nature climate change

Article

https://doi.org/10.1038/s41558-023-01831-0

Using a human rights lens to understand and address loss and damage

Received: 7 November 2022

Accepted: 6 September 2023

Published online: 02 November 2023

Check for updates

Karen E. McNamara[1], Rachel Clissold[1,2], Ross Westoby[3], Stephanie Stephens[4,5], George Koran[4,6], Willy Missack[4,7] & Christopher Y. Bartlett[8]

The Vanuatu government is seeking an advisory opinion from the International Court of Justice on the legal responsibility of countries to act on climate change. This will provide clarity on loss and damage finance and could catalyse powerful legal tools that hold polluters accountable. Human rights can be a valuable framing for calling attention to and addressing loss and damage, but there remains limited scholarship so far. Here we explore how climate change is impinging on the rights of Ni-Vanuatu and what can be done in response. Our findings show that loss and damage to fundamental rights is already occurring and will worsen, undermining the right to a life of dignity. The future loss and damage fund, and other initiatives, should integrate a human rights restoration package that includes recording and safeguarding Indigenous knowledge, promoting cultural continuity, restoring the socio-ecological system, building back better and investing in education.

Climate change has been labelled 'the human rights challenge of the twenty-first century'[1]. Since the 2005 Inuit petition put before the Inter-American Commission on Human Rights, the links between climate change and human rights have increasingly received attention, highlighting the importance of the Universal Declaration of Human Rights, among others, in responding to the climate crisis. All countries have ratified at least one of the nine core international human rights treaties, and most have ratified several, implying an international obligation to prevent the foreseeable adverse effects of climate change and ensure that those affected by it have access to appropriate remedies and means of adaptation[2]. Bringing a human rights lens to climate change is new in that it seeks to shift the focus and attention onto the individual experiences of those suffering its impacts[3]. Such a lens provides 'a compelling reason why each of us should bear our fair share of the costs of mitigation and adaptation—namely, if we don't, we will be contributing to the violation of someone's human rights'[3].

A human rights lens is particularly valuable in framing, calling attention to, and addressing loss and damage, despite limited scholarship in this field so far (see an exception in ref. 1) and limited application thus far in addressing loss and damage[4]. Although not a silver bullet, international law, especially human rights law, can provide a strong normative framework to guide policymakers and implementers in loss and damage actions, refocus the political narrative on the fundamental rights of individuals that must be protected through climate action, and amplify the voices and interests of those who are often sidelined[1,5–7]. Bridging the loss and damage regime with international law helps emphasize how climate change and loss and damage policy do not exist in isolation from the obligations that countries already have under existing international and regional human rights treaties[8]. It can also provide judicial recourse, and its basic principles and guidelines can provide the relevant normative foundations for liability and compensation mechanisms under the climate regime[1,9], shifting the burden of addressing loss and damage, which was historically placed disproportionately on developing countries that have contributed little to climate change[4]. At the national level, human rights impact assessments can inform national and sectoral

[1]School of the Environment, The University of Queensland, Brisbane, Queensland, Australia. [2]International Centre for Environmental Management, Hanoi, Vietnam. [3]Climate Action Beacon and Griffith Institute for Tourism, Griffith University, Brisbane, Queensland, Australia. [4]Vanuatu Climate Action Network, Port Vila, Vanuatu. [5]Food and Agriculture Organisation of the United Nations, Port Vila, Vanuatu. [6]Oxfam Vanuatu, Port Vila, Vanuatu. [7]Learn to Serve Vanuatu, Port Vila, Vanuatu. [8]Department of Climate Change, Vanuatu Government, Port Vila, Vanuatu. e-mail: karen.mcnamara@uq.edu.au

policy planning and budgeting, ensuring that climate policies align with affected peoples' needs and rights, and that effective redress is established with transparency and accountability[1].

This dialogue is particularly relevant now after the historic decision at the 2022 United Nations Climate Change Conference (COP27) to establish and operationalize a global loss and damage fund. A dedicated funding structure and fund will be established, with a transitional committee set up in March 2023 to develop institutional arrangements and governance, define the funding arrangements and sources of funding, and ensure coordination with existing funding arrangements[10]. This follows multiple proposals since 1991 by Vanuatu as founding chair of the Alliance of Small Island States for similar types of funding arrangements, which have been repeatedly rejected[11]. Human rights law can provide a normative framework to assist the transitional committee in its work and for countries to design funding arrangements and long-term plans to avert, minimize, and address loss and damage in ways that protect the rights of individuals.

The COP27 decision on establishing the fund complements and offers support to the case raised by Vanuatu for consideration by the International Court of Justice (ICJ), the principal legal organ of the United Nations (UN). Over the last 4 years, the government of Vanuatu (a nation with good claim to be one of the most at-risk nations globally to environmental hazards[12–14]) has built a global coalition of more than 132 countries seeking an advisory opinion from the ICJ on how climate change affects the rights of individuals from present and future generations, and what the legal responsibilities of countries are to protect against harm, loss and damage[15]. In late March 2023, the UN adopted the landmark resolution by the Vanuatu government for the ICJ advisory opinion and the court process is underway to deliver an opinion on climate change and the legal consequences countries face. This 'could set a legal precedent that may be used in any court—a potentially powerful tool for the growing number of plaintiffs using legal levers to try and hold big polluters (and big countries) to account'[16]. It is critical that, in this process, frontline communities, such as those in the Pacific Islands region, are not portrayed as 'victims' or 'proof' of climate change but 'as real people with dignity and dreams for the future'[6]. In this way, we acknowledge the rich, varied and extensive practices and knowledge of Pacific Islanders that have been used to face variability for centuries, which is critical for ongoing adaptive capacity and resilience[17–19].

In support of the Vanuatu government's ICJ strategic litigation process and to support the work of the transitional committee in the design of the loss and damage fund, we present the findings of research undertaken from June to October 2022 with 118 participants across Vanuatu (Methods). The study aimed to explore how climate change is affecting people's fundamental human rights and identify tangible ways to address the loss and damage to these rights.

Climate change is impinging on people's human rights

Participants shared their personal experiences with a changing climate, which ranged from slow-onset changes, such as sea level rise, saltwater intrusion, longer dry periods and increasing temperatures, to extreme weather events, such as more intense cyclones, heavy downpours and flooding. The extent to which climate change impacts have affected everyday lives over the last year yielded a mean of 3.94 (using a scale of 1 (meaning not at all) to 5 (meaning very high)). The majority of participants selected 'high' (39.8%) or 'very high' (30.6%), with 23.5% selecting 'medium', only 5.1% selecting 'little' and 1% selecting 'not at all'.

Loss and damage to human rights from these changes in slow-onset processes and extreme events have had, and will continue to have, interrelated and diverse effects on people's everyday lives. Impacts are affecting the availability of food and water, health, individual property and communal infrastructure (for example, roads in particular), income sources and, in some cases as an option of last resort, the ability to remain on homelands. One participant explained how 'the future is just unpredictable… I think the future will be like this, just unexpected' (participant number 11). Direct and indirect impacts related to these changes and events are impinging on people's right to lives of dignity.

To gain a deeper understanding of how climate change impinges on and causes loss and damage to people's human rights, key human rights declarations and covenants were analysed and articles with relevance for climate change were identified and grouped. From this, nine thematic groupings were created, and participants considered 'how much' (using a scale of 1 (for not at all) to 5 (for very high)) and 'how' each of these groupings have been affected by the impacts of climate change (Fig. 1).

The most severe impacts are on Ni-Vanuatu's rights to a healthy environment and ability to own, use, develop and control lands, followed closely by high impacts on rights to property and communal assets, standard of living, and family and social cohesion. As participants expressed: 'Our low-lying areas are always flooded during heavy rains—our land is not fertile any more due to topsoil wash down by heavy rain' (participant number 60), and 'I am more concerned about sea level rise which is washing away our land, which our forefathers have inherited over many generations and with it being washed away, it means our family's access to equitable land for gardening is limited' (participant number 48). Pacific Islanders have deep connections to land, which is the foundation of culture, livelihoods and identity[20], and it is this foundation that is considered to be the most severely affected human right due to the impacts of climate change.

The impingements of climate change on people's human rights are having cascading implications on numerous other interconnected human rights and can transcend across generations. Examples of such implications include climate-induced losses of traditional medicines that impact on ways of being, health, human life and well-being. Flooding of low-lying areas not only impacts infrastructure and precious cultural heritage such as gravesites but also causes salinization of freshwater tables that then impinge on potable water—another critical human need or right. Furthermore, increases in ocean temperatures and ocean acidification induces reef degradation, increased coral bleaching and outbreaks of crown-of-thorns starfish (all interconnected); these effects cascade into fishing resources being diminished and marine wildlife losses. This then presents challenges to ways of being, traditional and cultural food sources, and people's diet, negatively impacting human health.

One poignant example, worth exploring at length here, is of cascading impacts caused by the destruction of the yam, a traditional root crop and staple food widely used in Vanuatu and elsewhere in the Pacific Islands region. One participant from Ambrym explained how yam is the 'main commodity of value for exchange' and that the 'rituals, rites, and customs of the yam… are the main social fabric that holds our kinship, tribe and communities, and society, together' (participant number 61). The deterioration and physical loss of the yam due to increased climate variability and extreme weather has impinged on human rights on multiple fronts, violating Vanuatu's social fabric, culture and traditions, agency, identities and food security:

> The yams are significant in our culture. Its harvest is marked by special cultural rituals and ceremonies, but the climate had affected the harvest sessions which resulted in a big delay in harvest and that makes people lose their normal cultural rhythm and ritual… The cultural ways of planting are not adaptive to these fast changes caused by the climate which is now leading to a loss of cultural practices and knowledge. This is a cultural right that can never be recovered and re-built if we lose it due to climate change. No financial means can recover those non-economic losses, which are our heritage and dignity. And climate change is taking these rights away from us. (participant number 59)

https://doi.org/10.1038/s41558-023-01831-0

Fig. 1 | An infographic summarising how climate change impinges on human rights. The relevant Articles of the UN Declaration on the Rights of Indigenous Peoples (UNDRIP)[29], Universal Declaration of Human Rights (UDHR)[30], International Covenant on Civil and Political Rights (ICCPR)[31] and International Covenant on Economic, Social and Cultural Rights (ICESCR)[32] are listed for each thematic grouping. Design credit: Sarah K. Jones.

https://doi.org/10.1038/s41558-023-01831-0

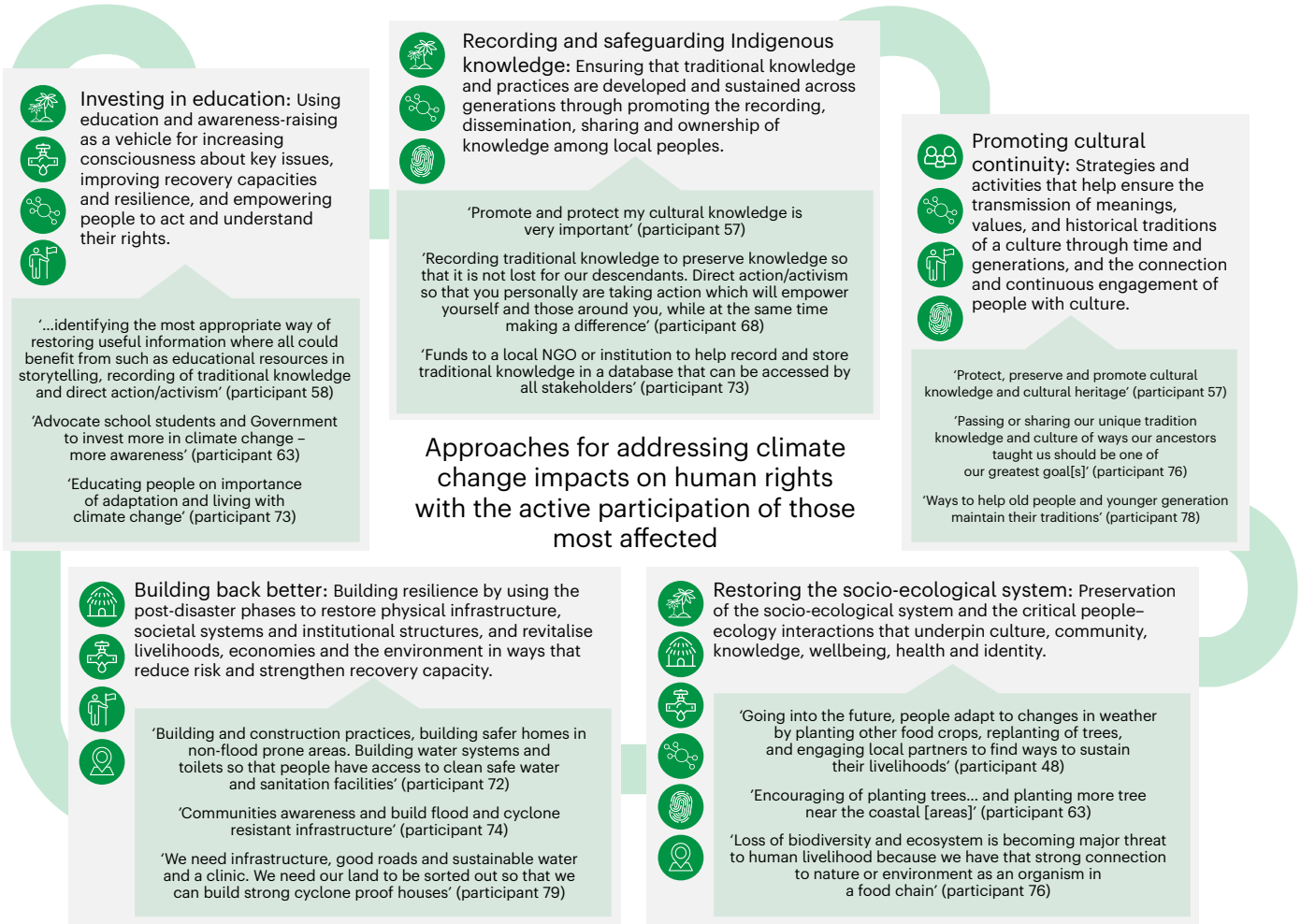

Fig. 2 | Five key approaches for addressing the impacts of climate change on people's human rights. These five key approaches address the impacts of climate change on people's human rights. NGO, non-governmental organization.

The centrality of yam to identity, social cohesion, culture, tradition and food security illustrates the impacts of climate change on Vanuatu's 'biocultural heritage' and the complex, cascading human rights impingements from the loss of one singularly important crop species[21]. The loss of identity is associated with a substantial rupture of one's sense of self and the agency to control how one can identify themselves with respect to the world around them[22].

Responding to the loss and damage of people's human rights

Loss and damage to fundamental human rights is already occurring and will only increase over time, necessitating effective and appropriate ways of responding. Here we show a series of locally developed solutions that participants described as the most appropriate and useful ways of mitigating and restoring human rights that have been affected by the impacts of climate change. These solutions have been categorized into five key approaches that complement each other and should be funded and implemented as part of a human rights restoration package (Fig. 2).

A key approach for restoring the climate-induced loss and damage on people's human rights involves promoting mechanisms to safeguard Indigenous knowledge and cultural practices and restore the socio-ecological system, which is foundational for Pacific ways of living. To protect lives and livelihoods, support from the Global North to build back better after extreme weather events (induced by climate change) in the Pacific Islands was also strongly suggested as a means of restoring human rights loss and damage. Participants also emphasized the responsibility of national and provincial governments in efficiently providing loss and damage finance, including the provision of emergency funding for families 'to re-establish themselves' (participant number 82) after disaster events. Participants noted that investments in these approaches should be considered holistically and in the context of, and in support for, ongoing investment in mitigation and adaptation. By bringing the focus to those most affected at an individual scale, it can be seen how the human rights lens helps address a central deficiency of the ongoing climate debate—the abstract, state-centric terms in which loss and damage has been framed[7]. Underpinning any human rights restoration packages should be the effective and active participation of those most directly affected by loss and damage through institutionalized cooperation[23].

Beyond investment in specific approaches, participants made it clear that compensation is also an appropriate and justice-based financial response to climate-induced human rights violations and must be considered as part of the funding arrangements to be proposed by the transitional committee. In the context of human rights, the compensation for some loss and damage is more difficult than others. As one participant explained: 'Compensation will be challenging as we cannot compensate for the loss of a culture... But for economic compensation, climate finance must be given, and a justice process must be given to countries that cause more of these losses due to their GHG emissions' (participant number 59).

At the centre of Ni-Vanuatu participant concerns and experiences with loss and damage is the importance of land and rights to an

adequate environment, including biodiversity and ecosystem services. The right to an adequate environment protects interests of paramount importance, such as life, health and welfare[24]. Extreme weather events and gradual processes place substantial pressures on local environmental resources that have cascading effects on livelihoods, health, food and water security, culture, way of life, knowledge systems, community and kinship[25–27]. Therefore, climate change impacts affect an interconnected and complex system that is centred on the critical relationships between Pacific Islanders and their environments. Greater attention must be given to the interdependencies between losses, including the nature of some losses as risk multipliers (for example, loss of important crops, such as yam)[28]. This reinforces the importance of restoring the socio-ecological system as a critical resilience-building response to climate change that can mitigate impingements on human rights, especially through nature-based solutions and biodiversity and ecosystem conservation. Preserving critical people–ecology interactions and the socio-ecological system that underpins culture, community, knowledge, well-being, health and identity are paramount.

Key takeaway messages

When considering these findings, a few conclusions can be made. The first is that the Ni-Vanuatu people are already experiencing loss and damage to their fundamental human rights, and this will worsen over time. The second is that the most severe loss and damage now undermining Ni-Vanuatu's rights are related to the right to a healthy environment and ability to own, use, develop and control lands, and to the high impacts on rights to property and communal assets, standard of living and family and social cohesion. The third point is that loss and damage to Ni-Vanuatu's human rights are having cascading impingements on many other interconnected human rights and can transcend across generations (for example, interconnected human rights to custom, Indigenous knowledge, family, agency and identity). Loss and damage to one human right is rarely in isolation, and cascading impacts and risks are unfortunate but inevitable[28], the acknowledgement of which should motivate the transitional committee of the loss and damage fund to recommend long-term, nationally determined and programmatic funding approaches to address these compounding, cascading and intensifying climate impacts. Finally, the loss and damage fund must finance locally developed and led initiatives to address human rights loss and damage, including investing in recording and safeguarding of Indigenous knowledge, promoting cultural continuity, restoring the socio-ecological system, building back better and investing in education. Compensation is also an appropriate and justice-based financial response to climate-induced human rights violations and must be included as part of the funding arrangements to be proposed by the transitional committee.

This study demonstrates how a human rights lens to loss and damage can provide a useful normative framework and basis for holistically assessing and understanding climate change impacts, loss and damage. It helps to refocus the narrative on the fundamental rights of individuals that must be protected through, and when taking, climate action, and illustrates how climate policy generally, and the UN Framework Convention on Climate Change and its Paris Agreement, cannot operate in a vacuum, disconnected from other obligations in relevant treaties and customary international law. The detailed findings on experiences of and the nature of loss and damage should inform climate policy, guiding international and national activities on what should be funded and targeted for effective redress and adaptation. Although a human rights lens cannot tell us all we need to know about the morality of climate change, it emphasizes the moral seriousness of the problem and can be a driving force for meaningful international action[3].

Online content

Any methods, additional references, Nature Portfolio reporting summaries, source data, extended data, supplementary information, acknowledgements, peer review information; details of author contributions and competing interests; and statements of data and code availability are available at https://doi.org/10.1038/s41558-023-01831-0.

References

1. Toussaint, P. & Blanco, A. M. A human rights-based approach to loss and damage under the climate change regime. *Clim. Policy* **20**, 743–757 (2020).
2. *Understanding Human Rights and Climate Change*. Submission of the Office of the High Commissioner for Human Rights to the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (OHCHR, 2015).
3. Bell, D. Climate change and human rights. *Wiley Interdiscip. Rev. Clim. Change* **4**, 159–170 (2013).
4. Simlinger, F. & Mayer, B. in *Loss and Damage from Climate Change. Climate Risk Management, Policy and Governance* (eds Mechler, R., Bouwer, L., Schinko, T., Surminski, S. & Linnerooth-Bayer, J.) 179–203 (Springer, 2019).
5. Bodansky, D. Introduction: Climate change and human rights: unpacking the issues. *Ga. J. Int. Compar. Law* **38**, 511–524 (2010).
6. Dreher, T. & Voyer, M. Climate refugees or migrants? Contesting media frames on climate justice in the Pacific. *Environ. Commun.* **9**, 58–76 (2015).
7. Toussaint, P. Loss and damage and climate litigation: the case for greater interlinkage. *Rev. Eur. Comp. Int. Environ. Law* **30**, 16–33 (2020).
8. Burkett, M. Climate reparations. *Melb. J. Int. Law* **10**, 509–542 (2009).
9. *Human Rights as a Compass for Operationalizing the Loss and Damage Fund*. Brief submitted to the UNFCCC for the 2nd Glasgow Dialogue (Amnesty International and Centre for International Environmental Law (CIEL), 2023); https://www.amnesty.org/en/documents/ior40/6463/2023/en/
10. Transitional committee https://unfccc.int/topics/adaptation-and-resilience/groups-committees/transitional-committee (UNFCCC, 2023).
11. Vanhala, L. & Hestbaek, C. Framing climate change loss and damage in UNFCCC negotiations. *Glob. Environ. Polit.* **16**, 111–129 (2016).
12. Behlert, B. et al. *World Risk Report 2020* (Bündnis Entwicklung Hilft and Ruhr University Bochum—Institute for International Law of Peace and Armed Conflict, 2020).
13. Aleksandrova, M. et al. *World Risk Report 2021: Social Protection* (Bündnis Entwicklung Hilft and Ruhr University Bochum—Institute for International Law of Peace and Armed Conflict, 2021).
14. Atwii, F. et al. *World Risk Report 2022: Digitization* (Bündnis Entwicklung Hilft and Ruhr University Bochum—Institute for International Law of Peace and Armed Conflict, 2022).
15. Vanuatu Government Vanuatu ICJ Initiative https://www.vanuatuicj.com/home (2022).
16. Loy, I. Q&A: Behind the push to bring the climate crisis to court. *The New Humanitarian* https://www.thenewhumanitarian.org/interview/2022/10/10/Vanuatu-ICJ-climate-change-advisory-opinion-International-Court-of-Justice (2022).
17. McMillen, H. et al. Small islands, valuable insights: systems of customary resource use and resilience to climate change in the Pacific. *Ecol. Soc.* **19**, 44–61 (2014).
18. Granderson, A. The role of traditional knowledge in building adaptive capacity for climate change: perspectives from Vanuatu. *Weather Clim. Soc.* **9**, 545–561 (2017).
19. Dacks, R. et al. Developing biocultural indicators for resource management. *Conserv. Sci. Pract.* **1**, e38 (2019).
20. Kelman, I. et al. A review of mental health and wellbeing under climate change in small island developing states (SIDS). *Environ. Res. Lett.* **16**, 033007 (2021).
21. Cámara-Leret, R. et al. Climate change threatens New Guinea's biocultural heritage. *Sci. Adv.* **5**, eaaz1455 (2019).

22. Tschakert, P. et al. Climate change and loss, as if people mattered: values, places, and experiences. *Wiley Interdiscip. Rev. Clim. Change* **8**, 476–505 (2017).
23. Broberg, M. & Sano, H. Strengths and weaknesses in a human rights-based approach to international development—an analysis of a rights-based approach to development assistance based on practical experiences. *Int. J. Hum. Rights* **22**, 664–680 (2018).
24. Nickel, J. W. The human right to a safe environment: philosophical perspectives on its scope and justification. *Yale J. Int. Law* **18**, 281–295 (1993).
25. Fisher, P. B. Climate change and human security in Tuvalu. *Glob. Change Peace Secur.* **23**, 293–313 (2011).
26. Charan, D., Kaur, M. & Singh, P. in *Climate Change Adaptation in Pacific Countries. Climate Change Management* (ed. Leal Filho, W.) 19–33 (Springer, 2018).
27. Piggott-McKellar, A. E., McNamara, K. E., Nunn, P. D. & Sekinin, S. T. Moving people in a changing climate: lessons from two case studies in Fiji. *Soc. Sci.* **8**, 133–150 (2019).
28. Westoby, R., Clissold, R., McNamara, K. E., Latai-Niusulu, A. & Chandra, A. Cascading loss and loss risk multipliers amid a changing climate in the Pacific Islands. *Ambio* **51**, 1–8 (2021).
29. *United Nations Declaration on the Rights of Indigenous Peoples* (United Nations, 2007); https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html
30. *Universal Declaration of Human Rights* (United Nations, 1948); https://www.un.org/en/about-us/universal-declaration-of-human-rights
31. *International Covenant on Civil and Political Rights* (United Nations, 1966); https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-civil-and-political-rights
32. *International Covenant on Economic, Social and Cultural Rights* (United Nations, 1966); https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-economic-social-and-cultural-rights

Methods

This study set out to explore how Ni-Vanuatu people experience human rights loss and damage due to the impacts of climate change. These experiences and perspectives were ascertained through an online survey that was carried out between 18 June and 6 October 2022 (see Supplementary Information for the survey template used). We chose to use a survey for its speed, ease, cost-effectiveness, ability to reach geographically dispersed populations in Vanuatu and ability to gather qualitative data[33]. Although effective in ascertaining the views of a geographically dispersed population, we also note the limitations of surveys. These limitations include being weak on 'why' questions and the inherent assumptions that attitudes and beliefs can be numerically measured, but we have resolved some of these issues by making most questions open ended. These open-ended questions allowed participants to recount their experiences and perspectives in their own way and own words[34].

To design the survey, we first reviewed key human rights declarations and covenants including the Universal Declaration of Human Rights[30], International Covenant on Civil and Political Rights[31], International Covenant on Economic, Social and Cultural Rights[32] and the UN Declaration on the Rights of Indigenous Peoples[29]. Each of the four declarations and covenants were carefully analysed, and articles with relevance for climate change were identified. We had a shortlist of 22 human rights as a result of this process. Two of the authors then collaborated to thematically group the human rights together and arrive at a final list of nine generally representative human rights 'groupings'. These nine overarching thematic areas included cultural life, traditions, customs and traditional knowledge; family and social cohesion; freedom, peace and security; identity; local environment; property and communal assets; sense of place and home; standard of living; and self-determination and agency.

Guided by the identified groupings, 24 questions were developed for the survey, with the majority of questions being open ended (yielding substantive qualitative data) and the remaining being closed answers. The survey started with questions related to participants' backgrounds, including age, birthplace, formal education, local or Indigenous knowledge and sources of income. In-depth questioning about the impacts of climate change on everyday lives followed, and participants were prompted to include personal examples and stories, where possible, to elucidate these experiences over the last year. We acknowledge, however, that it is probable that participants recollected experiences from the last 5–10 years.

For each of the nine thematic areas, a five-point Likert scale was used to understand how much these human rights groupings have been affected by the impacts of climate change. This was followed by a series of in-depth questions around what has been affected, how and why. Questions were also asked about the experiences of vulnerable groups, along with the most appropriate and useful ways of responding to the impacts of climate change on people's human rights and restoring losses and damages (for example, fair, just and equal compensation).

The survey was reviewed by staff in the Climate Diplomacy Taskforce of the Vanuatu Government and members of the Vanuatu Climate Action Network to check that questions were clear, appropriate and easy to complete. The survey was then administered online through the programs Checkbox and Kobo, and participants could complete the survey in Bislama, English or French.

The online survey was circulated on the email lists of the Climate Diplomacy Taskforce and Vanuatu Climate Action Network. Members of the Vanuatu Climate Action Network living in outer islands collaborated with their local community members to complete the survey using Kobo, which does not require an internet connection. Although this ensured that some views and experiences of people living in the outer islands was included, the majority of respondents were living in the most populous province (Shefa), where the nation's capital (Port Vila) is located. An additional sample bias was the high number of 'professional' participants with a bachelor's degree.

Potential participants were assured of the confidentiality and anonymity of their responses and, before undertaking the survey, were asked to consent to participating. This followed ethical protocols as part of the approval from the University of Queensland (approval number 2020000640). Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS v.27) and qualitative data were analysed manually through content analysis to help capture core themes and storylines.

Overall there were 118 participants in the study. Participants included 65 women, 49 men and 4 participants who preferred to self-identify. The age range for participants was 18–76 years old (mean age of 36.4 years old). Participants were predominately born in the Shefa province (39.6%), followed by Tafea (21.6%), Sanma (13.5%), Penama (12.6%), Malampa (9%) and Torba (3.6%). These proportions differ from where participants currently live, which was concentrated in the Shefa province (72.8%, which includes Port Vila, the country's capital), followed by Sanma (12.3%), Tafea (9.6%), Malampa (3.5%), Penama (0.9%) and Torba (0.9%). A bachelor's degree was the highest level of formal education for most participants (38.8%), followed by a master's degree (20.7%), high school certificate (18.1%), technical training (18.1%), elementary school certification (2.6%) or a PhD (1.7%). Most participants also indicated that they are holders of substantial Indigenous knowledge, particularly in relation to crops (75% of participants), plants and animals (50%), weather (49.1%), forests (41.7%), medicine (42.6%), fishing (35.2%), weaving (28.7%) and marine life (27.8%).

Reporting summary

Further information on research design is available in the Nature Portfolio Reporting Summary linked to this article.

Data availability

The data that support the findings of this study are not publicly available due to them containing information that would compromise research participant confidentiality and anonymity.

References

33. Overton, J. & van Diermen, P. in *Development Fieldwork: A Practical Guide* 4th edn (ed. Scheyvens, R.) 39–58 (SAGE, 2014).
34. McGuirk, P. M. & O'Neill, P. in *Qualitative Research Methods in Human Geography*, 4th edn (ed. Hay, I.) 246–273 (Oxford Univ. Press, 2016).

Acknowledgements

We thank the participants for providing such valuable and important insights in this study. Without you, this study would not have been possible. This research was funded through an Australian Research Council Future Fellowship grant (grant number FT190100114) and by the Ministry of Foreign Affairs, International Cooperation and External Trade, Republic of Vanuatu.

Author contributions

K.E.M., R.C., R.W. and C.Y.B. conceived and designed the research. K.E.M., R.C., R.W., S.S., G.K. and W.M. collected data. K.E.M., R.C. and R.W. analysed data. K.E.M., R.C., R.W. and C.Y.B. wrote the article.

Competing interests

The authors declare no competing interests.

Additional information

Supplementary information The online version contains supplementary material available at https://doi.org/10.1038/s41558-023-01831-0.

Correspondence and requests for materials should be addressed to Karen E. McNamara.

Peer review information *Nature Climate Change* thanks Ma. Laurice Jamero, Beate M. W. Ratter, Tony Weir and the other, anonymous, reviewer(s) for their contribution to the peer review of this work.

nature portfolio

Corresponding author(s): DBPR NCLIM-22112186

Last updated by author(s): Feb 2, 2023

Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed	
☒	☐	The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☒	☐	A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☒	☐	The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☒	☐	A description of all covariates tested
☒	☐	A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☒	☐	A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☒	☐	For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐	For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☒	☐	For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☒	☐	Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	Primary, qualitative and quantitative data was collected as part of a survey distributed across Vanuatu.
Data analysis	SPSS version 27 was used to code and analyze the quantitative data and qualitative data was coded preliminarily in Excel to create themes and analyzed manually.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

The raw data is confidential and not publicly available.

Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.

Reporting on sex and gender	Participants included 65 females, 49 males and four who preferred to self-identify.
Population characteristics	See below ("Research sample").
Recruitment	See below ("Sampling strategy").
Ethics oversight	As a study involving human participants, ethical approval was provided by the University of Queensland (approval number: 2020000640). All participants gave informed consent to participate in this voluntary study.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☐ Life sciences ☒ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description	The aim of this study was to explore how locals in Vanuatu experience the impacts of climate change and how these impacts can impinge on their human rights.
Research sample	Participants included 65 females, 49 males and four who preferred to self-identify. The age range for participants was from 18 to 76 years old, with a mean age of 36.4 years old. Participants were predominately born in Shefa province (39.6%), followed by Tafea (21.6%), Sanma (13.5%), Penama (12.6%), Malampa (9%), and Torba (3.6%). This was slightly different to where participants currently live, which was largely Shefa province (72.8%), followed by Sanma (12.3%), Tafea (9.6%), Malampa (3.5%), Penama (0.9%), and Torba (0.9%). As for highest level of formal education or training, most participants indicated that they hold a bachelor's degree (38.8%), followed by a master's degree (20.7%), high school certificate (18.1%), technical training (18.1%), elementary school certification (2.6%), or a PhD (1.7%). Participants, who could select more than one option, are holders of vast local and Indigenous knowledge related to crops (75% of participants), plants and animals (50%), weather (49.1%), forests (41.7%), medicine (42.6%), fishing (35.2%), weaving (28.7%), marine life (27.8%), rivers (16.7%), pest and disease on crops and animals (14.8%), 'other' (14.8%), and carving (8.3%). Examples of 'other' included: custom ceremonies, architecture, cultural stories, local cooking, governance and leadership, and teaching. Participants predominately earned an income through government work (31.9% of respondents), 'other' activities such as volunteering or working for NGOs (25.9%), being a private business employee (15.5%), through farming (12.9%), being a private business owner (7.8%), having money sent from others (2.6%), through handicrafts or fishing (both 0.9%) or had no income (1.7%).
Sampling strategy	The local partner organization, the Vanuatu Climate Action Network (VCAN), undertook extensive promotion of the project and survey through its network (via its email list and social media sites). Participants were encouraged to share the survey link with other local Vanuatu community members to complete. As mentioned below, local VCAN members also undertook the survey with local community members in very remote parts of the country. In this way, our sampling strategy was largely based on expediency and access. A limitation of this study was the lack of targeting towards groups of different ability, ethnicity and religion, among other factors, and we acknowledge that viewpoints from these groups may remain underrepresented.
Data collection	Data collection involved an online survey with both qualitative and quantitative questions. Using a survey method is useful in terms of its ease, cost-effectiveness, and ability to reach geographically dispersed populations in Vanuatu. We used Checkbox and Kobo to administer the survey. Checkbox was available through an online link that was circulated to, and through, several networks and relevant organisations across the country. Kobo was used by local members of VCAN, the local partner organization, to complete in-field surveys in remote parts of Vanuatu not requiring an Internet connection, that could later be uploaded. The survey had a logical structure: introductions and participant consent (landing page), followed by questions about participant's backgrounds, experiences of climate change impacts, links between human rights and climate change, and appropriate and useful responses. The survey was provided in English, Bislama, and French.
Timing	The overall study was conducted between June and October 2022.
Data exclusions	No data were excluded from the analysis.
Non-participation	No participants dropped out or declined participation.

Randomization	Participants were not allocated into experimental groups.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☒	☐ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging