



## Global mental health and climate change: A geo-psychiatry perspective

Anna Sri<sup>a</sup>, Dinesh Bhugra<sup>b</sup>, Albert Persaud<sup>c</sup>, Rachel Tribe<sup>d</sup>, Sam Gnanapragasam<sup>e</sup>,  
João M. Castaldelli-Maia<sup>f</sup>, Julio Torales<sup>g</sup>, Antonio Ventriglio<sup>h,\*</sup>

<sup>a</sup> Core Trainee Psychiatrist, Cornwall Partnership NHS Trust, Cornwall, UK

<sup>b</sup> Institute of Psychiatry, King's College London, UK

<sup>c</sup> Institute of Psychiatry, Psychology & Neuroscience, King's College London, UK

<sup>d</sup> School of Psychology, UEL and Department of Psychiatry and Mental Health, Queen Mary, University of London, UK

<sup>e</sup> NIHR Academic Clinical Fellow, South London and Maudsley NHS Foundation Trust, UK

<sup>f</sup> Department of Neuroscience, Medical School, FMABC University Center, Santo André, SP 09060-870, Brazil

<sup>g</sup> Department of Medical Psychology, School of Medical Sciences, National University of Asunción, San Lorenzo, Paraguay

<sup>h</sup> Department of Clinical and Experimental Medicine, University of Foggia, Foggia, Italy

### ARTICLE INFO

#### Keywords:

Climate health  
Mental health  
Human rights  
Geo-psychiatry  
Economy  
Foreign policy

### ABSTRACT

Climate changes affect planet ecosystems, living beings, humans, including their lives, rights, economy, housing, migration, and both physical and mental health. Geo-psychiatry is a new discipline within the field of psychiatry studying the interface between various geo-political factors including geographical, political, economic, commercial and cultural determinants which affect society and psychiatry: it provides a holistic overview on global issues such as climate changes, poverty, public health and accessibility to health care. It identifies geopolitical factors and their effects at the international and national levels, as well as considers the politics of climate changes and poverty within this context. This paper then introduces the Compassion, Assertive Action, Pragmatism, and Evidence Vulnerability Index (CAPE-VI) as a global foreign policy index: CAPE-VI calculates how foreign aid should be prioritised for countries that are at risk or already considered to be fragile. These countries are characterised by various forms of conflict, disadvantaged by extremes of climate change, poverty, human rights abuses, and suffering from internal warfare or terrorism.

### 1. Background

In recent times, increasing attention is being paid to social determinants of mental health. It is worth remembering that these are in turn influenced by geographical, commercial, cultural, political and economic factors, among others. Of all these factors, climate change is one of the greatest and possibly one of the most urgent challenges to human health in the 21st century.

High levels of atmospheric carbon dioxide mostly due to the fossil fuel combustion as significant source were noted by the Johnson's administration in the USA in 1965 (Webb, 2021). At the Earth Summit (also called the United Nations Conference on Environment and Development) in 1992, a global effort was initiated to respond to these scientific evidences and adopt strategies to contrast the global climate change (Webb, 2021). It took another two decades to reach a global climate change agreement in Paris in 2015, ratified by the European Union and 189 states including nations responsible for 97 % of the

global carbon emissions. The long-term aim of the Paris Agreement was to limit the global temperature yearly rise to 1.5 °C since it had been rising by 2 °C above the pre-industrial levels (NDC; Webb, 2021). It was argued that policies on green, resilient, and inclusive development might reduce Green House Gases (GHGs) emissions and provide new jobs and growth opportunities (World Bank Group, 2021). Globally, the poor countries, which are the least responsible for GHGs emissions, are most likely to suffer from climate change impacts. In addition, poor countries have often faced natural disasters (e.g. earthquakes, tropical cyclones, river floods, tsunamis, volcanic eruptions, etc.) and conflicts alongside the climate change impacts (World Bank Group, 2021). The climate change crisis and extreme weather events have adversely affected planet ecosystems, reduced food security as well as contributed to human migration and displacement, damaged the security of people and increased social inequalities (Academy of Medical Sciences & Royal Society, 2021; IPCC: Intergovernmental Panel on Climate Change, 2022). The World Bank Group (WBG) has developed a Climate Action

\* Corresponding author.

E-mail address: [dr.ventriglio@gmail.com](mailto:dr.ventriglio@gmail.com) (A. Ventriglio).

<https://doi.org/10.1016/j.ajp.2023.103562>

Received 26 January 2023; Received in revised form 15 March 2023; Accepted 17 March 2023

Available online 21 March 2023

1876-2018/© 2023 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

Plan 2021–2025 to support countries and relevant sectors in response to the ongoing global crisis (due to the COVID-19 pandemic, climate change, social inequalities and Ukrainian conflict) (World Bank Group, 2021). The impact of climate change is multi-faceted from the loss of livelihoods, food and water insecurity to poor and limited investments in infra-structures (Ventriglio and Ricci, 2023). Climate change also increases the risk of internal displacement, emigration as well as collective and individual instability (Academy of Medical Sciences & Royal Society, 2021). It also shows a complex impact on human health as divided into three categories: a) direct effects such as heat and weather extremes, 2) indirect impact via ecosystems, the effects on global food supplies and changes in vector-borne disease transmission, and 3) indirect impacts via socioeconomic systems, such as increased poverty and exacerbated inequalities and migration (Smith & Woodward, 2018; Ventriglio et al., 2021a; Ventriglio et al., 2021b).

The COVID-19 (SARS-CoV-2) pandemic international resilience-plans have been proposed to support recovery based on net-zero emissions (which mean achieving a balance between greenhouse gases going to the atmosphere and those removed from the atmosphere) and the equity of economic stimulus, beyond the global severe economic impact and uncertainties for the future (Department for Business, 2020): some countries have unveiled green initiatives such as the Green Recovery Challenge Fund in September 2020 (Department for Environment, 2020), the Ten Point Plan for a Green Industrial Revolution in November 2020 (UK Government, 2020), and the Green Jobs Taskforce in November 2020 (UK Government, 2020).

## 2. Climate change and mental health

The capacity for climate change to affect critical determinants of physical health and mental wellbeing, directly or indirectly, is being increasingly recognised (Hayes et al., 2018; Goldmann and Galea, 2014). Direct effects on mental health include altered seasonal patterns affecting mood, stresses related to high or low temperatures, pollution, external and internal migration, altered circadian rhythms or hypothalamic-pituitary-adrenal axis (Goldmann and Galea, 2014). Indirect effects occur at both individual and social levels from collective violence, involuntary displacement and migration, civil strife, and economic loss (Goldmann and Galea, 2014).

As the potential mental health consequences of climate change become more widely recognized, terms describing climate-specific and environment-specific mental health outcomes, such as *ecological grief* and *climate anxiety* have gained prominence in the global literature (McMichael and Lindgren, 2011; Woodhall-Melnik and Grogan, 2019). *Ecological grief* is defined as a sense of loss, anxiety, despair and hopelessness arising from direct or indirect experiences of environmental destruction related to climate changes. *Climate anxiety* or *eco-anxiety* is the distress related to worries about the effects of climate change. It is not necessarily a mental illness but is based on anxiety rooted in uncertainty about the future and alerting to the dangers of a changing climate (McMichael and Lindgren, 2011; Woodhall-Melnik and Grogan, 2019).

Large-scale extreme events such as tornadoes and severe storms, earthquakes and volcanic eruptions, hurricanes and tropical storms, wildfires, floods and tsunamis, are likely to occur increasingly as a consequence of climate change. These disasters can cause harm or death to large numbers and also destroy infrastructures and social networks thus affecting mental and physical health amongst those affected (Belleville et al., 2021). Following natural disasters, an increase in Post-Traumatic Stress Disorder (PTSD), Major Depressive Disorder (MDD), Sleep Disturbances, Generalised Anxiety Disorder (GAD), Substance Use Disorders, Suicide, and Grief reactions has been reported (McCann-Pineo et al., 2021). In addition, forced relocation and increased violence as well as intergroup conflicts have been noted (Belleville et al., 2021; McCann-Pineo et al., 2021). The vulnerability to these factors has been recognised in older and younger age groups

(Clayton et al., 2017; Dodgen et al., 2016). It has been also argued that psychosocial consequences among young adults may be observed in the long run (Hayes et al., 2018; Trombley et al., 2017; Cunsolo Willox et al., 2015; Jantarasami et al., 2018; Middleton et al., 2020). In a recent study with a global sample of youth aged 16–25, high levels of climate-related negative emotions, such as sadness, anxiety, and helplessness were reported (Hickman et al., 2021). Prevalent psychopathology following natural disasters includes Post-Traumatic Stress Disorder (PTSD) and depression (McCann-Pineo et al., 2021). The severity of trauma and psychological distress during and following a natural disaster is a key factor in post-disaster outcomes. Trauma may occur following death in the family or friends, loss and separation (Belleville et al., 2021). Following the Hurricane Harvey (USA), survivors were displaced with consequent high rates of post-traumatic symptoms (Fitzpatrick, 2021). Similarly following the Hurricane Katrina (USA), a sample of displaced students reported high levels of traumatic exposure and subsequent distress with significantly more symptoms of both depression and PTSD (Davis et al., 2010).

Recent systematic reviews looking at indigenous communities globally concluded that climate change exacerbated various unique mechanisms of vulnerabilities for these groups which were particularly threatened by climate change (Australian Indigenous, 2020; Middleton et al., 2020; Woodhall-Melnik and Grogan, 2019; Cianconi et al., 2019; Anderson et al., 2016). Climate change especially threatens communities living in remote and rural areas (Billiot and Mitchell, 2019; Doherty and Clayton, 2011; Ford, 2012). For some communities, maintaining and sharing cultural traditions and time spent in the land, are effective coping strategies in order to deal with trauma along with utilising traditional environmental knowledge and practices (Green and Martin, 2017; Rigby et al., 2011). Traditional teachings through music, arts, dance etc can help individuals cope (Pearce et al., 2015). Similarly, The Canadian youths in the Inuit community of Rigolet, reported resilience when connecting to the Inuit culture, and having strong community, family and friend relationships (Petrasek MacDonald et al., 2015).

Resilience is an important factor in managing distress (Leiva-Bianchi et al., 2018). Therapeutic interventions can help in enhancing a sense of safety, hope and optimism, and promote social connectedness. These can be provided in the pre-, peri-, and post-disaster periods (Birur et al., 2017; Hambrick et al., 2014; Leiva-Bianchi et al., 2018). Human rights also need to be defended for those people affected by climate changes: rights to life, self-determination, development, food, health, water, sanitation, and housing (Academy of Medical Sciences & Royal Society, 2021; IPCC, 2014). The goal should be to ensure that all people are treated fairly in finding solutions to climate change in the framework of a so called "*Climate Justice*" (Intergovernmental Panel on Climate Change, 2022). Climate actions are required for climate justice and should be consistent with obligated human rights standards and principles (the United Nations High Commissioner for Human Rights; OHCHR, 2015) A human rights-based approach may address the integration of socioeconomic, cultural, and political problems into a set of climate change measures aimed to promote the adaptation or mitigation of changes while empowering individuals and groups, especially those in vulnerable and disadvantaged situations: various measure suggested include alternative energy sources, conservation of forests (including tree-planting projects), and resettlement schemes in partnership with affected individuals and communities (OHCHR's Report: Climate Change and Human Rights, 2015; United Nations, 1992).

### 2.1. The Asian perspective

Asia-Pacific regions are particularly challenged by climate changes. Temperatures are rising two time faster in Asian countries than the rest of the globe, leading to weather-related disasters (Dbla-Norris, Nozaki and Daniel, 2021). A severe water scarcity has been registered in India in 2019, torrential rains in South-Asia have caused destruction and displacements, bushfires have been fueled by a dry season in Australia and

more than 25 tropical cyclones damaged Pacific and Indian Ocean coasts (Dbla-Norris, Nozaki and Daniel, 2021; Wahid et al., 2023). In addition, in the last century, rising sea levels have been threatening some Asian megacities (e.g. Bangkok, Shantia, etc.; Dbla-Norris, Nozaki and Daniel, 2021). China and India have been also included in the list of largest carbon-dioxide emitting countries with consequent high levels of particulate matter in the air (World Bank Group, 2021). All these factors are threatening livelihoods, growth, productivity and well-being in the continent. It was recently described that climate-related stressors have shown a significant association with rates of depression and anxiety (Odds Ratios ranging 1.31–1.69) in Bangladesh, in particular due to the exposure to flooding (Wahid et al., 2023). In the same country, Mamun et al. (2019) measured some disasters-related variables among village women detecting 64.9 % of prevalence of depression with 36.9 % of them reporting an onset of mood disorders after the disasters. Similarly, Kabir (2018) argued that climate-changes in Asia led to an increase of drug and alcohol use as well as family stress in Bangladesh. Also, previous traumas were amplified by additional climate-related stressors leading to higher rates of suicidal ideation above all in the Hill-Tracts region of the country (Kabir, 2018).

All these reports from Asia concluded that community-level interventions should be promoted in order to reduce the impact of climate-related stressors among vulnerable groups of population and disadvantaged regions of the continent.

### 3. Climate change and geo- psychiatry

The Geopolitical Determinants of Health proposed by Persaud et al. (2021) offer a broader framework of geographical, political, economic, commercial and cultural factors which affect social determinants and consequently mental and physical health. Geo-psychiatry studies the impact of factors such as climate change, disasters, globalisation, population increase and mobility, urbanisation, agricultural production, industrialisation, geopolitics, socioeconomic transformations, and cultural changes on mental health of individuals, families and communities (Castaldelli-Maia and Bhugra, 2022). Global climate change, as discussed above, brings large socioeconomic, health, and environmental changes and disparities. Also mental health is highly affected by climate crisis and suicide global rates have been increasing with the increase of planet temperatures in the last decade (Watts et al., 2018). Geopolitical decisions on development may result in a negative impact on health as well as political conflicts in countries, coupled with droughts and famines or floods because of climate change, contribute to migration, displacement and poor mental health (Persaud, Bhugra et al., 2021). Geo-psychiatry proposes a foreign policy tool incorporating vulnerability and aid to be delivered based on mental health needs for each country in order to identify priorities in interventions for those areas reporting relevant vulnerability and mental health issues (Persaud and Bhugra, 2022). The CAPE VI (Compassion, Assertive Action, Pragmatism, and Evidence Vulnerability Index 6th version) is a global foreign policy index offering an evidence-based, structured, and reasoned approach that identifies those countries requiring foreign aid and how they can be prioritized. Access to healthcare, wealth and poverty, intra-national inequality, conflict and disaster, forcible population displacement, corruption (which worsens inequality), and international assistance are all included (Persaud et al., 2021). Aid indicators included are based on the following nine measures: life expectancy, disability-adjusted life years, physicians per person, Gross Domestic Product (GDP), Gini coefficient (intra-country income), current conflicts ( $\geq 1000$  deaths/year), refugees by country of origin, corruption perceptions index, and external aid received. Thus, the number of times each country appeared in the last 20 states for each of the nine measures considered, was then used to calculate the CAPE VI (Persaud et al., 2021). Since the climate change exacerbates inequalities in wealth, health, and the ability of people everywhere to adapt to changing circumstances (Zhang et al., 2021), the CAPE VI includes this factor in the

vulnerability assessment.

Without integrating this geopolitical perspective into the response of mental health services, the future of mental health at an international level would be uncertain. By working together with policymakers and geopolitical experts, mental health professionals can facilitate them in identifying interventions aimed to help people in responding to the enormous and unpredictable challenges, including climate change, climate-altering pollutants, climate and farming-related suicides, water security, famine, and floods, at global level. These actions may also help in reducing the number of displaced people escaping from catastrophes and disasters. The major burden of refugees and displaced persons falls on low income countries which has increased from 70 % a decade ago to 83 % (UNHCR, 2022). We believe that the current health agenda internationally does not adequately address the effects of climate change and its interactions with geopolitical determinants of mental health. Geo-psychiatry offers a new approach in the global mental health framework which is different and more inclusive than the traditional individual or idiographic narrative.

### Financial Disclosure

No funding sources were contributed to the writing of the manuscript or the decision to submit it for publication.

### Conflicts of Interest Statement

Authors were not precluded from accessing data in the manuscript, and they accept responsibility for submitting for publication. All authors do not have conflicts of interests to the writing of the manuscript or the decision to submit it for publication.

### Acknowledgments

None.

### References

- Academy of Medical Sciences, T., & Royal Society, the. (n.d.). *A healthy future – tackling climate change mitigation and human health together*.
- Anderson, I., Robson, B., Connolly, M., Al-Yaman, F., Bjertness, E., King, A., Tynan, M., Madden, R., Bang, A., Coimbra, C.E.A., Pesantes, M.A., Amigo, H., Andronov, S., Arminen, B., Obando, D.A., Axelsson, P., Bhatti, Z.S., Bhutta, Z.A., Bjerregaard, P., Yap, L., 2016. Indigenous and tribal peoples' health (The Lancet-Lowitja Institute Global Collaboration): a population study. *Lancet* 388 (10040), 131–157. [https://doi.org/10.1016/S0140-6736\(16\)00345-7](https://doi.org/10.1016/S0140-6736(16)00345-7).
- Australian Indigenous, H. (2020). Overview of Aboriginal and Torres Strait Islander health status 2019. *Australian Indigenous HealthInfoNet, Perth*. (<https://healthinfonet.edu.au/learn/health-facts/overview-aboriginal-torres-strait-islander-health-status/44570/?title=Overview+of+Aboriginal+and+Torres+Strait+Islander+health+status+2021&contentid=44570-1>).
- Belleville, G., Ouellet, M.-C., Lebel, J., Ghosh, S., Morin, C.M., Bouchard, S., Guay, S., Bergeron, N., Campbell, T., MacMaster, F.P., 2021. Psychological symptoms among evacuees from the 2016 Fort McMurray Wildfires: a population-based survey one year later. *Front. Public Health* 9. <https://doi.org/10.3389/fpubh.2021.655357>.
- Billiot, S., Mitchell, F.M., 2019. A conceptual interdisciplinary model of exposure to environmental changes to address indigenous health and well-being. *Public Health* 176, 142–148. <https://doi.org/10.1016/j.puhe.2018.08.011>.
- Birur, B., Math, S.B., Fargason, R.E., 2017. A review of psychopharmacological interventions post-disaster to prevent psychiatric sequelae. *Psychopharmacol. Bull.* 47 (1), 8–26.
- Castaldelli-Maia, J.M., Bhugra, D., 2022. What is geopsychiatry? *Int. Rev. Psychiatry* 34 (1), 1–2. <https://doi.org/10.1080/09540261.2022.2031915>.
- Cianconi, P., Lesmana, C.B.J., Ventriglio, A., Janiri, L., 2019. Mental health issues among indigenous communities and the role of traditional medicine. *Int. J. Soc. Psychiatry* 65 (4), 289–299. <https://doi.org/10.1177/0020764019840060>.
- Clayton, S., Manning, C.M., Krygman, K., Speiser, M. (2017). Mental health and our changing climate: Impacts, implications, and guidance. *American Psychiatric Association and EcoAmerica*. (<https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf>).
- Cunsolo Willox, A., Stephenson, E., Allen, J., Bourque, F., Drossos, A., Elgarøy, S., Kral, M.J., Mauro, I., Moses, J., Pearce, T., MacDonald, J.P., Wexler, L., 2015. Examining relationships between climate change and mental health in the Circumpolar North. *Reg. Environ. Change* 15 (1), 169–182. <https://doi.org/10.1007/s10113-014-0630-z>.



- Davis, T.E., Grills-Tauechel, A.E., Ollendick, T.H., 2010. The psychological impact from hurricane Katrina: effects of displacement and trauma exposure on university students. *Behav. Ther.* 41 (3), 340–349. <https://doi.org/10.1016/j.beth.2009.09.004>.
- Dbla-Norris, E., Nozaki, M., Daniel, J. (2021). Asia's Climate Emergency. International Monetary Fund; Available at: (<https://www.imf.org/en/Publications/fandd/issues/2021/09/asia-climate-emergency-role-of-fiscal-policy-IMF-dabla>); retrieved on 15 march 2023.
- Department for Business, E. and I.S. U. G., Prime Minister's Office No 10 Downing Street, Rt Hon Alok Sharma MP, & Rt Hon Boris Johnson MP. (2020). The Green Industrial Revolution. <https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution>.
- Department for Environment, F. & R. A. U. G., Natural England, U. G., Environment Agency, U. G., & Rebecca Pow MP. (2020). The Green Recovery Fund.
- Dodgen D., Donato D., Kelly N., la Greca A., Morganstein J., Reser J., Ruzek J., Schweitzer S., Shimamoto M.M., Thigpen Tart K., Ursano R. (2016). Mental health and well-being. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*, 217–246. ([https://health2016.globalchange.gov/low/ClimateHealth2016\\_08\\_MentalHealth\\_small.pdf](https://health2016.globalchange.gov/low/ClimateHealth2016_08_MentalHealth_small.pdf)).
- Doherty, T.J., Clayton, S., 2011. The psychological impacts of global climate change. *Am. Psychol.* 66 (4), 265–276. <https://doi.org/10.1037/a0023141>.
- Fitzpatrick, K.M., 2021. Post-traumatic stress symptomatology and displacement among Hurricane Harvey survivors. *Soc. Sci. Med.* 270, 113634 <https://doi.org/10.1016/j.socscimed.2020.113634>.
- Ford, J.D., 2012. Indigenous health and climate change. *Am. J. Public Health* 102 (7), 1260–1266. <https://doi.org/10.2105/AJPH.2012.300752>.
- Goldmann, E., Galea, S., 2014. Mental health consequences of disasters. *Annu. Rev. Public Health* 35 (1), 169–183. <https://doi.org/10.1146/annurev-pubhealth-032013-182435>.
- Green, D., Martin, D., 2017. Maintaining the healthy country–healthy people nexus through sociocultural and environmental transformations: challenges for the wIk aboriginal people of Aurukun, Australia. *Aust. Geogr.* 48 (3), 285–309. <https://doi.org/10.1080/00049182.2016.1220898>.
- Hambrick, E.P., Rubens, S.L., Vernberg, E.M., Jacobs, A.K., Kanine, R.M., 2014. Towards successful dissemination of psychological first aid: a study of provider training preferences. *J. Behav. Health Serv. Res.* 41 (2), 203–215. <https://doi.org/10.1007/s11414-013-9362-y>.
- Hayes, K., Blashki, G., Wiseman, J., Burke, S., Reifels, L., 2018. Climate change and mental health: risks, impacts and priority actions. *Int. J. Ment. Health Syst.* 12 (1), 28. <https://doi.org/10.1186/s13033-018-0210-6>.
- Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R.E., Mayall, E.E., Wray, B., Mellor, C., van Susteren, L., 2021. Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. *Lancet Planet. Health* 5 (12), e863–e873. [https://doi.org/10.1016/S2542-5196\(21\)00278-3](https://doi.org/10.1016/S2542-5196(21)00278-3).
- Intergovernmental Panel on Climate Change. (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability*. ([https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC\\_AR6\\_WGII\\_SummaryForPolicymakers.pdf](https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf)).
- IPCC. (2014). Synthesis, Report, Contribution of Working Groups 1, 2 and 3 to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. *IPCC Climate Change 2014*. ([https://epic.awi.de/id/eprint/37530/1/IPCC\\_AR5\\_SYR\\_Final.pdf](https://epic.awi.de/id/eprint/37530/1/IPCC_AR5_SYR_Final.pdf)).
- Jantarasami, L., Novak, R., Delgado, R., Narducci, C., Marino, E., McNeeley, S., Raymond-Yakoubian, J., Singletary, L., Powys Whyte, K. (2018). *Chapter 15: Tribal and Indigenous Communities. Impacts, Risks, and Adaptation in the United States: The Fourth National Climate Assessment, Volume II*. (<https://doi.org/10.7930/NCA4.2018.CH15>).
- Kabir, S.M.S., 2018. Psychological health challenges of the hill-tracts region for climate change in Bangladesh. *Asian J. Psychiatry* 34, 74–77. <https://doi.org/10.1016/j.ajp.2018.04.001>.
- Leiva-Bianchi, M., Ahumada, F., Aranedo, A., Botella, J., 2018. What is the psychosocial impact of disasters? A meta-analysis. *Issues Ment. Health Nurs.* 39 (4), 320–327. <https://doi.org/10.1080/01612840.2017.1393033>.
- Mamun, M.A., Huq, N., Papia, Z.F., Tasfina, S., Gozal, D., 2019. Prevalence of depression among Bangladeshi village women subsequent to a natural disaster: a pilot study. *Psychiatry Res.* 276, 124–128. <https://doi.org/10.1016/j.psychres.2019.05.007>.
- McCann-Pineo, M., Taioli, E., Schwartz, R.M., 2021. Exposure to hurricane sandy and risk of opioid abuse. *Subst. Use Misuse* 56 (8), 1241–1245. <https://doi.org/10.1080/10826084.2021.1912098>.
- McMichael, A.J., Lindgren, E., 2011. Climate change: present and future risks to health, and necessary responses. *J. Intern. Med.* 270 (5), 401–413. <https://doi.org/10.1111/j.1365-2796.2011.02415.x>.
- Middleton, J., Cunsolo, A., Jones-Bitton, A., Wright, C.J., Harper, S.L., 2020. Indigenous mental health in a changing climate: a systematic scoping review of the global literature. *Environ. Res. Lett.* 15 (5), 053001 <https://doi.org/10.1088/1748-9326/ab68a9>.
- Office of the United Nations High Commissioner for Human Rights. (n.d.). *Key Messages on Human Rights and Climate Change*.
- Pearce M., Eagle L., Low D., Schurmann A. (2015). *Cut from "country: The impact of climate change on the mental health of aboriginal pastoralists*. (<https://search.informit.org/doi/abs/10.3316/ielapa.097175075527244>).
- Persaud, A., Bhugra, D., 2022. Geopsychiatry—"putting mental health into foreign policy". *International Review of Psychiatry*. Taylor and Francis Ltd, <https://doi.org/10.1080/09540261.2022.2032615>.
- Persaud, A., Bhugra, D., Valsraj, K., Bhavsar, V., 2021. Understanding geopolitical determinants of health. *Bull. World Health Organ.* 99 (2), 166–168. <https://doi.org/10.2471/BLT.20.254904>.
- Persaud, A., Day, G., Bhugra, D., Castaldelli-Maia, J.M., Torales, J., Valsraj, K., Bhavsar, V., Watson, C., Clissold, E., Ventriglio, A., 2021. CAPE Vulnerability Index. *Int. Rev. Psychiatry* 33 (1–2), 43–55. <https://doi.org/10.1080/09540261.2020.1738093>.
- Petrsek MacDonald, J., Cunsolo Willox, A., Ford, J.D., Shiwak, I., Wood, M., 2015. Protective factors for mental health and well-being in a changing climate: perspectives from Inuit youth in Nunatsiavut, Labrador. *Soc. Sci. Med.* 141, 133–141. <https://doi.org/10.1016/j.socscimed.2015.07.017>.
- Rigby, C.W., Rosen, A., Berry, H.L., Hart, C.R., 2011. If the land's sick, we're sick: The impact of prolonged drought on the social and emotional well-being of Aboriginal communities in rural New South Wales. *Aust. J. Rural Health* 19 (5), 249–254. <https://doi.org/10.1111/j.1440-1584.2011.01223.x>.
- Smith Kirk R. (USA), & Woodward Alistair (New Zealand). (n.d.). Human health: Impacts, Adaptation and Co-benefits. Intergovernmental Panel on Climate Change (2018). Retrieved June 5, 2022, from [https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-Chap11\\_FINAL.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-Chap11_FINAL.pdf).
- Trombley, J., Chalupka, S., Anderko, L., 2017. Climate change and mental health. *AJN, Am. J. Nurs.* 117 (4), 44–52. <https://doi.org/10.1097/01.NAJ.0000515232.51795.f>.
- UK Government. (2020). *Green Jobs Taskforce*. (<https://www.gov.uk/government/groups/green-jobs-taskforce>).
- UNHCR (UN Refugee Agency). (2022, June 16). *UNHCR Global Trend Report 2021*. (<https://www.unhcr.org/62a9d1494/global-trends-report-2021>).
- United Nations. (1992). *United Nations Framework Convention on Climate Change*. ([https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtmsg\\_no=XXVII-7&chapter=27&Temp=mtmsg3&clang=en](https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtmsg_no=XXVII-7&chapter=27&Temp=mtmsg3&clang=en)).
- Ventriglio, A., Ricci, F., 2023. Poverty in Modern Era: challenges for mental health professionals. *Int. J. Soc. Psychiatry* in press.
- Ventriglio, A., Torales, J., Castaldelli-Maia, J.M., De Berardis, D., Bhugra, D., 2021a. Urbanization and emerging mental health issues. *CNS Spectr.* 26 (1), 43–50. <https://doi.org/10.1017/S1092852920001236>.
- Ventriglio, A., Bellomo, A., di Gioia, I., Di Sabatino, D., Favale, D., De Berardis, D., Cianconi, P., 2021b. Environmental pollution and mental health: a narrative review of literature. *CNS Spectr.* 26 (1), 51–61. <https://doi.org/10.1017/S1092852920001303>.
- Wahid, S.S., Raza, W.A., Mahmud, I., Kohrt, B.A., 2023. Climate-related shocks and other stressors associated with depression and anxiety in Bangladesh: a nationally representative panel study. *Lancet Planet. Health* 7 (2), e137–e146. [https://doi.org/10.1016/S2542-5196\(22\)00315-1](https://doi.org/10.1016/S2542-5196(22)00315-1).
- Watts, N., Amann, M., Ayeb-Karlsson, S., Belesova, K., Bouley, T., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Chambers, J., Cox, P.M., Daly, M., Dasandi, N., Davies, M., Depledge, M., Depoux, A., Dominguez-Salas, P., Drummond, P., Ekins, P., Costello, A., 2018. Countdown on health and climate change: from 25 years of inaction to a global transformation for public health. *Lancet (Lond., Engl.)* 391 (10120), 581–630. [https://doi.org/10.1016/S0140-6736\(17\)32464-9](https://doi.org/10.1016/S0140-6736(17)32464-9).
- Webb, R. (2021). *New Scientist Essential Guide No: 8 Climate Change: The Science, The Challenge, The Solutions*.
- Woodhall-Melnik, J., Grogan, C., 2019. Perceptions of mental health and wellbeing following residential displacement and damage from the 2018 St. John River flood. *Int. J. Environ. Res. Public Health* 16 (21), 4174. <https://doi.org/10.3390/ijerph16214174>.
- World Bank Group. (2021). *Climate Change Action Plan 2021 - 2025*. ([www.worldbank.org](http://www.worldbank.org)).
- Zhang, S., Braithwaite, I., Bhavsar, V., Das-Munshi, J., 2021. Unequal effects of climate change and pre-existing inequalities on the mental health of global populations. *BJPsych Bull.* 45 (4), 230–234. <https://doi.org/10.1192/bjb.2021.26>.