

Climate change impacts on mental health in Europe

An overview of evidence

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1. Introduction

A billion people worldwide are suffering from mental health disorders (Lawrance et al., 2021), and WHO estimates that around 800 000 people die from suicide each year (WHO, 2018). The estimated prevalence of mental disorders in the WHO European Region in 2015 was 110 million, equivalent to 12 % of the entire population (WHO/Europe, 2019). Across the EU countries and the UK, 84 million of people are affected by mental health problems. This means that, in 2016, more than one in six people across EU countries had a mental health problem, with an estimated 25 million people suffering from anxiety disorders and 21 million from depressive disorders. In 2015, over 84 000 people died of mental health problems and suicides across EU countries (OECD and EC, 2018). Yet, mental health is systematically underrepresented in public budgets and the health care system despite its implications for the quality of life and the massive global economic burden (WHO, 2018). In the WHO European Region, spending on mental health amounts only to 1% of total health expenditure (WHO/Europe, 2019). Thus, mental health is considered one of the most neglected areas of public health¹.

Climate change is expected to worsen the mental health outcomes (Patel et al., 2018; Lawrance et al., 2021; Romanello et al., 2021), despite the EU commitment to combat climate change (EU, 2021) and

¹ <https://www.who.int/news/item/27-08-2020-world-mental-health-day-an-opportunity-to-kick-start-a-massive-scale-up-in-investment-in-mental-health>

tackle climate change effects on human health (see Lancet Countdown and EEA, 2021). Mental health challenges are already associated with increasing temperatures, trauma from weather and climate extreme events, and loss of livelihoods and culture. Mental health issues are expected to increase under further global warming across the world, particularly for children, adolescents, elderly, and those with underlying health conditions (IPCC, 2022).

Although increasingly acknowledged, the impact of climate change on mental health (see Box 1) is under-researched compared to physical health impacts. This is despite reports emphasizing that cases of psychological traumas² from climate-related disasters can exceed those of physical injury by 40 to 1 (Lawrance et al., 2021). Moreover, climate change impacts on mental health can be considered to be an ‘invisible’ injustice. This is because socially vulnerable communities (people with pre-existing health conditions, young people, indigenous communities and other), who tend to be less visible in society, are often more impacted (Ingle and Mikulewicz, 2020; Burke et al., 2018).

In this context, this note presents a review of evidence on the impacts of climate change on mental health in Europe³. The following sections describe the main causal pathways identified in the literature that explain the impact of climate-related impacts on mental health.

Box 1. Definitions

Mental health: State of well-being in which the individual realises his or her abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community (WHO, 2004).

Post-traumatic stress disorder (PTSD): A mental health condition that is triggered by a terrifying event — either experiencing it or witnessing it. Symptoms may include flashbacks, nightmares, and severe anxiety, as well as uncontrollable thoughts about the event (Torres, 2020).

Solastalgia: The anguish produced by environmental changes affecting one’s own beloved place, especially the loss of solace once provided by the environment (Albrecht et al., 2007).

Eco-anxiety or climate anxiety: The chronic fear of environmental cataclysm that comes from observing the seemingly irrevocable impact of climate change and the associated concern for one’s future and that of next generations (Clayton et al., 2017). It is important to note that **climate anxiety** is rational and does not imply mental illness. Anxiety is an emotion that can lead to searching for potential solutions. However, because the climate crisis is so complex and lacks a clear solution, anxiety can easily become too intense and even overwhelming (Hickman et al., 2021).

Eco-paralysis: The feeling of not being able to take effective action to mitigate the effects of climate change (Albrecht, 2011).

Morbidity: The condition of suffering from a disease or medical condition.

Disability-Adjusted Life Year: a measure of burden of disease that combines years of life lost due to premature mortality (YLLs) and years of life lost due to time lived in states of less than full health. One DALY represents the loss of the equivalent of one year of full health (WHO).

Somatisation: the manifestation of psychological distress by the presentation of physical symptoms.

² Most of the cases of mental traumas following climate-related disasters are normal psychological reactions to difficult situations and not all require clinical intervention.

³ This paper focusses on the impacts of climate change on mental health and does not consider the impacts on mental health from actions aimed at mitigation of climate change

2. Impacts of climate change on mental health and well-being

2.1 Pathways of how climate change impacts mental health

Climate change – the extreme weather events, long-term changes of seasonal patterns and the projected catastrophic scale of future impacts - affects mental health of individuals through different pathways (Berry et al. 2010; Hayes and Poland, 2018; Palinkas and Wong, 2020; Lawrance et al., 2021). The pathways through which climatic events affect mental health are varied, complex and interconnected with other non-climatic influences on human vulnerability. In general, climate change risks to health can be classified into direct, i.e., biologic consequences of extreme weather events etc; and indirect, i.e., those mediated by changes in biophysical and ecological systems, e.g., food yields and undernutrition, mental health problems in failing farm communities or even anxiety about the future (McMichael, 2013).

The four main pathways of climate change impacts on mental health, around which this paper is structured, are as follows:

- **Mental health impacts from losses and damages associated with extreme weather events (direct impacts):** The direct and immediate (although often long-lasting) effects of extreme weather events (e.g., flooding, wildfires, droughts) on mental health, particularly in the form of Post-Traumatic Stress Disorder (PTSD), depression and anxiety, has been the most extensively documented pathway in the literature. Damages and loss of livelihoods following extreme weather events, such as flooding, have shown to have a significant effect on the mental health of individuals (Graham et al., 2019) and tend to be more frequently reported than physical health effects (Hayes et al., 2018).
- **Impact of high and increasing temperatures on mental health (direct impacts):** The direct and immediate impacts of high temperatures on mental well-being, such as changes in mood, as well as more severe behavioural disorders, including an increase in aggressive behaviour, crime and addiction. Moreover, a global systematic literature review revealed strong associations between high temperatures and an increase in suicide risks (Thompson et al., 2018). Higher temperatures also negatively affect mental status of those with pre-existing mental health issues and have been found to raise the psychiatric hospital admissions.
- **Distress from ongoing and anticipated climate and environmental change (indirect impacts):** The persistent emotional distress caused by the projected devastating effects of climate change and the future of our planet have increasingly been explored in the recent years. New terms such as solastalgia, eco-anxiety, climate anxiety, and eco-paralysis (see Box 1) are used to describe the psychosocial consequences of climate change-related consequences. Children and young people are particularly prone to experience this type of distress (Hickman et al., 2021).
- **Impacts at the community level (mainly indirect impacts):** Climate change can affect community cohesion, disrupt the sense of belonging and affect general well-being through losses and damages to natural habitats or cultural heritage associated with coastal erosion, storms or wildfires. Impacts on livelihoods may in extreme cases trigger socio-economic instabilities potentially leading to violent outbreaks over limited resources, displacement and forced migration. In addition, the cumulation of individual mental health issues associated with climate change can cause issues at the community level (e.g., aggressive behaviour turning into increased rates of violence), especially in communities with high proportion of vulnerable individuals.

Figure 1 offers a simplified view of the mental health impacts associated with climate change and the four pathways forming the structure of this paper. The following sections present a review of the scientific evidence per pathway, with particular focus on Europe.

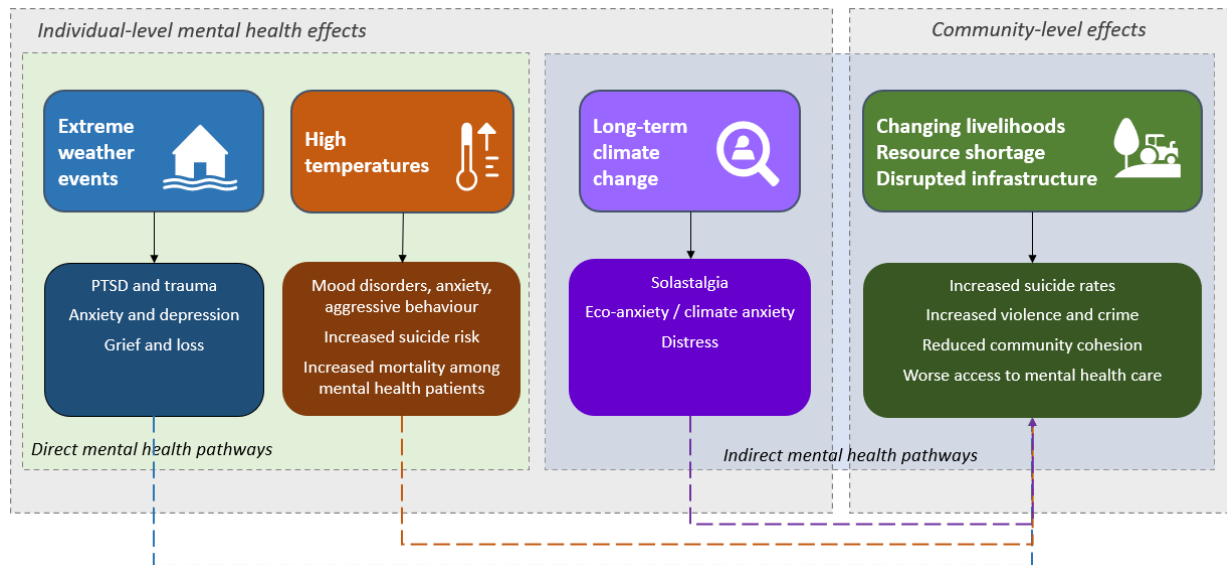


Figure 1. The pathways of climate change impacts on mental health in Europe considered in this report.
Source: EEA own elaboration, based on Lawrance et al. (2021) and Berry et al. (2010)

2.2 Mental health impacts associated with exposure to extreme weather events

2.2.1 Flooding

The number of people affected by flooding and reporting mental side effects in Europe between 1998 and 2018 has been estimated to be in the range of 1.72 to 10.6 million (Jackson and Devadason, 2019). Projections estimate that coastal flooding in the EU could potentially cause five million additional cases of mild depression annually by the end of the 21st century under a high sea level rise scenario in the absence of adaptation (Bosello et al., 2012).

The impact of flooding on mental health has been relatively well-researched in the global context: reviews of studies (Fernandez et al., 2015; Cianconi et al., 2020) confirmed a strong link between flooding and episodes of PTSD, anxiety and depression. Various factors – personal, health-related, social and others - were found to mediate the development of mental-health disorders **Error! Reference source not found.** caused by exposure to flooding (Fernandez et al., 2015; Table 1) **Error! Reference source not found.**

Flood-related displacement, especially happening without warning, has been associated with symptoms of depression, anxiety and PTSD (Tong, 2017). Moreover, an increase in the number of psychotropic drug prescriptions in the aftermath of flooding was found in France (Motreff et al., 2013) and the United Kingdom (Milojevic et al., 2017). Whilst out of the scope for the EEA, the considerable evidence of the mental health impact of floods comes from the UK (Box 2).

Table 1. Factors mediating the relation between being affected by flooding and mental health outcomes

Factors	Effect on outcomes
Social resources	In general, greater social support reduces mental distress, although the relation is complex.
Coping factors	Positive and proactive behaviours such as acceptance, positive reframing, and humour were associated with better mental wellbeing.
Health-related factors	Poor mental health status before the flood, as well as existing physical health problems, were associated with worse post-event mental health.
Personal factors	Lower socio-economic status is associated with a higher risk of mental health problems. There is contradictory evidence regarding the effect of gender and age. While some studies found poorer post-event mental health in women, other studies found no relation. Similarly, some studies found a protective effect in older age while others found an increase in the risk of mental disorders for older adults.
Degree of damages	Flood level or water depth in the house - measured in cm - was associated with an increase in the levels of mental problems. This relationship was not found in children. The inability to collect possessions and the perceived severity of loss and threat were other factors associated with an increase in mental health-related problems. Those who suffered financial losses because of a flood, faced problems with insurers, and experienced a high level of disruption to daily routines, including temporary or permanent loss of employment or loss of services, presented higher levels of mental health problems.

Source: Based on Fernandez et al. 2015. It should be noted that the results are based on a global review of studies conducted in different parts of the world and not exclusively in Europe

Box 2. Evidence on flooding impacts on mental health from the UK

According to the Environment Agency for England and Wales, experiencing damage caused by extreme weather, such as storms or flooding, can increase the chance of facing mental health problems (such as stress and depression) by 50%. A quarter of people who had been flooded still experienced these at least two years after the event (EA and DEFRA, 2020). Exposure to flooding predicts having a common mental disorder above the effects of other known predictors of poor mental health, such as age, income, general health, or alcohol use (Graham et al., 2019). Mental health problems were estimated to be responsible for more than 80% of the Disability-Adjusted Life Years (DALYs; see Box 1) attributable to floods in the UK between 2003 and 2008 (Fewtrell and Kay, 2008).

The depth of flooding has been found to be associated with the probability of developing PTSD symptoms. In one study, the probability of developing PTSD was three times higher among those who experienced flooding of depths over 100 cm compared to those affected by floodwater above 30 cm (Waite et al., 2017). Evidence linking an increase in psychological morbidity to the lack of insurance has also been identified (Mulchandani et al., 2019).

A significant association was found between being displaced due to floods and the prevalence of symptoms of depression, anxiety, and PTSD one year after the event. If displacement happened suddenly and without warning, the effects showed higher prevalence and were more long-term (Munro et al., 2017). A cohort study found that depression, anxiety, and PTSD may persist for at least three years after the flooding event for those, whose houses were flooded (Mulchandani et al., 2020).

2.2.2 Wildfires

A global review of 63 studies concerned with mental health impacts of wildfires revealed an increased rate of PTSD, depression, and generalized anxiety among the exposed population up to several years after the fire. An increased rate of mental health disorders post-wildfire has been found among both adults and children (To et al., 2021). The review identified only nine articles from Europe (eight from Greece, one from Spain), therefore evidence of the impacts of wildfires on mental health in Europe is scarce.

In Greece, a study analysing the impacts of the 2007 wildfires concluded that individuals affected by fires were more likely to experience symptoms of somatisation (see Box 1), depression, anxiety, hostility, phobic anxiety, and paranoia, compared to the control group (Papanikolaou et al., 2011a). The level of material losses due to wildfires and earthquakes were found by Papanikolaou et al. (2011b) to be a risk factor for psychological distress. A study of nearly 1 500 adolescents six months after a wildfire identified that 29.4% of them still had probable PTSD and 20% had probable depression (Papadatou et al., 2012).

Another study, in Northwest Spain, assessed the impacts of wildfires on mental health by investigating the consumption of anxiolytics-hypnotics – drugs used to treat sleeping and anxiety disorders - by people exposed to wildfires. The use of these drugs among men affected by fires was significantly higher than in the baseline control group. Interestingly, no such effect was observed for women (Caamano-Isorna et al., 2011).

2.2.3 Droughts and water scarcity

Farmers are often found to be highly vulnerable to mental health risks associated with environmental factors such as droughts (Cianconi et al., 2020), but there are limited studies from Europe that would support that. According to a global evidence review conducted by Daghigh Yazd et al. (2019), climate variability/drought emerges as one of the four factors most affecting farmers' mental health (alongside pesticide exposure, financial difficulties, and poor physical health/past injuries). This interplay between droughts and mental health has been explored mainly in the USA, Australia and the UK, and the evidence in Europe remains scarce (around 10% of the studies reviewed by Daghigh Yazd et al., 2019). Another overview of the literature examining mental health in farming populations worldwide also found that only a small proportion of studies were from Europe and mainly concerned the UK (Hagen et al., 2019).

There is mixed evidence on the impact of water scarcity on mental well-being among urban residents, and none of it is from Europe. Studies from various cities across the globe point towards adverse mental effects of poor access to water, with women particularly affected (Abadi et al., 2020). However, a national survey in Australia found that while drought was associated with elevated psychological distress in rural communities, this was not the case for urban dwellers (O'Brien et al., 2014 in Charlson et al., 2021).

2.3 High temperatures' impact on mental health

Overall, literature agrees that heatwaves lower mental well-being and increase the risk of mental health-related outcomes such as mood and behavioural disorders. According to Watts et al. (2021), local heatwave exposure was found to significantly reduce positive expressions on Twitter and increase negative expressions from users around the world.

Heatwaves are associated with an increase in suicide risk. Based on a global review, Liu et al. (2021) concluded that a 1°C rise in outdoor ambient temperature is associated with a 2.2% increase in mental health-related mortality and a 0.9% increase in mental health-related morbidity. Another systematic global review (including studies from Austria, Belgium, Finland, Ireland, Spain, and Switzerland) found that while heat seemed to increase the risk of the mental health outcomes in general, the strongest association was found for suicide risks, in particular for men (Thompson et al., 2018). A study in Italy for data between 1974 and 2003 found that mortality due to suicide among men was associated with higher monthly average temperatures, especially in the summer months (Prete et al., 2007).

A specific group vulnerable to the mental effects of extreme hot temperatures is people with pre-existing mental health conditions (Palinkas and Wong, 2020; Page et al., 2012). According to a global review, heat, among other climate-related exposures, is associated with psychological distress, worsened mental health, higher mortality among people with pre-existing mental health conditions, increased psychiatric hospitalisations, and heightened suicide rates (Charlson et al. 2021). In the European context, a study

conducted in a Swiss hospital concluded that increasing temperatures could negatively affect mental status of psychiatric patients (Bundo et al., 2021). In Italy, people suffering from bipolar disorder were found to be more sensitive to weather and climate compared to the healthy control group subjects; the level of sensitivity to weather changes was associated with the number of lifetime suicide attempts (Di Nicola et al., 2020). Heat can also affect physical health and increase risk of dying for mental health patients (Box 3).

Box 3. Morbidity and mortality of mental health patients associated with high temperatures

Certain mental health conditions – for example dementia, schizophrenia as well as drug/alcohol abuse – are significant risk factors associated with an increased frequency of heat-related illness hospitalisations, according to a global review (Schmeltz and Gamble, 2017). In Germany, the mortality of elderly persons with dementia was found to increase by 11 % during heat waves, compared to usual temperatures (Fritze, 2020). In Italy, those suffering from depression and other mental health disorders had a significantly higher risk of dying on days around 30°C compared to 20°C (Staffoglia et al., 2006). Among older adults in Rome, the risk of dying during heat waves was higher among those with psychiatric disorders (Schifano et al., 2009). Also in the UK, patients with a mental illness (psychosis, dementia, substance misuse) had an increased risk of death by 4.8 % per 1°C increase in temperature above the 93rd percentile of annual temperature distribution. One hypothesis explaining this association, is the use of medication containing diuretics and psychotropic drugs. which, at high temperatures and especially in the elderly, have been associated with an increased risk of morbidity and mortality (Page et al. 2012).

In agreement with the above, an analysis of the mortality and morbidity during the 2003 heatwave in France shows that the use of psychotropic drugs was associated with an increased risk of admission to hospital with heat-related health problems (Martin-Latry et al., 2007); and that the use of antidepressants and antipsychotics was associated with increased risk of death (Nordon et al., 2009). In Sweden, warm weather was found to increase the risk of drug-induced hyponatremia (a low concentration of sodium in blood), which is a known adverse side effect from common drugs such as antidepressants (Jönsson et al., 2017).

2.4 Distress from ongoing and anticipated climate and environmental change

Climate change is for many people a source of concern, which may translate into lower mental well-being. According to the 2021 Eurobarometer survey on climate change, Europeans consider climate change to be the single most serious problem facing the world (see Figure 2). More than nine in ten Europeans (93%) believe that climate change is a serious problem, including 78% who say it is a very serious problem (EC, 2019). Increasing acknowledgment of the risks of climate change may result in psychological distress and anxiety (Palinkas and Wong, 2020).

Since the beginning of 2000s, new concepts referring to the distress caused by environmental change have been coined. **Solastalgia** refers to the anguish produced by environmental changes affecting one's own beloved place, especially the loss of solace once provided by the environment (Albrecht et al., 2007; and Albrecht, 2011). Through an evidence review, Galway et al. (2019) identified extreme weather events/natural disasters and climate change as the main sources of environmental change causing solastalgia. Most of the research on solastalgia has been carried out in Australia and the USA, but the evidence in Europe remains scarce. A case study analysing the impact of coastal erosion on a community in Southeast Ireland found a positive correlation between length of residence in the community and solastalgia. Moreover, solastalgia was strongly correlated with a negative outlook for the future, both for oneself and future generations (Phillips and Murphy, 2020).

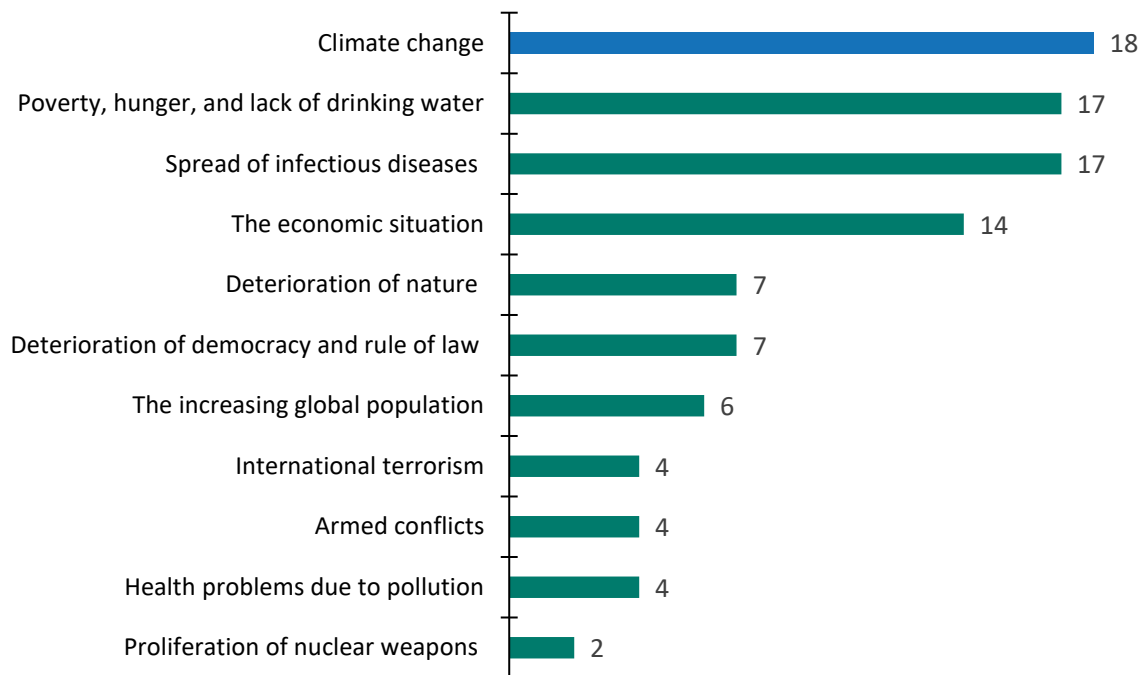


Figure 2. Percentage of respondents in EU-27 that in 2021 identified a given issue as the single most serious problem facing the world. Source: EC (2021).

Eco-anxiety is described by the American Psychology Association as the chronic fear of environmental cataclysm that comes from observing the seemingly irrevocable impact of climate change and the associated concern for one's future and that of next generations (Clayton et al., 2017). **Climate anxiety** is often used interchangeably with eco-anxiety in the context of climate change. **Eco-paralysis** is defined as the feeling of not being able to take effective action to mitigate the effects of climate change (Albrecht, 2011). Other emotions such as anger (**eco-anger**) have been demonstrated to lead to major engagement in climate change activism (Stanley et al., 2021), see also Box 4.

Children, youth, and young adults are particularly vulnerable to the distress and mental health problems caused by both the direct effects of climate change and the concern about anticipated environmental change (Burke et al., 2018). The 2018-19 pan-European survey 'The Europe kids want' indicated climate change as the third biggest fear, after not being able to find a job and the possibility of war or terrorist attacks, for the respondents under 30 years old, including children (UNICEF and Eurochild, 2019). A 2020 survey of 22 000 people (aged 15 – 35) in 23 European countries shows that the most serious problems facing humanity were seen as climate change (46%) and environmental degradation (44%), despite the on-going COVID-19 pandemic. In addition, 84% of the respondents said they were worried about climate change and 65% believed it would affect them directly (EEB, 2021).

According to a global survey of 10 000 children and young people (aged 16 - 25) in various countries across the world (Marks et al., 2021; Hickman et al., 2021), over 45% of respondents said their feelings about climate change negatively affected their daily life and functioning, and 75% respondents judged their future as "frightening". Considering respondents from the European countries, in Portugal this percentage was 81%; in France 74%, and in Finland 56%. In addition, 65% of respondents in Portugal stated that they felt extremely or very worried about climate change, followed by 58% in France and 44% in Finland. The feelings about climate change negatively affected the daily lives of 37% of surveyed children in Portugal, over 35% in France, and 31% in Finland (Marks et al., 2021). Other global studies of

children (Hickman, 2020; Hickman, 2019) have also found strong evidence for eco-anxiety associated with climate change. Climate anxiety for children and young people may become so severe that it requires specialist help; according to the English National Health Service survey of psychiatrists, 57% of those treating children and adolescents have seen patients distressed about environmental and ecological issues in the previous year, which was nearly 10 percentage points higher compared to psychiatrists dealing with all age groups (Royal College of Psychiatrists, 2020a).

In the global study by Hickman et al. (2021), 83% of the surveyed children and young people said that they think that people have failed to take care of the planet. The governmental responses to climate change were rated negatively and there was a correlation between climate anxiety and distress and the perceived inadequate government response and associated feelings of betrayal. The level of concern about the future and discontent with the perceived inadequate action is illustrated by the increasing climate activism. In March 2019, hundreds of thousands of students in 2 000 cities across 123 countries left school in an act of protest about political inaction regarding climate change, titled Fridays for Future. This action has by 2021 mobilized over 14 million people in 8 200 cities globally (Martin et al., 2021). The engagement of so many children in those strikes demonstrates young people's deep concerns about their future and their determination to prevent a climate catastrophe (Sanson et al., 2021). Climate activism itself can have effects on mental health of young people (Box 4).

Box 4. Mental health effects of climate change activism among children and youth

Given the evidence that many children feel powerless and hopeless about preventing catastrophic climate change, it is important to build their sense of self-efficacy and collective efficacy (i.e., the beliefs that they can make a significant contribution and that people working together can effect change). Taking action through having a meaningful role in the face of adversity can offer psychological protection by helping children to feel more in control, more hopeful, and more resilient (Sanson et al., 2019). A study from USA shows that participation in projects addressing environmental issues helps children to build their efficacy and sense of hope (Gallay et al. 2021); a global review identified youth empowerment and policy advocacy as the interventions in disaster reduction and response that empower young people to become effective agents of change in building safer and resilient communities (Bessaha et al., 2021).

However, the coping strategies employed by the young activists to deal with their emotions may affect their mental health outcomes. A study of the coping strategies of Swedish young people to deal with climate change found that problem-focused coping (i.e., attempts to reduce the cause of the problem), was associated with pro-environmental behaviours but also with anxious and depressive feelings. In contrast, a meaning-focused coping strategy (realistically acknowledging a threat and then looking for its 'silver linings' that align with one's beliefs, values and goals) was related to higher well-being and satisfaction with life, a sense of purpose and optimism, and more active engagement in environmental issues, despite serious concerns about climate change (Ojala, 2012; 2015).

Therefore, children and youth experiencing climate anxiety and engaging in climate activism need to be supported by adults, so that their mental well-being is enhanced rather than compromised. Alongside actions aiming at mitigation of greenhouse gas emissions, this can be done by reframing climate anxiety as a rational response to reality, rather than psychopathological thoughts and feelings (Royal College of Psychiatrists, 2020b; Lawton (2019). Listening and providing opportunities for active engagement are among the ways adults can help young people cope and build a sense of agency to tackle the crisis and adapt to climate impacts (Sanson et al., 2019). Professional psychological help is also needed, yet addressing eco-anxiety remains a low priority among child and adolescent mental health professionals, according to a survey in the UK (Sanson and Dubicka, 2022).

2.5 Impacts at the community level

How the mental health impacts on individuals translate into effects for the community is driven by many factors. They include the level of exposure of the given community to a given type of threat (the intensity, duration, recurrence or persistence of the climate hazards), the vulnerability of the community, i.e., the make-up of the population that makes it more prone to negative mental health outcomes; and the impacts of climate change on livelihoods, traditional way of living, and social ties.

In terms of the exposure, cities exposed to high temperatures may become more violent (Cianconi et al., 2020). Studies highlight a correlation between temperature and crimes (Murataya and Gutiérrez, 2013), and rising temperatures seem to be a catalyst for civil disturbance. In Finland, the incidence of violent crime was increasing with the higher ambient temperatures, 1.7 % increase per 1°C, implying a possible increase of more than 3 % in violent crime rates in non-tropical and non-subtropical regions with a temperature rise of 2°C (Tiihonen et al., 2017). Heatwaves can also be associated with an increase in intimate partner violence according to a study conducted in Madrid (Sanz-Barbero et al., 2018). However, it is controversial if global warming will result in increased crime and conflict rates (Tiihonen et al., 2017).

Seasonal affective disorder associated with increased depression and increased suicide rates have been identified as mental health challenges in locations that receive little sunlight during winter months, such as Finland (Grimaldi et al., 2009; Ruuhela et al., 2009). Climate change could further aggravate these issues as overall brightness of northern Europe might further decrease due to less snow cover and increased cloudiness (Burenby et al., 2021; Meriläinen et al., 2021).

Considering the vulnerability of the community, certain groups - women, young people, and people with lower socio-economic status - have shown to be more vulnerable to anxiety and mood disorders related to disasters. Climate change impacts in general groups of vulnerable populations that therefore have an increased probability of developing psychopathologies: women, the elderly, children, people with previous psychiatric illnesses, and those on lower incomes or experiencing social isolation, as well as indigenous and native communities (Cianconi et al., 2020). Children can be particularly affected through both direct and indirect climate impacts, as their dependency on adults can lead to health and psychosocial consequences related to the impacts of climate change on parents' well-being, family functioning, and economic status. Children's exposure to reoccurring and cumulative risks is particularly harmful to health and psychological development, with consequences including PTSD, depression, aggression, and ineffective coping styles, which may substantially affect the next generation (Sanson et al., 2019).

Literature suggests that climate change can place strain on communities due to shortage of resources, resulting in displacement, violence, and crime (Hayes and Poland, 2018). In addition, the prospect of loss (anticipatory grief) due to climate-related changes can also affect people, in particular the indigenous and traditional communities (IPCC, 2022). This is manifested in different ways across Europe, with particular impacts on the fastest warming regions. In the Circumpolar North, an analysis based on existing literature, community-based research, and mental health practice, identified five main ways in which climate change may affect mental health of populations and especially indigenous peoples. Namely, these are effects from biophysical changes in land, ice, snow, and weather; physical health impacts with consequences for mental health; damages to the built environment and infrastructure leading to loss and displacement; effects from media discourses; and the aggravation of pre-existing drivers of stress (Cunsolo Willox et al., 2015). For example, the way of life of the Sami community, indigenous people who inhabit the north of Norway, Sweden, and Finland, is threatened by climate change as the Arctic is warming at almost twice the rate of the global average causing mental health issues. Half of Sami adults in Sweden suffer from anxiety and depression, and one in three young indigenous reindeer herders have contemplated suicide (Environmental Justice Foundation, 2019). Developing or enhancing access to mental health resources and infrastructure, including climate-specific counselling services, are critical to improve the mental well-being of the communities in the Arctic (IPCC, 2022).

The Mediterranean basin is also at risk, as the temperature rise in the region is higher than current global warming trends, which could worsen the climate-related hazards such as droughts, floods, and fires. A combination of growing populations and the impacts of climate change could create a shortage of crucial resources jeopardizing water and food security in the Mediterranean (MedECC, 2020). Agricultural loss – lower crop productivity and yields - is linked to a decrease in economic growth leading to long-term economic disadvantages while promoting political instability and conflicts (Cianconi et al., 2020).

Other community-level impacts of climate change that affect mental health include more difficult access to health care. For example, flooding disrupts infrastructure, causing problems for the standard systems of care, including mental health care that could assist and mitigate the psychological outcome for victims (Cianconi et al., 2020).

Extreme weather events seem to have the power to also destroy social ties (Cianconi et al 2020). In Italy, migrants from African countries that are extremely vulnerable to climate change were found to more likely experience emotional disorders associated with the loss of social capital than those from countries with slightly less vulnerability (Di Giorgi et al. 2020). Thus, restoring social cohesion of communities and families immediately after calamities is crucial to reduce suffering and promote effective recovery. Community resilience also has a preventive effect, as it prepares the population for future events while also helping them to cope with the current situation (Cianconi et al., 2020).

3. Responses in policy and practice

3.1 European policy framework

In general, there is an increasing recognition of mental health crisis in Europe, based on the growing evidence and awareness about the magnitude of mental health problems, albeit not in relation to climate change. In the previous decade, the *European Framework for Action on Mental Health and Wellbeing* – an EU joint action involving 25 Member States, Iceland and Norway (EC, 2016) - focused on the effective implementation of policies and interventions contributing to promotion of mental health and the prevention and treatment of mental disorders, including through integration of mental health in all policies and multi-sectoral cooperation. Under this joint action, the *EU-Compass for Action on Mental Health and Wellbeing* drove the collection, exchange, and analysis of information on policy and stakeholder activities in mental health in European countries between 2015 and 2018 (OECD and EC, 2018). In addition, the mental health and wellbeing policies and activities of EU countries and non-governmental stakeholders were monitored.

The new '*Healthier Together*' – *EU Non-Communicable Diseases Initiative* of the European Commission will help Member States reduce the burden of non-communicable diseases. It will cover the period 2022-2027 and include five strands: cardiovascular diseases, diabetes, chronic respiratory diseases, mental health and neurological disorders, and a horizontal strand on health determinants. In each of these strands, the initiative will promote the reduction of health inequalities (European Commission, 2021b).

From the climate change adaptation perspective, the new *EU Strategy on Adaptation to Climate Change* does not make explicit reference to mental health, although it emphasises the need to better understand the health impacts of climate change in general and greater capacity to counteract them (EC, 2021c).

The WHO Regional Office for Europe has long been drawing attention to the mental disorders being one of the top public health challenges in the region, for example through the *European Mental Health Strategy* (WHO/Europe 2011) followed by the *European Mental Health Action Plan 2013–2020* (WHO/Europe). In the recent resolution on its *European Framework for Action on Mental Health 2021-2025*, The WHO Regional Office for Europe acknowledges the progress made to improve mental health in Europe and reiterates the need to address remaining gaps, recognising the significance of mental

health for achieving the sustainable development goals (WHO/Europe, 2021b). However, climate change is not explicitly covered in those strategies. Whilst the *European Programme of Work 2020-2025* (WHO/Europe, 2021a) does set goals relating to both the health risks from climate change and in mental health and well-being, it does not address them in an integrated manner. Therefore, the need for stronger integration of mental health into the policies relevant to climate change, and vice versa, remains.

3.2 National policies

At the national level, in terms of general mental health, several countries (e.g., Belgium, Czechia, Finland, France, Hungary, Ireland, Italy, the Netherlands, Slovenia, Spain, Portugal) have a specific plan or policy document addressing mental health promotion and prevention (OECD and EC, 2018), but it is unknown to what extent they cover climate change impacts.

According to the [EEA analysis of national climate change adaptation policies and national health strategies](#), more than half of the national climate change adaptation strategies consider one or more impacts from climate change on mental health; whereas less than one-fifth of the national health strategies paid attention to mental health impacts of the changing climate. The most frequently recognised impacts were those associated with mental trauma from extreme weather events, whereby other types of impacts were included to a lesser extent (Figure 3).

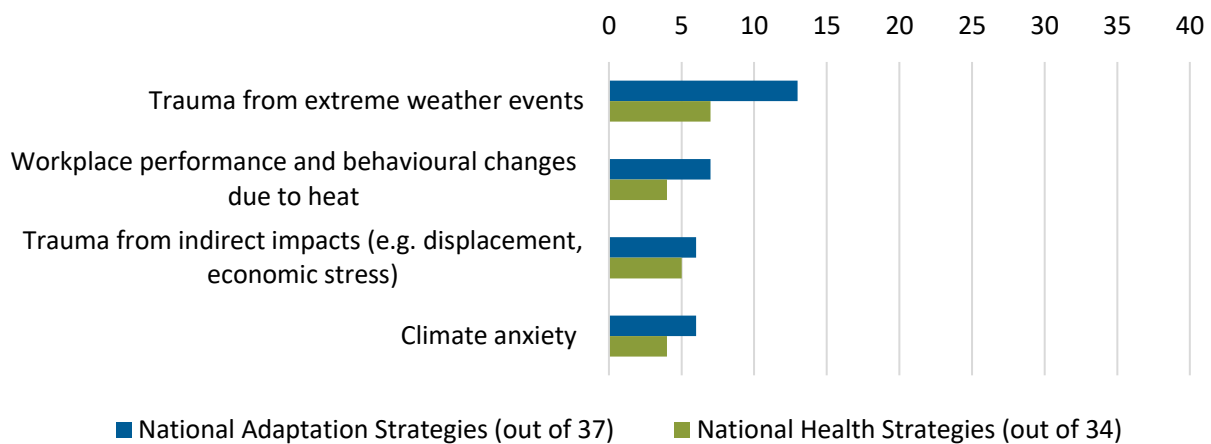


Figure 3. Mental health impacts included in the national policies reviewed ([European Climate and Health Observatory, 2022](#))

There are not many examples of policies addressing climate change impacts on mental health. The [Austrian National Adaptation Strategy](#) includes among its measures strengthening of mental health services in response to PTSD, loss, or climate related anxiety. Finland identifies mental health as one priority area in its [adaptation plan for the social and health sector](#) and specifies the objectives for capacity building and cross-sectoral adaptation measures. Focus areas seem to be effects from extreme weather events, increased summer heat and reduced light during winter, whilst other aspects such as climate anxiety are also mentioned.

Therefore, for effective actions protecting mental health under the changing climate, there is a need for the countries to include mental health impacts of climate change more explicitly in their policies, in particular the health strategies. Also, the consideration needs to go beyond addressing the mental health impacts of extreme events only, but also cover those related to climate anxiety and indirect impacts.

3.3 Opportunities for action

According to IPCC (2022), effective adaptation options for reducing mental health risks under climate change include improving surveillance, access to mental health care, and monitoring of psychosocial impacts from extreme weather events. Key barriers to mental health adaptation actions include lack of funding, coordination, surveillance, and training (e.g., psychological first aid) (Hayes and Poland, 2018).

The following opportunities for action for stakeholders in healthcare and policy makers are based on the recommendations by Lawrance et al. (2021) and supplemented with other literature and comments by the reviewers of this document (see Acknowledgements):

Health care leaders and healthcare and social care practitioners:

- Train healthcare workers to understand, identify, manage, and speak out about the impacts of climate change on mental health, as well as impacts of climate change on the well-being of mental health patients (for example the risk/benefit ratio of psychotropic drugs during heatwaves (Martin-Latry et al., 2007)).
- Raise awareness of the mental health impacts of climate change among the general public.
- Collaborate with researchers to strengthen the evidence base on climate change and mental health outcomes.
- Advocate for climate adaptation⁴ and take relevant actions within health systems.
- Work cross-organisationally and cross-sectorally to share good practices in addressing adverse mental health outcomes from a changing climate and guide social and emergency services' actions.
- Include the voices of those particularly vulnerable to, and with lived experience of, climate change impacts in the development and delivery of services, so that they are adapted to the needs of those groups.
- Incorporate the evidence for the mental health impacts of climate change in risk assessment and forecasting needs.
- Build resilience into the mental healthcare systems so they are not only prepared for disruptions due to climate-related disasters, but also can accommodate for higher numbers of people affected by climate change, e.g., through eco-anxiety.

Policy makers:

- Prioritise those climate adaptation policies that include mental health and equity benefits, for example use of nature-based solutions, such as urban greening (see EEA, 2021).
- Include the voice of vulnerable groups in the development of climate change policies that would help to identify the needs, develop the appropriate solutions, and direct proactive adaptation interventions to communities that are most vulnerable.
- Allocate funds to both research on climate change impacts on mental health and for required actions by health system leaders.
- Collaborate with researchers and civil society actors to identify the effective actions that should be promoted.
- Ensure that co-benefits of climate action for mental health are included in cost-benefit calculations.
- Focus on appropriate communication: develop and promote climate policies and narratives with consideration for individuals' psychological and emotional responses.
- Integrate psychosocial support in humanitarian assistance related to natural disasters and other consequences of climate change (Patel et al., 2018).

⁴ And mitigation of climate change, although it is out of the scope of this report.

4. Research gaps

Impacts of climate change on health in general is an emergent area of research. Berrang-Ford et al. (2021) identified mental health impacts of climate change as one of the major gaps in the global evidence on climate and health, constituting only 5% of the studies identified in the field. Therefore, the main research gap is the overall scarcity of evidence on the links between climate change and mental health. Studies on the consequences that climate change has on mental health are still at their very beginning (Cianconi et al., 2020; Daghigh Yazd et al., 2019).

One of the key gaps remains attribution, i.e., the scientific association between climate change and mental health. Causal evidence is scarce. An increasing body of scientific literature links extreme weather events with impacts on mental health, but the link to climate change is missing. This may underestimate the role of climate change in relation to mental health (Hayes et al., 2018).

Whilst the studies of impacts of the extreme weather events on mental trauma and development of PTSD are more numerous (Berrang-Ford et al., 2021), concepts such as solastalgia or climate anxiety are new and therefore under-researched. Knowledge gaps persist on the diverse impacts of high temperatures on many common mental health disorders (Thompson et al 2018). Moreover, research largely overlooks the impact climate change has on the mental well-being of children, i.e., the group that is disproportionately at risk and who will bear the brunt of the changing climate for decades to come (Martin et al., 2021). More research is needed to examine how best to support children experiencing such negative impacts (Martin et al., 2021; Lawton, 2019).

Globally, most of the evidence available on climate change impacts on mental health is based on studies conducted outside Europe, mainly the United States, Australia, and China. In the European context, whilst there is a reasonable understanding of the mental health impacts of flooding and high temperatures, much less is known about the impacts of drought or wildfires. According to the climate projections, these phenomena are on the rise in substantial parts of Europe, requiring more investigation into their impacts. Moreover, the knowledge about the impacts of flooding on mental health is predominantly coming from the UK and Northwest Europe, whereas the evidence on wildfires is limited to Greece and Spain. There seems to be almost no coverage of the topics in the Central and Eastern European countries.

Longitudinal studies aimed at tracking mental health outcomes over the years as a result of climate-related hazards are rare. Therefore, despite the introduction of new concepts such as solastalgia and eco-anxiety, the longer-term, chronic impact of climate change on mental health remains under-explored.

There is a relative absence of studies covering the community-level effects, or cascading effects on mental health of agricultural shifts or migration. Finally, climate-health literature is dominated by impact studies, with only a minority of studies focusing on solutions and co-benefits (Berrang-Ford et al 2021), which does not support the policy-makers' and practitioners' need to design appropriate interventions.

Charlson et al. (2022), based on a consultation with leading experts around the globe, identified the following ten key future research priorities in the area of climate change impacts on mental health:

1. Understand, characterise, and quantify the full range of (past, present, and future) mental health outcomes impacted by climate change-related exposures.
2. Understand what factors increase vulnerability and resilience to the mental health impacts of climate change.
3. Develop appropriate and validated quantitative measures of climate change-related mental health impacts.
4. Define and quantify the causal pathways, including modifying and mediating factors, between climate change exposures and mental health outcomes.

5. Assess the appropriateness, feasibility, effectiveness, and scalability of mental health and psychosocial interventions (clinical and non-clinical) in the context of climate change.
6. Understand how communication around climate change can impact mental health.
7. Explore the interaction between engagement in activities that support climate change mitigation and adaptation and mental health outcomes.
8. Explore the association between, and potential co-benefits of, climate change mitigation and adaptation practices and mental health outcomes.
9. Understand how the evidence-base from mental health research influences decision-making related to climate change.
10. Understand and quantify the economic costs of the mental health impacts of climate change.

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