

Advancing disability-inclusive climate research and action, climate justice, and climate-resilient development

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Globally, more than 1 billion people with disabilities are disproportionately and differentially at risk from the climate crisis. Yet there is a notable absence of climate policy, programming, and research at the intersection of disability and climate change. Advancing climate justice urgently requires accelerated disability-inclusive climate action. We present pivotal research recommendations and guidance to advance disability-inclusive climate research and responses identified by a global interdisciplinary group of experts in disability, climate change, sustainable development, public health, environmental justice, humanitarianism, gender, Indigeneity, mental health, law, and planetary health. Climate-resilient development is a framework for enabling universal sustainable development. Advancing inclusive climate-resilient development requires a disability human rights approach that deepens understanding of how societal choices and actions—characterised by meaningful participation, inclusion, knowledge diversity in decision making, and co-design by and with people with disabilities and their representative organisations—build collective climate resilience benefiting disability communities and society at large while advancing planetary health.

Introduction

More than 1 billion people with disabilities, 80% of whom live in low-income and middle-income countries (LMICs), are disproportionately and differentially adversely affected by the climate change crisis.¹⁻⁴ People with disabilities have substantially higher rates of mortality and undergo greater harms in climate emergencies than do their non-disabled counterparts.³⁻⁵ Moreover, disability populations are disparately affected by insidious manifestations of climate change, such as food and water insecurity.³⁻⁶ Discrimination, stigma, social exclusion, and economic inequality increase the exposure of people with disabilities to climate hazards, disproportionately threatening disability human rights, including the rights to life, health, water, food, education, livelihood, cultural life, independent living, and personal mobility.^{4,5} Climate change creates further barriers⁶ that are unique to people with disabilities and exacerbates existing harms, both within countries and across regions, unequally affecting low-income settings.⁴⁻¹⁶

Worldwide, disability communities facing ableism, stigma, and discrimination are disproportionately excluded from the socioeconomic gains accrued from capitalism and colonialism and are disparately harmed by atmospheric colonialism.^{4-6,8-12,14,15} Climate change disproportionately affects minoritised people subjected to intersectional discrimination on the basis of disability, race, gender, class, caste, age, and other categories, as well as geography, culture, and migratory or legal status.^{4,5,8-15} People with disabilities are at disparately high risk from worsening climate hazards as the biophysical effects of global warming, ableism, systematic oppression, and histories of colonialism intersect, increasing disability human rights harms in many spaces, such as within minoritised communities (eg, Indigenous people with disabilities in settler-colonial countries) and especially in

low-income countries and small island states.^{4,6,8,9,15-18}

Children with disabilities in low-income countries in the 2020 birth cohort will encounter more than five times the lifetime exposure to extreme weather events under present emission-reduction pledges compared with the 1960 birth cohort, causing severe harms that result in intergenerational inequality.¹⁹ Unjustly, people with disabilities who are greatly affected by climate-related harms are often the least responsible for climate change, including those inhabiting low-income countries and small island states, children, and Indigenous people with disabilities.^{4-6,8,12,18,19}

Amplifying this climate injustice, people with disabilities have to impel climate action amid social discrimination that positions them as “the least worth saving”.²⁰ Discriminatory processes largely exclude this population from climate-related decision making, knowledge production, and power.^{4,11} Consequently, disability marginalisation diminishes societal understanding of the urgent need for climate action and how to collectively respond²¹ to the climate crisis. Exclusionary processes are further intensified as poverty, gender, ethnicity, and other dimensions intersect, affecting the extent to which organisations of people with disabilities (OPDs) can participate in debates on climate solutions, especially within LMICs.⁴ Internationally, there is no disability constituency in the UN Framework Convention on Climate Change, in contrast to the constituencies that exist for Indigenous people, women and gender, and youth.²² Consequently, people with disabilities are further adversely affected by mitigation and adaptation approaches designed without their participation, such as inaccessible evacuation shelters.⁴

Compounding this inequity, researchers, practitioners, and policy makers continue to exclude consideration of

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disability.^{4,11,13} Strikingly, an assessment of 1682 climate adaptation response articles identified that only 1% even considered disability.²³ Furthermore, a 2022 analysis showed that 81% of states parties to the Paris Agreement did not reference disability in their nationally determined contributions.²⁴ Indeed, the Intergovernmental Panel on Climate Change (IPCC) reported in 2022 that, internationally, almost no evidence showed the group's inclusion in climate adaptation, and emphasised that rights-based approaches are key to addressing structural vulnerabilities, including inequality based on disability.^{25–27} The paucity of research, policy, and programmes on climate change and its consequent disability implications reflects continuing societal disability marginalisation, ableism, an overall absence of political commitment, and attendant funding constraints.^{3,4,13} People with disabilities—including individuals with physical, sensory, intellectual, or mental health disabilities²⁸—face discrimination, are disproportionately affected by poverty, and are less likely to be included than their non-disabled counterparts in a wide range of biomedical, public health, legal, and socioeconomic research and programmes intended to improve understanding of and responses to climate change.^{4,11} These issues are of marked concern in view of the growing body of data showing that people with disabilities are at increased risk from climate change.^{3,4,6,11} Notably, a 2022 study of Australian heatwave fatalities between 2001 and 2018 reported that 316 (89%) of 354 people who died had one or more disabilities.²⁹

States violate international legal obligations by failing to decrease carbon emissions in accordance with the Paris Agreement³⁰ or by excluding people with disabilities from climate responses.^{2,28,30} Foundationally, the UN Convention on the Rights of Persons with Disabilities (CRPD) legally mandates that government-sponsored climate mitigation and adaptation measures and all “international cooperation, including international development programmes”²⁸ be inclusive of disability. Of special note within the CRPD is Article 11, which accords protection to people with disabilities in situations of risk and calls for complementarity between the CRPD and other domains of international law.²⁸ Attuned with the CRPD, the Sustainable Development Goals (SDGs)³¹ acknowledge disability as a crosscutting issue.

A disability climate justice framework encompasses the cross-disability community with myriad intersectional identities; embraces human diversity; and values self-actualisation, everyday problem solving, interconnectedness, and environmental stewardship.^{4,21,28} The framework recognises that people with disabilities' experiences and knowledge of climate change are affected by their disability, race, gender, age, and other identity categories, as well as their culture, socioeconomic and legal status, and geographical setting, and that this population are crucial climate actors.^{4,5} This framework applies legal mandates under which states must decarbonise society and carry out climate adaptation in a manner that realises

disability human rights.^{4,28,30} Disability climate justice pursues the removal of discrimination, marginalisation, and poverty and the fulfilment of rights, including the rights to life, health, education, independent living, cultural life, and accessibility.^{4,28} This framework recognises the legal mandate for synergistic alignment with other human rights instruments, including those drawn on by Indigenous people, women, and children.^{2,28,30} Disability climate justice is in accordance with the human right to a clean, healthy, and sustainable environment.³² The framework fosters solidarity within an intersectional climate justice movement and is attuned with environmental justice, racial justice,¹⁵ and the LGBTQ+ movement.

Climate-resilient development fosters human well-being and planetary health by pursuing social justice, implementing climate adaptation and mitigation, and advancing sustainable development.^{21,25} Indeed, the IPCC recognises that climate-resilient development is grounded in social equity and sustainable development for all and draws attention to how social choices need to mobilise systemic transformation.²⁵ Failing to enable climate-resilient co-development with the world's largest minority is a notable lost opportunity to enhance climate solutions that advance planetary health. People with disabilities hold knowledge of their lived experience and of innovating and developing climate resilience in the face of discrimination.^{4,10,13,21} Research emphasises that a disability perspective can deepen understanding of societal choices that effectively shift systems and build collective climate resilience, especially the crucial role of knowledge diversity in decision making and action.²¹ Importantly, disability studies emphasise how societal processes produce vulnerability and the need to shift conventional understandings of resilience from that of fixing individuals' misperceived inherent vulnerability to addressing socioenvironmental processes that render these populations vulnerable.³³ Advancing climate justice urgently requires accelerated disability-inclusive research and climate action. Doing so mandates promoting, respecting, and fulfilling disability human rights in all climate decision making, adaptation, and mitigation.⁴

Adopting a disability human rights approach to climate research and action provides a nuanced understanding of the unique ways in which people with disabilities are affected by climate change compared with their non-disabled counterparts.⁴ This approach recognises and values people with disabilities and OPDs as essential agents of positive change, with the leadership and problem-solving skills to shape climate decisions and action,^{4,5} enhance climate resilience, and promote planetary health. Crucially, this approach acknowledges and respects the co-design of research and knowledge production by researchers and disability climate activists with lived experience of disability, including Indigenous people with disabilities who can provide Indigenous knowledge.⁴ Enabling collective climate-resilient development requires

a disability human rights approach to repair human rights harms and foster social equity, wellbeing, and planetary health. Advancing climate-resilient development requires reimagining interconnectedness, prioritising environmental stewardship, and developing interactions that accelerate equity rather than violate human rights.

This Personal View emphasises ways in which climate change disproportionately affects people with disabilities and the consequent imperative of disability-inclusive climate research and action. Next, taking a disability human rights approach we synthesise and innovate research recommendations and guidance for climate action utilising knowledge from researchers with disabilities, OPDs, and global experts. Finally, recognising the need for accelerated disability-inclusive climate action, we emphasise disability-inclusive climate research priorities and outline pivotal guidance for disability-inclusive climate action. This Personal View elucidates the crucial role of meaningful participation, capacity building, inclusion, knowledge diversity in decision making and climate action, and accountability.

To respond to the striking absence of disability-inclusive climate research and action,^{4,11–13} an international interdisciplinary group of experts on disability, climate change, sustainable development, public health, environmental justice, humanitarianism, gender, Indigeneity, mental health, law, and planetary health gathered at a workshop on Sept 28–29, 2022, convened by the Harvard Law School Project on Disability and University College London's International Disability Research Centre. The 30 experts were globally diverse, from high-income countries, LMICs, and small island states, representing Indigenous people, academia, OPDs, and international organisations, and included researchers and practitioners with disabilities. This Personal View shows the disproportionate effect of climate change on people with disabilities and the necessity of disability-inclusive climate research and climate action through disability scholarship, OPD knowledge, and policy analysis. We provide key research recommendations, priorities, and guidance on climate action from our globally diverse group of researchers with international expertise and lived experience of disability. Our hope is that this Personal View mobilises scholars, practitioners, and policy makers to undertake disability-inclusive climate research and action as collaborators and allies of researchers with disabilities and OPDs.

Disproportionate climate change impacts

The so-called vulnerability of people with disabilities to climate change is a result of stigma, discrimination, and structural, institutional, and socioeconomic barriers that undermine both disability and collective societal climate resilience.⁴ Discrimination together with structural and socioeconomic barriers compound the diverse negative effects of climate change on health, water, food security, and other rights, undermining social equity and wellbeing.^{3–5} People with albinism face stigma; absence

of efforts to raise awareness; inequality in accessing quality sunscreen, health care, and indoor employment opportunities; and an increased risk of skin cancer.³⁴ During periods of unusually warm weather or high humidity, people with multiple sclerosis have a greater likelihood of seeking emergency room or inpatient visit care,³⁵ yet because of poverty and inaccessible health systems, they experience limitations in receiving adequate health care.³ People with disabilities who are admitted to emergency rooms might not have the physical mobility or the financial resources¹⁴ to leave an overheated home or workplace. Many might be unable to afford an air-conditioner or even electricity.¹⁴ People with disabilities facing intersectional discrimination are disproportionately affected by harms, including women, girls, and Indigenous people.^{4–6,8,11,18} People who are homeless or living in an institution and have mental or physical disabilities might also be at increased risk. Consequently, heat-related research is necessary at the intersection of disability, race, low-income status, and social class. Participatory action research with people with cognitive and mobility-related disabilities on public health responses to heatwaves and hot weather is imperative. Overall, innovative disability-inclusive heat policies and initiatives are urgently required. Moreover, the magnified risk from climate change that is faced by people with albinism, particularly in sub-Saharan Africa, warrants further research.³⁴

People with disabilities are also disproportionately experiencing reduced access to water due to climate change.^{4–6} Notably, water insecurity is increased for people with disabilities who face stigma, discrimination, absence of physical accessibility, and economic barriers that reduce access to clean water, sanitation, and hygiene (WASH).^{4,36} Increased WASH insecurity in turn has important implications in the face of severe weather, drought, and rising sea levels. In India, accessible raised hand pumps were installed that were designed to remain operational during flooding.³⁷ Further innovative WASH initiatives that are inclusive of people with disabilities³⁸ are required to increase water security.

Food insecurity related to climate change disproportionately affects people with disabilities, many of whom already have decreased food access because of poverty.^{4–6,14} People with disabilities in the Pacific, for instance, are heavily reliant on subsistence activities, such as farming, that are negatively affected by climate change.⁵ Disability-related food insecurity requires research at the intra-household, household, and community level and beyond, including investigations into differential power. Illustratively, school-based malnutrition reduction programmes are often less accessible to children with disabilities, who are less likely to attend school than their non-disabled counterparts.¹⁴ In Mozambique, keyhole gardens were adapted for people with disabilities.³⁹ Further disability-inclusive initiatives are required to inform and develop food security approaches.

Poverty and discrimination towards people with disabilities cause a disproportionate number of this population to live in substandard housing and in neighbourhoods that are at increased risk from flooding and rising sea levels. In the USA, for example, the proportion of flooded areas due to Hurricane Harvey in Harris County, TX, was larger in neighbourhoods with higher proportions of people with disabilities, many of whom reside in public housing.⁴⁰ These circumstances likewise increase the number of people with disabilities who are exposed to environmental pollution. One study from the USA showed that a higher proportion of people with disabilities than their non-disabled counterparts live in neighbourhoods with increased exposure to fine particulate matter (PM_{2.5}), and thus this population is at increased risk of exposure to chronic air pollution nationally.⁴¹ Climate-sensitive respiratory diseases are affected by small particulates, wildfire particulates, and ground-level ozone.²⁶ Climate change is increasing the intensity and frequency of heatwaves, an ignition source for wildfires that increases exposure to wildfire particulates.²⁶ These trends emphasise the importance of environmental justice research and initiatives that are inclusive of people with disabilities. Moreover, recognition that socioenvironmental processes position people with disabilities in vulnerable situations advances understanding that climate resilience can be enhanced through disability-inclusive health care, education, employment, housing, and city planning policies, initiatives that are rarely considered within climate policies.

Climate change can be a primary cause of psychosocial disability because of acute trauma that occurs during events such as wildfires and floods and negative effects on social determinants of mental health, such as increased poverty and solastalgia.⁴² People with pre-existing disabilities are also negatively affected by climate change stressors.^{43,44} Notably, the odds of post-traumatic stress for people with disabilities were 4.4 (95% CI 2.71–7.14) times higher than for people without disabilities following Winter Storm Uri in Texas, USA.⁴³ People with psychosocial disability face triple the risk of mortality during heatwaves, and consequently, heat research and initiatives should be inclusive of this group.⁴⁴ Further research is urgently needed on the wellbeing and mental health of the diverse group of people with disabilities in climate emergencies. Moreover, research is required on the linkages between mental health and climate change in Africa.²⁶ This link is of particular concern because low-income settings are disproportionately affected by climate change and have fewer resources to address the needs of people with mental health disabilities.

Marginalisation and disability interact in a recursive cycle that is exacerbated by the climate crisis; thus, people with disabilities disproportionately inhabit lower-income communities that are most affected by climate change.^{5,14,18,41} Climate risk is strongly related to disability

and multidimensional inequality and frequently intersects with poverty.⁷ Consequently, without rapid reductions in carbon emissions and the establishment of disability-inclusive climate responses, people with disabilities are at increased risk of chronic and intergenerational inequality.^{14,19} The disproportionate climate harm that affects this group emphasises the imperative and benefit of accelerated disability-inclusive climate research and action. However, analysis of research and climate responses at the nexus of disability and climate change are affected by the marginalisation of people with disabilities, which excludes them from knowledge production, climate decision making, and consequently data, policies, and initiatives.^{4,11,24} Next, we set forth further research recommendations and guidance on climate responses by use of a disability human rights approach.

Advancing disability-inclusive climate research and action

Recognise disability intersectionality

Pursuant to the Office of the High Commissioner for Human Rights, “Intersecting factors related to gender, age, ethnicity, geography, migration, religion and sex can subject some persons with disabilities to higher risks of experiencing the adverse effects of climate change”.⁵ In disasters, people with disabilities facing intersectional discrimination experience further barriers; for example, Black residents in Texas, USA, had increased risk of post-traumatic stress due to Winter Storm Uri.⁴³ Already having socioeconomic disadvantages and meagre access to social assistance, in the wake of Hurricane Maria, around one in three adult Puerto Ricans with disabilities⁴⁵ lost access to basic infrastructure, and many were denied emergency warnings, accessible shelters, oxygen, and power-operated medical equipment.⁴⁶ Strikingly, a third of all deaths attributed to Hurricane Maria were due to disrupted medical care.⁴⁷ Following the hurricane, OPDs had a crucial role in providing basic assistance, such as delivering food and home support services.¹⁰ Further research on the multidimensional effects of climate change on people with disabilities that disaggregates data by disability, gender, Indigeneity, race, and legal and socioeconomic status would provide invaluable insight into the actual effects on and experiences of climate change for disability populations. Crucially, further research is required to investigate the intersectional dynamics that undermine or advance social justice and climate-resilient development.⁴⁸

The meaningful participation of the diverse disability community in government bodies and decision-making processes can provide intersectional perspectives and solutions for governments facing growing climate crises. Plans, policies, and initiatives need to recognise and respond to the widely diverse disability group to enable inclusive governance, ensure diverse knowledge and social equity, and advance climate-resilient development.^{4,11,25}

Next, we consider children and young people with disabilities and the intersection of disability and gender and of disability and Indigeneity.

Ensure inclusion of children and youth with disabilities

Research on children and climate change, if inclusive of children with disabilities at all, tends to focus on environmental exposures leading to disabilities. Although important, so is the development of empirical research on the social, physical, and psychological effects of climate change on children with disabilities. As the Office of the High Commissioner for Human Rights acknowledges, “The negative impacts of climate change can exacerbate inequities already experienced by children with disabilities.”⁴⁹ In the face of climate change, children with disabilities are disproportionately affected by poverty; reduced access to education and health care; barriers to accessing water and food; abuse; omission from disaster risk reduction efforts;⁴⁹ and exclusion from decision making. Notably, the UN’s First Children and Young People’s Consultation indicated that “children reporting a disability or medical condition were more likely to report that their lives changed due to climate change or environmental damage.”⁵⁰

Children and young people with disabilities are largely excluded from emergency preparedness at all levels and are disproportionately affected by mortality, injury, and abuse.⁵¹ For example, following Hurricane Katrina, a third of children who were displaced for months were children with disabilities; furthermore, children with disabilities had little access to health care or medical equipment.⁵¹ Research is required to examine whether children with disabilities are at increased risk of psychological disabilities due to the increasing severity and frequency of climate emergencies. Studies on effective education programmes that provide inclusive education on environmental, climate change, and disaster preparedness will be crucial, along with measures to ensure that science, technology, engineering, and mathematics education and careers are inclusive.^{52,53} Strikingly, children and young people with disabilities are rarely given a voice in decision making in climate change initiatives, even when efforts are made to include young people. Climate justice and disability advocacy training,⁴ climate literacy,⁵³ accessible safe spaces, outreach, and sensitive mediation can enable participatory and decision-making processes to empower young people with disabilities who face intergenerational climate injustice.

Incorporate gender as a disability issue

Gendered risk and responses to climate impacts vary at the intersection of disability, social norms, laws, policies, and power.⁴¹¹ Compounded disability and gender discrimination mediate experiences such as loss of agriculture and marine systems related to climate change, as well as structural constraints, be it unequal education or employment opportunities.^{14,54} For instance, women

with psychosocial disabilities who face disability and gender discrimination are often socially isolated, with only intermittent or no government support and repressed agency to adapt to the climate crisis.⁵⁵ Consequently, climate-related disability data disaggregated by gender and age are urgently required. Also needed are gendered disability analyses and gendered social learning methodologies with relational dimensions that can provide crucial social insights. For example, water scarcity can result in the marketplace controlling household water supplies, with resulting financial costs that increase poverty and also simultaneously break social norms as men take over water carriage, a task that has increased the human rights harms of women for centuries.⁵⁶ Happiness as a subjective measure of wellbeing might be a useful indicator of equity in gendered disability climate research.

The climate crisis compounds gendered health effects.^{26,57} Growing research indicates that high ambient temperatures; extreme weather, including heat events, hurricanes, cyclones, and floods; and airborne particulates adversely affect women’s perinatal and maternal health.^{26,57} Research into the health of cisgender women also needs to consider intersectionality and the climate-related health of women with disabilities and people who face intersectional discrimination on the basis of race, ethnicity, Indigeneity, and other identity categories. Initiatives for the health of pregnant women during hot weather, including early warning systems, check-ups, cooling areas, and building modification, need to reach minoritised populations, including women with disabilities.⁵⁸ Additionally, women with disabilities face challenges in menstrual hygiene management in LMICs and small island states.^{38,59} The barriers to menstrual hygiene management of taboo, stigma, challenges in accessing and managing menstrual materials, and inaccessible WASH facilities are compounded by extreme weather events, devastation to basic infrastructure, and increasing water insecurity.^{38,59} This milieu increases the risk of infection and is unfavourable for sexual and reproductive health.⁵⁹ Conversely, a WASH study in Vanuatu emphasised the benefit of bolstering household water supplies and supply chains for menstrual products.³⁸ Following Cyclone Harold, disaggregated disability data from the WASH study in Vanuatu enabled the building back of accessible toilets.³⁸ This action shows the benefit of applying transformative mixed-method research at the intersection of disability and climate change. Further mixed-methods research is required to support inclusive WASH initiatives in diverse affected contexts. Non-binary people face stigma and discrimination, poverty, high rates of homelessness, inequitable disaster responses, and attendant health inequalities.⁶⁰ In 2017, advocates from the queer disability community distributed masks during wildfires in California, USA.⁶¹ Queer and transgender disability communities are a growing movement with experience in responding to the climate crisis.⁶¹

Gender-sensitive climate adaptation is an opportunity for the inclusion of people with disabilities and anti-colonial perspectives from co-design to implementation. Disability-inclusive measures include creating safe spaces, ensuring physical and virtual accessibility, providing inclusive gender advocacy training, mitigating gender-based violence, and developing local solutions by and with minoritised voices. To illustrate, in Burundi, a national dialogue on disability-inclusive climate policy and initiatives included the Her Resilience Enabled Project to strengthen the climate resilience of women and girls with disabilities, thereby facilitating participation in decision making.⁶²

Self-representation by Indigenous people with disabilities

Growing research shows that Indigenous people with disabilities are disproportionately affected by climate change due to intersectional discrimination; inter-generational genocide and colonialism; environmental degradation and changes to ancestral land, water, and air; increasing food insecurity; and disempowerment.^{4,6,8,18} Indigenous people are emotionally and psychologically affected as climate hazards disrupt their cultural life, traditional food systems, and sacred spaces; post-traumatic stress, depression, and suicide are linked to acute climate events.⁸ An increasing body of research on Indigenous people values Indigenous knowledge on health, wellbeing, sustainability, and climate adaptation.^{25,26,63,64}

Crucially, further studies should address climate injustices and underlying social inequalities experienced by Indigenous people with disabilities. In Nepal, for instance, 75% of Indigenous women with disabilities face food insecurity.⁶⁵ The National Indigenous Disabled Women Association Nepal urges free, prior, and informed consent for climate projects that affect Indigenous people's rights to land,⁶⁶ as legally obligated by the UN Declaration of the Rights of Indigenous Peoples.⁶⁷ This OPD also calls on states to heighten Indigenous people's food security by eliminating barriers to accessing land for customary food practices and traditional livelihoods.⁶⁶ Future interventions need to be developed by and with Indigenous people with disabilities to strengthen their climate resilience, self-determination, and agency. The participation of people with disabilities, including Indigenous people with disabilities, is crucial to assessing loss and damage from climate change.

Empowering disability-inclusive climate action

Internationally, disability climate activists are increasingly advocating for disability climate justice, including OPDs such as the Pacific Disability Forum, the National Indigenous Disabled Women Association Nepal, and the International Disability Alliance.^{66,68} In response, states adopted, for instance, overarching decision 1/CP.27,⁶⁹ and the decision on Action for Climate Empowerment 23/CP.27,⁷⁰ which reference people with disabilities, but

these gestures fail to meet OPD demands for the protection and fulfilment of their disability human rights. And, despite OPD advocacy, disability is still systemically excluded from UN climate negotiations, as shown by the dearth of disability-related organisations admitted to the UN Framework Convention on Climate Change process.⁷¹ By contrast, a disability constituency and disability action plan, akin to the Gender Action Plan, would raise awareness within the UN Framework Convention on Climate Change and encourage national public discourse on disability-inclusive climate policy and solutions.⁴ A greater awareness of the disparate impact of climate change on people with disabilities can increase the general risk perceptions of leaders regarding climate change,⁷² as can disability leadership, and enable the implementation of inclusive measures to address risks. OPDs have experience in advocating for global change, solving complex problems, and breaking down barriers.^{4,6,13,66,68} The first UN treaty process to involve stakeholders, the CRPD negotiations, shows the positive outcomes that can result from including OPDs to educate state representatives as to the needs and priorities of people with disabilities.⁴

Nationally to locally, advocacy training on the nexus of disability rights and climate justice is crucial for empowering the self-perceptions of people with disabilities and building the capacity of OPDs on climate change. Attitudinal change campaigns that disseminate stories at the intersection of disability and the climate crisis will transform cultural perceptions.⁴ Enhancing both the climate literacy of people with disabilities and societal understanding at the intersection of disability and climate change is urgently required.⁵³ Achieving these goals necessitates the dissemination of accessible climate-related information; development of intersectional climate change and disability education; access to inclusive education and science, technology, engineering, and mathematics education and careers; mentorship of people with disabilities; and appointment of disability experts to government bodies.^{4,11,12,53} Enabling meaningful participation requires accessible spaces and using sensitive cultural mediation to ensure the inclusion of voices and perspectives that are routinely excluded, mischaracterised, or subjugated.

Meaningful participation ensures a shared understanding of contested values, including the outcomes that diverse people with disabilities view as successful or harmful to their wellbeing. The 2022 IPCC report established that societal choices and outcomes arising through interactions between diverse stakeholders can build climate-resilient development.²⁵ The quality of these interactions (ie, inclusive or exclusive, knowledge based on diverse or single perspectives, and ecosystem stewardship or degradation) decides whether resulting actions advance or undermine climate-resilient development.²⁵ OPDs in Bangladesh, for example, impart diverse knowledge, strengthen disaster risk reduction, and

improve attitudes towards people with disabilities within communities as they become effective disability and community advocates.^{4,73}

Innovate effective disability-inclusive mitigation and adaptation approaches

Discrimination and inequality experienced by people with disabilities are increased by the scarcity of disability-inclusive climate mitigation and adaptation policies,²⁴ plans, and initiatives.^{4,11} Exclusionary climate mitigation approaches, such as near-silent electric cars,⁷⁴ negatively affect people with disabilities, whereas inclusionary approaches afford an opportunity to participate in societal systemic shifts. In the face of climate catastrophe, the contributions to climate mitigation of over a billion people should surely be harnessed. The efficacy and effectiveness of climate mitigation interventions will be enhanced by mitigation strategies that are co-designed by researchers with disabilities and OPDs, benefiting people with disabilities and society at large. Disability-inclusive mitigation approaches include, for example, accessible charging stations and public transportation.¹¹ Accessible mass transit, for instance, is a legal obligation for people with disabilities and also benefits pregnant women, families with children, and older people.¹¹ Both high-technological and low-cost climate solutions are required to increase social equity and advance climate-resilient development.⁵³ Future research will be required to co-design innovative disability-inclusive solutions and analyse the scalability of disability-inclusive climate interventions.

Climate adaptation approaches often overlook disability. Indeed, 76% of states fail to reference people with disabilities in their climate adaptation policies,²⁴ despite the urgent need for disability-inclusive climate solutions, particularly in LMICs and small island states. Disability-inclusive climate adaptation is required across sectors to remove structural barriers, including obstacles to accessing health, education, agriculture, employment, and housing.⁴ Policies, initiatives, and analyses should consider, for example, in response to hot weather, the accessibility of alert systems and cooling spaces, cooling measures and home visits during extreme heat events for people with reduced mobility, targeted outreach and communication to isolated people with disabilities,⁷⁵ increasing accessible green spaces, and reasonable accommodation measures applicable to planning contexts. Climate adaptation policies and initiatives must acknowledge the heterogeneous disability population, with intersectional identities, and institute measures directed to, for instance, minoritised women with disabilities, displaced people, and older people. Innovative disability-inclusive national or city climate plans and initiatives must be reviewed from a disability-inclusive, climate-resilient development perspective and, if effectual, be disseminated as good practices.⁷⁶

Nowadays, when disability is included in national climate commitments, climate change policies, or

programmes, it is too often as a passing reference. A twin-track approach is an established strategy for disability inclusion that is easily understandable and implementable by government and civil society organisations.¹⁴ Under this approach, people with disabilities are included in all interventions and projects on an equal basis with others and, where needed, specific targeted efforts are made to ensure that these people are empowered to participate equally, thereby resulting in them having the same rights and opportunities as others.¹⁴

OPDs must be enabled to participate in the design and implementation of climate adaptation measures, including monitoring mechanisms.⁴ OPD leadership and collaboration is needed in both a top-down and bottom-up approach.^{4,10} Crucially, future research and initiatives are required to develop effective locally led adaptation strategies⁷⁷ and scalable disability-inclusive climate adaptation solutions and to identify good practices for dissemination. Climate adaptation and mitigation priorities should be identified by OPDs nationally, hyperlocally, and intersectionally, so that climate decision making and solutions reflect the perspectives of affected disability communities.⁷⁸ Updating nationally determined contributions, for example, provides an opportunity for disability inclusion through consultation with scholars with disabilities and OPDs to identify measures to protect and fulfil disability human rights. Vanuatu's nationally determined contribution is a good practice example that includes promoting the inclusion of OPDs in national climate decision making.²⁴

Advance disability-inclusive disaster risk reduction

OPDs have responded to climate crises, from floods in Bangladesh to wildfires in California, USA.^{10,73} However, government plans and actions continue to neglect disability.^{4,11,24} A 2013 international survey identified that a mere 20.6% of people with disabilities could immediately evacuate a disaster without difficulty.⁷⁹ Strikingly, according to the IPCC, mortality between 2010 and 2020 from storms, floods, and droughts was 15-fold higher in highly vulnerable regions than in very low vulnerability regions.¹⁷ Concerningly, people with disabilities in disasters have mortality rates that are two to four times higher than their non-disabled counterparts, have increased risk of injury, and are also more likely to have their property damaged.^{3,80} Accessible early warning systems, information, transportation to evacuation areas, and shelters often do not exist.^{4,10,80} Internationally, people who are Deaf, deaf, or hard of hearing face barriers to disaster risk information, such as inaccessible sound-based warning systems and the absence of quality live captioning.⁸¹ Funds to flee or relocate in the face of disaster and emergency rarely account for the extra costs of living with a disability. Support services become unavailable, and their

re-establishment is not prioritised. Illustratively, people with disabilities in Houston, TX, USA, were less likely to be able to access health care after Hurricane Harvey.⁸²

Accurate disaggregated disability data are crucial⁸³ to ensure full participation in disaster risk reduction, recovery, and reconstruction and to make certain that the mortality rate of people with disabilities is visible.⁸⁴ However, data are often not disaggregated by disability in, for example, risk assessments and rapid needs assessments.⁸⁴ Compounding this knowledge gap, government data are often of low quality; in many countries, people with disabilities frequently are not registered with government departments due to stigmatic, socioeconomic, geographical, and accessibility barriers.^{83,84} Disability-inclusive disaster risk reduction initiatives must consider how to reach individuals with differing disabilities and intersectional identities, such as women and Indigenous people with disabilities and people with disabilities from low-income backgrounds,¹⁰ and how knowledge of intersectional dynamics can advance disaster risk reduction, recovery, and reconstruction. OPD collaborations with government bodies and non-governmental organisations should occur well before and following disasters.¹⁰ Both OPD-led and collaborative disaster risk reduction research, initiatives, and monitoring can support the development of effective adaptation practices that are inclusive of people with disabilities. Effective measures include bolstering disability advocacy training, inclusive multistakeholder platforms, rapid needs assessments, early warning systems, and shelters.⁸⁴ Ensuring energy security during and after climate emergencies is crucial to prevent human rights harms.⁴⁷ Governments, non-governmental organisations, and UN agencies would benefit from the disability-specific knowledge of OPDs and experts with disabilities on disaster preparedness.¹⁰ Evaluations of disability-inclusive disaster risk reduction practices in diverse settings are required to establish whether meaningful inclusion is achieved.⁸⁴ Longitudinal studies should be initiated to analyse the effect of such initiatives on disability mortality rates, cultural attitude change, and disability inequalities.⁸⁴

Innovate social protection measures

Social protection is an opportunity to enhance societal transformation by addressing the disparate impact of climate change and exclusionary climate measures on disability communities. A negative feedback loop of social isolation, limited access to education and employment, and absence of community inclusion leads to a compounding cycle of poverty for people with disabilities in several domains that are of immediate relevance to climate justice.¹⁴ For example, following climate emergencies, many people with disabilities lose equitable housing and access to durable medical equipment and assistive technology and have no social safety net.^{46,80} Yet climate resilience can be developed through functional national

social protection. This protection can be achieved by mainstreaming well coordinated disability social protection across government sectors, such as health, education, and public works, along with targeted interventions.⁸⁵ Targeted social protection programmes include disability cash benefits, community-based rehabilitation, and vocational training.^{6,86,87} Disability-inclusive adaptive social protection that is linked to weather forecast triggers, anticipates shocks, and adjusts to growing climate risk has the capacity to enhance disaster prevention.⁸⁶ Long-term climate adaptation and measures for disaster risk reduction should be integrated with disability-inclusive adaptive social protection, such as accessible reconstruction, affordable housing, evacuation routes, and relocation planning.⁸⁶ Furthermore, people with disabilities are often not informed of extant social protections due to the paucity of accommodations, such as the provision of sign language for people who are Deaf or deaf. Hence, research is required on disability-inclusive distribution strategies and networks. Future social protection policies and measures should ensure disability inclusion through augmented and transformational climate responses.⁸⁷ In view of the scarcity of people with disabilities and OPDs that are involved in climate negotiations, an accessible repository of peer-reviewed disability data would facilitate the drafting of climate-related social policy reforms and loss and damage mechanisms.

Disability-inclusive approaches to migration and humanitarian assistance

By 2050, up to 216 million people could migrate due to climate change.⁸⁸ Migrants with disabilities are disproportionately impacted at every stage of migration. When migrating across borders, people with disabilities face discriminatory immigration policies that often deny international mobility due to so-called health considerations that are premised on a retrogressive medical model that does not view the group as contributing to society.⁸⁹ This issue emphasises the opportunity for policies that enable migration of people with disabilities to strengthen the resilience of communities. Migrants with disabilities who pursue humanitarian assistance, health care, and livelihoods often face discrimination and violence, particularly women.⁹⁰ Asylum seekers who crossed the Mediterranean Sea reported that people with disabilities had early and higher rates of mortality due to the absence of water, medicine, and a sufficiently inclusive humanitarian response.⁹¹ Thus, data disaggregated by disability are crucial for humanitarian initiatives and assessments. Studies on innovative OPD-inclusive humanitarian responses and evidence-based adaptation approaches to issues relating to forced migration, health, and wellbeing are also sorely needed. Initiatives are required to ensure that migrants with disabilities are meaningfully included in integration planning and programming efforts. OPDs are effective actors and

collaborators in humanitarian responses and advocate for the elimination of barriers to humanitarian assistance and attitudinal change.⁹² For example, in 2017, a project that was designed and implemented by an OPD in Greece improved services for refugees with disabilities.⁹² Research is also crucially needed on developing the climate resilience of front-line disability communities. Furthermore, humanitarian responses are necessary for people with disabilities and older people in institutions or group homes who might otherwise be abandoned when communities disperse.

Finally, disability climate justice requires that multi-lateral and bilateral climate aid and financing no longer operate through exclusionary pathways.⁴ Instead, local OPDs, including organisations representing people facing intersectional discrimination, should have access to resources to advocate for and implement climate solutions that reflect the priorities and needs of local disability communities. Disability safeguards must be promulgated so that climate financing is directed only to disability-inclusive societal transformation, rather than ultimately costlier measures that increase human rights harms. Rapid implementation of approaches to loss and damage should address the needs of marginalised populations that are disproportionately affected by severe climate impacts, including people with disabilities.

Develop disability-inclusive monitoring and assessment tools

A disability human rights approach requires monitoring, evaluation, and learning to assess and strengthen the extent to which policies, programmes, funding, and loss and damage mechanisms recognise and incorporate people with disabilities. Researchers and advocates from fields that historically have not included disability can look to established collection methods for disability data, such as the Washington Group on Disability Statistics,⁹³ to increase the effectiveness of monitoring and evaluating disability inclusion. However, a 2022 report identified that only 10% of datasets included the internationally tested Washington Group Short Set of questions in national censuses and household surveys worldwide from 2009–21.⁹⁴ Globally, countries can disaggregate some SDG indicators for disability but not others, because disability-specific questions are not yet included across all data instruments.⁹⁵ Future research on multidimensional poverty should consider whether climate-resilient development is intersectionally advancing the situation of people with disabilities or leaving them behind.

Strategic litigation

Human rights frameworks and international instruments are mechanisms for challenging state failures to respond to climate change, dismantling discriminatory policies, and inducing structural change. Leveraging the CRPD,²⁸ the Paris Agreement,³⁰ and the SDGs,³¹ individuals with disabilities are filing lawsuits against governments,

claiming that their rights have been violated.⁹⁶ These claims have been brought across several judicial systems, including national courts, the European Court of Human Rights, the Committee on the Rights of the Child, and the Committee on the Rights of Persons with Disabilities.^{4,11,96} Disability-related complaints could potentially be brought to several other venues, including the Inter-American System and the World Bank Inspection Panel. In 2021, a communication was submitted collectively by young people with disabilities and Indigenous people to the UN Special Rapporteur on the rights of people with disabilities.^{4,96} In 2022, the Australian Government was found through climate inaction to have violated Indigenous Torres Strait Islanders' right to home, private life, and family, and right to culture under the International Covenant on Civil and Political Rights.⁹⁷ Future research will be required to assess to what extent litigation raising the profile of disability climate justice leads to increased implementation of disability rights, changes in social norms that increase social equity, and increased climate resilience.

Moving forward

We encourage researchers, practitioners, and climate activists to pursue research and action at the intersection of disability and climate change. This field abounds in opportunities to engage in collaborations with OPDs to develop disability-inclusive climate research, policies, and initiatives that dismantle structural discrimination and advance the wellbeing of people with disabilities and planetary health. Effective climate research requires the

Panel 1: Guiding principles for disability-inclusive climate research and action

- Recognise that people with disabilities and their representative organisations are experts on their own lives with experience as change agents, and value disability knowledge
- Enable organisations of people with disabilities and researchers with disabilities to participate in the development, design, and implementation of climate knowledge and solutions
- Value knowledge diversity in decision making and social change, including the Indigenous knowledge of Indigenous people with disabilities
- Enable representation of a diverse range of disability perspectives, including the frequently marginalised categories of people with intellectual and psychosocial disabilities, displaced people, and individuals facing intersectional discrimination on the basis of gender, age, race, caste, class, and other categories
- Ensure that disability perspectives from low-income countries and small island states are represented in global decision making and policy formation
- Adopt a decolonial approach that recognises harms and accordingly decentralise the dissemination of resources and funds
- Enable people with disabilities to access co-generated knowledge and climate information
- Ensure climate advocacy, policy, processes, and solutions respect, protect, and fulfil disability human rights
- Make sure that disability communities decide on measures of wellbeing and success, and enable disability-inclusive accountability mechanisms

development of knowledge and co-design of solutions by and with researchers with disabilities and OPDs, who are experts on their own lives and have experience as change agents.^{4,53,98} We invite researchers, practitioners, and climate activists to empower the voices of people with disabilities through an anti-ableist and anti-discriminatory approach. Consequently, we provide guiding principles (panel 1) for disability-inclusive climate research⁹⁸ and action that align with the human rights principles of participation and inclusion.

Recognising, as does the IPCC, the “narrowing window of opportunity to enable climate resilient development”,²⁵ we present non-exhaustive research priorities (panel 2) to launch dialogue and collaborations by and with researchers with disabilities and OPDs that consider local cultural, socioeconomic, and discriminatory experiences and biophysical effects, and take an intersectional approach. Research priorities were identified to reduce existential harm and rapidly accelerate climate action. Research into existential threats that disproportionately affect people with disabilities is imperative, with transformative mixed-methods as a framework for addressing disability inequality. Participatory action

research can also empower the disability community to identify problems and solutions and enable decision makers to co-develop policies and direct resources. Research should investigate ways to promote locally led adaptation that empowers disability-inclusive decision making, priority setting, implementation, and monitoring. We emphasise that low-technological and high-technological development⁵³ are required for inclusive climate solutions and analyses to ensure the disability inclusivity of climate action. Research should consider whether infrastructure that is designed to reduce carbon emissions and climate risk is advancing disability inclusion and equity from a diverse range of disability perspectives. City redesign, community driven relocation, and reconstruction following disasters provide opportunities for social transformation that open accessible spaces for disability communities, including disproportionately marginalised categories.

People with disabilities experience disparate and substantial loss and damage,^{53,99} including disability-specific harms, such as loss of personal mobility and independent living. Yet, glaringly, efforts in the sector of disability-related loss and damage are meagre relative to

Panel 2: Disability-inclusive climate research priorities

Existential threats that disparately affect people with disabilities

- Conduct transformative mixed-method research at the intersection of disability and climate change relating to hot weather, disaster risk reduction, the mental health of people with disabilities in climate emergencies, food security, and water, sanitation, and hygiene
- Conduct participatory action research on public health responses, including those related to heat and mental health
- Innovate ways to promote disability-inclusive locally led adaptation, and engage with the diversity of contexts within which people with disabilities experience climate impacts
- Investigate discrimination and climate responses by use of an intersectional approach through quantitative, qualitative, and interdisciplinary research

Disability-inclusive technological development

- Instigate technological development related to early warning systems, water solutions, food production, and assistive devices
- Innovate data collection to enable disability-inclusive disaster risk reduction, humanitarian initiatives, and climate responses

Disability inclusivity of climate solutions

- Analyse the effectiveness of infrastructure that is designed to reduce climate emissions and risk at increasing disability inclusion and equity, and disaggregate data by disability and other group categories
- Analyse the disability inclusivity of initiatives to develop climate resilience in communities that are greatly impacted by climate change and community driven relocation

Centre loss and damage in human rights

- Facilitate storytelling and collect testimonials of climate harms from people with disabilities

Law and policy

- Analyse the effectiveness of climate policies at ensuring equity for people with disabilities and disaggregate data by disability and pertinent categories
- Examine the effectiveness of strategic litigation to shift nationally determined contributions, climate policies, funding, and the attitudes of policy makers and the public on climate change
- Identify opportunities in legal and regulatory frameworks to develop disability-inclusive climate resilience from the perspective of the disability community

Good practices

- Identify good practices for enabling disability-inclusive action for climate empowerment and providing disability-inclusive climate training, especially in communities that are greatly affected by climate change
- Identify and disseminate good practices in climate advocacy, policy, education, and action, rapidly and globally

Fund disability-inclusive research

- Fund research at the nexus of disability, climate change, and disability climate justice
- Ensure mainstream climate research funding is disability inclusive

Panel 3: Guidance for disability-inclusive climate action**Locally**

- Build the capacity of people with disabilities and their representative organisations through advocacy, climate justice, and disaster risk reduction training
- Ensure the availability of climate information that is accessible and easy to read
- Focus on disability-inclusive climate action priorities identified by disability communities

Nationally or institutionally

- Take disability-inclusive action for climate empowerment, and promote media champions to change negative attitudes towards disability and raise awareness on disability climate justice
- Adopt a twin-track approach that mainstreams disability and uses targeted disability initiatives
- Generate and use data disaggregated by disability
- Transform societal structures so that they promote disability climate justice, including within disaster risk reduction, health care, employment, and city planning
- Enable accessibility and ensure reconstruction is accessible
- Institute both mainstream and specifically targeted social protection that fosters disability inclusion through augmented and transformational climate responses, including cash transfers that are triggered by weather forecasts
- Ensure that education systems are inclusive of people with disabilities, provide education on disability and climate change, and train mainstream institutions on disability inclusion and climate justice

- Facilitate disability inclusion by raising awareness of disability laws and policies; ensure that all climate mitigation and adaptation policies and initiatives respect, protect, and fulfil disability human rights; and enable access to justice
- Foster solidarity, allyship, and collaboration on intersectional approaches to promoting climate justice
- Promulgate disability safeguards so that climate action does not violate disability human rights
- Train disability leaders as loss and damage negotiators, and implement disability-inclusive approaches to loss and damage

Internationally

- Promote disability-inclusive international cooperation between organisations of people with disabilities in low-income and middle-income countries and high-income countries, non-governmental organisations, and donors
- Facilitate the meaningful participation of organisations of people with disabilities in the UN Framework Convention on Climate Change processes and decision making, recognise a disability constituency, and institute initiatives, such as a disability action plan
- Ensure rapid decarbonisation so that the global temperature increase is below 1.5°C
- Rapidly direct climate funding to disability-inclusive climate action, particularly by and with organisations of people with disabilities

the urgent climate harms.^{3,4,6,8,11,18} Consequently, it is crucial to use storytelling and testimonials of climate harm experienced by people with disabilities to bear witness to these harms and impel the accelerated release of loss and damage funds. Future research should consider whether implemented loss and damage funds are repairing harm and enabling transformation towards interconnectedness and environmental stewardship. National climate commitments and climate policies provide opportunities for implementation of a disability human rights approach.²⁴ Analysis of the effectiveness of policies and availability of data disaggregated by disability and other identity categories are required for all sectors. Given the continuing strategic litigation brought by people with disabilities, analysis of how complaints affect nationally determined contributions, climate policies, funding, and the attitudes of policy makers and the public on climate change would be helpful. Disability communities must be able to contribute to, and in turn access, accumulated knowledge and data about their lives and experiences. Moreover, the diverse perspectives of researchers with disabilities and OPDs will aid commissions and government, intergovernmental, and UN bodies directing climate research and action, such as the IPCC.¹²

We present overarching, non-exhaustive guidance to accelerate disability-inclusive climate action (panel 3). Disability-inclusive policies and initiatives provide collaborative opportunities to counter marginalisation and develop innovative responses to advance climate justice. Inclusive climate-resilient development fosters interconnectedness, social equity, and collective wellbeing, benefiting people with disabilities and the whole society while advancing planetary health.

Contributors

PJSS, MAS, NG, MK, and WPA co-organised the underlying workshop and were responsible for funding acquisition. PJSS and MAS coordinated the collaborative writing and editing of the Personal View. The authors collectively conceptualised, wrote, reviewed and edited the Personal View.

Declaration of interests

We declare no competing interests.

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References

- 1 WHO, The World Bank. World report on disability. 2011. <https://iris.who.int/handle/10665/44575> (accessed March 8, 2024).
- 2 UN Human Rights Council. Resolution adopted by the Human Rights Council 41/21 UN Doc. A/HRC/Res/41/21. July 12, 2019. <https://undocs.org/A/HRC/41/21> (accessed March 8, 2024).
- 3 Stein PJS, Stein MA. Climate change and the right to health of people with disabilities. *Lancet Glob Health* 2022; 10: e24–25.
- 4 Stein PJS, Stein MA. Disability, human rights, and climate justice. *Hum Rights Q* 2022; 44: 81–110.
- 5 UN Office of the High Commissioner for Human Rights. Analytical study on the promotion and protection of the rights of persons with disabilities in the context of climate change. UN Doc. A/HRC/44/30. April 22, 2020. <https://undocs.org/A/HRC/44/30> (accessed March 8, 2024).
- 6 Pacific Disability Forum. Disability and climate change in the Pacific: findings from Kiribati, Solomon Islands, and Tuvalu. Pacific Disability Forum, Australia Aid, Australia Pacific Climate Partnership. August, 2022. <https://pacificdisability.org/wp-content/uploads/2022/08/PDF-Final-Report-on-Climate-Change-and-Persons-with-Disabilities.pdf> (accessed March 8, 2024).
- 7 O'Neill B, van Aalst M, Zaiton Ibrahim Z, et al. Key risks across sectors and regions. In: Pörtner H-O, Roberts DC, Tignor M, et al, eds. Climate change 2022: impacts, adaptation, and vulnerability. Contribution of Working Group II to the sixth assessment report of the Intergovernmental Panel on Climate Change. Cambridge and New York, NY: Cambridge University Press, 2022: 3–33.
- 8 Middleton J, Cunsolo A, Jones-Bitton A, Wright CJ, Harper SL. Indigenous mental health in a changing climate: a systematic scoping review of the global literature. *Environ Res Lett* 2020; 15: 53001.
- 9 National Council on Disability. Disparate treatment of Puerto Rico residents with disabilities in federal programs and benefits. May 25, 2022. <https://www.ncd.gov/assets/uploads/docs/ncd-puerto-rico-report-508.pdf> (accessed March 8, 2024).
- 10 Engelman A, Craig L, Iles A. Global disability justice in climate disasters: mobilizing people with disabilities as change agents. *Health Aff (Millwood)* 2022; 41: 1496–504.
- 11 Jodoin S, Lofts K, Ananthamoorthy N. A disability rights approach to climate governance. *Ecol Law Q* 2020; 47: 73–116.
- 12 Kosanic A, Petzold J, Martín-López B, Razanajatovo M. An inclusive future: disabled populations in the context of climate and environmental change. *Curr Opin Environ Sustain* 2022; 55: 101159.
- 13 Kett M, Sriskanthan G, Cole E. Disability and climate justice: a research project. December, 2021. https://www.ucl.ac.uk/epidemiology-health-care/sites/epidemiology_health_care/files/disability_and_climate_justice_research_project_final_to_share.pdf (accessed March 8, 2024).
- 14 UN Department of Economic and Social Affairs. Disability and development report: realizing the sustainable development goals by, for and with persons with disabilities. 2018. <https://social.un.org/publications/UN-Flagship-Report-Disability-Final.pdf> (accessed March 8, 2024).
- 15 Deivanayagam TA, English S, Hickel J, et al. Envisioning environmental equity: climate change, health, and racial justice. *Lancet* 2023; 402: 64–78.
- 16 Gasparrini A, Guo Y, Sera F, et al. Projections of temperature-related excess mortality under climate change scenarios. *Lancet Planet Health* 2017; 1: e360–67.
- 17 Lee H, Calvin K, Dasgupta D, et al. Current status and trends. In: Lee H, Romero J, eds. IPCC, 2023: climate change 2023: synthesis report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Geneva: IPCC, 2023: 6–32.
- 18 Deerinwater J. Colonial forces of environmental violence on deaf, disabled, & ill Indigenous people. *Disabil Stud Q* 2022; published online Jan 21. <https://doi.org/10.18061/dsq.v41i4.8479>.
- 19 Thierry W, Lange S, Rogelj J, et al. Intergenerational inequities in exposure to climate extremes. *Science* 2021; 374: 158–60.
- 20 Abbott D, Porter S. Environmental hazard and disabled people: from vulnerable to expert to interconnected. *Disabil Soc* 2013; 28: 839–52.
- 21 Eriksen SH, Grøndahl R, Sæbønes AM. On CRDPs and CRPD: why the rights of people with disabilities are crucial for understanding climate-resilient development pathways. *Lancet Planet Health* 2021; 5: e929–39.
- 22 UN Framework Convention on Climate Change. Non-governmental organization constituencies. https://unfccc.int/sites/default/files/resource/constituencies_and_you.pdf (accessed March 8, 2024).
- 23 Araos M, Jagannathan K, Shukla R, et al. Equity in human adaptation-related responses: a systematic global review. *One Earth* 2021; 4: 1454–67.
- 24 Jodoin S, Lofts K, Bowie-Edwards A, Leblanc L, Rourkeet C. Disability rights in national climate policies: status report. November, 2022. <https://www.disabilityinclusivelclimate.org/researcheng/project-one-ephnc-76974-dsc4y> (accessed March 8, 2024).
- 25 Pörtner H-O, Roberts DC, Adams H, et al. Summary for policymakers. In: Pörtner H-O, Roberts DC, Tignor M, et al, eds. Climate change 2022: impacts, adaptation, and vulnerability. Contribution of Working Group II to the sixth assessment report of the Intergovernmental Panel on Climate Change. Cambridge and New York, NY: Cambridge University Press, 2022: 3–33.
- 26 Cissé G, McLeman R, Adams H, et al. Health, wellbeing, and the changing structure of communities. In: Pörtner H-O, Roberts DC, Tignor M, et al, eds. Climate change 2022: impacts, adaptation, and vulnerability. Contribution of Working Group II to the sixth assessment report of the Intergovernmental Panel on Climate Change. Cambridge and New York, NY: Cambridge University Press, 2022: 1041–170.
- 27 New M, Reckien D, Viner D, et al. Decision making options for managing risk. In: Pörtner H-O, Roberts DC, Tignor M, et al, eds. Climate change 2022: impacts, adaptation, and vulnerability. Contribution of Working Group II to the sixth assessment report of the Intergovernmental Panel on Climate Change. Cambridge and New York, NY: Cambridge University Press, 2022: 2539–654.
- 28 UN. Convention on the Rights of Persons with Disabilities General Assembly Resolution A/RES/61/106. Dec 13, 2006. <https://undocs.org/A/Res/61/106> (accessed March 8, 2024).
- 29 Coates L, van Leeuwen J, Browning S, Gissing A, Bratchell J, Avci A. Heatwave fatalities in Australia, 2001–2018: an analysis of coronial records. *Int J Disaster Risk Reduct* 2022; 67: 102671.
- 30 UN Framework Convention on Climate Change. Paris Agreement to the United Nations Framework Convention on Climate Change, T.I.A.S. No. 16–1104. Dec 12, 2015. https://unfccc.int/sites/default/files/english_paris_agreement.pdf (accessed March 8, 2024).
- 31 UN. Transforming our world: the 2030 Agenda for Sustainable Development General Assembly Resolution A/Res/70/1. Sept 25, 2015. <https://undocs.org/A/Res/70/1> (accessed March 8, 2024).
- 32 UN. Resolution adopted by the Human Rights Council on 8 October 2021: the human right to a clean, healthy and sustainable environment. UN Doc. A/HRC/RES/48/13. Oct 18, 2021. <https://undocs.org/A/HRC/Res/48/13> (accessed March 8, 2024).
- 33 Görgens T, Ziervogel G. From “no one left behind” to putting the last first: centering the voices of disabled people in resilience work. In: Watermeyer B, McKenzie J, Swartz L, eds. The Palgrave handbook of disability and citizenship in the Global South. Cham: Palgrave Macmillan, 2018: 85–102.
- 34 Astle B, Buyco M, Ero I, Reimer-Kirkham S. Global impact of climate change on persons with albinism: a human rights issue. *J Clim Change Health* 2023; 9: 100190.
- 35 Elser H, Parks RM, Moghavem N, et al. Anomalously warm weather and acute care visits in patients with multiple sclerosis: a retrospective study of privately insured individuals in the US. *PLoS Med* 2021; 18: e1003580.
- 36 Groce N, Bailey N, Lang R, Trani JF, Kett M. Water and sanitation issues for persons with disabilities in low- and middle-income countries: a literature review and discussion of implications for global health and international development. *J Water Health* 2011; 9: 617–27.
- 37 Turnbull M, Sterrett CL, Hilleboe A. Toward resilience. A guide to disaster risk reduction and climate change adaptation. Rugby: Practical Action Publishing, 2013.

- 38 Mactaggart I, Baker S, Bamberg L, et al. Water, women and disability: using mixed-methods to support inclusive WASH programme design in Vanuatu. *Lancet Reg Health West Pac* 2021; **8**: 100109.
- 39 USAID, CRS. "Home grown" keyhole gardens for DRR learning initiative. Dec 28, 2012. https://pdf.usaid.gov/pdf_docs/PDACU835.pdf (accessed March 8, 2024).
- 40 Chakraborty J, Grineski SE, Collins TW. Hurricane Harvey and people with disabilities: disproportionate exposure to flooding in Houston, Texas. *Soc Sci Med* 2019; **226**: 176–81.
- 41 Chakraborty J. Disparities in exposure to fine particulate air pollution for people with disabilities in the US. *Sci Total Environ* 2022; **842**: 156791.
- 42 Charlson F, Ali S, Benmarhnia T, et al. Climate change and mental health: a scoping review. *Int J Environ Res Public Health* 2021; **18**: 4486.
- 43 Grineski SE, Collins TW, Chakraborty J. Cascading disasters and mental health inequities: Winter Storm Uri, COVID-19 and post-traumatic stress in Texas. *Soc Sci Med* 2022; **315**: 115523.
- 44 Bouchama A, Dehbi M, Mohamed G, Matthies F, Shoukri M, Menne B. Prognostic factors in heat wave related deaths: a meta-analysis. *Arch Intern Med* 2007; **167**: 2170–76.
- 45 Centres for Disease Control and Prevention. Disability and health U.S. profile data for Puerto Rico (adults 18+ years of age). <https://www.cdc.gov/ncbddd/disabilityandhealth/impacts/puerto-rico.html> (accessed March 8, 2024).
- 46 National Council on Disability. Testimony of the chairman of the National Council on Disability, Andres J. Gallegos, esq., before the U.S. Commission on civil rights on the Federal Emergency Management Agency's role in disaster preparedness and response to Hurricanes Maria in Puerto Rico and Harvey in Houston, Texas. June 25, 2021. <https://www.usccr.gov/files/2021/06-24-Andres-Gallegos-Testimony.pdf> (accessed March 8, 2024).
- 47 Kishore N, Marqués D, Mahmud A, et al. Mortality in Puerto Rico after Hurricane Maria. *N Engl J Med* 2018; **379**: 162–70.
- 48 Mikulewicz M, Caretta MA, Sultana F, Crawford NJW. Intersectionality & climate justice: a call for synergy in climate change scholarship. *Env Polit* 2023; **32**: 1275–86.
- 49 UN Office of the High Commissioner for Human Rights. Analytical study on the relationship between climate change and the full and effective enjoyment of the rights of the child. UN Doc. A/HRC/35/13. May 4, 2017. <https://undocs.org/A/HRC/35/13> (accessed March 8, 2024).
- 50 UN General Comment No 26 Children's Advisory Team. Report of the first children and young people's consultation. September, 2022. <https://childrightsenvironment.org/wp-content/uploads/2022/09/Report-of-the-first-Children-and-Young-Peoples-Consultation.pdf> (accessed March 8, 2024).
- 51 Peek L, Stough LM. Children with disabilities in the context of disaster: a social vulnerability perspective. *Child Dev* 2010; **81**: 1260–70.
- 52 Nguyen Thi Hoang Y. Early education on environmental protection and skills to respond to natural disaster and climate change for children with disabilities at early intervention center. *HNUE Journal of Science* 2021; **66**: 106–11.
- 53 Stein PJS, Stein MA, Groce N, Kett M. The role of the scientific community in strengthening disability-inclusive climate resilience. *Nat Clim Chang* 2023; **13**: 108–09.
- 54 Birkmann J, Liwenga E, Pandey R, et al. Poverty, livelihoods and sustainable development. In: Pörtner H-O, Roberts DC, Tignor M, et al, eds. *Climate change 2022: impacts, adaptation, and vulnerability. Contribution of Working Group II to the sixth assessment report of the Intergovernmental Panel on Climate Change*. Cambridge and New York, NY: Cambridge University Press, 2022: 1171–284.
- 55 Hans A. Women with psychosocial disabilities: intersecting disasters and climate change. *ReFrame* 2022; **5**: 26–29.
- 56 Graham JP, Hirai M, Kim S-S. An analysis of water collection labor among women and children in 24 sub-Saharan African countries. *PLoS One* 2016; **11**: e0155981.
- 57 Veenema RJ, Hoepner LA, Geer LA. Climate change-related environmental exposures and perinatal and maternal health outcomes in the U.S. *Int J Environ Res Public Health* 2023; **20**: 1662.
- 58 Chersich MF, Scorgie F, Filippi V, Luchters S. Increasing global temperatures threaten gains in maternal and newborn health in Africa: a review of impacts and an adaptation framework. *Int J Gynaecol Obstet* 2023; **160**: 421–29.
- 59 United Nations Population Fund. Menstrual health and the climate crisis. May 28, 2023. <https://reliefweb.int/report/world/menstrual-health-and-climate-crisis> (accessed March 8, 2024).
- 60 Goldsmith L, Raditz V, Méndez M. Queer and present danger: understanding the disparate impacts of disasters on LGBTQ+ communities. *Disasters* 2022; **46**: 946–73.
- 61 Raditz V, Berne P. To survive climate catastrophe, look to queer and disabled folks. July 31, 2019. <https://perma.cc/C8QY-KEML> (accessed March 12, 2024).
- 62 World Council of Churches. Empowering women and girls with disabilities: resilience and inclusion in the face of climate change. June 16, 2023. <https://reliefweb.int/report/burundi/empowering-women-and-girls-disabilities-resilience-and-inclusion-face-climate-change> (accessed March 8, 2024).
- 63 Paneque-Gálvez J, Pérez-Llorente I, Luz AC, et al. High overlap between traditional ecological knowledge and forest conservation found in the Bolivian Amazon. *Ambio* 2018; **47**: 908–23.
- 64 Ford JD, Cameron L, Rubis J, et al. Including Indigenous knowledge and experience in IPCC assessment reports. *Nat Clim Chang* 2016; **6**: 349–53.
- 65 Gurung P. The situation of Indigenous girls and women with disabilities to The Committee on the Elimination of All Forms of Discrimination Against Women (CEDAW) on GR on Indigenous women and girls 79th session, Geneva, National Indigenous Disabled Women Association Nepal NIDWAN. 2021. <https://perma.cc/GKJ4-DNVL> (accessed March 12, 2024).
- 66 National Indigenous Disabled Women Association Nepal. Call to action from Indigenous women and girls with disabilities for disability-inclusive climate action. Dec 21, 2022. <https://nidwan.org.np/2022/12/21/cop27-call-to-action-from-indigenous-women-and-girls-with-disabilities/> (accessed Oct 18, 2023).
- 67 UN. United Nations Declaration on the Rights of Indigenous Peoples General Assembly Resolution A/Res/61/295. Sept 13, 2007. <https://undocs.org/A/Res/61/295> (accessed March 8, 2024).
- 68 Centre for Human Rights and Legal Pluralism. IDA. Towards COP26: enhancing disability inclusion in climate action. 2021. https://www.internationaldisabilityalliance.org/sites/default/files/cop26_advocacy_paper_0.pdf (accessed March 8, 2024).
- 69 UN Framework Convention on Climate Change. Report of the Conference of the Parties on its twenty-seventh session, held in Sharm el-Sheikh from 6 to 20 November 2022. FCCC/CP/2022/10/Add.1. March 17, 2023. https://unfccc.int/sites/default/files/resource/cp2022_10a01_adv.pdf (accessed March 8, 2024).
- 70 UN Framework Convention on Climate Change. Report of the Conference of the Parties on its twenty-seventh session, held in Sharm el-Sheikh from 6 to 20 November 2022. FCCC/CP/2022/10/Add.2. March 17, 2023. https://unfccc.int/sites/default/files/resource/cp2022_10a02_adv.pdf (accessed March 8, 2024).
- 71 UN Framework Convention on Climate Change. Admitted NGOs. <https://unfccc.int/process/parties-non-party-stakeholders/non-party-stakeholders/admitted-ngos/list-of-admitted-ngos> (accessed March 8, 2024).
- 72 King MM, Gregg MA. Disability and climate change: a critical realist model of climate justice. *Sociol Compass* 2022; **16**: e12954.
- 73 CBM. Saving lives and leaving no one behind: the Gaibandha model for disability-inclusive disaster risk reduction 2018. 2018. https://www.cbm.org/fileadmin/user_upload/DRR_Booklet_FINAL_-_Online_10MB.pdf (accessed March 8, 2024).
- 74 Sovacool BK, Martiskainen M, Hook A, Baker L. Decarbonization and its discontents: a critical energy justice perspective on four low-carbon transitions. *Clim Change* 2019; **15**: 581–619.
- 75 British Columbia Coroners Service. Report to the Chief Coroner of British Columbia, extreme heat and human mortality: a review of heat-related deaths in B.C. in summer 2021. June 7, 2022. https://www2.gov.bc.ca/assets/gov/birth-adoption-death-marriage-and-divorce/deaths/coroners-service/death-review-panel/extreme_heat_death_review_panel_report.pdf (accessed July 7, 2023).

- 76 City and County of San Francisco Mayor London N Breed. San Francisco's climate action plan 2021. 2021. https://www.sfenvironment.org/files/events/2021_climate_action_plan.pdf (accessed March 8, 2024).
- 77 Rahman MF, Falzon D, Robinson SA, et al. Locally led adaptation: promise, pitfalls, and possibilities. *Ambio* 2023; 52: 1543–57.
- 78 International Institute for Child Rights and Development. The phoenix manifesto. North American consultation, children's rights to a healthy environment. 2021. <https://www.disabilityinclusiveclimate.org/resources-the-phoenix-manifesto> (accessed March 8, 2024).
- 79 UN Office for Disaster Risk Reduction. Living with disability and disasters: UNISDR 2013 survey on living with disabilities and disasters—key findings. 2014. https://www.unisdr.org/2014/jddr/documents/2013DisabilitySurveyReport_030714.pdf (accessed March 8, 2024).
- 80 National Council on Disability. The impacts of extreme weather events on people with disabilities. May 4, 2023. <https://www.ncd.gov/report/the-impacts-of-extreme-weather-events-on-people-with-disabilities/> (accessed March 8, 2024).
- 81 Cooper AC, Bui HT, Nguyen LT, Nguyen PK, Nguyen THT, Phan DPN. Deaf-led organizations and disaster communication in Viet Nam: interdisciplinary insights for disability inclusive disaster risk reduction planning. *Int J Disaster Risk Reduct* 2021; 65: 102559.
- 82 Flores AB, Collins TW, Grineski SE, Chakraborty J. Disparities in health effects and access to health care among Houston area residents after hurricane Harvey. *Public Health Rep* 2020; 135: 511–23.
- 83 Abualghaib O, Groce N, Simeu N, Carew MT, Mont D. Making visible the invisible: why disability-disaggregated data is vital to “leave no-one behind”. *Sustainability (Basel)* 2019; 11: 3091.
- 84 Grech S. Disability inclusive disaster risk reduction: critical insights and good practices from the field. 2022. https://www.cbm.org/fileadmin/user_upload/DIDRR_Critical_Insights_Best_Practices.pdf (accessed March 8, 2024).
- 85 Devandas Aguilar C. Social protection and persons with disabilities. *Int Soc Secur Rev* 2017; 70: 45–65.
- 86 Dodman D, Hayward B, Pelling M, et al. Cities, settlements and key infrastructure. In: Pörtner H-O, Roberts DC, Tignor M, et al, eds. *Climate change 2022: impacts, adaptation, and vulnerability. Contribution of Working Group II to the sixth assessment report of the Intergovernmental Panel on Climate Change*. Cambridge and New York, NY: Cambridge University Press, 2022: 907–1040.
- 87 Aleksandrova M. Principles and considerations for mainstreaming climate change risk into national social protection frameworks in developing countries. *Clim Dev* 2020; 12: 511–20.
- 88 Clement V, Rigaud KK, de Sherbinin A, et al. Groundswell part 2: acting on internal climate migration. Washington, DC: The World Bank, 2021.
- 89 Burns N. The human right to health: exploring disability, migration and health. *Disabil Soc* 2017; 32: 1463–84.
- 90 UN High Commissioner for Refugees. Working with persons with disabilities in forced displacement. 2019. <https://www.refworld.org/policy/opguidance/unhcr/2019/en/112054> (accessed March 8, 2024).
- 91 Pisani M, Grech S. Disability and forced migration: critical intersectionalities. *Disability and the Global South* 2015; 2: 421–41.
- 92 Palmer T, Bertozzi E, Dominik G, Pettay E. Inclusion of persons with disabilities in humanitarian action. Dec 3, 2019. <https://reliefweb.int/report/world/inclusion-persons-disabilities-humanitarian-action-39-examples-field-practices-and> (accessed March 8, 2024).
- 93 Washington Group on Disability Statistics. The Washington Group short set on functioning. Oct 11, 2022. https://www.washingtongroup-disability.com/fileadmin/uploads/wg/Washington_Group_Questionnaire__1_-_WG_Short_Set_on_Functioning__October_2022_.pdf (accessed March 8, 2024).
- 94 Mitra S, Yap J. Disability data report 2022. 2022. <https://disabilitydata.ace.fordham.edu/twentyreport/disability-data-initiative-2022-report/> (accessed March 8, 2024).
- 95 Washington Group on Disability Statistics. Report of ability of countries to disaggregate SDG indicators by disability. June 8, 2020. https://www.washingtongroup-disability.com/fileadmin/uploads/wg/Documents/WG_Implementation_Document__10_-_SDG.pdf (accessed March 8, 2024).
- 96 Environmental Justice Australia. Environmental Justice Australia (EJA) v Australia. Oct 25, 2021. https://climatecasechart.com/wp-content/uploads/non-us-case-documents/2021/20211025_14762_complaint.pdf (accessed March 8, 2024).
- 97 Human Rights Committee. Daniel Billy and others v Australia. Views adopted by the Committee under article 5 (4) of the Optional Protocol, concerning communication No. 3624/2019. CCPR/C/135/D/3624/2019. July 21, 2022. <https://undocs.org/CCPR/C/135/D/3624/2019> (accessed March 8, 2024).
- 98 Jodoin S, Buettgen A, Groce N, et al. Nothing about us without us: the urgent need for disability-inclusive climate research. *PLoS Clim* 2023; 2: e0000153.
- 99 The Loss and Damage and Challenges of Human Mobility and Displacement Working Group. Loss damage and displacement: key messages for the road to COP28. 2023. https://researchinginternaldisplacement.org/wp-content/uploads/2023/09/LDCRI-FINAL_DISPLACEMENT_MESSAGES.pdf (accessed March 8, 2024).

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