Asia-Pacific Centre for the Responsibility to Protect

Climate Change and Mass Atrocities: Towards a Blueprint for Future Research

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Communications:

Asia Pacific Centre for the Responsibility to Protect
School of Political Science and International Studies
The University of Queensland St Lucia Brisbane QLD 4072 Australia
Email: r2pinfo@uq.edu.au
http://www.r2pasiapacific.org/index.html

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Executive Summary

What is the relationship between climate change and mass atrocities? This report contends that researchers and practitioners are yet to accrue sufficient knowledge to make definitive statements about the relationship between the two. In this case, the report seeks to examine the context and scope, and identify the many key relationships therein, that require research so that definitive statements can be made, and effective policy responses pursued. To achieve this, the report uses insights found in the 'climate-conflict' literature, which examines the relationship between climate change and conflict, to populate the comparatively empty climate-atrocity research space. However, while significant overlap exists between climate change, conflict and atrocity research – for example, atrocity crimes are largely committed in the context of an armed struggle – climate-conflict research should not be fully conflated with climate-atrocity research. The report explains the similarities and differences in the research agendas, and in doing so, cautions climate-atrocity researchers and practitioners uncritically using the 'threat multiplier' thesis – the dominant understanding of the climate-conflict relationship – to understand the climate-atrocity relationship. Ultimately however, the report aims to provide some initial thinking to help catalyse a *Blueprint for Future Research* into climate change and mass atrocities.

Key Takeaways

Climate-atrocity research could:

- be understood as a subcategory of the climate-conflict agenda,
- more formally examine the 'direct' and 'indirect' pathways between climate change and mass atrocities as well as the mediating and conditioning factors - as the climate-conflict research does,
- formally distinguish between peacetime and wartime atrocities (with a focus on the escalation to atrocities in the latter) - both of which expose limitations in the climate-conflict literature,
- consider the five key analytical categories found in the climate-conflict literature - geography, timeframes, drivers, policies, and methodology - when designing a research project to explore the 'direct' and 'indirect' 'pathways' between climate change and atrocities that occur in peacetime and wartime, and
- contemplate the complexities found in this report when conveying the 'threat multiplier' thesis - the dominant framing of climate-conflict and climate-atrocity relationship in practice.

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Introduction

The report is divided into two parts.

Part One outlines the essential background and contextual issues between climate change, conflict, and atrocities. It begins by attempting to locate the climate-atrocity research agenda within the climate-conflict research. The report contends that the climate-atrocity agenda should be understood as subcategory of the climate-conflict agenda. Next, the report explores the study of 'pathways' between climate and conflict. It provides an understanding of 'direct' and 'indirect' pathways and mediating and conditioning factors binding the two variables. This is followed by an investigation of the pathways between climate change and atrocities. The aim of this comparison is to provide climate-atrocity authors with some overarching categories (eg direct and indirect pathways) to better structure and coordinate their future research. Third, the report highlights two key differences between climate-conflict research and climate-atrocity research. The broad question that drove this inquiry asks; why can't climate-conflict research be used to examine and explain climate-atrocity situations? The short answer is, first, because sometimes atrocities are committed outside of armed conflicts (so-called ‘peacetime atrocities'); and second, because only on occasion will conflicts escalate into atrocities.

Part Two identifies a variety of research categories and options uncovered in 36 climate-conflict literature reviews (see Appendix 1).[1] These issues were extracted and displayed to help guide and advance prospective climate-atrocity research. The categories include Geography, Timeframes, Drivers, Policies, and Methodology. Each category includes a variety of options for prospective climate-atrocity researchers to consider when seeking to analyse the direct and indirect pathways between climate change and atrocities that occur in peacetime and wartime.

The report shows that, to date, the climate-conflict agenda appears disconnected to the climate-atrocity agenda – both from climate-conflict scholars who very rarely explicitly acknowledge atrocities in their research despite covering key case studies in the atrocities literature such as Syria and Darfur; and likewise, from climate-atrocity researchers who seem to engage very little with the enormous body of influential research published by climate-conflict scholars. Both should pay each other a lot more attention.

[1] In 2021, leading climate-conflict scholars, Nina von Uexkull and Halvard Buhaug, published an examination of climate-conflict literature reviews published between 2012-2020. They used 35 literature reviews. The present report uses the same 35 reviews plus von Uexkull and Buhaug’s 2021 contribution for a grand total of 36. The report also draws heavily on the information verbally discussed in Cullen S. Hendrix, Vally Koubi, Jan Selby, Ayesha Siddiqi & Nina von Uexkull, ‘Climate Change and Conflict', *Nature Reviews: Earth and Environment*, Vol 4, March 2023, p 144-148.

PART 1: The Essential Context

1. Locating the Climate Change–Mass Atrocity Nexus

Mass atrocities can occur both within and outside the context of armed struggle. For example, Alex Bellamy shows that of the 103 episodes of mass killing (defined as a minimum of 5,000 civilians killed intentionally) observed between 1945 and 2010, 69 cases (or 67 per cent) occurred within, and 34 cases (or 33 per cent) occurred outside, a context of armed conflict.[2] Analysts suggest however that the ratio of so-called 'peacetime atrocities' compared to 'wartime atrocities' is likely higher today.[3] Figures such as these have led some international policymakers, such as former UN Secretary-General Kofi Annan, to argue that the atrocity prevention agenda should be incorporated into the armed conflict prevention agenda because mass atrocities usually occur within armed struggles; and therefore, preventing armed conflict would naturally reduce the incidence of mass atrocities.[4] Others however, such as his successor UN Secretary-General Ban Ki-moon, focus on the lesser figure to argue that the armed conflict and atrocity prevention agendas ought not to be conflated because mass atrocities occur both within *and* outside armed struggles.[5]

While this is a useful distinction to make, in many cases attempting to categorise a situation as purely a 'conflict' or an 'atrocity' can prove difficult. For example, Martin Shaw describes mass atrocities as 'chameleon-like' in the sense that when atrocities are committed across rural Rakhine in Myanmar, they are attributed to wider conflict dynamics until it is too late.[6] Shaw's remark could, on the one hand, mean considering the Government of Myanmar's ethnic cleansing campaign against the Rohingya in August 2017, in which almost 30,000 people were massacred by government forces, as a conflict situation that escalated into an atrocity situation. On the other hand, one could also reasonably consider the Government of Myanmar's campaign as a mass atrocity situation that occurred outside armed conflict because of the absence of an armed struggle (exceeding the occasional skirmish) against the targeted population – the Rohingya.

Nonetheless, Annan's and Ban's alternative conceptualisations provide an important entry point to consider the location of the climate-atrocity research agenda in relation to the climate-conflict research agenda (and broader security agenda). Should the climate-atrocity research agenda be considered its *own* agenda (because of "peacetime atrocities"), or should it be understood as a subcategory of the climate-conflict research agenda (as Annan might argue)? The following attempts to provide a preliminary answer to this question.

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[2] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 2.
[3] Kate Ferguson and Michael Jones, 'Between War and Peace: Preventing Mass Atrocities Outside Armed Conflict', *RUSI Newsbrief*, Vol 41, No 4, May 2021, p 1.
[4] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 2.
[5] Ibid., p 2.
[6] Kate Ferguson and Michael Jones, 'Between War and Peace: Preventing Mass Atrocities Outside Armed Conflict', *RUSI Newsbrief*, Vol 41, No 4, May 2021, p 1.

The focus of security studies has changed over time. Traditionally, security studies tended to focus on nation-states and existential threats – namely, external military attack.[7] However, the end of the Cold War brought forth a new focus: internal conflicts and ecological threats (among others). This shift in thinking was captured in 1992 with the UN Security Council issuing a statement urging a 'time for a change', stating: 'The absence of war and military conflicts among States does not in itself ensure international peace and security. The non-military sources of instability in the economic, social, humanitarian, and ecological fields have become threats to peace and security'.[8] This environmental security thesis derived much inspiration from the Brundtland Report titled *Our Common Future*, published in 1987; and the first major international policy conference on global warming held in 1988, titled: *The World Conference on the Changing Atmosphere: Implications for Global Security*. [9] The post-Cold War security reorientation was firmed up in 1994 with the release of the landmark *Human Development Report 1994*.[10] The central idea in the report, the concept of human security, directed attention towards the security of people and away from the security of nation-states, with ecological threats featuring prominently in this discussion.

It was at about this time, the mid-1990s, that two foundational scholarly projects began to examine the relationship between environmental change and violent conflict. The first, led by Thomas Homer-Dixon in Canada (Toronto Group), and the second, led by Guenter Baechler in Switzerland (Bern-Zürich Group). [11] Both research groups hypothesised that human pressure on natural resource endowments could impact on a population's well-being and thus contribute to the outbreak of violent conflict. [12] While different causal mechanisms were identified and prioritised, these two major projects, which used qualitative research methods, broadly confirmed each other's findings, as Tom Deligiannis explains: 'that a positive linkage exists between environmental change and conflict'.[13]

Roused by these early studies, in the 2000s, scholars began to employ quantitative research methods to examine the causal links between climate change and violent conflict within countries.[14] As leading climate-conflict scholar, Joshua Busby, wrote in 2018, 'Much of the last 15 years of study has focused on whether climate change is directly correlated with the onset of violent internal conflict inside states'.[15] Contradicting the Toronto Group and Bern-Zürich Group findings, this body of research found a weak causal relationship between climate change and violent conflict inside states.

The post-Paris Agreement period (2015 to today) saw an acceleration in climate-conflict research. This massive uptick in interest and output, most notably, exhibited a distinct turn towards studying the indirect pathways and mediating factors between climate change and

[7] Joshua Busby, 'Taking Stock: The Field of Climate and Security', *Current Climate Change Reports*, Vol 4, 2018, p 339.
[8] Chapter VIII. Consideration of questions under the responsibility of the Security Council for the maintenance of international peace and security. Decision of 31 January 1992 (3046th meeting): Statement by the President, p. 821.
[9] Other inputs were important as well, see for example, *Limits to Growth* (1972), and *A Blueprint for Survival* (1972).
[10] UNDP, Human Development Report 1994: New Dimensions of Human Security (Oxford University Press, 1994).
[11] For an expanded discussion, see Tom Deligiannis, 'The Evolution of Environment-Conflict: Research: Toward a Livelihood Framework', *Global Environmental Politics*, Vol 12, No 1, February 2012, p 78-100.
[12] Ibid, p 80.
[13] Ibid, p 80.
[14] Joshua Busby, 'Taking Stock: The Field of Climate and Security', Current Climate Change Reports, Vol 4, 2018, p 339.
[15] Ibid., p 339.

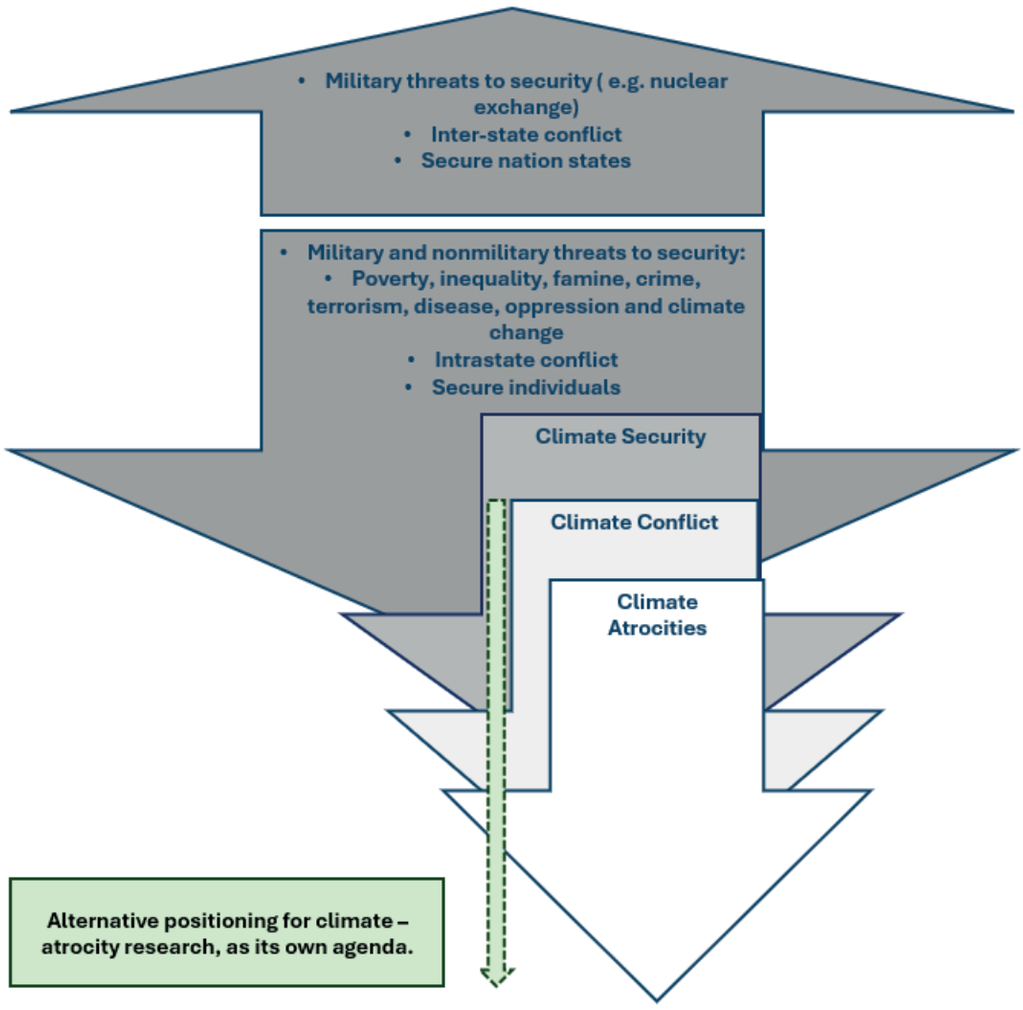
conflict. Distinctions between climatic change (eg gradual temperature rise) and climate extremes (eg floods, cyclones, and wildfires) were identified; and definitions of 'conflict' would expand from armed violence to encompass less severe forms of violence such as 'social conflict' found in anti-fossil fuel protests.[16] And the number of mediating factors proliferated. For the most part however, the research still focused on civil wars – overwhelmingly those fought on the African continent – and used quantitative methods. By and large, researchers still recorded a weak relationship between climate change and conflict.

The study of 'mass atrocities' (encompassing genocide, ethnic cleansing, crimes against humanity, and large-scale war crimes) as they individually or collectively relate to climate change did not explicitly feature in any structured and or concerted way in the entire 30 years of climate-conflict research. At best, atrocity situations were implied in ancient and modern case studies, such as the fall of the Mayan Civilization, or the 2003-2004 situation in Darfur.[17] However, as John Riley and Will Atkins explain, the study of the relationship between climate change and mass atrocities 'is situated in the much larger, albeit inconclusive, research on climate change and conflict'.[18] The present report adopts this view: that the climate change–mass atrocity nexus can be understood, both conceptually and practically, as a subcategory of the climate–conflict nexus, which in turn, is a subcategory of the broader security discussion (which over the last 30 years has developed into a specialised 'climate security' area of study). See Diagram 1.

It should be noted that this location is debatable. On the one hand, atrocities could be viewed as an extreme outcome of an ongoing conflict situation, which would validate this positioning.[19] On the other hand, atrocities can be committed in the absence of an armed struggle,[20] which could suggest that the climate-atrocity research agenda should stand outside the climate-conflict agenda (as an independent agenda). At this early stage of research however – and given that most atrocity situations occur within conflict situations – it would seem appropriate to situate atrocities research within the climate-conflict discussion. This association opens up the possibility of integrating learnings from climate-conflict scholarship with climate-atrocity scholarship - which is how this report proceeds.

[16] Ibid., p 339.
[17] See for example IPCC, 2014: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects.* Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, (Cambridge and New York: Cambridge University Press. 2014), p 772.
[18] John Riley and Will Atkins, 'Catalysts and Accelerants: Untangling the Linkages between, Climate Change and Mass Atrocities', *Journal of Peace and War Studies*, ISOMA Special Edition (October 2021), p 60.
[19] Ibid., p 58.
[20] Kate Ferguson and Michael Jones, 'Between War and Peace: Preventing Mass Atrocities Outside Armed Conflict', *RUSI Newsbrief*, Vol. 41, No. 4, May 2021.

Diagram 1: Simplified (possible) location of the climate-atrocity research agenda.



2. Pathways Between Climate Change and Deadly Violence

This section is divided into two parts. First, it identifies the direct and indirect 'pathways' between climate change and various forms of conflict and discusses the mediating and conditioning factors linking the two. Second, it examines the atrocity-focused literature that includes a climate or environmental dimension. The aim is to provide new climate-atrocity researchers with a basic sense of how climate-conflict scholars understand, and explain, the relationship between climate change and deadly violence.

Climate–conflict pathways

Since the late-2000s, climate change and its impacts on human violence and conflict have received increased attention from the academic community. Much of this interest grew out of the 2007 CNA report, co-authored by 11 retired senior US military officials, that first identified climate change as a 'threat multiplier'.[21] The threat multiplier thesis argued that climate change could increase the risks of conflict by exacerbating known pathways, namely, economic conditions, food production, access to clean water, and human displacement.[22] Key global policymakers supported this conceptualisation and began to apply its causal underpinnings to 'real world' situations. For example, in 2007 the UN Secretary-General, Ban Ki-moon, wrote that '… the Darfur conflict began as an ecological crisis, arising at least in part from climate change'.[23] In 2009, US President Barack Obama asserted that, 'There is little scientific dispute that if we do nothing, we will face more drought, more famine, more mass displacement – all of which will fuel more conflict for decades'.[24] And later, in 2015, President Obama stated that climate-related drought 'helped fuel the early unrest in Syria, which descended into civil war'.[25] His Secretary of State John Kerry agreed, insisting, that 'it's not a coincidence that immediately prior to the civil war in Syria, the country experienced its worst drought on record'.[26] A number of other national governments (e.g. UK and EU members), regional and international organisations (e.g. NATO and the World Bank), and leading civil society actors (e.g. NGOs, think tanks, academics) argued similarly – linking climate change directly and or indirectly to violent conflicts. However, some scholars had reservations. Some began to simply raise concerns about the conclusions being made, while others passionately argued that there was

[21] CNA Military Advisory Board, *National Security and the Threat of Climate Change* (Alexandria, VA: CNA Corporation, 2007). See also, Sherri Goodman and Pauline Baudu, 'Climate Change as a "Threat Multiplier": History, Uses and Future of the Concept', *Centre for Climate and Security*, 3 January 2023.
[22] Elisabeth A. Gilmore, 'Introduction to Special Issue: Disciplinary Perspectives on Climate Change and Conflict', *Curr Clim Change Rep*, 3, 2017, p 194.
[23] Ban Ki-moon, 'A Climate Culprit in Darfur', Opinion Editorial, *The Washington Post*, 16 June 2007.
[24] Barack Obama, 'Remarks by the President at the Acceptance of the Nobel Peace Prize', *The White House*, Oslo, Norway, 10 December 2009.
[25] Barack Obama, 'Remarks by the President at the United States Coast Guard Academy Commencement', *The White House*, New London Connecticut, 20 May 2015.
[26] John Kerry, 'Remarks by The Secretary of State at Old Dominion University on Climate Change and National Security', *The White House*, 10 November 2015.

little-to-no evidence that a short-term drought in Darfur caused the 2003 conflict;[27] or that a drought in Syria triggered the situation in that country in 2011.[28]

Throughout the 2010s, the scholarly debate continued at pace, with different results reported, and with increased acrimony.[29] For example, in 2013 Hsiang, Burke, and Miguel published a meta-review based on 60 quantitative studies that correlated climate variability with instances of conflict and concluded that there is strong causal evidence linking the two.[30] The following year, 2014, Buhaug (and his 24 colleagues), criticised this study's sample selection, selection of indicators, and interpretation of results – and warned the authors against drawing such strong conclusions.[31] However, by the mid-to-late 2010s, most scholars agreed that climate change did influence conflict behaviour in some way. Since then, the climate-conflict debate increasingly sought to test *how* or *why* (and not whether) climatic variables alone, or in conjunction with other factors, affected violence.[32]

In what follows, the report outlines some of the key scholarly issues and debates that these controversies produced. It is hoped that this discussion might provide prospective climate-atrocity authors with a few pointers to consider when undertaking their research.

* * *

Direct pathways. Much of the climate-conflict research undertaken between 2005 and 2015 focused on whether climate change is directly correlated with the onset of violent conflict inside of states.[33] Some empirical studies have successfully uncovered a direct relationship. For example, Hsiang, Meng, and Cane (2011) find that the probability of civil conflict onset in the tropics during El Niño years is twice as large as in La Niña years.[34] Similarly, Burke and colleagues (2009) find that temperature increase had a significantly positive effect on civil war

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[27] Leslie Gray and Michael Kevane, *Darfur: Rainfall and Conflict* (May 2008). See also, Jeffrey Mazo, 'Darfur: The First Modern Climate-Change Conflict', *The Adelphi Papers*, Vol 49, 2009, p 73-86; John Hagan and Joshua Kaiser, 'The Displaced and Dispossessed of Darfur: Explaining the Sources of a Continuing State-led Genocide', *The British Journal of Sociology*, Vol 62, Iss 1, 2011, p 1-24; Lyal S. Sunga, 'Does Climate Change Kill people in Darfur?', *Journal of Human Rights and the Environment*, Vol 2, No 1, 2011, p 64-85; Harry Verhoeven, 'Climate Change, Conflict and Development in Sudan: Global Neo-Malthusian Narratives and Local Power Struggles', *Development and Change*, Vol 42, No 3, 2011, p 679-707.

[28] See for instance, Colin P. Kelley, Shahrzad Mohtadib, Mark A. Cane, Richard Seager, and Yochanan Kushnir, 'Climate change in the Fertile Crescent and Implications of the recent Syrian Drought', *PNAS*, Vol 112, No 11, March 2015, p 3241–3246; Jan Selby, Omar S. Dahi, Christiane Frohlich, and Mike Hulme, 'Climate Change and the Syrian Civil War Revisited', *Political Geography*, Vol 60, 2017, p 232-244; Colin P. Kelley, Shahrzad Mohtadi, Mark Cane, Richard Seager, and Yochanan Kushnir 'Commentary on the Syria Case: Climate as a Contributing Factor', *Political Geography*, Vol 60, September 2017, p 245-247. See also, Marwa Daoudy, *The Origins of the Syrian Conflict: Climate Change and Human Security* (Cambridge: Cambridge University Press, 2020).

[29] This interpretation found in Hanne Seter, 'Connecting climate variability and conflict: Implications for empirical testing', *Political Geography*, 53, 2016, p 1-9.

[30] Solomon M. Hsiang, Marshall Burke, and Edward Miguel, 'Quantifying the Influence of Climate on Human Conflict', *Science*, Vol 341, September 2013.

[31] H. Buhaug, J. Nordkvelle, T. Bernauer, T. Böhmelt, M. Brzoska, J. W. Busby, A. Ciccone, H. Fjelde, E. Gartzke, N. P. Gleditsch, J. A. Goldstone, H. Hegre, H. Holtermann, V. Koubi, J. S. A. Link, P. M. Link, P. Lujala, J. O'Loughlin, C. Raleigh, J. Scheffran, J. Schilling, T. G. Smith, O. M. Theisen, R. S. J. Tol, H. Urdal and N. von Uexkull, 'One Effect to Rule Them All? A Comment on Climate and Conflict', *Climatic Change*, Vol. 127, 2014, p 391-397.

[32] Idean Salehyan, 'Guest Editorial Climate Change and Conflict: Making Sense of Disparate Findings', *Political Geography*, Vol 43, 2014, p 1.

[33] Joshua Busby, 'Taking stock: The Field of Climate and Security', *Current Climate Change Reports*, Vol 4, No 4, 2018, p 339.

[34] Solomon M. Hsiang, Kyle C. Meng, Mark A. Cane, 'Civil Conflicts are Associated with the Global Climate', *Nature*, 24 August 2011.

incidence in sub-Saharan Africa between 1981 and 2002.[35] However, this line of argument has been heavily criticised. For example, Buhaug (2010), using an expanded data set and different econometric models, showed that temperature does not predict civil conflict in Africa.[36] In addition, scholars have identified a variety of other confounding factors in the relationship between climate impacts (eg increased resource scarcity) and conflict such as poor governance, corruption, institutional instability, and other location-specific conditions.[37] Hsiang's and Burke's studies have been criticised for relegating such causal mechanisms to mere speculation.[38] In other words, scholars tend to criticise the direct relationship argument as being overly deterministic since it removes violent conflict from its local social and political contexts. By the mid-to-late 2010s, it was apparent that most climate-conflict scholars agreed that the empirical evidence base to support the notion of a direct climate-conflict link was thin, or at best contradictory.[39] This general consensus that the two phenomena are not connected in a simple and direct manner served to put down the notion, and associated headlines, that 'climate change will push the world into war' or that 'drought caused Syria's civil war'.

Indirect pathways. Over the last several years, climate-conflict research has focused much more intently on examining the indirect causal pathways between climate change and conflict. Indirect pathways between climate and conflict can include, for instance, the agricultural sector and food prices, economic growth and jobs, and migration.[40] An example of an indirect pathway is as follows: a severe drought reduces the flow of water in a particular municipality; which in turn, severely damages agricultural production, incomes, and livelihoods, and raises food prices (which could also in turn, increase internal migration flows); which in turn, leads to some form of conflict (be that protests, through to armed violence).[41] In this scenario, in short, reduced water flow negatively impacted on economic factors (and increased people movement, if one wants to take the indirect pathway a step further) which indirectly caused tensions and conflict. Compare this to the direct relationship, where reduced water flow is understood to have *caused* the conflict (e.g. groups began to fight over the dwindling resource itself). Scholars who examine the indirect relationship between climate change and conflict are also acutely aware of the socioeconomic and political factors that condition (intensify or weaken) the indirect relationship.[42] That is, good governance and/or effective agricultural policies, for instance, can significantly disrupt the indirect pathway leading from climate impacts to conflict via economic outcomes (e.g. incomes) and agricultural production (e.g. inflation). The UN IPCC's Fifth Assessment Report (2014) supported the indirect relationship

[35] Marshall B. Burke, Edward Miguel, Shanker Satyanath, John A. Dykema, and David B. Lobell, 'Warming Increases the Risk of Civil War in Africa', *PNAS*, 106, 2009, p 20670-74.
[36] Halvard Buhaug, 'Climate Not to Blame for African civil Wars, *PNAS*, 107, 2010, p. 16477–82.
[37] Vally Koubi, 'Climate Change and Conflict', Annual Review of Political Science, Vol 2, 18 March 2019, p 347.
[38] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 3-17.
[39] See for example, Adger et al 2014; Bernauer, Böhmelt, and Koubi 2012; Buhaug et al 2014; and Salehyan 2014. See also, Buhaug 2016; and Koubi, 2019.
[40] Joshua Busby, 'Taking stock: The Field of Climate and Security', *Current Climate Change Reports*, Vol 4, No 4, 2018, p 340-341. See also, Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 347-348.
[41] For more examples see, Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 348-353.
[42] Ibid. A variety of authors also emphasise the importance of governance and institutions, adaptive capacity, and potential cooperative behaviour in moderating climate-related violence. See for example, Elisabeth A. Gilmore, 'Introduction to Special Issue: Disciplinary Perspectives on Climate Change and Conflict', *Curr Clim Change Rep*, Vol 3, 2017, p 193.

thesis, stating that climatic changes indirectly increased the risk of conflict by amplifying well-documented drivers of conflict such as economic shocks and poverty.

Existing empirical literature however, produces quite ambiguous results for this climate-economy-conflict pathway. For instance, relationships have been recorded between decreased rainfall and conflict via negative impacts on micro and macro economic situations; but also, *increased* rainfall has delivered the same result.[43] Other critical research suggests that while economics might seem to be the driver, other considerations were also were important but excluded from the research. For instance, Raleigh and Kniveton (2012) find evidence that rebel violence is more common in dry periods when troop movements are easier, there are fewer diseases to contend with, and the harvest period improves food intake.[44] The definition of 'conflict' in some studies may also present a misnomer about the indirect climate-conflict relationship. For instance, climate impacts may have contributed to higher food prices that contributed to 'conflict', but conflict may be defined in terms of 'social unrest' such as demonstrations, riots, and government crises (as is becoming common),[45] or military action.

While there remains considerable controversy over the extent to which climate change may directly or indirectly cause conflict – and the mediating factors involved and their relative importance[46] – there is little scholarly disagreement when the causality is reversed.[47] Several studies have found that conflict is a powerful driver of vulnerability to climate change.[48] The evidence shows that conflicts and wars cause enormous human suffering, destroy material goods and infrastructure, trigger capital flight and brain drain, and deter investment in future development.[49] Political instability, institutional decay and corruption and poor economic growth and development, in turn limit a population's ability to prepare and respond to climate shocks, and rebuild in their aftermath.[50] This view is carried by the IPCC assessors who write: 'conflict strongly influences vulnerability to climate change impacts'.[51]

Finally, climate-conflict research in the 2020s is beginning to focus on the compound effects of different and/or simultaneous climate impacts on conflict outcomes.[52] For example, the interaction of food and water scarcity, and/or the heightened exposure faced by simultaneous slow and rapid-onset disasters. This is important because the ongoing warming of the climate system will likely lead to concurrent sea-level rise and desertification, extreme heat, floods, and fires; and thus, damage and depress agricultural output, strain government income and services, and perhaps increase migration flows all at once. The precise combination and

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[43] Ibid.

[44] Clionadh Raleigh and Dominic Kniveton, 'Come Rain or Shine: An Analysis of Conflict and Climate Variability in East Africa', *Journal of Peace Research*, Vol 49, Iss 1, 2012, p 51-64.

[45] Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 348-353.

[46] Katharine J. Mach, Caroline M. Kraan, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jürgen Scheffran, Kenneth A. Schultz and Nina von Uexkull, 'Climate as a Risk Factor for Armed Conflict', *Nature*, Vol. 571, 11 July 2019, p 196.

[47] François Gemenne, Jon Barnett, W. Neil Adger and Geoffrey D. Dabelko, 'Climate and Security: Evidence, Emerging Risks, and a New Agenda', *Climatic Change*, Vol 123, No 1, 2014, p 4.

[48] See Barnett 2006; Lind and Eriksen 2006; Tignino 2011; Feitelson et al 2012.

[49] Halvard Buhaug, 'Climate Change and Conflict: Taking Stock', *Peace Econ Peace Sci Publ Pol*, Vol 22, No 4, 2016, p 335.

[50] Daniel Abrahams and Edward R. Carr, 'Understanding the Connections Between Climate Change and Conflict: Contributions from Geography and Political Ecology', *Curr Clim Change Rep*, Vol 3, 2017, p 238.

[51] Cited by Abrahams and Carr; and Buhaug. See 'Human Security' in IPCC AR5, WG2, p 758.

[52] Vally Koubi, 'Climate Change and Conflict', Annual Review of Political Science, Vol 2, 18 March 2019, p 348-353.

severity is of course context dependent. But nonetheless, estimating how such simultaneous processes together shape conflict risk is vital to realistically assess the future security implications of climate change. [53]

Climate–atrocity pathways

Compared to the climate-conflict agenda, there has been very limited scholarly research undertaken on the relationship between climate change and mass atrocities. As an example, in the past decade, only three academic journals have published a Special Issue that covers the climate-atrocity relationship. [54] Of the three, only the 2015 Special Issue directly addressed the climate-atrocity nexus, the other two examined the climate-component in the broader context of 'ecocide' (2021) and 'environmental degradation' (2022). Over a comparative timeframe, six Special Issues have been published that explicitly address the climate-conflict nexus (encompassing 'the security implications of climate change'): Journal of Peace Research (2012 and 2021), Geopolitics (2014), Political Geography (2014), Global Environmental Change (2014), and Current Climate Change Reports (2017) – publishing 51 research articles in total (see Appendix 2).[55] The 'impact factor' of each of these six journals far exceed that of any of the three exploring the climate-atrocity nexus; and the articles therein, are well represented in the IPCC assessment reports[56] – indicating impact beyond academia.

Four notable themes run through the collective scholarship found in the three Special Issues covering the climate-atrocity nexus. First, this body of work tends to take a broad and narrow approach to the two key variables under investigation: climate change and mass atrocities. In terms of climate change, it takes a broad approach encompassing issues associated to climate-related industrialisation (green or polluting), ecocide, environmental degradation, and a variety of climate impacts. In terms of atrocities, it takes a narrow approach, focusing on indigenous populations and the sole crime of 'genocide', with much less attention paid to crimes against humanity,[57] ethnic cleansing,[58] and war crimes;[59] and/or 'mass atrocities' as a collective.

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[53] Katharine J. Mach, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Caroline M. Kraan, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jurgen Scheffran, Kenneth A. Schultz, and Nina von Uexkull, 'Directions for Research on Climate and Conflict', *Earth's Future,* Vol. 8, 2020, p 2.

[54] 'Special Issue: Climate Change, Environmental Violence and Genocide', *The International Journal of Human Rights*, Volume 18, Issue 3, 2014; 'Special Issue on the Genocide-Ecocide Nexus', *Journal of Genocide Research*, Volume 23, Issue 2, 2021; 'Special Issue: Environmental Degradation and Genocide', *Genocide Studies and Prevention: An International Journal*, Volume 16, Issue 1, 2022. The 2014 and 2021 journals were subsequently converted into edited books titled, *Climate Change and Genocide: Environmental Violence in the 21st Century* (Routledge, 2015); and *The Genocide-Ecocide Nexus* (Routledge, 2022),

[55] 'Special Issue on Climate Change and Conflict', *Journal of Peace Research*, Volume 49, Issue 1, 2012; 'Special Issue: Rethinking Climate Change, Conflict and Security', *Geopolitics*, Volume 19, Issue 4, 2014; 'Special Issue: Climate Change and Conflict', *Political Geography*, Volume 43, 2014; 'Special Issue: Climate Change and Conflicts', *Current Climate Change Reports*, Volume 3, Issue 4, 2017; 'Special Issue on Security Implications of Climate Change', *Journal of Peace Research*, Volume 58, Issue 1, 2021.

[56] See for instance, IPCC Working Group 2 in the AR5 of 2014 or AR6 of 2022.

[57] John Langmore and Ashley McLachlan-Bent, 'A Crime Against Humanity? Implications and Prospects of the Responsibility to Protect in the Wake of Cyclone Nargis', *Global Responsibility to Protect*, Vol 3, No 1, 2011, p 37-60.

[58] Ola Olsson and Eyerusalem Siba, 'Ethnic Cleansing or Resource Struggle in Darfur? An Empirical Analysis', *Journal of Development Economics*, Vol 103, 2013, p 299-312.

[59] Aaron Fichtelberg, 'Resource Wars, Environmental Crime, and the Laws of War: Updating War Crimes in a Resource Scarce World', in *Environmental Crime and Social Conflict* (Routledge, 2015).

Second, the scholarship, while at times including quantitative research and disciplines,[60] bends towards the use of qualitative methods and elevates associated disciplines (e.g. historical studies, sociology, and anthropology, as well as legal scholars and constructivist-orientated political scientists).[61] This methodological mix has permitted the climate-atrocity scholarship to present a wide range of arguments. For example, in the 2014 Issue, some argued that the empirical evidence was inconclusive as to whether climate change impacts will increase genocidal risk;[62] while others argued that climate change and ecological collapse 'will become a primary driver of genocide'.[63]

Third, this body of work also tends to attribute broad meanings to key terms – such as using the term 'genocide' to refer to 'cultural genocide' – which serves to dilute the more extreme sounding arguments. For example, a prominent issue in the 2014 publication considers whether warming of the climate system, and its associated impacts such as environmental degradation and forced migration, will precipitate 'cultural genocides' by undermining the identities and practices of indigenous communities.[64]

Fourth, while a range of arguments can be observed, one is left with the distinct impression that the collective scholarship supports the view that a moderate to strong relationship exists between climate change and mass atrocities. For example, the 2014 Special Issue's introductory argument is that it supports 'the inclusion of climate change in genocide studies and vice versa' given that 'many see climate change as the scourge of the twenty-first century'.[65] This publication, it seems, set the tempo and focus for the subsequent two.

With this context in mind, in what follows, the report discusses some of the climate-atrocity pathways that have been identified in the climate-atrocity literature. This literature does not appear to use the term 'pathways' in any consistent way, nor does it use 'direct' or 'indirect' as top-line categories. To make comparison easier between the bodies of literature under investigation (climate-conflict versus climate-atrocity), the following section attempts to package up the various climate-atrocity links into 'direct' and 'indirect' categories, as seen in the climate-conflict literature, as well as uses the term 'pathways' to address the mediating factors that link climate to atrocities (and the reverse). This bundling approach of course risks misrepresenting climate-atrocity arguments; but over the longer term, it may help to organise future research output and heighten impact.

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[60] Andreas Exenberger and Andreas Pondorfer 'Genocidal Risk and Climate Change: Africa in the Twenty-First Century', *The International Journal of Human Rights*, Vol 18, No 3, 2014, p 350-368.
[61] See for example, in Special Issue in *The International Journal of Human Rights*, 2014: Jürgen Zimmerer 'Climate Change, Environmental Violence and Genocide'; Mark Levene and Daniele Conversi, 'Subsistence Societies, Globalisation, Climate Change and Genocide: Discourses of Vulnerability and Resilience'; Rebecca Hofmann, 'Culturecide in Changing Micronesian Climates? About the Unintentionality of Climate Change'.
[62] Andreas Exenberger and Andreas Pondorfer 'Genocidal Risk and Climate Change: Africa in the Twenty-First Century', *The International Journal of Human Rights*, Vol 18, No 3, 2014, p 350-368.
[63] Martin Crook and Damien Short, 'Marx, Lemkin and the Genocide–Ecocide Nexus', *The International Journal of Human Rights*, Vol 18, No 3, 2014, p 298.
[64] See for example, Rebecca Hofmann, 'Culturecide in Changing Micronesian Climates? About the Unintenionality of Climate Change', *The International Journal of Human Rights*, Vol 18, No 3, 2014, p 336-349.
[65] Jürgen Zimmerer, 'Climate Change, Environmental Violence and Genocide', *The International Journal of Human Rights*, Vol 18, No 3, 2014, p 267.

Direct pathway: This potential pathway views climate as directly affecting the likelihood of conflict (and atrocities in this instance) via warmer or colder temperatures (e.g. drought or flood), which in turn reduces the availability of non-renewable resources (e.g. freshwater, arable land, forests and fisheries), which in turn leads to elevated levels of individual and/or group competition over the dwindling resource in question, as well as discomfort and aggressiveness, which in turn increases hostility and deadly violence (and atrocity crimes) .[66] An example of a direct 'real world' scenario is as follows: a severe drought reduces the flow of water in a particular municipality; which in turn, increases competition between groups for the depleted resource; which in turn, leads to increased intergroup tension and violent conflict.[67] In short, the climate impact (water resource scarcity) directly caused the conflict (violent behaviour). As suggested, any number of climatic changes (e.g. sea level rise and inland saline penetration, or desertification) or climate extremes (e.g. wildfires or severe flood) could replace 'water scarcity' – so long as the impact negatively affects life-giving resources such as arable land, fisheries or forestry, and that that resource scarcity led to some form of heightened competition and deadly conflict (e.g. between farmers and herders, or urban unrest, insurrections, and other forms of civil or even transboundary violence).[68] These kinds of scenarios are captured in the 2008 book titled, "Climate Wars".[69]

This view is central to the climate-atrocity literature. For example, prominent historian Timothy Snyder suggests in his book, *Black Earth: The Holocaust as History and Warning* (2015), that prospective climate-induced resource scarcity may lead to the return of Nazi-style ideologies that similarly view the large-scale extermination of groups of people – be that via direct killing or resource diversion (i.e. causing starvation) – as the most effective option to secure limited water, arable land, forests or fisheries in the future.[70] And therefore, he concludes, that 'understanding the Holocaust is our chance, perhaps our last one, to preserve humanity.'[71]

Snyder's remarks have attracted followers and detractors. For example, Alex Alvarez, author of the book *Unstable Ground: Climate Change, Conflict, and Genocide* (2017), writes that, 'In many ways, his comments echo my own work in which I have previously called attention to the ways in which the impacts of climate change will increase the risk of conflict generally, and genocide more specifically'.[72] Alvarez is also sympathetic to the direct causation thesis in the Syria and Darfur cases; that is, while acknowledging that identity politics, religion and prejudices played a role, 'In both of these examples, Syria and Darfur, resources provided an underlying impetus toward violence', he writes.[73] Rachel Killean and Lauren Dempster (2021) pursue this argument (which also hints an indirect element), stating that, 'while often interacting with other social, economic, and political dynamics, competition over natural

[66] Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 346.
[67] Ibid.
[68] Ibid.
[69] Halvard Buhaug, 'Climate Change and Conflict: Taking Stock', *Peace Econ Peace Sci Publ Pol*, Vol 22, No 4, 2016, p 333.
[70] See Snyder's conducting chapter 'Conclusion: Our World' in Timothy Snyder, *Black Earth: The Holocaust as History and Warning* (New York: Tim Duggan Books, 2015), p 327-334.
[71] Ibid., p 342.
[72] Alex Alvarez, *Unstable Ground: Climate Change, Conflict, and Genocide* (New York: Rowman & Littlefield, 2017). See also Alex Alvarez, *Genocidal Crimes* (London: Routledge,2010).
[73] Alex Alvarez, 'Borderlands, Climate Change, and the Genocidal Impulse', *Genocide Studies International*, Vol 10, No 1, 2016, p 29.

resources can be a significant motivator of mass atrocity'.[74] As evidence, they point to the 'critical food-people-land imbalances' and 'intense inter-communal competition for land' that has been linked to genocidal violence in Rwanda, Armenia, and Eastern Anatolia.[75] In terms of detractors, Mark Levene points out that Snyder's reading of the climate crisis and its cure through a Holocaust prism, while providing some important insights, is also 'extravagant' and 'problematic' – especially the notion that China and Russia to the exclusion of the West are likely to engage in colonial-style land grabs in weaker states to secure resources.[76]

Nonetheless, the proposition that a direct relationship exists between resource exploitation and atrocities is one of the most prominent features of the climate-atrocity literature. Multiple approaches have been explored beyond the above examples. For instance, Kieran Mitton (2022) unpacks the contention that resource *scarcity* rarely directly (or indirectly) causes atrocity crimes in comparison to the significant historical evidence, such as the 'scramble for Africa', which shows that resource *abundance* elicits especially cruel large and small-scale atrocities perpetrated by powerful states hell-bent on controlling that resource.[77] Regina Paulose (2021) argues that renewable energy projects (e.g. 'green tech' companies involved in wind power or hydropower) have, in some cases, rendered indigenous lands uninhabitable, undermined traditional practices such as reindeer herding, and in extreme cases, required the removal of minority groups from their land altogether – 'and thereby (green tech) functions genocidally against these groups', she argues.[78] Others (2024) suggest that agriculture and mining (eg gold, oil, coal) industries have been involved in large-scale massacres, forced relocations, slavery, and wide-spread habitat destruction upon which Indigenous communities rely throughout human history.[79] And in an especially bold assertion, Emily Sample and Henry Theriault (2021), write that,

> 'After a climate shock, such as a flood, drought, fire, or other major weather event, there may be competition or hoarding of limited key resources, such as food, water, or energy. In this circumstance, one group may commit genocide against another to reduce resource needs by "weeding out" the targeted population.'[80]

In other words, as climate change reduces natural resources that are critical to sustain life, people and groups may look to 'strike first' (they write) to secure those resources for themselves, their family or affiliate groups. Bucking this trend, Andreas Exenberger and Andreas Pondorfer use statistical methods to examine the relationship between climate

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[74] Rachel Killean and Lauren Dempster, 'Mass Violence, Environmental Harm, and the Limits of Transitional Justice', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, 2021, p 13.
[75] See also, Paul J. Magnarella, 'The Background and Causes of the Genocide in Rwanda', *Journal of International Criminal Justice*, Vol 3, No 4, 2005, p 817.
[76] Mark Levene, 'The Holocaust Paradigm as Paradoxical Imperative in the Century of Anthropogenic Omnicide', *Genocide Studies and Prevention: An International Journal,* Vol 16, Iss 1, 2021, p 91-92.
[77] Kieran Mitten, 'Natural Resources and Atrocities' in Barbora Holá, Hollie Nyseth Nzitatira, and Maartje Weerdesteijn (eds), *The Oxford Handbook on Atrocity Crimes* (Oxford University Press, 2022), p 159-196.
[78] Regina Paulose, 'Death by a Thousand Cuts? Green Tech, Traditional Knowledge, and Genocide', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, p 40-59.
[79] Ben L Parr, *Climate Change Action and the Responsibility to Protect* (London: Routledge, 2024), p 15-40.
[80] Emily Sample and Henry Theriault, 'Guest Editorial: Environmental Degradation and Genocide', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, 2021, p 6.

change and genocide in sub-Saharan Africa and find inconclusive evidence of a direct causal pathway.[81]

There are two other direct links that appear unique to the climate-atrocity literature. First, the contention that climate-related impacts and environmental change can be, and have been, used as a method to commit mass atrocity crimes.[82] For example, as a part of its campaign of mass murder in Darfur between 2003 and 2005, the Government of Sudan used air power (Antonov airplanes and helicopter gunships) to not only directly bomb civilians but also blow-up water wells, effectively making the area uninhabitable.[83] Second, which reverses this relationship, contends that mass atrocity crimes contribute to climate change and localised environmental damage. For instance, the activities of state and non-state militaries – the principal actors in most atrocity situations – not only generate carbon emissions that contribute to global warming but also can severely damage forests, waterways, and agricultural lands.[84]

Indirect pathways: The second pathway postulates that climate indirectly leads to conflict by reducing economic output and agricultural incomes, raising food prices, and increasing migration flows.[85] As suggested, several climate-atrocity authors hint at an indirect context, but will prioritise the more direct causal pathway. Killean and Dempster (2021), for instance, suggest directness, but follow up by identifying 'neoliberal ideologies and the unsustainable pursue of economic growth', as well as unsustainable resource exploitation by local communities and businesses – all of which could be interpreted as problems with agricultural and economic policies – as possible drivers of mass violence.[86] This is but one example of a broader theme in the climate-atrocity literature that tends to regularly find fault with the 'economic system'. For instance, Martin Crook and Damien Short argue that capitalist-driven land grabs and forced migration –pursuit out by industrial farms and extractive industries – are 'the principal vectors of ecologically induced genocide when the genos in question is an indigenous people'. [87] Similarly, Mark Levene and Daniele Conversi argue that 'neoliberal globalisation and concomitant nation-state building makes all subsistence societies vulnerable to what amounts to structural genocide'.[88] Sample and Theriault (2021) argue similarly.[89]

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[81] Andreas Exenberger and Andreas Pondorfer, Genocidal Risk and Climate Change: Africa in the Twenty-First Century, *The International Journal of Human Rights*, Vol 18, No 3, p 350-368.

[82] See for example, Emily Sample and Henry Theriault, 'Guest Editorial: Environmental Degradation and Genocide', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, 2021, p 6; Rachel Killean and Lauren Dempster, 'Mass Violence, Environmental Harm, and the Limits of Transitional Justice', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, 2021, p 13-14. Martin Crook and Damien Short, 'Marx, Lemkin and the Genocide–Ecocide Nexus', *International Journal of Human Rights*, Vol 18, No 3, 2014.

[83] Ben L Parr, *Climate Change Action and Responsibility to Protect* (2024), p 170. See, 'Darfur in Flames, Atrocities in Western Sudan: Abuses in Darfur by Government Forces', *Human Rights Watch*; and SHRO/ COHRE v. Sudan (AComHPR), Weapons Law Encyclopedia, 2022. See also, 'Sudan Aircraft Bomb Settlement Near Chad – Rebels', *Reuters*, 3 June 2009.

[84] Rachel Killean and Lauren Dempster, 'Mass Violence, Environmental Harm, and the Limits of Transitional Justice', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, 2021, p 13-14.

[85] Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 346.

[86] Rachel Killean and Lauren Dempster, 'Mass Violence, Environmental Harm, and the Limits of Transitional Justice', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, 2021, p 13-14.

[87] Martin Crook and Damien Short, 'Marx, Lemkin and the Genocide–Ecocide Nexus', *The International Journal of Human Rights,* Vol 18, No 3, 2014, p 298.

[88] Mark Levene and Daniele Conversi, 'Subsistence Societies, Globalisation, Climate Change and Genocide: Discourses of Vulnerability and Resilience', *The International Journal of Human Rights*, Vol 18, No 3, 2014, p 281-297.

[89] Emily Sample and Henry Theriault, 'Guest Editorial: Environmental Degradation and Genocide', *Genocide Studies and Prevention: An International Journal*, Vol 16, Iss 1, 2021, p 6.

Contextual Factors and State Strength

Climate-conflict authors tend to agree that the extent to which, or whether, these indirect mediating factors (economic, agriculture, migration) contribute to producing a violent conflict is dependent on a series of 'contextual' factors. That is, each mediating factor is conditioned (intensified or weakened) by a variety of economic and socio-political contextual factors. The contextual factors that have been found to intensify, or increase, the likelihood that adverse climatic conditions will lead to violent conflict include, poor transportation and water infrastructure, ethno-political exclusion, high levels of agricultural dependence and or inequality, and the presence of autocratic regimes.[90] Koubi explains that, overall, studies that examine contextual factors 'reveal that adverse climatic conditions are more likely to lead to conflict in places that already experience conflict, and where institutions are ineffective, essential services are difficult to obtain, and people are vulnerable to these climatic conditions.'[91]

Koubi's conclusion would suggest that climate-related conflict is more likely in fragile states. This suggestion could be the inevitable outcome of a research agenda that almost exclusively focuses on countries and regions that are already embroiled in conflict, and or are considered fragile – for instance, those already suffering from economic and institutional decay, endemic corruption, terrorism and insecurity, political and social discrimination, and wide-spread human rights abuses. Courtland Adams (and coauthors) portray this focus as a 'sampling bias in climate-conflict research' that prioritises African countries and regions such as the Sahel and sub-Saharan Africa.[92]

Climate-atrocity researchers similarly examine fragile states such as Sudan, Yemen, Rwanda, DR Congo, Liberia, as well as some Pacific Island countries. But they also place great emphasis on strong states, for example, Britain and European countries in the 1700s and 1800s, Germany in the early 1900s as well as Turkey, Russia, various Baltic countries, Indonesia, China, Israel, and the US. Emerging from this theme, recent research undertaken by John Riley and Will Atkins (2021) finds – somewhat dissimilarly to Koubi – that 'mass atrocities are more likely to be caused by climate change in relatively stable states than in fragile states'.[93] To unpack this idea further, Riley and Atkin explain that,

> 'This may seem counter-intuitive at first glance, but as we will show, fragile states are already likely to endure mass atrocities, and the effects of climate change have little additional impact. On the other hand, when relatively stable countries are exposed to climate change and lack the adaptive capacity to respond, their decision-makers or

[90] For the precise studies see Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 346.
[91] Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 346.
[92] Courtland Adams, Tobias Ide, Jon Barnett and Adrien Detges, 'Sampling Bias in Climate–Conflict Research', *Nature Climate Change*, Vol 8, 2018, p 200-203.
[93] John Riley and Will Atkins, 'Catalysts and Accelerants: Untangling the Linkages between, Climate Change and Mass Atrocities', *Journal of Peace and War Studies*, ISOMA Special Edition (October 2021), p 58. See also Jesse Jenkins, 'Climate Change as a Dangerous Accelerant of Mass Atrocity', *Space and Defense*, Vol 13, 2022.

> military leadership may conclude that committing a mass atrocity to solve a political or national security problem to be a valid strategic option.'[94]

This research seems to chime with the direct pathway argument conveyed by Snyder, Alvarez and others (above); however, even more so, it appears to resonate with the indirect pathway argument by prioritising politics and the agency vested in decision-makers.[95] As Riley and Atkin continue,

> …'virtually all modern analyses reject the idea that the atrocities are spontaneous, irrational, or an inevitable byproduct of war. Rather, as Benjamin Valentino put it, there is a strategic logic to mass killings, and they occur when powerful groups come to believe it is the best available means to accomplish certain radical goals, counter specific types of threats, or solve difficult military problems. That is, a mass atrocity can be understood as a product of a means-ends analysis, or a strategy that advances the interests of certain decision-makers.[96]

The strong state–agency nexus is also a central theme in the broader atrocity prevention literature. For example, as Kate Ferguson explains, 'The assumption that identity-based mass violence and atrocities only occur in fragile states or contexts of armed conflict is no longer – if indeed it ever was – sufficient to guide prevention and protection policy. Syria was not a failing state in 2011; nor is China today.'[97] Indeed, she continues, the network of detention camps in Xinjiang in which more than a million people – mostly Muslim Uyghurs – are thought to be incarcerated 'offer devastating proof that mass atrocities can be conducted in strong, peaceful and politically stable environments, exposing the shortfalls of a framework that primarily interprets atrocity through the prism of conflict'. [98]

This is not to say that climate-atrocity researchers should disregard the indirect pathways between climate change and atrocities in fragile states. On the contrary, there is good reason to continue to examine the links between climate change and atrocities in fragile states, for one, because key conflictual regions (e.g. across the MENA) are also highly exposed to both slow and rapid-onset climate change impacts; and second, to better understand the role that climate might play in fuelling an escalation to atrocities within an ongoing armed struggle. Section three of this report begins by further discussing so-called 'peacetime' atrocities as well as the escalation to atrocities that occur within conflicts.

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[94] John Riley and Will Atkins, 'Catalysts and Accelerants: Untangling the Linkages between, Climate Change and Mass Atrocities', *Journal of Peace and War Studies*, ISOMA Special Edition (October 2021), p 58-59.

[95] Hanne Seter is critical of direct pathway analysis because it neglects the casual mechanism and reduces the climate-conflict relationship to 'a simple stimulus–response relationship', whereas 'the social world is much more complex; agency can be found in countries, groups, and individuals alike and they all have the ability to respond to climate impacts in a variety of ways', he writes. See Hanne Seter, 'Connecting Climate Variability and Conflict: Implications for Empirical Testing, *Political Geography*, Vol 53, 2016, p 1.

[96] John Riley and Will Atkins, 'Catalysts and Accelerants: Untangling the Linkages between, Climate Change and Mass Atrocities', *Journal of Peace and War Studies*, ISOMA Special Edition (October 2021), p 59.

[97] Kate Ferguson and Michael Jones, 'Between War and Peace: Preventing Mass Atrocities Outside Armed Conflict', *RUSI Newsbrief*, Vol 41, No 4, May 2021, 1.

[98] Kate Ferguson and Michael Jones, 'Between War and Peace: Preventing Mass Atrocities Outside Armed Conflict', *RUSI Newsbrief*, Vol 41, No 4, May 2021, 2.

3. Research Primers

The climate-conflict literature devotes considerable attention to atrocity situations. Two case studies are especially prominent: the role that severe drought and environmental degradation played in Darfur's atrocity situation in 2003[99] and in sparking the situation in Syria in 2010.[100] This body of work – which extends to other countries across Africa and the Middle East in particular – tends to critique atrocity situations by employing pathways analysis (above), or an associated climate-conflict linkage concept or analytical framework. Atrocity crimes are rarely mentioned by name (eg 'genocide', 'ethnic cleansing', 'crimes against humanity' or 'war crimes'; or 'mass atrocities' as a collective), or in terms of the nature of the killings (eg murder, executions, torture, enslavement, mutilation, sexual violence). Atrocities are at best implied. In other words, in all but a few climate-conflict research outputs, atrocity situations are framed and analysed as conflict situations.

But there are important differences that separate climate-conflict situations from climate-atrocity situations. This section examines two:

- The relationship between climate change and the escalation to atrocities within the context of armed struggle; and

- The relationship between climate change and mass atrocities that occur outside the context of armed conflict.

These are described as "Research Primers" in this report because they provide an initial and distinctive lens to begin to examine situations that involve mass atrocities and climate change. They are addressed in sequence.

Climate and mass atrocity escalation

Not all armed conflicts give rise to mass atrocities.[101] Throughout 2023, leading conflict prevention and resolution INGO, the International Crisis Group (ICG), regularly identified and monitored more than seventy conflict situations globally covering roughly as many

[99] See for instance, Jeffrey Mazo, 'Darfur: The First Modern Climate-Change Conflict', *The Adelphi Papers*, Vol 49, 2009, p 73-86; John Hagan and Joshua Kaiser, 'The Displaced and Dispossessed of Darfur: Explaining the Sources of a Continuing State-led Genocide', *The British Journal of Sociology*, Vol 62, Iss 1, 2011, p 1-24; Lyal S. Sunga, 'Does Climate Change Kill People in Darfur?', *Journal of Human Rights and the Environmen*t, Vol 2, No 1, 2011, p 64-85; Harry Verhoeven, 'Climate Change, Conflict and Development in Sudan: Global Neo-Malthusian Narratives and Local Power Struggles', *Development and Change*, Vol 42, No 3, 2011, p 679-707.

[100] See for instance, Colin P. Kelley, Shahrzad Mohtadib, Mark A. Cane, Richard Seager, and Yochanan Kushnir, 'Climate change in the Fertile Crescent and Implications of the recent Syrian Drought', *PNAS*, Vol 112, No 11, March 2015, p 3241–3246; Jan Selby, Omar S. Dahi, Christiane Frohlich, and Mike Hulme, 'Climate Change and the Syrian Civil War Revisited', *Political Geography*, Vol 60, 2017, p 232-244; Colin P. Kelley, Shahrzad Mohtadi, Mark Cane, Richard Seager, and Yochanan Kushnir, 'Commentary on the Syria Case: Climate as a Contributing Factor', *Political Geography*, Vol 60, September 2017, p 245-247. See also, Marwa Daoudy, *The Origins of the Syrian Conflict: Climate Change and Human Security* (Cambridge: Cambridge University Press, 2020).

[101] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 3.

countries.[102] But not all these countries involved atrocity situations. An atrocity situation can be characterised as those 'where mass atrocity crimes – involving genocide, ethnic cleansing or other war crimes or crimes against humanity – are actually occurring or imminently about to occur', or could foreseeably occur, triggering the need for appropriate preventive measures to be pursued.[103] This narrowing process tends to half the number of countries involved. For example, the Global Centre for the Responsibility to Protect, a New York-based atrocity prevention advocacy group, identifies 36 countries that have experienced or are at risk of experiencing one or more of the four atrocity crimes above.[104]

So why do some conflicts escalate to atrocities while others do not (despite armed groups almost always having the means and opportunity to massacre civilians)? Studies show that government and non-government actors of all types might resort to atrocities during armed conflict if they consider the stakes high enough. For instance, non-state actors to a conflict may decide to commit atrocities as a means to demonstrate resolve and indeed to secure a seat at the negotiating table. Others may simply be seeking to settle old scores while a particular population or grouping is exposed, virtually unarmed, and or too weak to protect itself.[105] Research suggests that the likelihood that non-state actors will resort to atrocities in the context of armed struggle can be dependent on their relationship with the local community. However, what is clear is that much more conceptual and practically oriented research and development is required to better understand why some combatants, but not others, resort to egregious civilian-targeted violence.[106]

Given the uncertainty about the pathways and intervening variables between conflict and atrocities, international actors face considerable challenges in accurately predicting if, and when, an ongoing conflict might escalate to an atrocity situation – at least not with sufficient confidence to support a specialised atrocity prevention strategy. In addition, escalation prevention raises challenging questions about when prevention strategies end and perhaps more severe reaction strategies kick in; and the impact that those options will have on the persecuted population vis-à-vis regime decision-makers and their followers, vis-à-vis the broader country-wide and regional populations. The best option is to develop and implement an ongoing process to assess whether a conflict is likely to escalate that operates alongside determined efforts to prevent and resolve the armed conflict as a whole. [107]

The climate-atrocity literature does not appear to systematically address the escalation of an existing conflict into an atrocity situation. Similarly, the climate-conflict literature has repeatedly identified a need to 'better understand how climate may influence the dynamics of violence beyond outbreak or incidence (e.g. severity, escalation, duration, diffusion).'[108] This absence provides fertile ground to examine questions such as (broadly speaking): to what extent, if at

[102] 'Crisis Watch: Tracking Conflict Worldwide', International Crisis Group (accessed 2024).
[103] Gareth Evans, *The Responsibility to Protect: Ending Mass Atrocity Crimes Once and For All* (Washington DC: Brookings, 2008), p 72.
[104] 'Populations as Risk', Global Centre for R2P (accessed 2024).
[105] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 6.
[106] Ibid., p 6.
[107] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 3.
[108] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 6.

all, do climate-related impacts contribute to a conflict escalating to a mass atrocity situation? This question invites the researcher to 'open up' the conflict in search of climate-related factors that may have helped expedite an atrocity situation in an ongoing armed conflict. Researchers could also examine the extent to which 'climate action' policies (encompassing adaptation and mitigation policies) were present in the country in question and or integrated into the atrocity prevention and response policies that were implemented at the time; and consider whether those policies contributed to the problem – a phenomenon called 'maladaptation' – or if absent, could have made a material difference to escalation avoidance if they had been present.[109]

Climate and peacetime atrocities

There are four main forms of 'peacetime atrocities', which in what follows, have been paralleled with climate-related narratives as broad examples of possible research links:

State-directed suppression: These situations involve atrocities that are committed by non-democratic regimes against political opponents or marginalised ethnic groups (e.g. pre-emptively eliminating threats/perceived future risk). The most frequent type of 'peacetime' mass atrocity usually begins soon after an adverse regime change or attempted change.[110] However, some important situations have occurred outside the context of regime contestation, for example, China's Great Leap Forward plan between 1958 and 1961. This strategy, which followed Mao's political purges that he himself acknowledged amounted to 800,000 executions, was supposed to rapidly modernise China's agricultural and industrial systems by emphasising small-scale fossil-fuel powered industries and collective human labour, rather than high technology and centralised factories (the West's model). Mao believed that this alternative approach to Western industrialisation would propel China past Britain in industrial output.[111] However, not only did this experiment delay China's development by almost 20 years, but it has also been described as causing 'China's worst ever disaster, humanity's worst ever famine, and a death toll numbering in the tens of millions'.[112] Researchers estimate that in 1960 alone, 22 million people died of hunger in China,[113] with the total number of deaths due to famine estimated at 40 million over the three years.[114] Some researchers have described Mao's strategy as 'genocidal' and point to Mao's own words as validation: 'we are prepared to sacrifice 300 million Chinese for the victory of world revolution'.[115]

Communal violence: In these situations, atrocities are committed by groups not organised by national governments or well-established non-state armed groups. Violence is not entirely spontaneous and is usually incited or orchestrated by local or national political figures, often

[109] For a list of integrated climate-R2P policies see Part 2 in Ben L Parr, *Climate Change Action and the Responsibility to Protect*, (London: Routledge, 2024).
[110] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 3.
[111] Peter Stearns, *The Industrial Revolution in World History*, 4th Edition (Boulder: Westview Press, 2013), p 223.
[112] Adam Jones, *Genocide: A Comprehensive Introduction*, 3rd Edition (London: Routledge, 2017), p 284.
[113] Ibid., p 290.
[114] Yang Jisheng, *Tombstone: The Great Chinese Famine 1958– 1962* (New York: Farrar Strauss & Giroux, 2013).
[115] Jones, *Genocide: A Comprehensive Introduction*, p 290. Other cases in this category include regime attempted and actual change situations in Pinochet's Chile, in Zanzibar, and in Indonesia [1965-66], various situations in North Korea, the treatment of the Uyghurs in Western China, and the treatment of indigenous populations in the Amazon, and the 'war on drugs' in the Philippines.

either state officials, politicians, or local leaders of different varieties (religious, ethnic, clan, etc.).[116] Attacks are often religious or ethnic in nature and can be triggered by a variety of national and local events. For example, in late 2007, claims of election rigging in Kenya descended into ethnic and tribal violence resulting in more than 1,000 people being killed and around 300,000 displaced. To bring the situation under control, the African Union appointed Kofi Annan to lead a mediation team in the hope of negotiating a political settlement. Annan and his team built an agreement around redressing several historic and systemic grievances including establishing a plan for ongoing negotiations on the underlying root causes of the violence, especially those related to the constitution and land allocation and use. The Constitution of Kenya, the key outcome of the negotiations, was the genesis of a process that saw Kenya elevate climate action to a core government priority and has become a continental leader on climate change.[117]

Post-war retribution: In these situations, atrocities are committed by states and non-state actors in the immediate aftermath of armed conflict as retribution against former enemy groups.[118] Sometimes massacres are intended to avenge specific atrocities committed during the armed conflict. The most notable case in this category is arguably the 1994 Rwandan Genocide. In this situation, Belgium's programme of ethnic favouritism of the Tutsi minority deepened divisions in the country and played a key role in fostering genocidal intent. The 1990 military invasion by Rwandan exiles in Uganda – who had formed the Rwandan Patriotic Front (RPF) – further intensified the already deeply held anxieties in the Hutu majority population. In the years and months prior to the genocide, ethnic tensions flared up into isolated cases of extreme violence. The trigger for the full-scale genocide occurred on 6 April 1994 when a plane carrying majority Hutu President Habyarimana was shot down. Immediately, roadblocks were erected through and around towns. In just 12 weeks in 1994, almost 1 million people – overwhelmingly ethnic minority Tutsis, but also Hutu moderates opposed to the genocide – were massacred with machetes, clubs, and small arms. The horror ended on 2 June 1994 when the Tutsi-led RPF military force – led by current Rwandan President, Paul Kagame – took control of key areas. In 1996, the RPF invaded east Congo, where most of the Hutu genocidaires had fled, and massacred approximately 230,000 people.[119]

The Rwandan Genocide has been analysed by several climate-conflict researchers. In several publications, it has been described as having been likely, or even inevitably, caused by arable land degradation (land scarcity) and rapid population growth in the years preceding the genocide.[120] It is argued that these environmental and demographic pressures combined with

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[116] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 3.

[117] The Constitution of Kenya, 2010, Section 42. For a comprehensive assessment of Kenya's constitution making processes see work undertaken by Christina Murray – a constitutional scholar, senior mediation advisor for the UN, and member of the Kenyan Constitution Committee of Experts. See also, Johara Bellali, Lisa Strauch, Francis Oremo, and Benson Ochieng, 'Multi-level Climate Governance in Kenya: Activating Mechanisms for Climate Action', *Adelphi* and *the Institute of Law and Environmental Governance*, October 2018, p 9-10 and 30.

[118] Alex J Bellamy, 'Mass Atrocities and Armed Conflict: Links, Distinctions, and Implications for the Responsibility to Prevent', *The Stanley Foundation*, February 2011, p 3.

[119] See Jones, *Genocide: A Comprehensive Introduction*, p 490, also 354, 473 and 482. See also, Romeo Dallaire, *Shake Hands with the Devil: The Failure of Humanity in Rwanda* (Toronto: Random House, 2003); and Philip Gourevitch, *We Wish to Inform You that Tomorrow We Will Be Killed with Our Families: Stories from Rwanda* (New York: Picador, 1999).

[120] See Renner, 1996; André and Platteau, 1998; Diamond, 2005; Friedman, 2016 in Kieran Mitten, 'Natural Resources and Atrocities' in *The Oxford Handbook on Atrocity Crimes*, 2022. See also, Andreas Exenbergee and Andreas Pondorfer,

embedded socioeconomic and political inequalities, particularly with regard to the distribution of land (and the absence of proper resource management), to create incentives for violence against the Tutsi.[121] However, Homer-Dixon and Percival reject this reading of the genocide, writing soon after that 'environmental scarcity had at most a limited, aggravating role in the recent conflict'.[122] Other climate-conflict researchers similarly note that population density was high long before 1994, and demographic pressures have been even greater since.[123]

State neglect: In these cases, a central government demonstrates an indifference to the survival of their population to the extent that it causes unnecessary large-scale loss of life. Sometimes, doing nothing, or very little, can be considered a policy position. The major case study here involves the Government of Myanmar's neglectful response to their surviving population in the aftermath of Cyclone Nargis that killed 130,000 people and displaced a further 2.4 million in May 2008. The government's inadequate emergency response combined with its refusal to allow the inbound flow of international lifesaving aid – perhaps due to a combination of historical paranoia about the intention of 'outsiders' and an upcoming constitutional vote – caused widespread unnecessary suffering and death across its impacted population.[124]

Conclusion to Part 1

The purpose of Part 1 was to set the context. That is, it was designed to equip prospective researchers who are interested in examining the relationship between climate change and mass atrocities with a general background and understanding of the research field. It sought to achieve this by first locating the climate-atrocity research agenda within the broader climate-conflict history; second by highlighting some of the key issues and challenges that climate-conflict authors, and climate-atrocity authors, have had to grapple with in their quest to understand the direct and indirect 'pathways' between climate change and deadly violence; and third, by identifying two distinct features of the climate-atrocity relationship – namely, the escalation to atrocities within conflicts, and so-called 'peacetime atrocities'.

'Genocidal Risk and Climate Change: Africa in the Twenty-first Century', *The International Journal of Human Rights*, Volume 18, Issue 3, 2014.

[121] See Diamond, 2005; McNab & Mohamed, 2006 in Kieran Mitten, 'Natural Resources and Atrocities' in *The Oxford Handbook on Atrocity Crimes*, 2022.

[122] Val Percival and Thomas Homer-Dixon, 'Environmental Scarcity and Violent Conflict: The Case of Rwanda', *The Journal of Environment & Development*, Vol 5, No 3 (September 1996), p 270-291.

[123] McDoom, 'Rwanda's Exit Pathway from Violence: A Strategic Assessment', Background Paper, World Bank, 2011, p 7-8.

[124] See for example, Roberta Cohen, 'The Burma Cyclone and the Responsibility to Protect', *Global Responsibility to Protect*, No 1, 2009, p 253-257; Rebecca Barber, 'The Responsibility to Protect the Survivors of Natural Disaster: Cyclone Nargis, a Case Study', *Journal of Conflict & Security Law*, Vol 14, No 1, 2009, p 3-34; Jurgen Haacke, 'Myanmar and the Responsibility to Protect, and the Need for Practical Assistance', *Global Responsibility to Protect*, No 1, 2009, p 156-184; Mely Caballero-Anthony and Belinda Chng, 'Cyclones and Humanitarian Crises: Pushing the Limits of R2P in Southeast Asia', *Global Responsibility to Protect*, No 1, 2009, p 135-155; Ashley McLachlan- Bent and John Langmore, 'A Crime Against Humanity?: Implications and Prospects of the Responsibility to Protect in the Wake of Cyclone Nargis', *Global Responsibility to Protect*, No 3, 2011, p 37– 60; Julian Junk, 'Testing Boundaries: Cyclone Nargis n Myanmar and the Scope of R2P', *Global Society*, Vol 30, No 1, 2016, p 78-93.

PART 2: Considerations for Future Research

4. Research Scope

This section (and Part) builds on the previous discussion by identifying five key analytical categories found in the climate-conflict literature: Geography, Timeframes, Drivers, Policies, and Methodology. This section is designed to provide insights for climate-atrocity researchers to consider when constructing a research project that seeks to examine the 'direct' and/or 'indirect' pathways between climate change and atrocities that occur in peacetime and/or wartime.

Geography

Geography refers to the different geographic scales of analysis (sometimes referred to as 'units of analysis' or 'spatial scale') that the researcher can focus on. The main options encompass global scale, regional scale, country-level scale, sub-national scale (e.g. province, local/municipality, urban, rural), and individual scale, and cross-cutting scale (e.g. global to local). [125] The climate-conflict literature spans the full range of options. Considering geographical scale is important because different scales can produce different results. For instance, country-level concerns and responses to water scarcity will be different to sub-national levels.[126] Each geographic scale is addressed in sequence.

Global scale. Climate-conflict research that includes a global scale of analysis tends to examine the local security implications of climate-induced global structural change. [127] The origin of the Arab Spring is the central example used in the climate-conflict literature as the 'global unit of analyses' with proximate causes. While no scholars argue that the Arab Spring was caused by climate change alone, many argue that it was affected by the impacts of a changing climate. [128] One of those arguments is that climate-linked drought in Russia devastated wheat harvests, which generated grain shortages that reverberated through an increasingly interconnected global food system, resulting in an increase in global wheat

[125] Some investigate arbitrarily defined grid-cells. See for example, Clionadh Raleigh and Henrik Urdal, 'Climate Change, Environmental Degradation and Armed Conflict', *Political Geography*, Vol 26, Iss 6, August 2007, p 674-694; John O'Loughlin, Frank D. W. Witmer, Andrew M. Linke, Arlene Laing, Andrew Gettelman, Jimy Dudhia, 'Climate Variability and Conflict Risk in East Africa, 1990–2009', *PNAS*, Vol 109, Iss 45, September 2012, p 18344-18349.

[126] Idean Salehyan, 'Guest Editorial: Climate Change and Conflict: Making Sense of Disparate Findings', *Political Geography*, Vol 43, 2014, p 2.

[127] See Hendrix discussion in Cullen S. Hendrix, Vally Koubi, Jan Selby, Ayesha Siddiqi & Nina von Uexkull, 'Climate Change and Conflict', *Nature Reviews: Earth and Environment*, Vol 4, March 2023, p 146.

[128] See for example, Peter H. Gleick, 'Drought, Climate Change, and Conflict in Syria', *Weather, Climate, and Society*, Vol 6, No 3, 2014, p 331-340; Shiloh Fetzek and Jeffrey Mazo, 'Climate, Scarcity and Conflict', *Survival*, Vol 56, No 5, 2014, p 143-170; Andrea Beck, 'Drought, Dams, and Survival: Linking Water to Conflict and Cooperation in Syria's Civil War', *International Affairs Forum*, Vol 5, Iss 1, 2024, p 1-12. See also Kelley et al above.

prices.[129] In turn, the price of bread increased substantially – in some places upwards of 300 per cent – sparking so-called 'bread riots' that injected significant momentum into the then-nascent Arab Spring.[130] Hendrix himself asserts that 'there's a reasonable argument that the 2010 Russian drought had nearly as much to do with the Arab Spring protests – via reduced exports and higher global food prices – as any climatic conditions in the MENA region.'[131]

The Arab Spring in 2010/11 was a high-water mark for the atrocity prevention agenda and has spurred much academic and popular debate since. The protests in Libya, which began in February 2011, were especially important in this respect. In this situation, the country's dictator, Muammar Gaddafi, who had been in power for more than 40 years, initially responded to the protests by ordering his security forces to murder and disappear civilians in greater and greater numbers. Unable to suppress the demonstrations, Gaddafi began to broadcast dehumanising threats reminiscent of the Rwandan Genocide, referring to the protesters as 'cockroaches' and 'rats', and pledging to 'cleanse Libya house-by-house'.[132] In response, on 17 March 2011, the UN Security Council passed Resolution 1973 that authorised 'all necessary measures' including military action and a no-fly zone to protect Libyan civilians.[133] This was the first time in Council history that it had authorised the use of force for human protection purposes without the consent of the recognised government concerned.[134] Two days later, a NATO-led alliance, initiated by the US, UK, and France with the support of 18 other states including several Arab counties, conducted a massive aerial bombardment of Gaddafi's air defences and military forces positioned on the outskirts of Benghazi, eventually diminishing Gaddafi's capabilities, and avoiding a suspected large-scale massacre. While controversy ensued, former President of the International Crisis Group, Gareth Evans, asserted that NATO's intervention 'unquestionably worked – certainly in preventing a major massacre in Benghazi'.[135] Climate-atrocity researchers could seek to build an argument that Russia's drought indirectly contributed, via global food markets, to the atrocity situation in Libya – although such a research agenda is bound to provoke significant criticism and resistance from the outset.

Regional scale. The climate-conflict literature overwhelmingly focuses on countries located in sub-Saharan Africa.[136] This focus has been justified on the basis that the region suffers from disproportionate levels of armed conflict, poor governance, agricultural dependence and high exposure to climate impacts, as well as the fact that in some instances, such as Kenya, data is readily available. Courtland et al argue however that this regional focus reveals a 'sampling

[129] See Daniel Abrahams and Edward R. Carr, 'Understanding the Connections Between Climate Change and Conflict: Contributions from Geography and Political Ecology', *Current Climate Change Rep*, Vol 3, 2017, p 237.
[130] Troy Sternberg, 'Chinese Drought, Bread, and the Arab Spring. *Applied Geography*, Vol 34, May 2012, p 519-524.
[131] See Hendrix discussion in Cullen S. Hendrix, Vally Koubi, Jan Selby, Ayesha Siddiqi & Nina von Uexkull, 'Climate Change and Conflict', *Nature Reviews: Earth and Environment*, Vol 4, March 2023, p 146.
[132] Simon Adams, 'Libya', in Alex J Bellamy and Tim Dunne (Eds.), *The Oxford Handbook of the Responsibility to Protect* (New York: Oxford University Press, 2016), p 770.
[133] Resolution 1973, S/ RES/ 1973, Security Council, 17 March 2011.
[134] Alex J. Bellamy, *The Responsibility to Protect: A Defense* (New York: Oxford University Press, 2015), p 10.
[135] Gareth Evans, 'End of the Argument: How We Won the Debate Over Stopping Genocide', *Foreign Policy*, 28 November 2011.
[136] For example, Courtland et al (2018) examine the climate-conflict literature published between 1990–2017 and find that 'with respect to world regions, Sub-Saharan Africa was by far most frequently mentioned in the literature analysed (44 times), although the Middle East (22) and the Sahel (22) were also discussed often' - see Adams, Courtland; Tobias Ide, Jon Barnett and Adrien Detges, 'Sampling Bias in Climate–Conflict Research', *Nature Climate Change,* Vol 8, No. 3, 2018, p 200.

bias in climate-conflict research'.[137] An additional concern raised in the literature is the 'regionalisation' of findings. For example, Koubi cautions against extrapolating findings across a particular region without acknowledging the cultural, economic, political, and social diversity (and coping capacity) associated with each country and local communities therein (which at times are not constrained by state boundaries).[138] The most common regional issue examined in the literature is the security implications of climate variability and change in transboundary rivers systems (e.g. the Euphrates, and the Nile River). Possibilities for conflict as well as cooperation are examined. Such is the focus that recent reviews explicitly call for research that explores the security implications of regional climate impacts *beyond* transboundary river flows.[139]

There is good reason for climate-atrocity researchers to focus on regions in Africa (e.g. North and West Africa, sub-Saharan Africa, The Sahel, the Horn). In short, because the countries that are at risk of atrocity crimes are, by and large, the same as those identified as the most vulnerable to climate impacts. As an example, on the one hand, the Global Centre for the Responsibility to Protect, identifies 36 countries that have experienced or are at risk of experiencing atrocity crimes.[140] Sixteen of the countries are located in North and West Africa (Libya, Sudan and South Sudan, Somalia, Ethiopia, Eritrea, Mali, Burkina Faso, Niger, Cameroon, Nigeria, Guinea, Côte d'Ivoire), and sub-Saharan Africa (Central African Republic, Democratic Republic of Congo, Burundi). On the other hand, since 2015, the University of Notre Dame's' Global Adaptation Index' (ND- GAIN) has ranked more than 180 countries based on their vulnerability to climate impacts.[141] In 2020, the latest ranking, the countries identified as the top ten most vulnerable out of the 182 ranked were, in order (from most to least vulnerable): Niger, Somalia, Chad, Guinea-Bissau, Sudan (South Sudan), Liberia, Mali, Central African Republic, Eritrea, Rwanda (with the next 20 most vulnerable countries including the Democratic Republic of Congo, Uganda, Sierra Leone, Ethiopia, Burundi, Zimbabwe, Malawi, Burkina Faso, The Gambia). Studies examining the climate-atrocity nexus may wish to use Africa's regions as a starting point and radiate outwards thereafter.

Country scale. Country scale of analysis has been the focus of both qualitative and quantitative climate-conflict researchers since the field's inception in the mid-1990s. In the first place, Tom Deligiannis explains that qualitative environment-conflict research in the early 1990s was 'dominated' by state level analysis.[142] In the second place, Nina von Uexkull and Halvard Buhaug explain that 'the first generation of statistical climate–conflict research [commencing in the mid-2000s] focused almost exclusively on the risk of state-based conflict, such as civil war'.[143] As suggested, this body of state-level work tended to focus on the relationship between climate change and civil wars;[144] with, for the most part, alternative and contradictory findings. For example, employing qualitative methods, Homer-Dixon's mid-1990s studies

[137] Ibid.
[138] Vally Koubi, 'Climate Change and Conflict', *Annual Review of Political Science*, Vol 2, 18 March 2019, p 351.
[139] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 6.
[140] 'Populations as Risk', *Global Centre for R2P* (accessed 2022).
[141] 'ND- Gain Country Index: Country Rankings', *Notre Dame Global Adaptation Initiative* (accessed 2022).
[142] Tom Deligiannis, 'The Evolution of Environment-Conflict Research: Toward a Livelihood Framework', *Global Environmental Politics*, Vol 12, No 1, February 2012, p 96.
[143] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 6.
[144] Joshua Busby, 'Taking Stock: The Field of Climate and Security', *Current Climate Change Reports*, Vol 4, 2018, p 339.

generally found that environmental scarcity is an indirect cause of intra-state conflict.[145] By contrast, much of the statistically driven research that preceded it found a weak relationship between climate change and conflict in states.

One of the main country-level cases in the climate-conflict literature centres on the extent to which, or if, a severe drought played a role in sparking Syria's civil war in 2010. The argument in the affirmative, conveyed by former US President Barack Obama, among others, is generally sequenced in the following way: in the period 2008-2010, North-West Syria suffered from a severe drought; this caused catastrophic crop failure and destroyed livelihoods; this, in turn, caused rural-to-urban migration that the receiving cities were ill-prepared to cope with; this caused heightened urban unrest; then came the Arab Spring and protests against the Government ensued; and as a consequence, the Assad regime reacted with increasing brutality. Multiple climate-conflict authors refute this sequence of events, for example, Marwa Daoudy argues that the Assad Government's serious economic mismanagement and neoliberal agricultural policies, not the drought itself, were the critical factors that caused urban migration.[146] Others such as Jan Selby strongly reject the whole idea that climate-related factors had anything to do with the Syrian conflict.[147]

Syria's civil war also dominates the atrocity prevention literature.[148] As of 2024, the Syrian situation has claimed between 450,000 and 610,000 lives. This ongoing human protection disaster should be a priority consideration for prospective climate-atrocity researchers who are interested in pursuing a country-level analysis.

Sub-national scale. Since 2015, climate-conflict research has reorientated towards exploring the relevant connections within administrative regions (province, local/municipality, urban, rural) inside countries; and away from the country-level scale, which is probably now in the minority in comparison. The Bern-Zürich Group in the mid-1990s first examined sub-national connections and found that 'environmental discrimination' – the notion that environmental degradation and limited resources created resource allocation favouritism – can result in ethno-political conflict and centre-periphery conflict. However, as mentioned, country-level analysis was the dominant level of analysis throughout the 1990s and 2000s. By early 2010s however, dissatisfaction grew among scholars that country-level analysis overlooked important smaller-scale dynamics at play.[149] To remedy this situation, researchers started to collect an array of sub-national indicators such as battle locations and local resource availability.[150]And over time, they began to reduce the geographic scale of analysis to a particular province, district, municipality, and even grid-cell.[151] This local-level focus was

[145] Tom Deligiannis, 'The Evolution of Environment-Conflict Research: Toward a Livelihood Framework', *Global Environmental Politics*, Vol 12, No 1, February 2012, p 81.
[146] Marwa Daoudy, *The Origins of the Syrian Conflict: Climate Change and Human Security* (Cambridge: Cambridge University Press, 2020).
[147] Jan Selby, Omar S. Dahi, Christiane Frohlich, and Mike Hulme, 'Climate Change and the Syrian Civil War Revisited', *Political Geography*, Vol 60, 2017, p 232-244.
[148] See for example, Alex J Bellamy, *Syria Betrayed: Atrocities, War, and the Failure of International Diplomacy* (New York: Columbia University Press, 2022).
[149] Tom Deligiannis, 'The Evolution of Environment-Conflict Research: Toward a Livelihood Framework', *Global Environmental Politics*, Vol 12, No 1, February 2012, p 81 and 84.
[150] Idean Salehyan, 'Guest Editorial: Climate Change and Conflict: Making Sense of Disparate Findings', *Political Geography*, Vol 43, 2014, p 2 and 3.
[151] Ibid.

assisted and propelled by the corresponding proliferation of georeferenced conflict data and statistical software able to handle spatial data. The Syria situation demonstrates the importance of examining local-level dynamics in rural settings and the built environment and their interrelationship.

Individual scale. This scale focuses more acutely on climate-conflict interactions as they relate to individuals, livelihoods and communities. [152] Scholars investigating this scale of analysis will generally work with the concept of Human Security, which, as mentioned above, was developed in the 1990s, and published in the seminal *1994 UNDP Human Development Report*. [153] As the namesake suggests, it is concerned with the security of individuals and communities. A human security approach implies consideration of the well-being, physical survival, quality of life, and safety of all, including the most vulnerable and marginalised. [154] Climatic change and climate extremes as well as conflict, especially violent conflict – independently and together – can reduce human security by depriving individuals of access to food, shelter, and other assets essential to sustain a decent quality of life and livelihoods. [155] Some scholars have used this concept to examine the security implications of natural resource scarcity on individuals, families, and communities.

Cross-cutting scale. The scales mentioned above need not be siloed in any research agenda. Indeed, climate-conflict researchers have urged for more research to be undertaken on the local-regional-global interactions relevant to both climate change and conflict risk. This type of multi-scale tracing exercise has been exhibited in the Arab Spring example above: that a combination of weather shocks and export bans in a major grain-producing country caused global food prices to spike in 2010, with destabilising effects for importers in the Middle East and North Africa. [156] Overall, the task is to connect a climate-related shock in a time and in a place that is distant from a violent conflict through a variety of intermediaries such as agricultural markets or migration.

Timeframes

Timeframes (sometimes referred to as 'temporal scale'), refers to the period of time that the researcher will examine. The period of time could be in the past, or indeed, in the future. Climate-conflict studies vary with respect to their timeframe of analysis. [157] Some have examined the relationship between longer-term climatic changes such as megadroughts or prolonged cold periods (which can span several years or decades) and sustained armed conflict related to the downfall of empires and dynasties – all of which can only be seen at long

[152] François Gemenne, Jon Barnett, W. Neil Adger and Geoffrey D. Dabelko, 'Climate and Security: Evidence, Emerging Risks, and a New Agenda', *Climatic Change*, 123, 2014, p 2.
[153] *1994 UNDP Human Development Report*, United Nations Development Programme, 1994.
[154] Christos Zografos, Marisa C. Goulden, and Giorgos Kallis, 'Sources of Human Insecurity in the Face of Hydro-Climatic Change', *Global Environmental Change*, 29, 2014, p 328.
[155] Ibid., p 331.
[156] Katharine J. Mach, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Caroline M. Kraan, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jurgen Scheffran, Kenneth A. Schultz, and Nina von Uexkull, 'Directions for Research on Climate and Conflict', *Earth's Future,* Vol. 8, 2020, p 3.
[157] Idean Salehyan, 'Guest Editorial: Climate Change and Conflict: Making Sense of Disparate Findings', *Political Geography*, Vol 43, 2014, p 3.

time intervals.[158] While others, and the dominant timescale, examine short-term 'shocks' in temperature, rainfall, or other such climatic variables, usually measured in monthly or annual changes, and violent conflict.[159] Some consider the potential relationship between future warming scenarios and violent conflict. Timeframe options are important to consider because one's selection can generate different results on the closeness of the climate-conflict relationship.

Historical analysis. Climate-conflict researchers largely analyse historical events. This focus tends to show only a weak relationship between climate change and conflict. For example, as Jan Selby states, 'evidence from this research, is generally weak, and contradictory, and in some cases, non-existent, as for instance on the influence of climate change in the Lake Chad crisis'.[160] Similarly, a 2019 panel of climate-conflict experts agreed that the best estimates are that 3–20% of conflict risk over the past century has been influenced by climate variability or change and judged other drivers 'much more influential for conflict overall'.[161] That said, these overtures are based on, by and large, the use of quantitative research methods (discussed below) to examine the link between rapid-onset climate impacts and single conflict events. As Nina von Uexkull and Halvard Buhaug explain: 'the empirical climate–conflict literature almost exclusively studies effects of climate variability or extreme weather events, not climate change.'[162] Halvard Buhaug describes the practical implications of this focus in the following way: 'Although much of the public discourse concerns possible long-term impacts of climate change, virtually all empirical work to date relates to short-term changes in weather patterns and extreme weather events'.[163]

Long-term deep historical studies (i.e. ancient civilisations and pre-1850), by contrast, tend to find a coincidence between climate change and armed conflict, at least in some regions of the world.[164] For instance, Zhang and co-authors combine a set of variables for the time period 1500-1800 to identify climate change as a key driver of large-scale human crises in the Northern Hemisphere.[165] Similarly, Tol and Wagner find that in preindustrial Europe, cooler

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[158] Solomon M. Hsiang, Marshall Burke, and Edward Miguel, 'Quantifying the Influence of Climate on Human Conflict', *Science*, Vol 341, Iss 6151, 2013. See also, Brian Fagan, *The Little Ice Age: How Climate Made History 1300 – 1850* (New York: Basic Books, 2000); Brian Fagan, *The Great Warming: Climate Change and the Rise and Fall of Civilizations* (New York: Bloomsbury Press, 2008); Harvey Weiss (Eds.), *Megadrought and Collapse: From Early Agriculture to Angkor* (New York: Oxford University Press, 2017); Geoffrey Parker, 'Crisis and Catastrophe: The Global Crisis of the Seventeenth Century Reconsidered', *The American Historical Review*, Vol 113, No 4, 2008.

[159] See for example, Cullen Hendrix and Sarah M. Glaser, 'Trends and Triggers: Climate, Climate Change and Civil Conflict in Sub-Saharan Africa', *Political Geography*, Vol 26, Iss 6, 2007, p 695–715; Mathieu Couttenier and Raphael Soubeyran, 'Drought and Civil War in Sub-Saharan Africa', *The Economic Journal*, 27 March 2013.

[160] Jan Selby in discussion in Cullen S. Hendrix, Vally Koubi, Jan Selby, Ayesha Siddiqi & Nina von Uexkull, 'Climate Change and Conflict', *Nature Reviews: Earth and Environment*, Vol 4, March 2023, p 144.

[161] Katharine J. Mach, Caroline M. Kraan, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jürgen Scheffran, Kenneth A. Schultz and Nina von Uexkull, 'Climate as a Risk Factor for Armed Conflict', *Nature*, Vol 571, 11 July 2019, p 194.

[162] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 7.

[163] Halvard Buhaug, 'Climate–Conflict Research: Some Reflections on the Way Forward', *WIREs Climate Change,* Vol 6, 2015, p 270.

[164] Jürgen Scheffran, Michael Brzoska, Jasmin Kominek, P. Michael Link, and Janpeter Schilling, 'Climate Change and Violent Conflict', *Science*, Vol 336, 2012. p 870.

[165] David D. Zhang, Harry F. Lee, Cong Wang, Yulun An, 'The Causality Analysis of Climate Change and Large-scale Human Crisis', *PNAS*, Vol 108, Iss 42, 2011, p. 17296-17301.

periods were more likely to correspond to periods of violence than warmer phases.[166] Studies on pre-1850 China find similarly.[167] Climate-atrocity researchers should thus be cognisant that short-term (event-based) versus long-term (multi-decadal) historical analysis may produce different results.

Future scenarios. Even the most ardent climate-conflict sceptics are willing to concede that climate change will likely lead to future climate-related deadly violence. For example, Selby explains that, 'Climate change will increase exposure to climatic extremes and shocks, and will usher in various long-term climatic shifts – changes which might well increase conflict risks' (unless we 'solve the climate crisis', he qualifies).[168] Vally Koubi similarly agrees, explaining that 'the expectation is that any intensification of climate change and extreme events in the future will increase conflict risk via impacts on the economy, agricultural production, intergroup inequalities and migration' (also similarly, 'unless greenhouse gas trajectories are curtailed').[169] The previously mentioned 2019 expert panel finds similarly, even ascribing a numerical risk: an approximately 2°C increase in the global mean temperature above preindustrial levels is estimated to substantially increase conflict risk with 13% probability, rising to 26% probability under an approximately 4°C warming scenario. [170] Variations on this theme include Tobias Ide who explains that 'Scholars nowadays largely agree that climate change is unlikely to cause armed conflicts between states, at least in the next decades'.[171] And in a different take again, Jon Barnett suggests that peaceful outcomes are more likely if political leaders start to convey a more positive narrative about the future (and stop 'securitising' climate change).[172] Others argue that the success or failure of climate adaptation policies will largely determine a future marked by conflict or cooperation.[173]

Some scholars have conveyed concern that much of what the world knows about the climate-conflict nexus comes from observation of the past.[174] Their concern stems from the fact that projected global temperature rise (between 2.5-3°C),[175] and thus future climate shifts, will have no historical precedent for particular regions.[176] François Gemenne and colleagues explain that in such circumstances, insights from the past may have limited future

[166] Richard S J Tol and Sebastian S Wagner, 'Climate Change and Violent Conflict in Europe Over the Last Millennium', *Climatic Change*, Vol 99, 2010, p. 65-79.
[167] David D. Zhang, Peter Brecke, Harry F. Lee, Yuan-Qing He, and Jane Zhang, 'Global Climate Change, War, and Population Decline in Recent Human History', *PNAS*, Vol 104, Iss 49, 2007, p. 19214–19219.
[168] Jan Selby in discussion in Cullen S. Hendrix, Vally Koubi, Jan Selby, Ayesha Siddiqi & Nina von Uexkull, 'Climate Change and Conflict', *Nature Reviews: Earth and Environment*, Vol 4, March 2023, p 146.
[169] Vally Koubi in discussion in Cullen S. Hendrix, Vally Koubi, Jan Selby, Ayesha Siddiqi & Nina von Uexkull, 'Climate Change and Conflict', *Nature Reviews: Earth and Environment*, Vol 4, March 2023, p 146.
[170] Katharine J. Mach, Caroline M. Kraan, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jürgen Scheffran, Kenneth A. Schultz and Nina von Uexkull, 'Climate as a Risk Factor for Armed Conflict', *Nature*, Vol 571, 11 July 2019, p 194.
[171] Tobias Ide, 'Research Methods for Exploring the Links Between Climate Change and Conflict', *WIREs Climate Change*, Vol 8, 2017, p 1.
[172] Jon Barnett, 'Global Environmental Change: Climate Resilient Peace?', *Progress in Human Geography*, 2019, Vol 43, Iss 5, p 927-936.
[173] Christos Zografos, Marisa C. Goulden, and Giorgos Kallis, 'Sources of Human Insecurity in the Face of Hydro-Climatic Change', *Global Environmental Change*, 29, 2014, p 327-336.
[174] François Gemenne, Jon Barnett, W. Neil Adger, and Geoffrey D. Dabelko, 'Climate and Security: Evidence, Emerging Risks, and a New Agenda', *Climatic Change*, Vol 123, 2014, p 7.
[175] A 2024 survey of IPCC scientists found that 77% expect warming to exceed 2.5°C by 2100, with almost 50% expecting 3°C of warming. See, 'World's Top Climate Scientists Expect Global Heating to Blast Past 1.5C Target', *The Guardian*, 8 May 2024.
[176] François Gemenne, Jon Barnett, W. Neil Adger, and Geoffrey D. Dabelko, 'Climate and Security: Evidence, Emerging Risks, and a New Agenda', *Climatic Change*, Vol 123, 2014, p 7.

relevance.[177] Nina von Uexkull agrees, suggesting that the unprecedented magnitude of climate impacts humanity is facing may limit the future relevance of past experiences.[178] Kathrine Mach and colleagues agree.[179] Given this, research that specifically sets out to explore future climate-conflict scenarios is of critical importance. One way to glimpse into the future, and cautiously make predictions, is by examining multidecadal past trends (rather than single events) of climate change and conflict. Another way is to use climate modelling. The climate-conflict literature finds that there is a disconnect between the rapid advances in climate modelling and prediction, and the studies that use this information to examine future climate-conflict scenarios. As von Uexkull puts it: 'Science is making rapid progress in modelling potential future impacts of climate change on crop yields, economic productivity, and the prevalence of hunger. In contrast, there is a distinct lack of scenario-based projection studies that estimate future climate change impacts on conflict risk.'[180] Given that atrocities can occur in peacetime as well as under the cover of war, climate-atrocity researchers could develop predictions by triangulating data on countries with past atrocities, current marginalised minority groups, and severe weather forecasting. This may help identify populations that may suffer severe neglect in the aftermath of a cyclone or flood, amounting to a crime against humanity.

Drivers

The climate-conflict literature periodically conveys concern that the field suffers from definitional inconsistencies on its two key variables, and namesake, "climate" and "conflict" (among other terms).[181] This situation has played its part in generating contradictory results.[182] The following discussion attempts to provide clarity on these two keys terms as well as extending the discussion by providing basic definitions for 'atrocities'. Climate-atrocity researchers should learn from this definitional confusion and seek to clarify their key terms from the outset to ensure that subsequent research is comparing apples with apples. This section considers the 'climate' variable as the driver because the literature overwhelming adopts this unidirectional approach, rarely considering the impact that conflict has on climate.

Climate change. Climate-conflict researchers have repeatedly raised concern that the field suffers from terminological confusion, which has had a detrimental impact on research findings. For example, Halvard Buhaug explains that, 'Unfortunately, researchers are often not clear on the distinction between climate variability and climate change, and findings of

[177] Ibid., p 1 and 7.
[178] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 7
[179] Katharine J. Mach, Caroline M. Kraan, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jürgen Scheffran, Kenneth A. Schultz and Nina von Uexkull, 'Climate as a Risk Factor for Armed Conflict', *Nature*, Vol 571, 11 July 2019, p 195.
[180] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 11.
[181] Idean Salehyan, 'Guest Editorial Climate Change and Conflict: Making Sense of Disparate Findings', *Political Geography*, Vol 43, 2014, p 1. See also, Vally Koubi, 'Climate Change, the Economy, and Conflict', *Curr Clim Change Rep*, 2017, Vol 3, 2017, p 207.
[182] Idean Salehyan, 'Guest Editorial: Climate Change and Conflict: Making Sense of Disparate Findings', *Political Geography*, Vol 43, 2014, p 2. For a variation in findings compare: Solomon M. Hsiang, Marshall Burke, and Edward Miguel, 'Quantifying the Influence of Climate on Human Conflict', *Science*, Vol 341, September 2013, p 13; Nils Petter Gleditsch, 'Whither the Weather? Climate Change and Conflict', *Journal of Peach Research*, Vol 49, Iss 1, 2012, p 7; and Jurgen Scheffran and Antonella Battaglini, 'Climate and Conflicts: The Security Risks of Global Warming', *Regional Climate Change*, Vol 11, p 37.

behaviour related to the former are often used as foundation for projecting impacts of the latter'.[183] Hanne Seter finds similarly: first, that 'One source of confusion within the research field is the distinction between climate change and climate variability'; and second, that 'An effect of climate variability on conflict levels cannot automatically be translated into the conclusion that climate change (a warmer planet) will lead to more conflict'.[184]

As this suggests, an important initial distinction to be made is between 'climate change' (sometimes referred to as 'climatic change') and 'climate variability' (sometimes referred to as 'climate extremes' or 'extreme weather events'). Nina von Uexkull and Halvard Buhaug explain that climate change refers to a change in average weather patterns that persists for an extended period, typically decades or longer.[185] Busby adds nuance to this definition by distinguishing between natural climate change, which has been occurring throughout history, and human-caused climate change, which has been occurring since about 1850, stating that: 'Anthropogenic climate change reflects long-run changes in precipitation, temperature, and weather systems as a result of human activity, principally from the emissions of greenhouse gases'.[186] As Busby suggests, climate change, for the most part, can be associated with 'slow onset events' that include sea level rise, increasing temperatures, ocean acidification, glacial retreat and related impacts, salinisation, land and forest degradation, loss of biodiversity, and desertification.[187] Climate variability in contrast, von Uexkull and Buhaug explain, 'is most often used to denote short-term deviations from average weather conditions, including the occurrence of extreme events'.[188] Climate variability is usually associated with 'rapid onset events' such as land or marine heat waves, tropical cyclones, high-tide flooding, drenching rainfall, severe floods, droughts, and wildfires. Slow or rapid onset events, individually or in combination, can undermine food security and livelihoods, cause migration, and in worst case scenarios, threaten the survivability of a human population.

Conflict. The second important clarification to be made is the term 'conflict'. The climate-conflict literature examines a variety of 'conflict situations'. While not an exhaustive list, such situations can include violent crime, social unrest (such as protests), organised armed rebellions, through to an armed struggle between states.[189] These situations can embody significantly different characteristics, for instance, how long the 'conflict' might endure, who might be the perpetrators of the violence, and how severe the violence might be. Social unrest situations, as an example, are usually short-lived affairs that generally require a limited government response (e.g. police presence) to bring the situation back under control. By stark contrast, an armed struggle between states will usually require a sustained, much larger commitment of resources that prioritises the use of military power. Unclarified definitional diversity on conflict (as well as on climate) can be problematic, as Salehyan asserts: 'the

[183] Halvard Buhaug, 'Climate-Conflict Research: Some Reflections on the Way Forward', *WIREs Climate Change,* Vol 6, 2015, p 270.
[184] Hanne Seter, 'Connecting Climate Variability and Conflict: Implications for Empirical Testing', *Political Geography*, Vol 53, 2016, p 2.
[185] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 7.
[186] Joshua Busby, 'Taking Stock: The Field of Climate and Security', *Current Climate Change Reports*, Vol 4, 2018, p 339.
[187] 'Slow Onset Events', FCCC/TP/2012/7, United Nations Framework Convention on Climate Change, 26 November 2012.
[188] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 7.
[189] Idean Salehyan, 'Guest Editorial: Climate Change and Conflict: Making Sense of Disparate Findings', *Political Geography*, Vol 43, 2014, p 3.

causal chain leading from water scarcity to communal conflict between farmers and pastoralists may look very different when examining conflict between nation-states over water resources'.[190] The severity of the violence is another key characteristic. Over time it appears that the climate-conflict literature has tended to *scale-down* this characteristic. That is, for example, from examining battle deaths in civil wars to examining scuffles at fossil fuel protests. The climate-atrocity research agenda requires a dramatic *scaling-up* of this characteristic.

Atrocities. Climate-atrocity researchers should attempt to clarify the atrocity crime/s that they primarily seek to address, although this may not always be possible given that different political and organisational entities may present competing, and changing, designations over time. For example, the Government of Myanmar's self-described 'clearance operations' of the Rohingya population in 2017 has been termed both a 'genocide' and 'ethnic cleansing' campaign by different governments, multilateral organisations and civil society groups. An extra layer of analytical depth can be achieved by teasing out the multiple 'acts' that compose each atrocity crime. For example, acts considered to be war crimes include mutilation, torture, summary executions, and enlisting child soldiers (among others); while crimes against humanity include acts of widespread murder, enslavement, deportation, and rape (among others). A full list can be found in Appendix 3.

Policies

Policy is another feature of the climate-conflict literature and something to consider when designing a climate-atrocity research project.

Climate-conflict policies. The 36 climate-conflict literature reviews examined for this report tend not to specifically address policy solutions or challenges with any great emphasis. Rather, the focus is on uncovering the pathways between climate change and conflict, and should policies be involved in this investigation, then so be it. Nonetheless, four general themes can be discerned.

First, the issue of framing. Some scholars have been critical of governments that frame climate change as a 'risk or threat'. François Gemenne and colleagues suggest this and offer an alternative frame: 'more emphasis needs to be put on the factors for peace and cooperation, and on the capabilities of people and institutions, rather than just on the threats and risks'.[191] Jon Barnett agrees, more explicitly stating that 'reframing the relationship between climate change and security to be one of climate resilient peace draws attention to the ubiquitous if unspectacular evidence that peace is normal and is robust to environmental change'. [192] Policy frames are important because new frames can make previously unthinkable policy positions gradually seem acceptable, achievable and eventually normal.[193]

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[190] Ibid.

[191] François Gemenne, Jon Barnett, W. Neil Adger, and Geoffrey D. Dabelko, 'Climate and Security: Evidence, Emerging Risks, and a New Agenda', *Climatic Change*, Vol 123, 2014, p 6.

[192] Jon Barnett, 'Global Environmental Change: Climate Resilient Peace?', *Progress in Human Geography*, 2019, Vol 43, Iss 5, p 933.

[193] Ben L Parr, *Australian Climate Policy and Diplomacy* (PhD thesis, University of Melbourne, 2014), p 23.

Second, climate-conflict scholars tend to emphasise the virtues of 'peacebuilding' activities. Two nuances are worth noting. First, environmental peacebuilding, which has its modern roots in early 2000s scholarship,[194] tends to gravitate toward post-conflict policies that help communities manage their natural resources in a sustainable way (e.g. land, water, forests, and fisheries).[195] It is believed that such policies can facilitate cooperation between groups and thus reduce the risk of future conflict. Second, the literature argues that peacebuilding activities should be pursued with or without an integrated climate dimension. Halvard Buhaug explains the rationale for this approach, stating that, 'without peace and stable, and well-functioning political institutions, it is hard to see how societies can address existing and future security challenges affected by climate change'. [196] Buhaug adds, that, 'peace building is quite possibly the most effective climate resilience policy in unstable corners of the world'.[197]

Third, another major theme in the literature addresses 'mal-adaptation', which is a term used to denote policies that are pursued in the name of adaptation and security but end up undermining the security of parts of the population,[198] and in the worst cases, can contribute to violent conflict.[199] For instance, an international actor might implement a drought-resilient agricultural program in a fragile state to reduce food insecurity and the risk of conflict, but ultimately the program causes food inequality between groups, damages local labour markets, and inflames socio-political tensions. Jan Selby develops this point in the following way: 'climate adaptation programmes – mega-dams, land investments, forced resettlement schemes, and so on – are already having substantial conflict effects, as recognised in the 'mal-adaptation' literature'. [200] Tobias Ide describes such situations as 'the dark side of environmental peacebuilding.' [201]

The Responsibility to Protect and Climate Policy. The climate-atrocity literature is quite comfortable with identifying policy responses to avoid climate-related human protection catastrophes. For example, the three climate-atrocity Special Issues discuss economic sanctions through to military intervention.[202] This may be the upshot of prioritising qualitative methods (discussed below), which tend to produce an affirmative relationship between climate and atrocities. However, the policies identified in this emerging body of research are significantly underdeveloped and piecemeal.

Developing a more complete and structured policy toolbox could find inspiration in recent Western government activity. To address climate-related security risks, the US and EU especially have sought to integrate climate policies into traditional conflict prevention and

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[194] See, Conca and Dabelko (2002).
[195] Jon Barnett, 'Global Environmental Change: Climate Resilient Peace?', *Progress in Human Geography*, 2019, Vol 43, Iss 5, p 931-932.
[196] Halvard Buhaug, 'Climate Change and Conflict: Taking Stock', *Peace Econ Peace Sci Publ Pol*, Vol 22, No 4, 2016, p 336.
[197] Ibid., p 336.
[198] Christos Zografos, Marisa C. Goulden, and Giorgos Kallis, 'Sources of Human Insecurity in the Face of Hydro-Climatic Change', *Global Environmental Change*, 29, 2014, p 332.
[199] Jan Selby and Clemens Hoffmann, 'Rethinking Climate Change, Conflict and Security', *Geopolitics*, Vol 19, Iss 4, 2014, p 749.
[200] See Selby discussion in Cullen S. Hendrix, Vally Koubi, Jan Selby, Ayesha Siddiqi & Nina von Uexkull, 'Climate Change and Conflict', *Nature Reviews: Earth and Environment*, Vol 4, March 2023, p 147.
[201] Tobias Ide, 'The Dark Side of Environmental Peacebuilding', *World Development*, Vol 127, 2020, p 1-9.
[202] See for example, Jürgen Zimmerer, 'Climate Change, Environmental Violence and Genocide', *The International Journal of Human Rights*, Vol 18, Iss 3, 2014, p 267 and 276. See also, Gregory Kent, 'Crystallisations of the Global Western State in the Era of Climate Change', *The International Journal of Human Rights*, Vol 18, Iss 3, 2014, p 320-335.

response policies. For example, the EU has developed climate-informed: conflict early warning systems, mediation experts, Security Sector Reform processes, law enforcement and governance processes, and Disarmament, Demobilisation and Reintegration processes.[203] However, these approaches still lack a standardised framework and comprise only few policy options.

The Responsibility to Protect policy framework delivers on both of these issues. Developed in the early 2000s, the R2P toolbox encompasses a prevention, reaction, and rebuilding phase. Each phase comprises four broad sets of strategies: political, economic, legal, and security (the rebuilding phase is slightly different). Within each strategy lies a variety of policy options for decision makers to consider - in total, 46 policy options across the three phases (see Appendix 4). In addition, the R2P toolbox offers two other advantageous features. First, the strategies, and policy options therein, operate in a sequence moving from less to more intrusive and from less to more coercive, for instance, from diplomatic endeavours to economic sanctions and arms embargoes, through to a non-territorial show of force and coercive military intervention. Second, the broader R2P agenda makes clear who, in practice, should do what, when, and how to halt or avert an atrocity situation that is occurring or imminent. The primary responsibility to act lies with the state itself where the crisis is erupting; but if the state is unable or unwilling to act, the responsibility to take appropriate action falls to the international community.[204] Attempts have been made to integrate disparate climate policies into the R2P toolbox.[205]

Methodology

There are three main methodological categories present in the climate-conflict research. Arranged according to their pervasiveness, they are: quantitative, qualitative, and mixed methods (i.e. quantitative-qualitative). Method selection is very important because one's choice can be the decisive factor in producing research that conveys an affirmative or negative link between climate and conflict.

Quantitative methods. Quantitative research methods have dominated contemporary climate-conflict scholarship. For example, Tobias Ide's 2017 survey found that large-*N* statistical analysis was used in around 60 per cent of the studies published in upper-tier journals between 2007-2015.[206] Larger and more detailed data-sets, as well as enhanced computing technology, have spurred this focus. As mentioned, this approach tends to generate weak links between climate change and conflict. Statistical climate-conflict research is expected to grow in the immediate to mid-term as micro-data generating technologies, such as satellite and drone imagery, develop in parallel. [207] However, calls among scholars are also growing

[203] 'Concept for an Integrated Approach on Climate Change and Security', *European Union*, September 2021.
[204] Gareth Evans, *The Responsibility to Protect: Ending Mass Atrocity Crimes Once and For All* (Washington, DC: Brookings Institution Press, 2008), p 105.
[205] Ben L Parr, *Climate Change Action and the Responsibility to Protect: A Common Cause* (London: Routledge, 2024).
[206] Tobias Ide, 'Research Methods for Exploring the Links Between Climate Change and Conflict', *WIREs Climate Change*, Vol 8, 2017, p 3.
[207] Katharine J. Mach, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Caroline M. Kraan, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jurgen Scheffran, Kenneth A. Schultz, and Nina von Uexkull, 'Directions for Research on Climate and Conflict', *Earth's Future,* Vol. 8, 2020, p 3.

for enhanced methodological diversity to help provide a more complete picture of the climate-conflict nexus.[208] Statically-driven climate-atrocity research is rare, but where it does exist, produces the same weak relationship between the two key variables.

Qualitative methods. Qualitative climate-conflict research methods took precedent in the 1990s. However, throughout the 2000s, its share of research output dramatically shrunk. So much so that between 2007-2015, qualitative methods only occupied around 9 per cent of the top-tier studies, according to Ide.[209] Recent years however have seen a resurgence of qualitative research.[210] Qualitative methods include survey-based analysis, interviews with affected individuals, focus groups, direct observations, and discourse analysis.[211] A major strength of qualitative research, especially when field-based, is its ability to account for local complexities and context.[212] These methods tends to find a moderate to strong relationship between climate and conflict. Climate-atrocity research tends to prioritise qualitative methods and academic disciplines - and thus, tends to find a similarly moderate to strong relationship between the two variables.

Mixed method approach. According to Ide, only 4 per cent of high-impact scholarly research between 2007-2015 used integrated approaches that combined statistical and qualitative field-based methods.[213] There have been several calls for this to change with greater emphasis placed on multi-method research.[214] Such mixed approaches may for instance seek to integrate statistical techniques with process tracing; or combine geographical information systems (GIS) risk analysis with field-based interviews for subsequent discourse analysis.[215] Such mixed approaches may help shed new light on the mechanisms linking climate change to armed conflict,[216] and climate change to atrocities. It should also be noted that in general, climate-conflict practitioners - those working in NGOs and government - rely more heavily on qualitative research compared to scholars to develop understandings and recommendations. This might be one reason why policymakers are forging ahead with plans to address a range of climate-conflict phenomena: from preparing military bases and missions for climate extremes, through to actioning climate-informed peacemaking processes, and beyond.[217] To bring academics into the policymaking conversation, Joshua Busby argues for an increase in the 'coproduction of research'.[218] He suggests that this coproduction of research (and implied mixed method approach) should be directed towards informing decision-makers' goals and priorities.[219]

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[208] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 8.
[209] Tobias Ide, 'Research Methods for Exploring the Links between Climate Change and Conflict', *WIREs Climate Change*, Vol 8, 2017, p 3.
[210] Nina von Uexkull and Halvard Buhaug, 'Security Implications of Climate Change: A Decade of Scientific Progress', *Journal of Peace Research*, Vol 58, No 1, 2021, p 6.
[211] Daniel Abrahams and Edward R. Carr, 'Understanding the Connections between Climate Change and Conflict: Contributions from Geography and Political Ecology', *Curr Climate Change Rep*, 2017, Vol 3, p 235. Tobias Ide, 'Research Methods for Exploring the Links between Climate Change and Conflict', *WIREs Climate Change*, Vol 8, 2017, p 9.
[212] Discussed in Ide (2017) and Abrahams and Carr (2017).
[213] Tobias Ide, 'Research Methods for Exploring the Links between Climate Change and Conflict', *WIREs Climate Change*, Vol 8, 2017, p 3.
[214] See von Uexkull and Buhaug, 2021 p 6; or Ide 2017 p 10.
[215] Ide, 2017, p 2. See also, Katharine J. Mach, W. Neil Adger, Halvard Buhaug, Marshall Burke, James D. Fearon, Christopher B. Field, Cullen S. Hendrix, Caroline M. Kraan, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jurgen Scheffran, Kenneth A. Schultz, and Nina von Uexkull, 'Directions for Research on Climate and Conflict', *Earth's Future,* Vol. 8, 2020, p 3.
[216] Katharine J. Mach et al., 2020, p 3.
[217] Joshua Busby, 'Taking Stock: The Field of Climate and Security', *Current Climate Change Reports*, Vol 4, 2018, p 338.
[218] See Katharine J. Mach, et al., 2020, p 5.
[219] Joshua Busby, 2018, p 342-344.

Conclusions

This report was prompted by the question: what is the relationship between climate change and mass atrocities? An examination of the climate-conflict-atrocity literature revealed that no firm answer existed. To help precipitate answers, the report organised a variety of disparate climate-atrocity insights into the enduring contextual features and analytical categories found in the climate-conflict literature. In doing so, the report presented a proto-structure to help advance future climate-atrocity research. This outcome thus delivered on the ultimate aim of the report, which was to provide some 'initial thinking' to hopefully inspire the consolidation of a formal climate-atrocity *Blueprint for Future Research*. The report also demonstrated the enormous complexity that sits behind the climate-conflict-atrocity nexus, and by implication the 'threat multiplier' thesis.

The report was divided into two Parts.

Part One of the report outlined the essential context within which climate-atrocity researchers find themselves. It was divided into three Sections. Section 1 sought to locate the climate-atrocity research agenda in relation to the climate-conflict agenda. It found that the climate-atrocity agenda should perhaps be located within the climate-conflict agenda. However this location is subject to challenge. The benefits of couching the climate-atrocity agenda in this way permits an ease of transmission of decades of research from one to the other, helping to inform and advance our emerging agenda, and reducing the prospect of repeating mistakes (e.g. poor definitional clarity). Section 2 examined the 'pathways' literature. It found that a key task for climate-atrocity researchers is to organise their analysis between the two key variables ('climate' and 'atrocity') into standardised categories so that research can tracked and replicated. The report suggested that this could be achieved by way of adopting the climate-conflict 'pathways' analysis and categories: 'direct' and 'indirect'. Section 3 examined two unique features of the climate-atrocity relationship: first, that only in rare cases do conflicts escalate into atrocities; and second, that atrocities can be committed in the absence of conflict. These findings add a degree of complexity to the 'pathways' discussion because, for instance, peacetime atrocities sit somewhat outside the scope of climate-conflict research (but this would of course depend on one's definition of 'conflict').

Part Two presented a variety of analytical categories, and subcategories, extracted from the climate-conflict literature to help guide climate-atrocity research in general, but also, more specifically, to help examine the 'pathways' between climate change and atrocities. They were, in sequence: Geography, Timeframes, Drivers, Policies, Methodology. It is hoped that by explicitly using these research categories and subcategories to examine the 'direct' and 'indirect' 'pathways' between climate change and atrocities that occur in wartime and peacetime, researchers can expedite answers to the climate-atrocity link and enable the rapid adoption of effective atrocity prevention policies as the world races towards 2°C of warming.

Useful next steps might be:

- to establish a Community of Practice on climate-atrocity research, which would include scholars and practitioners, to further develop and ultimately finalise a *Blueprint*.
- to engage deeply with climate-conflict scholars and practitioners when crafting a *Blueprint*.
- to continue to (explicitly) explore the climate-atrocity nexus. New evidence should be fed into the *Blueprint* development process.

Appendices

Appendix 1: Climate-Conflict Reviews Examined, 2012-2022

1	Deligiannis, Tom (2012) The evolution of environment–conflict research: Toward a livelihood framework. *Global Environmental Politics* 12(1): 78–100.
2	Schilling, Janpeter; Korbinian P Freier, Elke Hertig & Jurgen Scheffran (2012) Climate change, vulnerability and adaptation in North Africa with focus on Morocco. *Agriculture, Ecosystems & Environment* 156(August): 12–26.
3	Schilling, Janpeter; Sarah Louise Nash, Tobias Ide, Jurgen Scheffran, Rebecca Froese & Pina von Prondzinski (2017) Resilience and environmental security: Towards joint application in peacebuilding. *Global Change, Peace & Security* 29(2): 107–127.
4	Hsiang, Solomon M; Marshall Burke & Edward Miguel (2013) Quantifying the influence of climate on human conflict. Science 341(6151): 1235367.
5	Klomp, Jeroen & Erwin Bulte (2013) Climate change, weather shocks, and violent conflict: A critical look at the evidence. Agricultural Economics 44(s1): 63–78.
6	Meierding, Emily (2013) Climate change and conflict: Avoiding small talk about the weather. *International Studies Review* 15(2): 185–203.
7	Theisen, Ole Magnus; Nils Petter Gleditsch & Halvard Buhaug (2013) Is climate change a driver of armed conflict? *Climatic Change* 117(3): 613–625.
8	Gemenne, Francois; Jon Barnett, W Neil Adger & Geoffrey D Dabelko (2014) Climate and security: Evidence, emerging risks, and a new agenda. *Climatic Change* 123(1): 1–9.
9	Hsiang, Solomon M & Marshall Burke (2014) Climate, conflict, and social stability: What does the evidence say? *Climatic Change* 123(1): 39–55.
10	Salehyan, Idean (2014) Climate change and conflict: Making sense of disparate findings. *Political Geography* 43(November): 1–5.
11	Selby, Jan (2014) Positivist climate conflict research: A critique. *Geopolitics* 19(4): 829–856.
12	Selby, Jan & Clemens Hoffmann (2014) Rethinking climate change, conflict and security. *Geopolitics* 19(4): 747–756.
13	Zografos, Christos; Marisa C Goulden & Giorgos Kallis (2014) Sources of human insecurity in the face of hydro-climatic change. *Global Environmental Change* 29: 327–336.
14	Buhaug, Halvard (2015) Climate–conflict research: Some reflections on the way forward. *Wiley Interdisciplinary Reviews: Climate Change* 6(3): 269–275.
15	Burke, Marshall; Solomon M Hsiang & Edward Miguel (2015) Climate and conflict. *Annual Review of Economics* 7(1): 577–617.
16	Gartzke, Erik & Tobias Bohmelt (2015) Climate and conflict: Whence the weather? *Peace Economics, Peace Science and Public Policy* 21(4): 445–451.
17	Burrows, Kate & Patrick L Kinney (2016) Exploring the climate change, migration and conflict nexus. *International Journal of Environmental Research and Public Health* 13(4): 443.
18	Buhaug, Halvard (2016) Climate change and conflict: Taking stock. *Peace Economics, Peace Science and Public Policy* 22(4): 331–338.
19	Seter, Hanne (2016) Connecting climate variability and conflict: Implications for empirical testing. *Political Geography* 53(July): 1–9.
20	Abrahams, Daniel & Edward R Carr (2017) Understanding the connections between climate change and conflict: Contributions from geography and political ecology. *Current Climate Change Reports* 3(4): 233–242.
21	Gilmore, Elisabeth A (2017) Introduction to special issue: Disciplinary perspectives on climate change and conflict. *Current Climate Change Reports* 3(4): 193–199.
22	Ide, Tobias (2017) Research methods for exploring the links between climate change and conflict. *Wiley Interdisciplinary Reviews: Climate Change* 8(3): e456.
23	Koubi, Vally (2017) Climate change, the economy, and conflict. *Current Climate Change Reports* 3(4): 200–209.

24	Sakaguchi, Kendra; Anil Varughese & Graeme Auld (2017) Climate wars? A systematic review of empirical analyses on the links between climate change and violent conflict. *International Studies Review* 19(4): 622–645.
25	Theisen, Ole Magnus (2017) Climate change and violence: Insights from political science. *Current Climate Change Reports* 3(4): 210–221.
26	Adams, Courtland; Tobias Ide, Jon Barnett & Adrien Detges (2018) Sampling bias in climate–conflict research. *Nature Climate Change* 8(3): 200–203.
27	Busby, Joshua W (2018) Taking stock: The field of climate and security. *Current Climate Change Reports* 4(4): 338–346.
28	van Baalen, Sebastian & Malin Mobjo¨rk (2018) Climate change and violent conflict in East Africa: Integrating qualitative and quantitative research to probe the mechanisms. *International Studies Review* 20(4): 547–575.
29	Barnett, Jon (2019) Global environmental change I: Climate resilient peace? *Progress in Human Geography* 43(5): 927–936.
30	Koubi, Vally (2019) Climate change and conflict. *Annual Review of Political Science* 22: 343–360.
31	Mach, Katharine J; CarolineMKraan,WNeil Adger, Halvard Buhaug, Marshall Burke, James D Fearon, Christopher B Field, Cullen S Hendrix, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Ju¨rgen Scheffran, Kenneth A Schultz & Nina von Uexkull (2019) Climate as a risk factor for armed conflict. *Nature* 571(7764): 193–197.
32	Pearson, Daniel & Peter Newman (2019) Climate security and a vulnerability model for conflict prevention: A systematic literature review focusing on African agriculture. *Sustainable Earth* 2(1): 2.
33	Mach, Katharine J; W Neil Adger, Halvard Buhaug, Marshall Burke, James D Fearon, Christopher B Field, Cullen S Hendrix, Caroline M Kraan, Jean-Francois Maystadt, John O'Loughlin, Philip Roessler, Jurgen Scheffran, Kenneth A Schultz & Nina von Uexkull (2020) Directions for research on climate and conflict. *Earth's Future* 8(7): e2020EF001532.
34	Bernauer, Thomas & Tobias Bo¨hmelt (2020) International conflict and cooperation over freshwater resources. *Nature Sustainability* 3(5): 350–356.
35	Vesco, Paola; Shouro Dasgupta, Enrica De Cian & Carlo Carraro (2020) Natural resources and conflict: A meta-analysis of the empirical literature. *Ecological Economics* 172(June): 106633.
36	von Uexkull, Nina & Buhaug Halvard (2021) Security implications of climate change: A decade of scientific progress. *Journal of Peace Research* 58 (1) 3–17.

Appendix 2: Special Issues on Climate Change and Conflict, 2012-2022

'Special Issue: Climate Change and Conflict', *Journal of Peace Research*, Volume 49, Issue 1, 2012
Contributing Authors
1. Nils Petter Gleditsch
2. Berit Kvaløy, Henning Finseraas, Ola Listhaug
3. Christopher K Butler & Scott Gates
4. Cullen S Hendrix & Idean Salehyan
5. Clionadh Raleigh & Dominic Kniveton
6. Wario R Adano, Ton Dietz, Karen Witsenburg, Fred Zaal
7. Ole Magnus Theisen
8. Tor A Benjaminsen, Koffi Alinon, Halvard Buhaug, Jill Tove Buseth
9. Conor Devitt & Richard SJ Tol
10. Drago Bergholt & Päivi Lujala
11. Rune T Slettebak
12. Erik Gartzke
13. Lucia De Stefano, James Duncan, Shlomi Dinar, Kerstin Stahl, Kenneth M Strzepek, Aaron T Wolf
14. Jaroslav Tir & Douglas M Stinnett
15. Thomas Bernauer & Tobias Siegfried
16. Eran Feitelson, Abdelrahman Tamimi, Gad Rosenthal
'Special Issue: Rethinking Climate Change, Conflict and Security', *Geopolitics*, Volume 19, Issue 4, 2014
Contributing Authors
17. Jan Selby & Clemens Hoffmann
18. Betsy Hartmann
19. Harry Verhoeven
20. Michael Mason
21. Jan Selby
22. Franziskus von Lucke, Zehra Wellmann & Thomas Diez
23. Ayesha Siddiqi
24. Alexander Dunlap & James Fairhead
'Special Issue: Climate Change and Conflict', *Political Geography*, Volume 43, November 2014
Contributing Authors
25. Idean Salehyan
26. Gerdis Wischnath & Halvard Buhaug
27. Nina von Uexkull
28. Colleen Devlin & Cullen S. Hendrix
29. Colin Walch
30. Joshua W Busby, Todd G Smith, Nisha Krishnan
31. Tobias Ide, Janpeter Schilling, Jasmin S.A. Link, Jürgen Scheffran, Grace Ngaruiya, Thomas Weinzierl
32. Nils Petter Gleditsch, Ragnhild Nordås
'Special Issue: Climate Change and Conflicts', *Current Climate Change Reports*, Volume 3, Issue 4, 2017
Contributing Authors
33. Elisabeth A. Gilmore
34. Vally Koubi

35. Ole Magnus Theisen
36. L. Jen Shaffer
37. Daniel Abrahams & Edward R. Carr
38. Rob White
'Special Issue on Security Implications of Climate Change', *Journal of Peace Research*, Volume 58, Issue 1, 2021
Contributing Authors
39. Nina von Uexkull & Halvard Buhaug
40. Vally Koubi, Quynh Nguyen, Gabriele Spilker, Tobias Böhmelt
41. Kristina Petrova
42. W Neil Adger, Ricardo Safra de Campos, Tasneem Siddiqui, Maria Franco Gavonel, Lucy Szaboova, Mahmudol Hassan Rocky, Mohammad Rashed Alam Bhuiyan, Tamim Billah
43. Ore Koren, Benjamin E Bagozzi, Thomas S Benson
44. Tobias Ide, Anders Kristensen, Henrikas Bartusevičius
45. Paola Vesco, Matija Kovacic, Malcolm Mistry, Mihai Croicu
46. Andrew M Linke & Brett Ruether
47. Cody J Schmidt, Bomi K Lee, Sara McLaughlin Mitchell
48. Alexander De Juan & Niklas Hänze
49. Katharine J Mach & Caroline M Kraan
50. Nils Petter Gleditsch
51. Joshua W Busby

Appendix 3: Atrocity Crimes

The international community identifies four specific atrocity crimes. These are defined in international law, the Rome Statute of the International Criminal Court, and the Responsibility to Protect principle. They are:

Genocide

Any of the following acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such:

a. Killing members of the group;
b. Causing serious bodily or mental harm to members of the group;
c. Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
d. Imposing measures intended to prevent births within the group;
e. Forcibly transferring children of the group to another group.

War Crimes

Because R2P is primarily concerned with the responsibility of a state to protect its own citizens, the following definition of war crimes is limited to acts in armed conflicts that take place within the territory of a state. They do not apply to situations of internal disturbances and tensions, such as riots, isolated and sporadic acts of violence or other acts of a similar nature, but to protracted armed conflict between governmental authorities and organised armed groups or between such groups.

Any of the following acts in grave breach of the Geneva Conventions:

a. Committing murder, mutilation, cruel treatment and torture;
b. Committing outrages of personal dignity, including humiliating and degrading treatment;
c. Taking hostages;
d. Passing sentences and carrying out executions without fair trial and due recognition of judicial guarantees.

Any of the following acts as part of a non-international armed conflict:

a. Intentionally directing attacks against civilians, humanitarian workers or peacekeepers;
b. Intentionally directing attacks against facilities, transport and personnel using the distinctive emblems of the Geneva Convention in conformity with international law;
c. Intentionally directing attacks against buildings dedicated to religion, art, science or charitable purposes, historic monuments, hospitals or areas where sick and wounded are collected;
d. Pillaging a town;

e. Committing rape, sexual slavery, enforced prostitution or forced pregnancy or enforced sterilisation, or any other form of sexual violence also constituting a grave breach of the Geneva Conventions;
f. Conscripting or enlisting child soldiers;
g. Ordering the displacement of the civilian population for reasons related to the conflict;
h. Killing or wounding treacherously a combatant adversary;
i. Declaring that no quarter will be given;
j. Subjecting persons in power of another party to the conflict to torture or mutilation;
k. Destroying or seizing the property of an adversary unless it is an imperative demanded by the necessities of the conflict.

Ethnic Cleansing

The policy of a particular group to systematically displace or deport another group from a particular territory on the basis of religious, ethnic or national origin. Ethnic cleansing differs from genocide in that the intent of the perpetrator may not be to destroy in whole or in part a group, but to create an ethnically homogenous territory.

Crimes Against Humanity

Any of the following acts when committed as part of a widespread or systematic attack directed against any civilian population, with knowledge of the attack:
a. Murder;
b. Extermination;
c. Enslavement;
d. Deportation or forcible transfer of population;
e. Imprisonment or other severe deprivation of physical liberty in violation of fundamental rules of international law;
f. Torture;
g. Rape, sexual slavery, enforced prostitution, forced pregnancy, enforced sterilisation, or any other form of sexual violence of comparable gravity;
h. Persecution against any identifiable group or collectivity on political, racial, national, ethnic, cultural, religious, gender, or other grounds that are universally recognised as impermissible under international law,
i. Enforced disappearance of persons;
j. The crime of apartheid;
k. Other inhumane acts of a similar character intentionally causing great suffering, or serious injury to body or to mental or physical health.

For acts to be considered crimes against humanity they must be more than isolated or sporadic commissions of the above abuses. Rather, acts constitute crimes against humanity when they are part of an established pattern of cruelty. Although crimes against humanity overlap with genocide and war crimes, crimes against humanity differ from genocide in that they do not implicate the intent to destroy in whole or in part a group, and they differ from war crimes in that they may occur in times of peace as well as war.

Appendix 4: Climate-Informed R2P Toolbox

RESPONSIBILITY TO PREVENT	RESPONSIBILITY TO REACT	RESPONSIBILITY TO REBUILD
Early Warnings		
Political and Diplomatic Strategies	**Political and Diplomatic Strategies**	**Achieving Security**
Support good governance	Diplomatic peacemaking	Peacekeeping in support of peacebuilding
Encourage membership to international orgs	Apply political incentives	Disarmament, demobilisation and reintegration
Enact preventive diplomacy	Apply political sanctions	Security sector reform
Threaten or apply political sanctions		
Economic and Social Strategies	**Economic Strategies**	
Encourage economic development	Apply economic incentives	
Support social programs	Apply economic sanctions	**Achieving Good Governance**
Aid conditionality		Rebuilding institutions of governance
Threaten or apply economic sanctions		Maximise local leadership
Promise or deliver economic incentives	**Legal strategies**	
Constitutional and Legal Strategies	Pursue criminal prosecution	
Develop constitutional structures		
Promote respect for human rights	**Military Strategies short of Coercive Force**	**Achieving Justice and Reconciliation**
Promote respect for the rule of law	Deploy peacekeepers	Managing refugee and IDP returns
Eradicate corruption	Establish save havens	
Involve the International Court of Justice	Establish no-fly zones	
Threaten international criminal prosecution	Implement arms embargoes	
Security Sector Strategies	Restrict communications	**Achieving Economic and Social Development**
Support security sector reform		Economic recovery and development
Transition from military to civilian government	**Military Intervention**	Social programs for sustainable peace
Support confidence-building measures	UNSC authorisation under Chapter VII	
Adherence to regimes and treaties	Self-defence under Chapter VII Article 51	
Threaten arms embargoes	Regional organisations under Chapter VIII	
Withdraw military cooperation	General Assembly authority	
Nonterritorial show of force		
Preventive deployment		