

1 **Climate Change and Mental Health: Position Paper of the** 2 **European Psychiatric Association**

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49 **Abstract**

50 **Background:** Climate change is one of the greatest threats to health that societies face and
51 can adversely affect mental health. Given the current lack of a European consensus paper on
52 the interplay between climate change and mental health, we signal a need for a pan-European
53 position paper about this topic, written by stakeholders working in mental health care.

54 **Methods:** On behalf of the European Psychiatric Association (EPA) we give recommendations
55 to make mental health care, research, and education more sustainable based on a narrative
56 review of the literature.

57 **Results:** Examples of sustainable mental healthcare comprise preventive strategies,
58 interdisciplinary collaborations, evidence-based patient care, addressing social determinants
59 of mental health, maintaining health services during extreme weather events, optimising use
60 of resources, and sustainable facility management. In mental health research, sustainable
61 strategies include investigating the impact of climate change on mental health, promoting
62 research on climate change interventions, strengthening the evidence base for mental health
63 care recommendations, evaluating the allocation of research funding, and establishing
64 evidence-based definitions and clinical approaches for emerging issues such as 'eco-distress'.
65 Regarding mental health education, planetary health, which refers to human health and how it
66 is intertwined with ecosystems, may be integrated into educational courses.

67 **Conclusions:** The EPA is committed to combat climate change as it poses a threat to the
68 future of mental health care. The current EPA position paper on climate change and mental
69 health may be of interest to a diverse readership of stakeholders, including clinicians,
70 researchers, educators, patients, and policymakers.

71

72 **Introduction**

73 Climate change is among the anthropogenic processes with the most critical impact on the
74 equilibrium of Earth's systems. The United Nations Framework Convention on Climate Change
75 defined climate change as the change of climate, which is attributed directly or indirectly to
76 human activity that alters the composition of the global atmosphere [1]. Notably, the change in
77 climate is in addition to natural climate variability observed over comparable time periods and
78 caused by human activity [1]. Environmental studies indicate that Earth is now outside of a
79 safe operating space for humanity and that anthropogenic effects such as climate change, loss
80 of biodiversity, and pollution interact and show aggregate effects on Earth's systems [2].
81 Carbon dioxide and other greenhouse gas (GHG) emissions, such as methane, contribute
82 significantly to the rising global surface temperatures [3]. According to the United Nations'
83 Intergovernmental Panel on Climate Change (IPCC), the world is currently experiencing the
84 largest increase in the Earth's surface temperature in over 2000 years [3]. Heat extremes, i.e.
85 temperatures exceeding previous maxima, have been observed in most inhabited regions of
86 the world and there is unequivocal evidence for the human contribution to heat extremes [3].
87 These heat extremes are associated with risks to physical and mental health [4]. Vulnerable
88 groups, such as young children and older people over the age of 65 years, are particularly
89 affected by the increase in heatwaves [5]. Climate change leads to an increase in extreme
90 weather and disasters and causes worsening of existing inequalities regarding psychosocial
91 and economic factors [5].

92 Given the importance of climate change for mental health(care) on the one hand and the lack
93 of a European consensus paper on the interplay between climate change and mental health
94 on the other, we signal a need for a pan-European position paper about this topic, written by
95 stakeholders working in mental health care. The European Psychiatric Association (EPA) is
96 committed to combat climate change as it poses a threat to the future of mental health care.
97 Therefore, on behalf of the EPA we give recommendations to make mental health care,
98 research, and education more sustainable. To that end, we start the position paper by

99 summarising the impact of climate change on mental health, then discuss strategies to
100 increase sustainability in mental health care, and end by providing recommendations for
101 people working in mental health patient care, research, and education across Europe.

102

103

104 **Methods**

105 We performed a narrative review of the literature. The studies were reviewed and qualitatively
106 synthesised according to the effects of climate change on mental health. The databases
107 PubMed, MEDLINE, and Web of Science were searched from database inception up until April,
108 2024, without restrictions to language or country of origin of the study or publication date
109 (search terms: “climate change” AND “mental health”). We manually searched references of
110 the included studies and performed additional selective searches with a search engine (i.e.,
111 Google scholar). We included original research and reviews focussing on climate change and
112 mental health.

113

114

115 **Impact of climate change on mental health**

116 The number of scientific articles on the impact of climate change on mental health has
117 increased significantly over the last two decades [5,6], providing evidence of the negative
118 effects of climate change on mental health [4,5]. Climate change can have a direct impact on
119 mental health, for example through heat, extreme weather, disasters, and air pollution [7,8].
120 Indirect negative impacts include food insecurity, climate-associated migration, and climate
121 inequality (figure 1). Direct and indirect consequences of climate change are interconnected
122 and all pose threats to mental health, particularly for vulnerable groups with limited coping
123 capacities and pre-existing mental disorders [4].

124

125 *[Attached]*

126 **Figure 1:** Direct and indirect effects of climate change, loss of biodiversity, and pollution (i.e. triple
127 planetary crisis [9]) on mental health.

128

129 Climate change affects mental health across borders and there is a need for international
130 psychiatric organisations and representatives to advocate for evidence-based positions and
131 policies regarding climate change and mental health. The European Psychiatric Association
132 (EPA) aims to address this omission in the literature with the current position paper that
133 includes recommendations for sustainability in mental health care, research, and education.
134 The current position paper by the international task force of the EPA complements other
135 position papers by national organisations such as the Royal College of Psychiatrists and the
136 German Association for Psychiatry, Psychotherapy and Psychosomatics (DGPPN) [7,10].

137 In the section below, we discuss the direct and indirect effects of extreme weather events,
138 disasters, increases in ambient temperature, and air pollution on mental health as well as
139 discuss forms of mental distress due to climate change. In keeping with the IPCC, we focus
140 on climatic impact drivers, such as disasters (e.g. flooding) and extreme heat and highlight the
141 available evidence [3]. Climate change is the focus of this position paper, but it is very important
142 to note that climate change is connected to a multitude of other planetary-scale environmental
143 processes and ecological crises, such as loss of biodiversity [2].

144

145

146 **Extreme weather events and disasters**

147 Climate change is leading to an increase in extreme weather and disasters [5]. Extreme
148 weather events include floods, storms, fires, and droughts [5]. Extreme weather events can
149 reach the scale of disasters, threatening physical integrity and destroying livelihoods and
150 critical infrastructure [3,5].

151 Extreme weather events and disasters can result in significant mental distress via different
152 pathways [4,11,12]. These pathways include the experience of mortal danger, the threat to
153 livelihoods, limited health care, and involuntary relocation, as well as the loss of property, work,

154 and social support [4,11]. The mental symptom severity depends on the extent to which the
155 person is affected by the environmental event [11,12] and the symptoms can last for years
156 [13]. A recent systematic review of studies from South and Southeast Asia identified risk
157 factors in demographic, economic, health, disaster exposure, psychological, and community
158 factor domains. For example, the following were found to be risk factors for mental health
159 disorders in the recent systematic review: severity of disaster exposure, lower education, and
160 financial stress [14].

161 The prevalence of post-traumatic stress disorder (PTSD) increases after disasters [15,16].
162 After Hurricane Katrina, one in three residents of New Orleans showed symptoms of PTSD
163 [16]. Symptoms of anxiety, psychosis, and depression including suicidal thoughts may
164 increase following extreme weather and disasters [12,17,18]. Floods are among the most
165 frequently recorded extreme weather events worldwide [7,19]. One year after a flood in
166 England, 36% of the regional population suffered from PTSD, around a quarter suffered from
167 anxiety disorders and a fifth from depression [20]. In follow-up studies, the persistence of
168 symptoms in those affected by the floods was demonstrated even after several years [13]. The
169 prevalence of depression and anxiety symptoms was two to five times higher in people who
170 were affected by flooding at home than in people who were not affected by flooding [21]. In
171 another example, it was highlighted that half of the residents of New Orleans suffered from an
172 affective disorder in the 30 days following Hurricane Katrina [16].

173 There is also an increased prevalence of affective disorders following droughts, bush fires, and
174 forest fires [4,17,18]. Droughts are increasing in severity and frequency due to climate change
175 [7] and droughts are a major driver of climate-associated migration [22]. As a result of droughts,
176 vulnerable groups, such as women, individuals with low socioeconomic status, minors, and
177 older individuals, are at increased risk of mental health problems [4]. There are also indications
178 of increases in alcohol and other substance use and domestic violence following disasters [4].

179

180

181 Increases in ambient temperature

182 Since the end of the 19th century, the average global surface temperature has increased
183 according to data since 1850 [23]. The rise in temperature has been especially fast over the
184 past fifty years, with an increase of average global surface temperature of 0.2°C per decade
185 [3,24]. Compared with the average global surface temperature, Europe is warming even faster
186 [3,24]. Europe's land areas were 2.04 to 2.10°C warmer in the recent ten years than during
187 the pre-industrial period [3,24]. Temperatures are projected to increase further, particularly in
188 north-eastern Europe, northern Scandinavia, and inland areas of Mediterranean countries,
189 whilst slower increases in temperature are projected for western Europe [3,24]. The increase
190 in temperature includes average global surface temperature as well as heat extremes. Both
191 aspects are associated with negative mental health outcomes [3].

192 Heat has emerged as one of the most comprehensively studied aspects of climate change in
193 the context of mental health [5]. In the general population, periods of heat are associated with
194 increases in mental health problems, such as stress and negative emotions [25]. Heat leads
195 to increased mortality [26] and psychiatric disorders are a leading risk factor for heat-related
196 deaths [27,28]. An increased mortality risk was identified for organic mental illnesses such as
197 dementia [26]. In vulnerable persons, such as persons with mental disorders, the potential
198 impact of medication on regulation of body temperature, fluid balance, and electrolytes should
199 be assessed [28,29].

200 A recent meta-analysis reported that an increase in average temperature by 1 degree Celsius
201 is associated with a 0.9% increase in mental health morbidity [26]. Another recent systematic
202 review indicated that individuals with mental disorders were at risk of increased morbidity and
203 mortality compared with individuals without mental disorders over a single day with high
204 temperatures [30]. In addition, both global warming and heat waves are associated with
205 increases in acute admissions to psychiatric clinics and emergency departments [26,31,32].

206 These findings raise the question if involuntary admissions might increase due to climate-
207 associated factors. Studies in one region in Greece and one city in Italy indeed indicate that

208 maximum temperatures are positively associated with involuntary admissions [33,34].
209 Unpublished work based on numerous weather stations and thousands of involuntary
210 admissions in the Netherlands indicates that mean average temperature is positively
211 associated with involuntary admissions, with projected increases in involuntary admissions
212 owing to climate change of up to 60 yearly by 2050 (manuscript in progress).

213 Heat is also associated with more aggression among inpatients [35,36]. A dose-response
214 relationship was found between increasing heat and increasing aggressive incidents in
215 inpatient settings [36]. Possible reasons for this correlation are insufficient opportunities to
216 lower the temperature in inpatient settings, which may lead to reduced quality of sleep as well
217 as limited opportunities for physical activities during heat, which may increase tension [35,36].
218 The effects of heat on suicide rates have also been examined [31,37,38]. Using data from
219 several decades for the USA and Mexico, it was shown that suicide rates increased by 0.7%
220 in the USA and 2.1% in Mexico when the average monthly temperature rose by 1°C [37]. The
221 authors predicted, based on a progression of climate change, that 9,000 to 40,000 additional
222 suicides could occur in the United States and Mexico due to temperature increases by 2050
223 [37].

224 More research is needed to differentiate between the effects of heat waves and increased
225 average temperatures on mental health as well investigate potential non-linear relationships
226 between temperature and adverse mental health effects (e.g. an average increase from 20°C
227 to 21°C may be associated with different effects than an increase from 40°C to 41°C).

228 In summary, these results indicate that heat is a relevant factor for the mental health of
229 individuals with and without pre-existing psychiatric conditions.

230

231

232 **Air pollution**

233 Air pollution includes pollutants such as small matter particles with a diameter of 2.5 microns
234 or less (PM_{2.5}) and has been linked to climate change due to fossil fuel use, industrialisation,

235 and urbanisation [5,7,10]. Air pollution has a negative impact on cognitive functioning, including
236 attention, memory, reading comprehension, verbal intelligence, and non-verbal intelligence
237 [39].

238 In addition, studies suggested an increased risk of mental illness, i.e. affective disorders such
239 as depression and bipolar disorder, with air pollution [40–43]. A recent meta-analysis found
240 that the exposure to air pollutants such as PM_{2.5} and NO₂ may be associated with the onset of
241 depression [44].

242 Recent publications discuss neuroinflammatory activation by pollutants as a possible
243 mechanism for the link between air pollution and mental illness [40]. This possible
244 neuroinflammatory mechanism in humans is supported by findings from animal models in
245 which depression-like phenotypes were immunologically induced by pollutants [40,45].
246 However, research is needed to better understand the causal links between air pollution and
247 mental illness [46].

248 Finally, there are interactions between climate change, mental and physical health, and social
249 disadvantage. For example, it has been shown that the influence of local poverty,
250 independently of individual income and educational level, correlates with the extent of mental
251 impairment [47,48] and that poverty in the neighbourhood is also related to the extent of
252 environmental pollution and reduced green spaces [49].

253

254

255 **Mental distress due to climate change**

256 Climate change can cause individual's fears about the future, which can be associated with
257 considerable distress [50,51]. 'Eco distress' refers to negative emotions such as sadness,
258 anger, fear, and hopelessness in relation to climate change and the loss of biodiversity [8,50].
259 'Climate anxiety' is a term that partially overlaps in meaning with 'eco distress'. 'Climate
260 anxiety' refers to a stressful expectation of being directly affected by climate change and is
261 characterised by pronounced fears [10,52–54]. In this context, a survey was conducted in 2021

262 among 10,000 adolescents and young adults aged 16 to 25 years from ten countries [55]. In
263 this survey, 59% of respondents stated that they were extremely or very concerned about
264 climate change. In 45% of individuals, this concern was reported to have an impact on the
265 person's everyday functioning. These results underline the distress due to climate change in
266 young people. The described forms of mental distress are different from psychological and
267 emotional responses to the climate crisis that should not be pathologized and can be
268 constructive and functional drivers of climate action [56].

269 The loss of biodiversity in combination with climate change and pollution has been described
270 as the triple planetary crisis and highlights the relevance and interconnectedness of these
271 important issues [9]. A recent systematic review shows that Indigenous Peoples are among
272 the disproportionately affected groups by the negative impacts of loss of biodiversity [57]. The
273 close ties between ecological habitats and Indigenous Peoples' lived experiences may
274 contribute to the disproportionate negative impact of biodiversity loss on Indigenous Peoples'
275 wellbeing [57].

276 Another term related to the loss of biodiversity is 'solastalgia'. 'Solastalgia' refers to grief
277 concerning the loss of natural habitats, activities, or traditions due to climate change [6].
278 Human physical and mental health is linked to the state of the natural habitat [7]. Thus, the
279 loss of the natural habitat may negatively impact the mental health of its inhabitants [7].
280 Indications of 'solastalgia' have been detected among youth in Indonesia, Inuit communities in
281 northern Canada, farmers in Australia, communities around the Great Barrier Reef, older
282 individuals in the Torres Strait between Australia and New Guinea, and individuals from Ghana
283 [6,58]. These findings illustrate the far-reaching consequences and existential threats of
284 climate change and loss of biodiversity.

285 In the following sections, we will discuss strategies to increase sustainability in mental health
286 care, with the ultimate goal of curtailing climate change, which in turn may improve planetary
287 as well as mental health outcomes.

288

289

290 **Towards more sustainable mental health care**

291 Climate change is a challenge for mental health care that needs to be addressed in the key
292 areas of patient care, research, and education [59].

293 The above-mentioned direct and indirect effects of climate change on mental health may lead
294 to an increased need for mental health care. In particular, mental health care needs may
295 increase in the areas of stress-related disorders, affective disorders, and anxiety disorders.
296 Care services must adapt to changes in the need for psychiatric and psychotherapeutic
297 treatment. Care approaches should be sustainable and adaptable to meet the potentially
298 increasing and changing needs of populations affected by climatic impact drivers [3].

299 At the same time, care providers, such as psychiatric and psychotherapeutic institutions,
300 should aim to reduce their own contribution to climate change by increasing the efficiency and
301 resource-conserving processes of their care provision and institutions. Reducing GHG
302 emissions and consumption in care facilities will improve sustainability in mental health care.
303 At the same time, GHG emission reductions alone may not make health care sustainable in
304 the long run, as, for instance, emissions resulting from the use of medication also pose a
305 burden on the environment [7,10]. Moreover, as mentioned in the introduction, while the scope
306 of the current paper is on climate change, loss of biodiversity should be another important
307 scope of healthcare systems in future endeavours to make healthcare more sustainable [7,10].
308 Below, we highlight strategies to increase sustainability in mental healthcare for the key areas
309 of patient care, research, and education.

310

311

312 **Patient care**

313 Clinical processes related to patient care, such as emissions generated by inpatient facilities,
314 contribute to increasing emissions and climate change. In this section, we outline mitigation
315 strategies that aim to reduce emissions and adaption strategies that aim to render mental

316 healthcare more resilient to climate change. Mitigation includes preventive strategies,
317 evidence-based patient care, addressing social determinants, optimising the use of resources,
318 and sustainable facility management measures. Adaption includes interdisciplinary
319 cooperation and maintaining health services during extreme weather events. Of note,
320 important strategies such as preventive strategies, evidence-based patient care, and
321 addressing social determinants are relevant for both mitigation and adaption.

322

323 Mitigation in mental health care includes several measures. First, the most sustainable care is
324 the care not needed to be given. Preventive strategies therefore play an important role in
325 sustainable mental health care such as primary prevention of mental disorders and promotion
326 of mental resilience [60]. Approaches that focus on reducing the likelihood of one day needing
327 psychiatric or psychotherapeutic treatment, as well as approaches that address mental health
328 vulnerabilities, are pivotal preventive strategies. For example, mental health services that
329 implement targeted interventions to effectively address the evolving needs of individuals in an
330 early stage could improve the sustainability of the health care system [60]. Furthermore,
331 access to primary care, such as regular consultations with general practitioners, may support
332 physical health as well as mental health [60,61]. Taken together, a public mental health
333 approach is key to achieve prevention of mental disorders, promotion of mental resilience, and
334 more sustainable healthcare [62].

335 Second, optimising guideline development processes is advisable (e.g. “living guidelines” that
336 are characterised by frequent guideline updates based on the most current evidence) [63]. A
337 more widespread implementation of “living guidelines” would support up-to-date clinical
338 guidance in line with the rapidly evolving body of evidence in psychiatric research. Evidence-
339 based mental health care based on the most recent data would enable efficient, resource-
340 effective, and sustainable health care.

341 Third, strategies that promote resilience as well as increased attention to the social
342 determinants of mental health, can reduce the need for inpatient and resource-intensive

343 treatment. Empowerment (e.g. promoting health literacy, self-care, and peer support), access
344 to psychotherapy, online consultations, supporting social networks, reducing poverty, reducing
345 homelessness, reducing social isolation, and promoting employment are considered important
346 steps towards sustainable mental health care [7,50]. Recent examples from countries such as
347 Australia highlight the need to prepare for increased climate-associated migration and the
348 mental health challenges posed by social and economic adversity [64]. Increased climate-
349 associated migration highlights the importance of culturally sensitive psychiatric and
350 psychotherapeutic interventions and language mediation. Individuals experiencing climate-
351 associated migration may be a vulnerable population in the health care system due to
352 psychosocial stressors before, during, and after migration [46,65,66].

353 Fourth, increasing access to green spaces for the general public as well as mental health
354 institutions may have beneficial effects on well-being and mental health [7]. A recent umbrella
355 review retrieved two meta-analyses examining green spaces and natural environments,
356 detecting associations between increased green spaces and reduction of mental health
357 symptoms, but results were limited due observational designs of a subset of the primary
358 studies [46]. Further research is required to assess the effect of green and blue spaces on the
359 incidence and severity of mental disorders such as affective disorders, anxiety disorders, and
360 stress-related disorders [67,68].

361 Fifth, care delivery systems and organisations need to reduce their climate impact. Based on
362 data from the 2022 report of the Lancet Countdown on health and climate change, the GHG
363 emissions per person from the health-care sector ranges between 250 to 1100 kilograms of
364 carbon dioxide equivalent in European countries [5]. In comparison, the USA accounted for
365 more than 1700 kilograms of carbon dioxide equivalent, which is 50 times the emissions of
366 India, but the USA had the sixth lowest healthy life expectancy at birth among the countries in
367 the 2022 report of the Lancet Countdown [5]. These findings illustrate the potential of high-
368 quality health care with lower emissions [5]. Psychiatric hospitals in Europe account for a
369 significant proportion of carbon dioxide emissions per capita, and the inpatient sector is more

370 resource-intensive than the outpatient sector [69]. Strategies to optimise the use of resources
371 in clinical care can include minimising the use of disposable products, using digital
372 interventions in clinical practice, reducing less efficient administrative processes, increasing
373 the proportion of outpatient care, and optimising the use of medications and materials
374 according to guidelines (e.g. examining necessary pharmacological doses [70–72]) [7,73,74].
375 It would be important to estimate the effects and potentials of different approaches to monitor,
376 evaluate, and optimise the use of resources in clinical care [7].
377 Sixth, facility management measures also apply to mental health facilities and include
378 improvements in domains of energy management, mobility, recycling, waste, resource use,
379 food, and procurement [6,69,74]. Clinics can adapt organisational structures, such as the
380 introduction of a climate officer and regular resource use analyses. Inclusion of sustainability
381 criteria in clinics' procurement strategies and public communication strategies (e.g. resource
382 use reports) could support sustainability.

383

384 Climate adaptation in mental health care includes several measures. First, in the context of
385 climate change, interdisciplinary cooperation with medical disciplines such as internal
386 medicine and other somatic disciplines is advisable, as climate change affects both physical
387 and mental health. Individuals with pre-existing physical and mental disorders may be
388 particularly vulnerable to the effects of climate change and the deterioration of physical and
389 mental health [4,5]. Providing optimal medical care for people with mental and physical
390 disorders is part of a sustainable mental health strategy.

391 Second, mental health services should prepare to deliver their services during extreme
392 weather events and disasters to maintain contact with people who may no longer be able to
393 physically reach mental health providers, for example by providing digital mental health
394 services [7,50].

395

396 In conclusion, both mitigation and adaptation strategies are needed to achieve progress
397 towards more sustainable mental health care.

398

399

400 **Research**

401 In this section, we outline strategies to build understanding of the links between climate
402 change, mental health and mental healthcare in ways that can inform policy and practice and
403 increase sustainability in mental healthcare research. Specifically, the outlined strategies
404 include establishing evidence-based definitions and clinical approaches for emerging issues
405 such as 'eco-distress', investigating the effects of climate change on mental health, promoting
406 research regarding actions on climate change, strengthening the evidence base for policy
407 recommendations, evaluating research funding allocation, and optimising research processes
408 to reduce their emissions.

409 On a diagnostic level, emerging phenomena described as 'eco-distress', 'solastalgia', and
410 'climate anxiety' require further research to establish evidence-based definitions (e.g. field
411 trials on diagnostic criteria) allowing for future epidemiological studies on the prevalence and
412 impact. Indeed, clear, evidence-based definitions may help to differentiate between
413 psychological and emotional responses to the climate crisis that are not mental health issues
414 and types of distress that may be a mental health issue. For example, further research is
415 needed regarding the possibility of certain types of eco-distress being a specific phobia [75]
416 while other types of distress are not a mental health issue.

417 Next, there is a need for psychiatric research to further investigate the effects of climate change
418 and related disasters on (mental) health and broader quality of life. It would be important to
419 identify protective and risk factors for environmental effects on mental disorders and quality of
420 life. This may allow the development of targeted preventive strategies and interventions in the
421 context of mental health care and planetary health. Within this context, vulnerable groups, such
422 as individuals with few resources and pre-existing mental disorders, as well as populations

423 affected by climate inequality, e.g., children and adolescents, should be particularly
424 considered. Research is also needed to examine how environmental exposures in relatively
425 poorer neighbourhoods and communities affect physical health and sleep quality, which in turn
426 may affect mental health [49,76].

427 On an intervention level, climate mitigation and adaptation actions can simultaneously benefit
428 mental health and mental healthcare [77]. Qualitative and quantitative research is needed to
429 assess the expected benefits of climate action for mental health and mental health care. For
430 example, it is important to further investigate the number of suicides that could be prevented if
431 heat waves became less frequent. It would also be important to assess the economic burden
432 of climate change on the mental health care system (specified for different geographical
433 regions). Specific interventions need to be explored. Within this context, a systematic review
434 has shown benefits of nature-based therapies for mental health outcomes [78]. Possibly, by
435 raising more awareness of such benefits, psychiatric institutions may become more
436 ecologically conscious and will thus be more inclined to promote biodiversity and reduce GHG.
437 Importantly, given the high risks of bias in the included studies [78], we signal a need for high-
438 quality, well powered randomised-controlled trials examining the potential benefits of nature
439 prescriptions for mental health outcomes.

440

441 National and international research funding and policy need to step up on this topic. Mental
442 health research is needed to strengthen the evidence base for policy recommendations to
443 inform how to best prevent and respond to the mental health impacts of climate change.
444 Research funding must be allocated to projects focusing on climate change and mental health
445 to support substantial progress in this urgent area of research. For research collaborations, it
446 is recommended to collaborate globally with researchers and other stakeholders from different
447 regions and different scientific disciplines to improve the relevance and applicability of
448 research.

449 Finally, in line with improving the sustainability of clinical care processes described above,
450 research processes in themselves should be optimised to reduce their emissions [79–81].

451

452

453 **Teaching**

454 In this section, we outline sustainable aspects in health education. Climate change has a major
455 impact on human physical and mental health, and information on this interaction should be
456 included in the training of health professionals [6,7]. Planetary health is a relevant concept in
457 the context of climate change since planetary health refers to the health of humans and how it
458 depends on the state of the natural systems [82]. Clinically important aspects of planetary
459 health, including the effects of climate change on mental health, should become a standard
460 part of the curricula of medical programmes at universities. Aspects of planetary health may
461 be integrated in educational courses, ranging from preclinical to clinical courses, which could
462 reflect the interdisciplinary concept of planetary health [82]. Essential information on mental
463 health and climate interactions could be part of advanced medical training, such as specialist
464 training in psychiatry and psychotherapy. For example, training could include the impact of
465 climate change on mental health and its implications for clinical care of the general population
466 and vulnerable groups, both for medical students and psychiatry residents and staff.

467 Finally, how to reduce the impact of healthcare provision and research itself, should be learned
468 by all health professionals. In that respect, 'circularity' strategies (including the steps 'refuse,
469 rethink, reduce, reuse, repair, refurbish, recycle, and recover') may constitute a helpful guiding
470 principle to reduce the footprint of one's own care and care provided by the facility [83].

471

472

473 **Limitations**

474 Our position paper has several limitations. First, this position paper does not include a
475 systematic review of the literature, which limits the comprehensiveness. In this position paper,

476 we aimed to include findings from other systematic reviews and meta-analyses to develop the
 477 positions of the EPA based on recent evidence-based literature. Second, this paper
 478 communicates the position of the EPA. A future policy paper may be developed together with
 479 other stakeholders. Third, connections between climate change and mental health constitute
 480 a rapidly evolving field of research with heterogenous study designs, populations, outcome
 481 parameters, and preventive and interventional measures. Therefore, several statements and
 482 positions put forward by the EPA in the current position paper may not generalise to other
 483 geographical regions. Fourth, the focus of this position paper is on climate change. However,
 484 other related important environmental issues (e.g. loss of biodiversity) require further
 485 comprehensive analysis beyond the scope of this paper.

486

487

488 **Conclusions and recommendations for stakeholders in mental** 489 **health care, research, and education**

490 The EPA is committed to focus on the important issue of climate change and mental health. In
 491 this position paper, we have provided a summary of evidence-based findings regarding the
 492 detrimental effects of climate change on mental health. Importantly, based on these findings,
 493 we highlighted sustainable recommendations for mental health care, research, and education.
 494 This position paper of the EPA includes guidance for a diverse readership of stakeholders in
 495 mental health care, research, and education.

496 The main recommendations are summarised in the table below.

497

498

499 Table of recommendations

Nr.	Recommendation
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1	Preventive and public mental health strategies that focus on reducing the likelihood of needing psychiatric or psychotherapeutic treatment and preventive strategies that address mental health vulnerabilities and inequities are important in promoting sustainability of mental health care. Preventive approaches such as empowerment, health literacy, peer support, and healthy lifestyle factors should be incorporated into mental health strategies
2	Social determinants of mental health, such as social isolation, unemployment, poverty, and homelessness, should be addressed to reduce the need for inpatient and resource-intensive treatment, which significantly contribute to the emissions of the healthcare system.
3	Further research is needed to further investigate the impact of climate change on mental health. Evidence-based mental health strategies and research should consider regional differences in climate change impacts throughout Europe.
4	Targeted mental health strategies are needed to effectively address the evolving needs of individuals in the context of climate change. For example, mental health strategies that include digital approaches could improve access to treatments tailored to individual needs (e.g. availability of both face-to-face and online consultations in case of disasters).
5	Interdisciplinary collaborations with medical disciplines such as internal medicine and other somatic disciplines is advisable as climate change affects both physical and mental health. Umbrella medical organisations such as the European Union of Medical Specialists (UEMS), may facilitate these interdisciplinary collaborations.
6	The clinical relevance of the interactions between climate change and mental health should be included in health education, such as medical student training and specialist training for psychiatrists and psychotherapists.
7	Clinical and consumer (patient, family) stakeholders are encouraged to optimise the use of resources in clinical care, such as minimising the use of disposable products,

	using digital interventions in clinical practice, reducing less effective processes, increasing the proportion of outpatient care, and optimising the use of drugs and materials according to guidelines. Sustainable facility management measures can include the installation of photovoltaics, the use of contracting and green electricity, and the use of insulation and shading instead of air conditioning. The sustainability of meals and catering in mental health facilities may be increased through ecological and vegetarian options.
8	The 'greening' of mental health facilities is recommended and may include boosting biodiversity within the institutional site as well as promoting more research into green prescriptions for mental health outcomes.
9	As an international scientific association, the EPA needs to review its own processes and activities and develop a strategic action plan to improve its organisational sustainability aiming to operate climate neutral within the next decade.
10	We encourage each national society of psychiatry to publish statements and recommendations for more sustainable mental health care, as was recently done in the U.K., Germany, and The Netherlands [7,10,84].

500

501 The above recommendations may hopefully inspire scientific associations, healthcare facilities
502 and governments to address the interplay between climate change and mental healthcare.

503 Clearly, they are 10 amongst many other conceivable actions with potential impact to mitigate

504 environmental harm caused by mental healthcare and to adapt to the prognosticated increases

505 in mental distress. Effective, inclusive, and sustainable multilateral actions on individual, social,

506 and political levels are needed to tackle climate change, biodiversity loss, and pollution as

507 promoted by the United Nations Environment Assembly [9]. Moreover, as has been

508 demonstrated by the civil, human and labour rights movements, societal transformations often

509 start bottom-up. Therefore, in addition to action by governments and national and international

510 societies, we need individuals within the mental health workforce to take local initiatives for a
511 green transformation in mental healthcare to become realistic in the years to come.

512

513

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517

518

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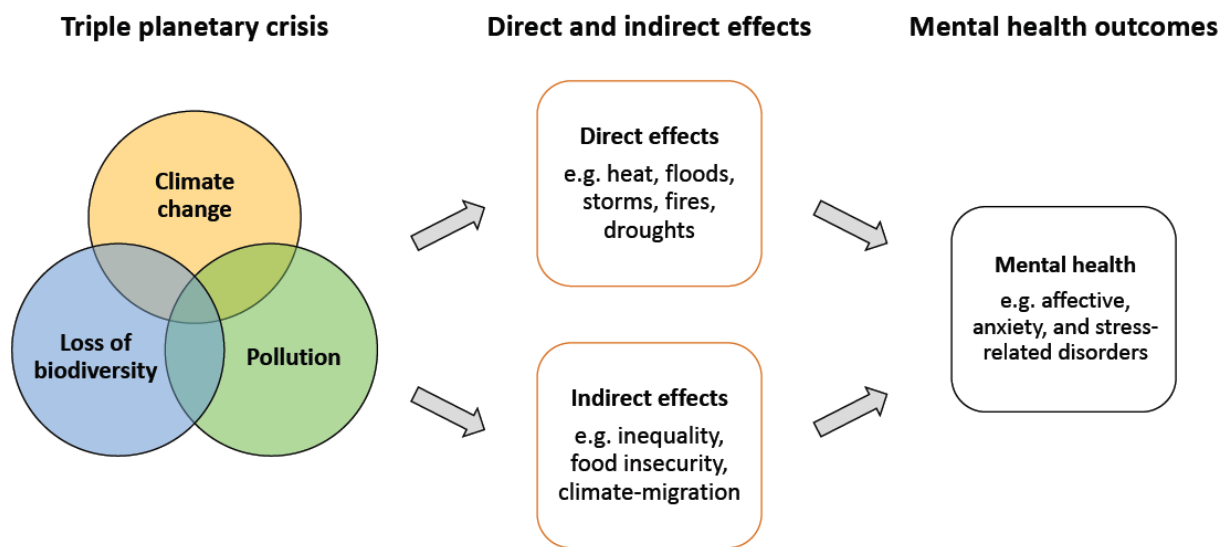
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791 Figure 1



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