pathological dysfunction. Researchers emphasize that while eco-anxiety can motivate climate action, it also risks impairing mental well-being if left unaddressed [14,31,32].

Ecological grief describes the mourning or sorrow associated with the loss of ecosystems, species, and landscapes due to climate change. According to Comtesse *et al.*, [28], ecological grief is a natural emotional response to environmental degradation, and it may contribute to symptoms similar to depression and grief disorders. Studies conducted among Inuit populations and other Indigenous communities in the Arctic illustrate profound ecological grief connected to rapid environmental transformations disrupting traditional lifestyles [33]. Overall, these evolving constructs enrich our understanding of climate-linked mental health by capturing the emotional and existential dimensions of living through global environmental change.

3. Direct Mental Health Impacts of Acute Climate Events

3.1. Psychological Effects of Extreme Weather Events (Floods, Wildfires, Hurricanes)

Extreme weather events, which have increased in frequency and severity due to climate change, pose immediate and substantial threats to mental health worldwide. Floods, wildfires, hurricanes, and storms disrupt communities and induce intense psychological stress due to sudden loss of homes, livelihoods, and loved ones. Exposure to such disasters is consistently associated with elevated rates of anxiety, depression, and stress-related disorders. Flooding, for instance, leads not only to displacement but also to ongoing uncertainty, which perpetuates psychological distress long after waters recede [9,34,35]. Similarly, wildfires generate profound trauma owing to their unpredictable nature and potential for rapid devastation, often accompanied by displacement and long-term exposure to environmental toxins [36]. The psychological burden during and immediately after these acute events often includes acute stress reactions such as panic, fear, and confusion. Survivors frequently report feelings of helplessness and loss of control, which exacerbate emotional turmoil. The destruction of familiar landscapes and community infrastructure also contributes to solastalgia, a form of distress caused by environmental change, which can compound feelings of despair and mourning. Hurricanes add another layer of complexity by combining wind damage with flooding, creating multifaceted trauma. The cumulative effect of such disasters is a spike in mental health service needs, overwhelming often under-resourced health systems, especially in low-income and vulnerable regions [9,30,36].

Chique et al. [37] have found that the psychological effects of extreme weather events are not uniformly distributed across populations. Those with preexisting mental health conditions, low socioeconomic status, or limited social support are more susceptible to severe and prolonged distress. Children and adolescents are especially vulnerable due to their developmental sensitivity to trauma. The disruption of daily routines, schooling, and social networks following these disasters can significantly affect their emotional and cognitive development, as highlighted by Masten and Osofsky [38]. This body of research emphasizes the need for targeted, culturally appropriate mental health interventions immediately following acute climate disasters to reduce long-term psychological sequelae.

3.2. Post-Traumatic Stress Disorder and Natural Disasters

Post-Traumatic Stress Disorder (PTSD) is one of the most studied psychiatric outcomes following natural disasters, and evidence confirms its high prevalence among survivors of climate-related extreme events. The research of Goldmann and Galea [39] demonstrates that PTSD prevalence after disasters ranges widely from 5% to 60%, depending on disaster type, severity, and population studied. Hurricanes such as Katrina and Maria have served as key case studies, revealing PTSD rates of approximately 30% among directly affected individuals, substantially higher than baseline community rates [40]. This condition manifests through persistent re-experiencing of trauma, avoidance behaviors, hyperarousal, and negative alterations in cognition and mood, severely impairing quality of life and functioning.

Studies focusing on floods reveal that survivors often suffer from PTSD symptoms exacerbated by factors such as forced evacuation, loss of property, and witnessing injury or death. PTSD can persist for years post-disaster if unaddressed, contributing to chronic psychological disability [41,42]. Early psychological interventions and trauma-informed care significantly reduce PTSD symptom severity, yet such services remain insufficient in many disaster-prone areas. The lack of mental health infrastructure and trained personnel, especially in developing countries, hampers timely identification and treatment of PTSD [42].

Additionally, Mao et al. [43] emphasize the critical role of social support and community cohesion in mitigating PTSD risk after natural disasters. According to their findings, survivors embedded within strong social networks are less likely to develop severe PTSD symptoms. This suggests that interventions fostering community resilience and psychosocial support are crucial components of disaster mental health preparedness. Collectively, these studies underline the urgency of integrating mental health care, particularly PTSD prevention and treatment, into disaster response frameworks worldwide.

3.3. Heatwaves, Aggression, and Suicide Rates

Heatwaves, as a distinct but increasingly prevalent consequence of climate change, have a well-documented impact on mental health that extends beyond immediate heat-related illnesses. Research led by Kim et al. [44] provides compelling evidence linking high ambient temperatures to increased aggression and violence, potentially mediated by physiological stress responses such as heightened cortisol levels and irritability. Laboratory and epidemiological studies corroborate these findings, showing spikes in violent crime rates and domestic abuse incidents during extreme heat periods. The neurobiological pathways underlying these behaviors include dysregulation of the hypothalamic-pituitary-adrenal axis, which influences mood and impulse control [9,12]. Heatwaves have been implicated in elevated suicide rates, especially among vulnerable populations including the elderly and those with preexisting psychiatric conditions. According to Chen et al. [45], suicide rates increase by approximately 0.7% for every 1°C rise in monthly average temperature, a statistic that carries profound implications in the context of global warming projections. The mechanisms proposed include exacerbation of depressive symptoms due to disrupted sleep patterns, neurochemical imbalances, and social isolation during prolonged heat events. This relationship has been confirmed across diverse geographical contexts, including the United States, Australia, and parts of Asia [45-47].

In addition to direct heat exposure, heatwaves exacerbate mental health through indirect social and economic stressors. For instance, heat-related reductions in agricultural productivity can increase financial stress among farming communities, which in turn raises rates of depression and suicide [46]. Integrated public health interventions that address heat mitigation, mental health screening, and community support can significantly reduce these adverse outcomes. This body of work emphasizes that heatwaves, as acute climate stressors, demand urgent attention not only for physical health risks but also for their profound psychological impacts. [9,46]

4. Indirect and Chronic Mental Health Impacts of Climate Change

Climate-induced displacement is recognized as one of the most pressing indirect consequences of global warming, posing significant mental health challenges to affected populations. Environmental factors such as sea-level rise, desertification, and increased frequency of extreme weather events have forced millions worldwide to leave their homes, becoming climate refugees. The psychological toll of such displacement is profound, involving loss of place, social disintegration, and exposure to new stressors in host environments [48-50]. Research by Siddik et al. [48] demonstrated that displaced individuals often exhibit elevated rates of depression, anxiety, and post-traumatic stress disorder (PTSD), stemming not only from the initial traumatic event but also from ongoing uncertainty and marginalization in displacement settings. Several empirical studies have highlighted that the mental health burden among climate migrants is exacerbated by the disruption of social support networks and cultural dislocation. For instance, from the work of Mohammadi et al. [49], migrants displaced by environmental degradation in low-lying island states reported intense feelings of loss, hopelessness, and identity erosion, phenomena often described as solastalgia—

the distress caused by environmental change in one's home environment. These psychosocial impacts are compounded by the socio-economic instability many migrants face, including unemployment, poverty, and inadequate access to healthcare, which further deteriorate mental well-being [9,49]. Research by Siddik et al. [48] links displacement with elevated suicide rates and chronic mental health conditions, suggesting that mental health consequences may persist long after relocation. Moreover, the lack of comprehensive mental health services in refugee camps and host communities significantly impairs recovery from trauma associated with forced migration. In their systematic review, Mohammadi et al. [49] found that mental health care is often neglected in climate displacement policy frameworks, leaving refugees vulnerable to chronic psychological disorders. The review highlights the urgent need for integrating culturally appropriate psychological support into humanitarian responses and for the development of long-term mental health strategies tailored to the unique challenges of climate migrants. Addressing these indirect effects of climate change on mental health requires multidisciplinary approaches that encompass social, psychological, and environmental dimensions.

Beyond acute displacement, prolonged environmental degradation exerts insidious effects on mental health, fostering a pervasive sense of psychological despair among affected populations. Environmental degradation includes deforestation, biodiversity loss, soil erosion, and pollution, which collectively diminish the capacity of ecosystems to support human livelihoods and cultural identities. Chronic exposure to environmental decline is linked to heightened levels of depression and anxiety, particularly in rural communities dependent on natural resources. These effects are often mediated by feelings of helplessness, grief, and disconnection from the natural environment. Researchers have identified the phenomenon of ecological grief a form of mourning for the loss of ecosystems and species as a significant psychological response to long-term environmental degradation. Affected individuals express deep sorrow and existential distress as their landscapes and ways of life change irrevocably. These emotional responses, while natural, can escalate into clinical conditions if unaddressed [51-53]. Research by Rony [54] supports this by demonstrating that chronic environmental stressors contribute to lowered psychological resilience, making individuals more susceptible to mental illnesses over time. The chronic nature of these stressors also creates challenges for mental health interventions, as the gradual progression of environmental harm often lacks the dramatic immediacy that triggers aid and public attention. Populations suffering from environmental degradation frequently experience a form of "psychic numbing," whereby prolonged exposure to stress reduces motivation to engage in adaptive behaviors. This phenomenon complicates public health responses, suggesting that mental health strategies need to include long-term psychosocial support and community empowerment initiatives aimed at restoring hope and agency in affected populations [53].

Climate change-induced food and water insecurity represent critical pathways through which indirect mental health effects manifest, disproportionately affecting vulnerable populations. The disruptions in agricultural productivity due to droughts, altered precipitation patterns, and soil degradation have increased food scarcity and malnutrition, leading to heightened psychological distress. In many communities, uncertainty about food availability exacerbates anxiety disorders and depression, particularly in low-income and rural populations where subsistence farming is common. Similarly, water insecurity, amplified by climate change, undermines both physical and mental health. Also, unreliable access to clean water is strongly correlated with chronic stress, which can precipitate or exacerbate mood disorders. The psychological burden of water insecurity is often compounded by gender dynamics; women, who frequently bear the responsibility of water collection, face additional stressors related to safety risks and time poverty. These psychosocial stressors are linked to increased incidence of anxiety and depressive symptoms [55,56]. Moreover, food and water insecurity contribute to broader socio-economic instability, including displacement and conflict, which further deteriorate mental health. The cyclical nature of environmental stressors and social vulnerability creates a feedback loop that entrenches psychological distress within communities. Their research calls for integrated public health interventions that simultaneously address food security, water access, and mental health support to break this cycle [54].

5. Vulnerable Populations and Disproportionate Burdens

The mental health impacts of climate change are not uniformly distributed; instead, certain populations bear a disproportionate burden due to their social, economic, cultural, and physiological vulnerabilities [57,58]. Children and youth represent one of the most at-risk groups facing climate-related psychological distress. From the findings of Brophy et al. [14], it is evident that young people are experiencing unprecedented levels of climate anxiety, characterized by feelings of fear, helplessness, and uncertainty about the future (see Table 1). This anxiety transcends individual experiences and has intergenerational implications, as trauma from climate disasters is often transmitted across generations, influencing developmental trajectories and emotional well-being. Studies demonstrate that children exposed to climate-related disasters, such as hurricanes or wildfires, exhibit increased prevalence of post-traumatic stress disorder (PTSD), depression, and behavioral disturbances [42]. Moreover, youth activism and awareness have

amplified concerns about the existential threat posed by climate change, further intensifying psychological strain [14]. These psychological burdens are not only driven by environmental realities but also by perceived governmental inaction. As shown in Figure 1, a global survey by Hickman et al. [58] reveals that many young people feel betrayed and dismissed by their governments' responses to climate change, deepening their sense of anxiety, anger, and hopelessness. The developmental sensitivity of children to environmental stressors makes them particularly susceptible to long-term mental health consequences.

Table 1 Vulnerable Group and Risk Factors for Climate-Linked Mental Health Impacts

Population Group	Contributing Risk Factors	Unique Mental Health Outcomes
Children and Adolescents	Developmental sensitivity, eco-anxiety, disrupted schooling	PTSD, anxiety, fear about future
Indigenous Peoples	Land loss, cultural identity erosion, spiritual dislocation	Solastalgia, ecological grief, depression
Elderly	Physiological fragility, social isolation, fixed income	Heat-related anxiety, cognitive decline
Climate Migrants	Forced displacement, legal insecurity, cultural disruption	PTSD, depression, anxiety
Urban Poor	Exposure to heat/flood zones, lack of infrastructure	Chronic stress, anxiety, depressive symptoms

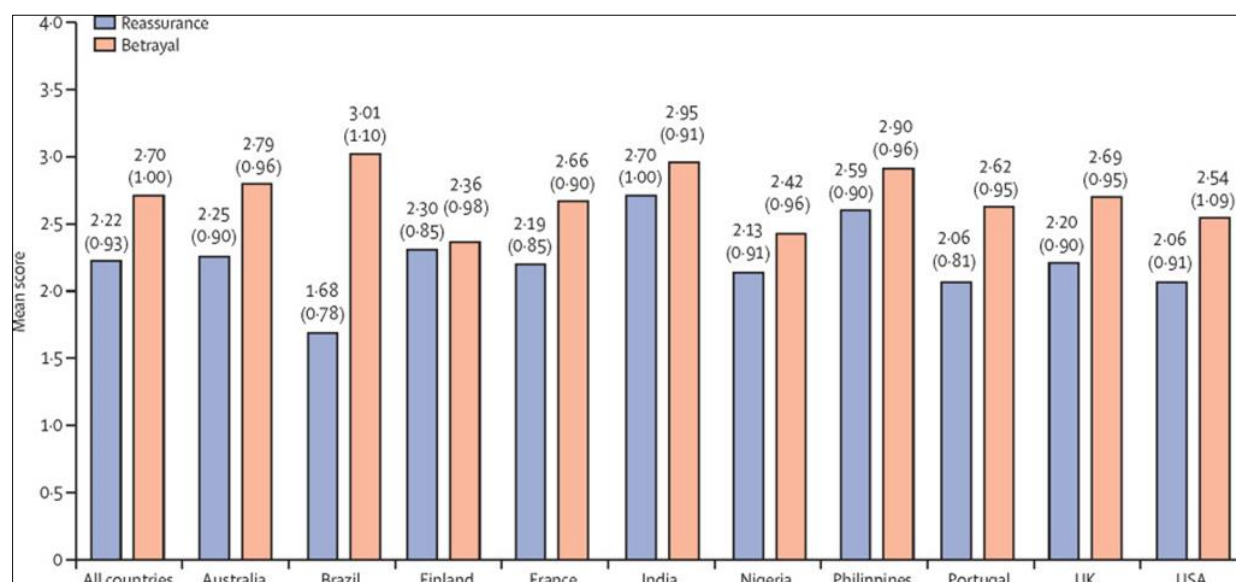


Figure 1 Youth Perceptions of Government Response to Climate Change: Reassurance and Betrayal (Reproduced with permission from ref [58])

Indigenous peoples worldwide are disproportionately impacted by the mental health consequences of climate change due to their deep cultural, spiritual, and livelihood connections to the environment. The loss of traditional lands and disruption of ecosystems due to climate change have led to cultural identity erosion, grief, and a profound sense of loss known as “ecological grief” or “solastalgia.” Indigenous communities’ intimate relationship with nature means that environmental degradation threatens not only their physical survival but also their social cohesion and spiritual practices, which are critical determinants of mental well-being [30]. A review by Vecchio et al. [16] further highlights how displacement and loss of biodiversity have contributed to increased rates of depression, substance abuse, and suicide in Indigenous populations. These psychological effects are exacerbated by systemic inequities, including inadequate access to mental health services and political marginalization.

Urban poor populations, the elderly, and persons with preexisting health conditions constitute additional groups bearing heightened mental health risks linked to climate change. From the findings of Brophy et al. [14], urban poor communities often reside in environmentally hazardous areas prone to flooding, heatwaves, and pollution, conditions that compound mental stress through insecurity and exposure to disaster. The elderly face increased vulnerability due to physiological frailty and social isolation, which amplify the psychological impact of climate-induced events such as heatwaves or displacement [9,14]. Persons with preexisting conditions, both physical and mental, are less resilient to environmental stressors, with studies showing exacerbation of anxiety, depression, and cognitive decline following climate-related disruptions [9]. Together, these vulnerable populations require targeted interventions that address both the social determinants of health and climate-specific stressors to mitigate disproportionate mental health burdens.

6. Mechanisms of Climate-Induced Mental Health Outcomes

The pathways through which climate change affects mental health are complex and multifactorial, involving neurological, hormonal, psychosocial, and economic dimensions. Neurological and hormonal stress pathways constitute critical biological mechanisms mediating climate-induced psychological distress. Exposure to extreme heat and environmental stressors activates the hypothalamic-pituitary-adrenal (HPA) axis, leading to elevated cortisol levels that are linked to anxiety, depression, and impaired cognitive functioning. Research using neuroimaging techniques has demonstrated that chronic environmental stress alters brain regions responsible for emotional regulation, such as the amygdala and prefrontal cortex, thereby increasing vulnerability to mood disorders. Furthermore, heat exposure has been correlated with increased incidences of aggression and suicidal behaviors, suggesting a physiological basis for some of the observed climate-related mental health outcomes [2,12,51].

Beyond biological mechanisms, psychosocial and economic disruptions play pivotal roles in exacerbating climate-related mental health conditions. Natural disasters and environmental degradation often lead to loss of livelihood, social networks, and community infrastructure, which undermine psychological resilience. Displacement due to climate events frequently results in social fragmentation and diminished access to mental health support, compounding stress and anxiety. Economic hardship caused by crop failures, job losses, and increased living costs disproportionately affects vulnerable groups, reinforcing cycles of poverty and mental ill-health. Studies have highlighted that the compounded stressors of climate change create cumulative psychological burdens that can overwhelm individual and community coping capacities, leading to chronic mental health disorders [20,24,39,43].

The role of media exposure and risk perception is increasingly recognized as a significant factor influencing mental health outcomes related to climate change. The constant dissemination of alarming climate information through news outlets and social media platforms has been associated with heightened levels of eco-anxiety and despair, especially among younger populations. Media coverage that emphasizes catastrophic futures without constructive coping messages can amplify feelings of helplessness and fatalism. Conversely, balanced communication that integrates adaptation strategies and community resilience can foster empowerment and reduce psychological distress. The interaction between risk perception, media narratives, and individual psychological responses highlights the need for careful public health messaging to mitigate the mental health impacts of climate change effectively [14,29,31].

7. Measurement, Methodologies, and Research Gaps

The assessment of climate-related mental health impacts has increasingly garnered scholarly attention, yet the tools and indices currently available for measuring these effects remain varied and, in many cases, insufficiently standardized. According to Owczarek et al. [59], psychometric tools such as the Climate Anxiety Scale and measures of ecological grief have been developed to quantify emerging psychological constructs linked to climate distress. For example, the Eco-Anxiety Scale enables researchers to gauge anxiety related to climate change in both clinical and community populations. However, many of these tools remain in the early validation stages and lack widespread application across diverse cultural contexts [60]. Furthermore, it is important to incorporate both qualitative and quantitative methodologies to capture the nuanced lived experiences of climate-affected populations, highlighting that purely quantitative tools may overlook key dimensions of psychological suffering tied to environmental loss and uncertainty [20,24].

Methodological limitations abound in current literature, notably the predominance of cross-sectional study designs which preclude establishing causality between climate events and mental health outcomes. Much research relies heavily on self-reported data collected immediately post-disaster, potentially exaggerating acute symptoms without accounting for long-term trajectories of mental health. Additionally, the geographic concentration of studies in high-income

countries introduces a bias, leaving gaps in understanding climate-mental health links in low- and middle-income regions where vulnerability is often greater due to socioeconomic and infrastructural disparities. Research often lacks culturally sensitive frameworks that consider local worldviews, social norms, and collective coping mechanisms, leading to incomplete or even misleading conclusions [24,42,43].

Addressing these limitations, experts such as Dillarstone et al. [61] advocate for longitudinal cohort studies that track individuals and communities over extended periods to better discern the chronic mental health effects of gradual environmental change. Cross-cultural comparative studies are also urgently needed to understand how climate-related psychological distress manifests in diverse sociocultural settings. There is marked differences in ecological grief expression between Indigenous populations in Australia and urban populations in the United States, underscoring the critical role of cultural context. Longitudinal designs coupled with mixed methods approaches would provide a more holistic and dynamic understanding of how mental health evolves in response to climate stressors and inform tailored intervention strategies [28,29,33].

8. Coping, Adaptation, and Resilience

8.1. Community-Based Mental Health Interventions

Community-based mental health interventions have emerged as critical strategies in addressing the psychological impacts of climate change, particularly in areas frequently exposed to extreme weather events and environmental degradation (see Table 2). Community programs that promote collective action, social support networks, and localized resource mobilization have demonstrated significant potential in mitigating the psychological distress associated with climate crises. Such interventions often include psychoeducation, trauma counseling, and the establishment of peer support groups, which help individuals and families process experiences of loss, displacement, and uncertainty. For example, after the Australian bushfires, community-led mental health initiatives provided culturally sensitive counseling and resilience-building workshops, which were shown to reduce symptoms of depression and post-traumatic stress disorder (PTSD) in affected populations. These programs emphasize empowerment and agency, recognizing that mental health recovery in the context of climate change is deeply interconnected with community cohesion and the restoration of social capital [36,42, 62].

Table 2 Selected Community-Based Interventions Addressing Climate-Linked Mental Health Needs

Country / Region	Type of Intervention	Target Group(s)	Mental Health Outcome(s) Improved
Australia	Community-led trauma recovery workshops (post-wildfires)	Fire-affected residents	Reduced PTSD and depressive symptoms
Philippines	Peer support groups and resilience training post-typhoon	Displaced families	Improved coping, lower anxiety
Canada (Arctic)	Cultural reconnection camps for Inuit youth	Indigenous youth	Reduced ecological grief, strengthened identity
Bangladesh	Mobile mental health clinics in flood-prone areas	Rural displaced persons	Early detection of trauma and stress

In addition, researchers like Heetderks-Fong et al. [63] and Ortiz et al. [64] have documented the role of community health workers and lay counselors in extending mental health services to marginalized populations who often face barriers to traditional healthcare. These workers, trained in trauma-informed care, serve as vital conduits for both psychological support and climate adaptation education, facilitating trust and ongoing engagement. Importantly, community-based interventions integrate local knowledge and cultural practices, enabling tailored approaches that resonate with the affected populations' values and lived realities. The findings of these researchers highlight that effective mental health interventions must transcend individual clinical care and focus on systemic, social dimensions of resilience-building within communities vulnerable to climate stressors.

However, the literature also identifies significant challenges in scaling up community mental health interventions in resource-limited settings. Obstacles such as insufficient funding, lack of trained personnel, and the competing demands of immediate disaster response hinder sustained mental health support. Despite these barriers, pilot programs that incorporate technology-driven solutions, such as tele-mental health and mobile apps, show promise in enhancing

accessibility and continuity of care in geographically isolated or underserved regions affected by climate change. These innovations may be crucial in bridging gaps in mental health service delivery and fostering adaptive capacities at the community level, particularly as climate-related disasters become more frequent and severe [65,66].

8.2. Psychological Resilience and Adaptive Capacities

Psychological resilience, the ability to maintain or regain mental health despite adversity, is increasingly recognized as a vital factor in how individuals and communities respond to climate-induced stress. Resilience is multifaceted, encompassing emotional regulation, cognitive flexibility, social connectedness, and a sense of purpose. Researchers have identified that resilience not only buffers against acute mental health disorders such as anxiety and PTSD but also enables longer-term adaptive behaviors essential for coping with ongoing environmental changes. For example, studies following hurricanes in the Caribbean have demonstrated that individuals with higher resilience scores experienced fewer depressive symptoms and showed greater engagement in community rebuilding efforts [24,36,42]. According to Comtesse et al. [28], adaptive capacities are influenced by both internal psychological traits and external environmental factors, including socioeconomic status, access to health services, and the stability of social support systems. These researchers emphasize that resilience is not an inherent trait but a dynamic process that can be cultivated through interventions targeting skills development, social empowerment, and access to resources. Furthermore, resilience frameworks have been adapted to include climate-specific stressors, acknowledging that chronic uncertainty about future climate impacts can erode psychological well-being even in the absence of direct exposure to disasters. This recognition has led to the development of resilience-building programs that integrate mindfulness, stress management, and problem-solving techniques tailored to climate anxiety and ecological grief [28,53].

However, resilience research also cautions against overemphasizing individual capacities at the expense of addressing structural vulnerabilities. From the findings of Heath [11], resilience must be situated within broader socio-political contexts that shape differential exposure to climate hazards and access to adaptive resources. Vulnerable populations, including Indigenous peoples and low-income communities, often face systemic barriers that limit their ability to build resilience, underscoring the need for equity-focused policies. The author advocates for a holistic approach that combines psychological support with efforts to enhance social justice, environmental sustainability, and climate mitigation, thereby fostering resilience on multiple interconnected levels.

8.3. Role of Cultural Narratives, Spirituality, and Collective Identity

Cultural narratives, spirituality, and collective identity play essential roles in shaping how communities interpret and respond to the mental health challenges posed by climate change. They provide frameworks through which individuals make sense of environmental loss, enabling both meaning-making and emotional processing. In many Indigenous communities, for example, spiritual connections to land and ecosystems underpin identity and well-being. The disruption of these connections due to climate impacts contributes to profound grief and identity crises, sometimes described as “cultural trauma” or “ecological grief”. Researchers emphasize that acknowledging and integrating these cultural dimensions into mental health responses can enhance their relevance and effectiveness [9,28,29].

Spirituality often offers individuals a source of hope, meaning, and coping in the face of climate uncertainty. Spiritual practices such as rituals, storytelling, and communal ceremonies can foster psychological resilience by reinforcing community bonds and providing avenues for expressing collective sorrow and hope. These practices also help to situate individual experiences of distress within larger cosmologies, reducing isolation and promoting collective healing. In contexts where climate change threatens not only physical environments but also cultural survival, spirituality can serve as a vital resource for maintaining continuity and resilience [9].

Furthermore, collective identity has been linked to improved mental health outcomes in populations facing climate threats. Strong social identities facilitate mutual support, collective action, and a sense of agency that buffers against feelings of helplessness and despair. Community mobilization around climate adaptation often draws on these shared identities to foster solidarity and promote mental well-being. However, researchers caution that collective identities can also become sites of conflict or exclusion, highlighting the need for inclusive and intersectional approaches in climate mental health initiatives. Cultural and spiritual dimensions are increasingly recognized as indispensable elements in the design and implementation of holistic, culturally competent mental health interventions in the context of climate change [9,67].

9. Policy, Governance, and Public Health Integration

Integrating mental health considerations into climate adaptation and mitigation plans has gained recognition as an urgent public health priority. The World Health Organization’s (WHO) recent framework on climate and health explicitly

calls for embedding mental health services within disaster preparedness and climate resilience programs. National governments that have begun incorporating mental health into their climate strategies such as Australia and New Zealand report improved community outcomes following extreme weather events due to coordinated psychosocial support and rapid crisis response teams. However, many countries, particularly in the Global South, lack the resources and policy infrastructure to implement such integrated approaches, leaving populations vulnerable to unaddressed mental health burdens [68].

The role of international organizations, NGOs, and governments in crisis response is multifaceted, encompassing emergency mental health services, capacity building, and advocacy. Successful interventions rely on multisectoral collaboration that bridges health, environmental, and social sectors to create holistic response systems. NGOs specializing in mental health, such as the International Red Cross and Médecins Sans Frontières, have increasingly incorporated climate mental health into their operational frameworks, providing trauma-informed care in climate disaster zones. Furthermore, partnerships with local governments and community organizations ensure culturally sensitive and contextually relevant service delivery, which is crucial for effectiveness [9,14,69].

Ethical, legal, and human rights implications arise from the intersection of climate change and mental health, necessitating policy frameworks that prioritize equity and justice. Research emphasizes that climate-induced mental health disparities often reflect broader social inequalities, including marginalization of Indigenous peoples, women, and low-income groups. The ethical obligation to protect mental health in climate policy intersects with human rights frameworks, such as the right to health and environmental rights. This has led to calls for climate litigation and policy reforms that hold governments accountable for safeguarding the mental well-being of vulnerable populations. Hence, addressing the mental health impacts of climate change requires embedding justice and ethical principles within governance structures to ensure equitable access to mental health resources and climate resilience [70,71].

10. Conclusion and Future Directions

This review highlights that climate change profoundly affects mental health through both immediate disasters like hurricanes and floods, as well as through ongoing environmental stressors such as rising temperatures and ecological loss. These impacts manifest in increased rates of anxiety, depression, PTSD, and emerging conditions like eco-anxiety and ecological grief. Vulnerable groups including children, Indigenous peoples, the elderly, and displaced populations bear a disproportionate burden due to their greater exposure and limited resources. The complex pathways linking climate change to mental health encompass biological, social, and economic factors, making it clear that these issues cannot be addressed in isolation. Community-based interventions, resilience-building, and culturally informed coping strategies are vital in reducing mental health distress, but challenges remain, especially in ensuring equitable access to these supports.

Looking ahead, mental health must be integrated into global climate and public health policies with urgency. Health systems need to prepare for both acute trauma and the chronic psychological stress caused by climate uncertainty. Strengthening mental health services, training providers in culturally sensitive care, and utilizing technology can improve access and outcomes, especially for marginalized communities. Future research must focus on long-term studies and culturally appropriate tools to better understand and respond to climate-related psychological distress. There is also a need for collaborative, interdisciplinary approaches that address the social determinants of health alongside environmental factors. Preventive efforts that build resilience and adaptive capacity in vulnerable communities will be essential as the climate crisis deepens. Ultimately, recognizing and addressing the mental health dimensions of climate change is critical for building sustainable, just, and resilient societies worldwide.

Compliance with ethical standards

Acknowledgments

The authors would like to thank all of the participating academics and colleagues who worked together to co-author and co-edit this review article. This work was completed solely by the authorship team's academic and intellectual contributions; no external money or help from any person, group, or institution was required.

Disclosure of conflict of interest

The authors declare that they have no conflict of interest to be disclosed.

References

- [1] Lamperti, F., Dosi, G., and Roventini, A. (2025). A complex system perspective on the economics of climate change, boundless risk, and rapid decarbonization (No. 2025/16). LEM Working Paper Series.
- [2] Mittal, K. (2025). Scorching heat impact on health: increasing deaths from mental health problems. In *Health and Climate Change* (pp. 73-95). Academic Press.
- [3] IPCC. (2023). *Climate Change 2023: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.
- [4] Mehta, P. (2024). The Impact of Climate Change on the Environment, Water Resources, and Agriculture: A Comprehensive Review. *Climate, Environment and Agricultural Development: A Sustainable Approach Towards Society*, 189-201.
- [5] Mehta, P. (2024). The Impact of Climate Change on the Environment, Water Resources, and Agriculture: A Comprehensive Review. *Climate, Environment and Agricultural Development: A Sustainable Approach Towards Society*, 189-201.
- [6] Bănăduc, D., Simić, V., Cianfaglione, K., Barinova, S., Afanasyev, S., Öktener, A., ... and Curtean-Bănăduc, A. (2022). Freshwater as a sustainable resource and generator of secondary resources in the 21st century: Stressors, threats, risks, management and protection strategies, and conservation approaches. *International Journal of Environmental Research and Public Health*, 19(24), 16570.
- [7] Constantino, S. M., and Weber, E. U. (2021). Decision-making under the deep uncertainty of climate change: The psychological and political agency of narratives. *Current opinion in psychology*, 42, 151-159.
- [8] Adams, M. (2021). Critical psychologies and climate change. *Current Opinion in Psychology*, 42, 13-18.
- [9] Lawrance, E. L., Thompson, R., Newberry Le Vay, J., Page, L., and Jennings, N. (2022). The impact of climate change on mental health and emotional wellbeing: a narrative review of current evidence, and its implications. *International Review of Psychiatry*, 34(5), 443-498.
- [10] Rajendran, R. K., and Binu, S. (2024). Navigating the Intersection of Global Climate Change and Mental Health. In *The Climate Change Crisis and Its Impact on Mental Health* (pp. 120-131). IGI Global.
- [11] Heath, S. C. (2025). Navigating psychosocial dimensions: understanding the intersections of adaptation strategies and well-being outcomes in the context of climate change. *Current Opinion in Environmental Sustainability*, 72, 101493.
- [12] Ferreira, R. J., and Ferreira, S. B. (2024). Mental Health and Psychosocial Wellbeing of Populations Exposed to Climate Change. In *The Routledge International Handbook of Social Work and Disaster Practice* (pp. 129-147). Routledge.
- [13] Kurebwa, J., Kurebwa, N. Y., and Supu, V. (2025). Climate Change and Mental Health. In *Managing the Health Risks of Climate Change* (pp. 155-178). IGI Global Scientific Publishing.
- [14] Brophy, H., Olson, J., and Paul, P. (2023). Eco-anxiety in youth: An integrative literature review. *International Journal of Mental Health Nursing*, 32(3), 633-661.
- [15] Nie, P., Zhao, K., Ma, D., Liu, H., Amin, S., and Yasin, I. (2024). Global Climate Change, Mental Health, and Socio-Economic Stressors: Toward Sustainable Interventions across Regions. *Sustainability*, 16(19), 8693.
- [16] Vecchio, E. A., Dickson, M., and Zhang, Y. (2022). Indigenous mental health and climate change: A systematic literature review. *The Journal of Climate Change and Health*, 6, 100121.
- [17] Hayward, G., and Ayeb-Karlsson, S. (2021). 'Seeing with Empty Eyes': a systems approach to understand climate change and mental health in Bangladesh. *Climatic Change*, 165(1), 29.
- [18] Barello, S. (2025). Psychological Frameworks for Understanding Global Health. In *Psychology for Addressing Global Health Challenges* (pp. 3-12). Cham: Springer Nature Switzerland.
- [19] Sebahutu, E. E. (2023). Theoretical Framework for Multiple Mental Disorder and the Biopsychopolitical Model of Mental Illnesses: Underscoring the Pressure of Politics on Citizens' SocialDeterminants of Mental Illnesses. *International Journal of Child Development and Mental Health*, 11(2).

- [20] Mpakosi, A., Cholevas, V., Tzouvelekis, I., Passos, I., Kaliouli-Antonopoulou, C., and Mironidou-Tzouveleki, M. (2024, September). Autoimmune diseases following environmental disasters: a narrative review of the literature. In *Healthcare* (Vol. 12, No. 17, p. 1767). MDPI.
- [21] Thompson, L. M., and Baker, E. J. (2023). Integrated biopsychosocial interventions for climate change-related mental health disorders. *Current Psychiatry Reports*, 25(3), 178–189.
- [22] Mahbod, M., and Parnian, A. (2024). Sustainable Development in Rural Areas: Climate Change Impacts on Water, Agriculture, Energy, and Psychological Health Consequences. In *Integration of Core Sustainable Development Goals in Rural Areas: Current Practices of Water, Energy, Food, Climate Change, and Ecosystems* (pp. 67-80). Cham: Springer Nature Switzerland.
- [23] Yadav, M., Chandel, A., Agrawal, H., and Quttainah, M. (2025). Climate change and global inequality: How does climate change exacerbate existing global inequalities and its implications. In *Effects of Climate Change on Social and Economic Factors* (pp. 21-48). IGI Global.
- [24] Smith, G. S., Anjum, E., Francis, C., Deanes, L., and Acey, C. (2022). Climate change, environmental disasters, and health inequities: the underlying role of structural inequalities. *Current environmental health reports*, 9(1), 80–89.
- [25] Parsons, E. S., Jowell, A., Veidis, E., Barry, M., and Israni, S. T. (2024). Climate change and inequality. *Pediatric research*, 1–8.
- [26] White, B. P., Breakey, S., Brown, M. J., Smith, J. R., Tarbet, A., Nicholas, P. K., and Ros, A. M. V. (2023). Mental health impacts of climate change among vulnerable populations globally: an integrative review. *Annals of global health*, 89(1), 66.
- [27] Cianconi, P., Hanife, B., Grillo, F., Lesmana, C. B. J., and Janiri, L. (2023). Eco-emotions and psychoterratic syndromes: reshaping mental health assessment under climate change. *The Yale journal of biology and medicine*, 96(2), 211.
- [28] Comtesse, H., Ertl, V., Hengst, S. M., Rosner, R., and Smid, G. E. (2021). Ecological grief as a response to environmental change: a mental health risk or functional response?. *International journal of environmental research and public health*, 18(2), 734.
- [29] Pihkala, P. (2022). The process of eco-anxiety and ecological grief: A narrative review and a new proposal. *Sustainability*, 14(24), 16628.
- [30] Albrecht, G. (2005). 'Solastalgia': A new concept in health and identity. *Philosophical Transactions of the Royal Society B*, 360(1462), 3655–3664.
- [31] Boluda-Verdu, I., Senent-Valero, M., Casas-Escolano, M., Matijasevich, A., and Pastor-Valero, M. (2022). Fear for the future: Eco-anxiety and health implications, a systematic review. *Journal of Environmental Psychology*, 84, 101904.
- [32] Sripathi, M., and Leelavati, T. S. (2024). Climate crisis chronicles: Navigating eco anxiety and climate related distress. In *Impact of Climate Change on Social and Mental Well-Being* (pp. 51-73). Academic Press.
- [33] Markkula, I., Turunen, M., Rikonen, T., Rasmus, S., Koski, V., and Welker, J. M. (2024). Climate change, cultural continuity and ecological grief: Insights from the Sámi Homeland. *Ambio*, 53(8), 1203-1217.
- [34] Charlson, F., Ali, S., Benmarhnia, T., Pearl, M., Massazza, A., Augustinavicius, J., and Scott, J. G. (2021). Climate change and mental health: a scoping review. *International journal of environmental research and public health*, 18(9), 4486.
- [35] Leal Filho, W., Krishnapillai, M., Minhas, A., Ali, S., Nagle Alverio, G., Hendy Ahmed, M. S., ... and Kovaleva, M. (2023). Climate change, extreme events and mental health in the Pacific region. *International journal of climate change strategies and management*, 15(1), 20-40.
- [36] Nabi, Z., Kumar, D., and Manzoor, J. (2024). Human Migration and Climate Change: A Traumatic Experience. In *The Climate Change Crisis and Its Impact on Mental Health* (pp. 85-95). IGI Global.
- [37] Chique, C., Hynds, P., Nyhan, M. M., Lambert, S., Boudou, M., and O'Dwyer, J. (2021). Psychological impairment and extreme weather event (EWE) exposure, 1980–2020: A global pooled analysis integrating mental health and well-being metrics. *International Journal of Hygiene and Environmental Health*, 238, 113840.
- [38] Masten, A. S., and Osofsky, J. D. (2018). Disasters and child development. *Child Development Perspectives*, 12(4), 241-246.

- [39] Goldmann, E., and Galea, S. (2014). Mental health consequences of disasters. *Annual Review of Public Health*, 35, 169-183.
- [40] Duque, M., Acaf, Y., Montero-Zamora, P., Cobb, C. L., Vo, D. H., Sahbaz, S., ... and Schwartz, S. J. (2025). Thriving amidst adversity: longitudinal psychological well-being and economic mobility in the Puerto Rican climate diaspora. *Applied Developmental Science*, 1-16.
- [41] Parel, J. T., and Balamurugan, G. (2021). Psychological Issues of People affected with Flood: A Systematic Review. *International Journal of Nursing Education*, 13(2).
- [42] Mahalingam, V. (2022). Post traumatic stress disorder ptsd and quality of life qol of natural disaster victims of uttarakhand (Doctoral dissertation, SRHU).
- [43] Mao, W., and Agyapong, V. I. (2021). The role of social determinants in mental health and resilience after disasters: Implications for public health policy and practice. *Frontiers in public health*, 9, 658528.
- [44] Kim, S. E., Kim, Y., Hashizume, M., Honda, Y., Kazutaka, O., Hijioka, Y., and Kim, H. (2023). Positive association of aggression with ambient temperature. *The Yale journal of biology and medicine*, 96(2), 189.
- [45] Chen, D. D., Tu, J. H., Ling, K. N., Jin, X. H., and Huang, H. Y. (2025). Climate change and suicide epidemiology: a systematic review and meta-analysis of gender variations in global suicide rates. *Frontiers in Public Health*, 12, 1463676.
- [46] Shoib, S., Hussaini, S. S., Armiya'u, A. Y. U., Saeed, F., Őri, D., Roza, T. H., ... and Chandradasa, M. (2023). Prevention of suicides associated with global warming: perspectives from early career psychiatrists. *Frontiers in psychiatry*, 14, 1251630.
- [47] Reddy, S. J. (2021). A note on: "Climate Change/Global Warming versus Climate Crisis. *Journal of Agriculture and Aquaculture*, 3(1), 23p.
- [48] Siddik, M. A. B., Ali, A., Shakil, M. R., Syfullah, M. K., Hoque, M. S., Islam, M. A., ... and Ali, S. L. (2025). Impact of climate-induced migration on depression: a study between disaster-affected migrant and non-migrant adolescents. *Climatic Change*, 178(4), 76.
- [49] Mohammadi, M., Jafari, H., Etemadi, M., Dalugoda, Y., Ali, H. M., Phung, H., ... and Chu, C. (2023). Health problems of increasing man-made and climate-related disasters on forcibly displaced populations: A scoping review on global evidence. *Disaster medicine and public health preparedness*, 17, e537.
- [50] Wewerinke-Singh, M. A. R. G. A. R. E. T. H. A., and Antoniadis, M. E. L. I. N. A. (2022). Climate displacement and the right to mental health. *Climate Refugees: Global, Local and Critical Approaches*; Behrman, S., Kent, A., Eds.
- [51] Jimenez, M. P., DeVille, N. V., Elliott, E. G., Schiff, J. E., Wilt, G. E., Hart, J. E., and James, P. (2021). Associations between nature exposure and health: a review of the evidence. *International journal of environmental research and public health*, 18(9), 4790.
- [52] Batterham, P. J., Brown, K., Trias, A., Poyser, C., Kazan, D., and Calear, A. L. (2022). Systematic review of quantitative studies assessing the relationship between environment and mental health in rural areas. *Australian Journal of Rural Health*, 30(3), 306-320.
- [53] Thoma, M. V., Rohleder, N., and Rohner, S. L. (2021). Clinical ecopsychology: The mental health impacts and underlying pathways of the climate and environmental crisis. *Frontiers in psychiatry*, 12, 675936.
- [54] Rony, M. K. K., and Alamgir, H. M. (2023). High temperatures on mental health: Recognizing the association and the need for proactive strategies—A perspective. *Health Science Reports*, 6(12), e1729.
- [55] Talukder, B., Ganguli, N., Matthew, R., VanLoon, G. W., Hipel, K. W., and Orbinski, J. (2021). Climate change-triggered land degradation and planetary health: A review. *Land Degradation and Development*, 32(16), 4509-4522.
- [56] Agostoni, C., Baglioni, M., La Vecchia, A., Molari, G., and Berti, C. (2023). Interlinkages between climate change and food systems: the impact on child malnutrition—narrative review. *Nutrients*, 15(2), 416.
- [57] White, B. P., Breakey, S., Brown, M. J., Smith, J. R., Tarbet, A., Nicholas, P. K., and Ros, A. M. V. (2023). Mental health impacts of climate change among vulnerable populations globally: an integrative review. *Annals of global health*, 89(1), 66.

- [58] Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., ... and Van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. *The Lancet Planetary Health*, 5(12), e863-e873.
- [59] Owczarek, M., Redican, E., Shevlin, M., and Nolan, E. (2025). Psychometric assessment of climate-related emotional responses: a systematic review of measures for eco-anxiety and related constructs. *Current Psychology*, 1-23.
- [60] Jarrett, J., Gauthier, S., Baden, D., Ainsworth, B., and Dorey, L. (2024). Eco-anxiety and Climate-anxiety linked to indirect exposure: A scoping review of empirical research. *Journal of Environmental Psychology*, 102326.
- [61] Dillarstone, H., Brown, L. J., and Flores, E. C. (2023). Climate change, mental health, and reproductive decision-making: A systematic review. *PLOS Climate*, 2(11), e0000236.
- [62] Bragge, P., Armstrong, F., Bowen, K., Burgess, M., Cooke, S., Lennox, A., ... and Capon, T. (2021). Climate Change and Australia's Health Systems: A Review of Literature. *Policy and Practice*.
- [63] Heetderks-Fong, E., and Bobb, A. (2024). Community Mental Health Workers: Their Workplaces, Roles, and Impact. *Community Mental Health Journal*, 60(8), 1547-1556.
- [64] Ortiz, T. N. B., DeChristofaro, S. C., Cheng, M., and Alegría, M. (2025). Community Health Workers Research: Where Are We Now? A Narrative Review of an Expanding Workforce for Mental Health. *Harvard Review of Psychiatry*, 33(3), 103-113.
- [65] Siddiqui, S., Ikeda, D. J., Saxena, S., Miller, B. F., Patel, V., and Naslund, J. A. (2022). Scaling up community-delivered mental health support and care: A landscape analysis. *Frontiers in Public Health*, 10, 992222.
- [66] Chutiyami, M., Cutler, N., Sangon, S., Thaweekoon, T., Nintachan, P., Napa, W., ... and River, J. (2025). Community-Engaged Mental Health and Wellbeing Initiatives in Under-Resourced Settings: A Scoping Review of Primary Studies. *Journal of Primary Care and Community Health*, 16, 21501319251332723.
- [67] Haslam, S. A., Fong, P., Haslam, C., and Cruwys, T. (2024). Connecting to community: A social identity approach to neighborhood mental health. *Personality and Social Psychology Review*, 28(3), 251-275.
- [68] <https://www.nema.gov.au/sites/default/files/2024-08/28108%20NEMA%20National%20Disaster%20Mental%20Health%20and%20Wellbeing%20Framework%20FA%20v4.pdf>
- [69] Adebayo, Y. O., Wahab, B. O., Isiaka, A. F., Salaudeen, I. A., Adebayo, K. T., Abdulsalam, R. O., and Bello, I. T. (2024). The impact of international NGOs on refugee support and policy influence: A global analysis.
- [70] Rahman, M., Ahmed, R., Moitra, M., Damschroder, L., Brownson, R., Chorpita, B., ... and Kumar, M. (2021). Mental distress and human rights violations during COVID-19: a rapid review of the evidence informing rights, mental health needs, and public policy around vulnerable populations. *Frontiers in psychiatry*, 11, 603875.
- [71] Antonina, U. (2025). Teenage Psychological Well-Being on AI-Driven Media Platforms: The Impact of Algorithms on Mental Health. In *The 2nd International scientific and practical conference "Innovative technologies for training and educating young people"* (January 14–17, 2025) Boston, USA. International Science Group. 2025. 309 p. (p. 264).