Climate change, conflict and security scan

Analysis of current thinking

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Contents

List of boxes

Boxes

1 Introduction

In the second instalment of ODI's climate change, conflict and security scan, we summarise the latest developments on Twitter, in the blogosphere, and in grey and academic literature, to find new themes and emerging discourse on the intersection of climate and conflict risk. A review of evidence across this quadrimester, spanning August to November 2018, reveals a continuation of themes identified in the first scan. These include:

• contributions to the theoretical framings used to understand the relationship between climate change and conflict
• a continued emphasis on the national security implications of climate change for western nations
• links to climate-related disasters and the politics of vulnerability.

We discover new areas of focus, such as conflict risk associated with the transition to low carbon development and geo-engineering, and find concrete analysis being undertaken through climate-fragility risk assessments in the Lake Chad region.

Of particular note in this instalment is the launch of the Intergovernmental Panel on Climate Change's (IPCC's) 1.5 degrees report (Box 1). Unsurprisingly, the launch of the report generated significant coverage on social media and within the blogosphere. The report provides a stark assessment for readers, warning that projected global temperature changes are likely to have a significant impact for both natural and human systems.

This quadrimester, covering the 1 August to 30 November 2018 period, also saw the launch of several new initiatives, including the Group of Friends on Climate and Security, and the Stockholm Climate Security Hub. The 73rd meeting of the United Nations (UN) General Assembly took place in September 2018,

where the Lake Chad region featured heavily. Contributions from the Nigerian President continued to emphasise the negative impacts of climate change on insecurity, with calls for greater collaboration between governments and UN agencies, along with regional and sub-regional organisations, to tackle the multifaceted nature of risks across the region.

Insights gleaned from Twitter have once again proved fruitful when considering this period, revealing a new set of 'top 5 individuals' who have been most prolific in their coverage of these topics on Twitter. Each individual has been shown to offer new insights into how climate change, conflict and security are being discussed on social media, and readers should consider following individuals as well as the top institutes listed. Regarding the latter, three institutes have reappeared in the top 10 list for this period: @SwedenUN, @SIPRIorg and @SierraClub. Meanwhile, there have been six newcomers to it, including @GermanyUN, @BelgiumMFA and @SEIclimate.

This period saw the emergence of a wealth of new literature from the disasters community on:

• the intersection of natural hazards
• climate-related disasters
• issues of politics, exclusion, conflict and state-citizen relations.

Marking the first ever journal dedicated to the topic, the *Disasters* Special Issue (volume 42, number S2) exposes the politics of disaster risk, the view of disasters in international security discussions and ideas associated with disaster diplomacy. The editor Siddiqi (2018: 161) argues that the 'absence of "politics" from the wider debate on disasters in conflict areas is not just a benign oversight, but is in fact the politics of disasters in conflict areas'. This sentiment was echoed in the Africa Arab Platform of Disaster Risk Reduction, where sessions and the

The IPCC (2018) 1.5 °C Special Report provides analysis of the potential impacts (risks) of global warming at 1.5 °C and 2 °C above pre-industrial levels and related global greenhouse gas emission pathways that could lead to it. The report is a response to an invitation from the IPCC to analyse the implications of a 1.5 °C world, issued in the decision of the 21st Conference of Parties of the UN Framework Convention on Climate Change to adopt the Paris Agreement.

The IPCC states that human activity is estimated to have already resulted in a global temperature rise of between 0.75 and 0.99 °C above pre-industrial levels. Temperatures are projected to reach 1.5 °C between 2030 and 2052 if these activities continue at their current rate. The IPCC warns that global CO_2 and non- CO_2 emissions must see a decline well before 2030 in order to avoid further warming effects and a reliance on uncertain, future large-scale deployment of emissions removal technologies and options.

However, it is thought that current estimates of the global emissions totals resulting from the sum of the nationally stated mitigation targets, as submitted under the Paris Agreement on Climate change will not be significant enough to limit global warming to 1.5 °C, even if they were to be supplemented by increases in the scale and ambition of emission reductions after 2030.

According to the report, we are already witnessing impacts to both human and natural systems, with the severity and extent of impacts to areas such as health, livelihoods, food security, water supply and economic growth only likely to worsen with further increases in temperatures beyond 1.5 °C. Some important ecosystems that people depend on for food and livelihoods are unlikely to survive in a 2 °C world (e.g. coral reefs). Climate change risks are not felt equally, with disadvantaged and vulnerable populations more likely than wealthier people to experience impacts in areas such as health, housing and livelihoods.

Consideration of ethics and equity is also highlighted by the IPCC as a means to not only address the 'uneven distribution of the adverse impacts' of global warming, but also to potentially offset those produced by mitigation and adaptation. The Sustainable Development Goals (SDGs), adopted in 2015, are therefore suggested to 'provide an established framework for assessing the links between global warming of 1.5 °C and 2 °C, along with developmental goals that include poverty eradication, reducing inequalities and undertaking climate action' (ibid: 18).

Going forward, climate change risks and responses are therefore suggested by the IPCC to be closely linked to sustainable development, 'which balances social well-being, economic prosperity and environmental protection' (ibid). The IPCC argue that sustainable development can support and enable 'the fundamental societal and system transitions and transformations that help limit global warming' (ibid: 22). In addition, the IPCC states that '[s]uch changes are predicted to facilitate the pursuit of climate-resilient development pathways that achieve ambitious mitigation and adaptation in conjunction with poverty eradication and efforts to reduce inequalities'(ibid).

ministerial level outcome document featured the following:

- a need for greater attention to how conflict increases vulnerability to disasters, including climate-related disasters
- emphasis on how more concerted effort is required to pursue Disaster Risk Reduction (DRR) and climate change adaptation in

contexts also affected by violence, conflict and fragility.

This scan is intended to help policy-makers, practitioners and academics to get to grips with the emerging literature, discourse and social media coverage of the intersection of resilience, climate change, disasters, conflict and security. Organised according to medium, we encourage

readers to be selective, and go straight to the themes that interest them most. Learning from the experience of producing the first scan, we have slightly adapted the methodology, but it remains largely comparable.

An adapted methodology has been used for the academic literature where selecting one academic journal database rather than two was considered sufficient. However, the breath of work covered remains high, including the top 21 blog posts, 25 items selected from the grey literature and 209 academic articles sourced and 48 summarised). The review is intentionally selective and, as such, does not claim to be exhaustive. Specific attention has been given to conveying the findings from academic literature, as these articles remain inaccessible to many, including many of the decision-makers working in positions that shape policy and funding allocation.

As the second of three instalments planned between 2018 and 2019, this scan continues the ambition to 'guide policy-makers, practitioners and researchers to pursue pro-poor ways to address the intersection of climate change, conflict and security risks' (Peters et al. 2019: 5) and to do so by showcasing the breath of evidence and ideas on the intersection. The scans also aim to help readers not fall into the trap of hearing an echo chamber on climate-security that has been shaped by a few dominant voices, instead aiming to encourage consideration of alternative ideas and evidence that could lead to new solutions to the challenges that prevail and lie ahead. The African and Arab states show an enthusiasm for linking climate-related disasters with ambitions to support conflict prevention. This reveals that change is afoot and that new collaborations and linked outcomes are being pursued.

2   Climate change, conflict and security on Twitter

This section offers insights into how climate change, conflict and security were discussed on Twitter, as well as identifying the prominent Twitter users and the nature of their engagement, for the period 1 August to 30 November 2018.

2.1   Methodology

An initial search, using the advanced settings on Twitter, identified tweets discussing climate change and conflict and security, employing the following hashtags: #climatesecurity and #climateandsecurity. This generated search results of tweets in a range of languages. The results were weighted by the number of retweets received, in the following groupings: 10 or more retweets eight to nine retweets and five to seven retweets. Using retweets as the primary factor, the top 50 tweets were shortlisted for analysis.

Climate change, conflict and security on Twitter

Top 5 individuals

1 @MalinMobjork
Senior Researcher, SIPRI

2 @FlorianKrampe
Researcher, SIPRI
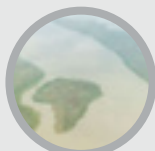
3 @Murtalalbin
Researcher

4 @GERonEconomy
Director-General for Economic Affairs and Sustainable Development, Federal Foreign Office, Germany
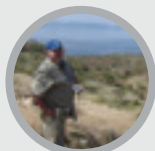
5 @geoffdabelko
Professor and Associate Dean at the George V. Voinovich School of Leadership and Public Affairs, Ohio University

Take note #environment & #security, #environmentalpeacebuilding, #climatesecurity folks: UNSG @antonioguterres weighs in with speech on natural resources, #climate, #conflict & #peace. @NewSecurityBeat @TheWilsonCenter @adelphi_berlin @EnvPeacebuild @CntrClimSec @SIPRIorg

Top 10 institutions

1 @SwedenUN

2 @SweMFA

3 @GermanyUN

4 @UNDP_Sweden

5 @SIPRIorg

6 @AWLNetwork

Members of the AWLNetwork salute the leadership of @SwedenUN @Margotwallstrom during their Presidency of the #UN Security Council. Strong engagements with #AfricanWomenLeaders on key issues #ClimateSecurity #Preventing terrorism & #Genderbasedviolence. Great leadership.

7 @SierraClub

8 @BelgiumMFA

9 @SEIclimate

10 @UCSUSA

Twitter engagement: hot topics

@MajGenMunir

Major General Munir Muniruzzaman (ret) Bangladesh military and former military advisor to the President of Bangladesh

@MalinMobjork

Its been two great days in Helsinki discussing #climaterisks and the progress on #climate security in the UN with @UlKoministerio and @FIIA_fi. Thanks @ezhakala for inviting me! @SIPRIorg @camilaborn

@SwedenNato

Mission of Sweden to NATO

@SIPRIorg

We need to do more to understand how climate change and conflict are linked. Here's why. @WEF focus on SIPRI's new study on climate-conflict research in South Asia and South East Asia #Climatesecurity #Risk #Climate Change.

@franceonu

French mission to the UN

@GermanyUN

#ClimateChange threatens to deprive people of their livelihood and become a risk for international security. Germany and the @Republic_Nauru have thus established a Group of Friends on #ClimateAndSecurity at the @UN

@KittyvdHeijden

Vice President for World Resources Institute Africa and Europe

@FlorianKrampe

How do regional institutions in Asia and Africa respond to #ClimateSecurity risks? New SIPRIorg insights just published!*

@SaleemulHuq

Director of the International Centre for Climate Change and Development

@SEIClimate

"Stockholm Climate Security Hub will benefit enormously from the range of knowledge and experience of the partners. We hope it will establish Stockholm as a world-leading resource on this vitally important topic" said SEI's Karl Hallding. #ClimateSecurity

* www.sipri.org/publications/2018/sipri-insights-peace-and-security/responses-climate-related-security-risks-regional-organizations-asia-and-africa

11

Key events and initiatives launched

@GermanyUN

Today marked the launch of the Group of Friends on #ClimateandSecurity at the #UN, co-authored by #Nauru and @GermanyUN. Joining forces to address a key global security challenge of our times!

@NorwayUN

A very timely Group of Friends coming together for the first meeting today: GoF #ClimateandSecurity Thank you to the chairs Nauru & Germany. Norway is a proud founding member – We look forward to take this important topic further!

@UNDP_Sweden

LAUNCHING TODAY: #Stockholm Climate Security Hub, a new initiative of the @SweMFA that brings together SEI, @siwi_water, @SIPRIorg and @ sthlmresilience to cooperate on research and analysis on #ClimateSecurity!

@NorwayUN

The effects of #ClimateChange are already present & island states are hit the hardest. #Norway is actively engaged in putting this topic on the international agenda. Thank you to the chairs GoF #ClimateAndSecurity Nauru & Germany for hosting this timely meeting #UNGA

@BelgiumMFA

Wrap-up of our 3rd day at the @UN General Assembly with several meetings in preparation for our #BelgiumUNSC mandate
- #G5Sahel
- #RespectIHL
- #SyriaConf18
- #ClimateSecurity

18th September - 5th October 2018
UN General Assembly 73rd meeting

1st August 2018
Establishment of Group of Friends on Climate and Security

30th August 2018
Establishment of the Stockholm Climate Security Hub

Top 3 retweets

As the top 3 retweets reveal, the launch of the new Stockholm Climate Security Hub was a prominent theme on Twitter.

SwedenUN

In July, #genderparity among #UNSC briefers was achieved for the first time!
Ensuring a transparent & inclusive UNSC means listening to those most affected by its decisions. @hindououmar on #ClimateAndSecurity, Yenny Londono on #CAAC & Justine Bihamba on #WPS. #SwedeninUNSC – at United Nations Security Council Chamber

@SweMFA

Launched today: Stockholm Climate Security Hub, a new initiative from @SweMFA for more research on #ClimateSecurity. #WorldWaterWeek #wwweek #globalgoals.

@MalinMobjork

On 30 Aug, during the World Water Week in Sthlm, we will launch the Sthlm Climate Security Hub. Join this open event and listen to the progress made in the UNSC and the goal for this #ClimateSecurity Hub @SEIresearch @sthlmresilience @siwi_water @SIPRIorg

@GERonEconomy

A new international expert network on Climate and Security was successfully launched @GermanyUN in #NewYork. Thanks to all who contribute through their knowledge and commitment.
#ClimateSecurity is priority for membership in the @UN Security Council 2019/2020. #StrongerUNited

29th October 2018
Launch of International Expert Network on Climate and Security

3 Climate change, conflict and security in the blogosphere

This section offers insights into how the blogosphere reports on climate change, conflict and security. We have systematically identified and analysed the top 21 blog posts on the topic that were published between 1 August and 30 November 2018.

3.1 Methodology

For the purposes of this research, blog posts have been defined as news or opinion articles that have been categorised as discrete entries (articles) by search engines and have a clear publication date. This approach is based on the metrics of visibility and online impact and engagement.

Using blog search engines, we performed Boolean search queries and used a set of predetermined key words to identify blog posts published on the topic of climate change, conflict and security. This initially produced 48 results, each of which were checked manually for relevance and context. Results that had low keyword/subject matter relevance were excluded. This process reduced the shortlist to 21 results, which we measured, ranked and scored for the following:

- number of social shares
- journalistic reach
- readership of publishing website.

The scores for each of the measures were then combined to produce a social visibility score and ranked to yield the final index for the blog search.

Key points
- Climate change is projected to have a negative impact on security, with economic fragility in Small Island Developing States (SIDS) particularly expected to be impacted in this way.
- Cooperation and stronger partnerships will be required to overcome the negative impacts of climate change. This process is exemplified by the European Union's (EU) commitment to assisting states in addressing their fragility risks and supporting those affected by both conflict and climate risks.
- In response to the momentum generated by the publication of the IPCC's 1.5 degrees report, climate change is argued to be the 'ultimate threat multiplier' and a key driver of fragility. It therefore requires diverse solutions that go beyond western-centric approaches, to include elements such as 'adaptive development', which takes account of the complex and fast changing contexts of fragile states.
- Innovative approaches to address climate change and its associated risks are occurring through the launch of the Stockholm Climate Security Hub. This is designed to enhance cooperation on research and promote policy dialogue. Simultaneously, food-security specific developments are occurring through the World Bank's collective initiative for developing early warning systems by teaming up with technological giants such as Google, Microsoft and Amazon.

3.2 The top 21 blog posts

Ranking	Blog post title	URL	Publisher	Total score	Rank
Blog post 1	The World Bank's latest tool for fighting famine: artificial intelligence	https://www.washingtonpost.com/gdpr-consent/?destination=%2ftechnology%2f2018%2f09%2f23%2fworld-banks-latest-tool-fighting-famine-artificial-intelligence%2f%3f&utm_term=.d246fdef15f7	P. Holley, The Washington Post	74.00	1
Blog post 2	UN: Climate change, depleted resources leave world hungry	https://www.apnews.com/d2db95c64c604f628128a5cfeb9ec347	E. Kurtenbach, AP News	62.00	2
Blog post 3	Global renewable energy transition could lead to conflict without proper management	https://cleantechnica.com/2018/08/17/global-renewable-energy-transition-could-lead-to-conflict-without-proper-management/	J.S. Hill, Clean Technica	59.00	3
Blog post 4	Fragile states and the search for 'what works'	https://www.brookings.edu/blog/future-development/2018/11/08/fragile-states-and-the-search-for-what-works/	G. Ingram and J. Papoulidis, Brookings Institute	49.00	4
Blog post 5	The Trump-wheeler polluting power plan: five key takeaways	http://blogs.edf.org/climate411/2018/08/23/the-trump-wheeler-polluting-power-plan-five-key-takeaways/	T. Carbonell, Environmental Defense Fund (with B. Levitan and R. Zakaria)	44.00	5
Blog post 6	China projects power through 'climate aid'	https://www.usnews.com/news/world/articles/2018-10-09/china-projects-power-through-climate-aid	A. Neuhauser, U.S. News and World Report	43.00	6
Blog post 7	Fiery summer a gauge of our planet's health	https://www.unenvironment.org/news-and-stories/story/fiery-summer-gauge-our-planets-health	UN Environment	34.00	7
Blog post 8	From fragility to resilience: Recommendations for strengthening USAID's 'self-reliance' approach	https://www.brookings.edu/blog/up-front/2018/08/17/from-fragility-to-resilience-recommendations-for-strengthening-usaids-self-reliance-approach/	G. Ingram and J. Papoulidis, Brookings Institution	33.00	8
Blog post 9	Trump signs military funding bill that includes focus on energy, climate security	https://www.greentechmedia.com/articles/read/trump-signs-military-funding-bill-that-included-focus-on-energy-climate-sec#gs.32xrdm	J. St. John, Greentech media	27.00	9
Blog post 10	At UN, Jamaica urges partnerships to tackle climate impacts, economic fragility in small islands	https://news.un.org/en/story/2018/09/1021212	UN News	27.00	9
Blog post 11	Culture – the "X Factor" for building back better after conflict and disasters	https://www.worldbank.org/en/news/feature/2018/11/16/culture-the-x-factor-for-building-back-better-after-conflict-and-disasters	The World Bank	25.00	11
Blog post 12	UK Minister for Africa makes maiden visit to Somalia	https://www.africanews.com/2018/10/09/uk-minister-for-africa-makes-maiden-visit-to-somalia/	Africa News	21.00	12

Ranking	Blog post title	URL	Publisher	Total score	Rank
Blog post 13	Why climate change Is a national security Issue	https://daily.jstor.org/why-climate-change-is-a-national-security-issue/	E. Schewe, JSTOR Daily	19.00	13
Blog post 14	CDB to help pay Haiti's 2018-2019 catastrophe insurance premiums	https://www.stlucianewsonline.com/cdb-to-help-pay-haitis-2018-2019-catastrophe-insurance-premiums/	INews Guyana, St. Lucia News	19.00	13
Blog post 15	Three maps show unchecked climate change's impact	https://www.spatialsource.com.au/gis-data/three-maps-show-unchecked-climate-changes-impact	D. Bishton, Spatial Source	15.00	15
Blog post 16	Mercy Corps: climate change is the ultimate 'threat multiplier'	https://reliefweb.int/report/world/mercy-corps-climate-change-ultimate-threat-multiplier	Mercy Corps, Reliefweb	15.00	15
Blog post 17	Nigerian president calls for global action on climate change, Lake Chad crisis	https://news.un.org/en/story/2018/09/1020612	UN News	13.00	17
Blog post 18	Trading partners, the EU and Seychelles reaffirm relationship at annual conference	http://www.seychellesnewsagency.com/articles/10032/Trading+partners%2C+the+EU+and+Seychelles+reaffirm+relationship+at+annual+conference	D. Laurence, Seychelles News	12.00	18
Blog post 19	Climate change technology and the solar radiation management debate	https://politicalinsights.org/2018/10/16/climate-change-tech-and-the-solar-radiation-management-debate/	D. Mayer, Political Insights	10.00	19
Blog post 20	Sweden, partners launch initiative to manage climate-related security risks	http://sdg.iisd.org/news/sweden-partners-launch-initiative-to-manage-climate-related-security-risks/	L. Mead, International Institute for Sustainable Development (IISD)	17.00	19
Blog post 21	Transition is a given, but what can trade unions in the Global South do to ensure that it's just?	https://www.equaltimes.org/transition-is-a-given-but-what-can?lang=en#.XJoFY5j7SM8	T. Gausi, Equal Times	5.00	21

3.3 News orientated blogs: UNGA, SIDS, durable solutions and 1.5 degrees

Insight into the conversations at the 73rd session of the UN General Assembly can be gleaned from blog posts 10 and 17. Blog post 17 (UN News, 2018a) reflects on the statement of address to the assembly by the President of Nigeria, Muhammadu Buhari, who highlighted the negative impact of climate change on insecurity and livelihood insecurity in the Lake Chad region. Buhari argued that the effects 'exposed [the regions inhabitants] to extremist and terrorist elements'. In addressing insecurity in the region,

the president also called for greater cooperation between the UN, national governments, and sub-regional and regional organisations. The Prime Minister of Jamaica, Andrew Michael Holness, used his statement of address to the UN General Assembly, to express concern for the 'economic fragility' of SIDS (as detailed in blog post 10, UN News 2018b). Holness warned that these issues are compounded by climate change and extreme weather events, all of which impede sustainable development. Similar to Nigeria, the Prime Minister of Jamaica called for solutions through greater partnerships among international financial institutes, UN member states and the private sector.

The vulnerability of SIDS was also an area of concern for blog posts 14 and 18. In blog post 14, INews Guyana (2018) highlights Haiti's vulnerability to both fragility and natural hazards. The article states that the government of Haiti is working alongside the Caribbean Development Bank to address the island's development challenges. INews Guyana also reveals that the Bank has contributed to DRR as a critical priority, including $3 million to Haiti's parametric insurance coverage. The Bank's director of projects explains that such insurance can provide financial support for humanitarian relief when there are significant strains placed on government resources.

Blog post 18 provides coverage of the sixth political dialogue between the EU and the Seychelles. The EU has highlighted its commitment to peace and stability in the region, in areas such as trade, maritime security and the fight against drugs. In addition, the EU has recognised the 'vulnerability and fragility risks' posed by climate change, which it has said will be addressed through agreed 'specific attention'.

Unilaterally, EU members have also been keen to contribute to helping states address their fragility risks. In blog post 12, Africa News (2018) reveals that, as part of a visit to Somalia, the United Kingdom's (UK) Minister to Africa, Harriett Baldwin MP, has 'announced new packages of support for Somalia, to help progress a comprehensive approach to Somalia's long-term security, stability and resilience'. The UK has also committed to assisting Somalia in addressing climate change, as demonstrated by a recent announcement of £60 million worth of financial aid. Africa News argue that, in the short term, such programmes aim to support those affected by both conflict and climate risk. In the longer term, it is hoped that this will help to ease tensions over access to natural resources, contributing to stability within the country.

Other blog posts have used the release of the IPCC 1.5 degrees report to draw attention to three separate visualisation maps highlighting the risks associated with climate change. In blog post 15, Bishton (2018) highlights a map developed by Revelator, which shows the impact of temperature rise on precipitation patterns by 2050. The second map, released by the Union of Concerned Scientists, highlights the impact of sea level rise on coastal communities in the United States (US). The final map (see Moran et al. 2018 in the grey literature for details) seeks to raise awareness of those states facing the 'double burden' of exposure to climate extremes and state fragility.

3.4 Opinion pieces: from fragility to resilience, the United States and national security, and peaceful transitions towards a green economy

The opinion pieces considered in this scan respond to the momentum generated by the publication of the 1.5 degrees report. In blog post 16, Mercy Corps repeats the message that climate change acts as the 'ultimate "threat multiplier"', calling on governments, the private sector and civil society to act. The post includes a warning from the organisation's chief executive officer that at a time when climate change is already a 'driver of fragility', the release of the 1.5 degree report has been a timely reminder that failure to act now will leave future generations with a world that is 'hotter, hungrier and wracked by conflict'. Mercy Corps also states that steps to mitigate these effects should include targeting those most vulnerable. This should take place through DRR, greater access to climate data, improved early warning systems and innovative financial systems to aid those facing increasing livelihood insecurity.

Blog post 7 follows a similar line of argument, where UN Environment draw upon the extreme events of Summer 2018 as a stark reminder of the current state of the 'planet's health'. The UN Environment executive director refers to historical evidence that links conflict to natural resources – such as water and land – suggesting that this should provide impetus for action in the face of a future climate where scarcity may become all too common. As the article reveals, these risks are increasingly being recognised within the UN system, including through the UN Secretary-General's conflict prevention agenda and UN Security Council resolutions. These developments are also being reflected within other international organisations, such as the

Organisation for Economic Cooperation and Development, whose measurements of fragility now include environmental factors. Worryingly, the article refers to the following statistic: '[o] f the 23 countries that have been on all of the Organisation for Economic Cooperation and Development fragile states lists since 2007, around 70 per cent depend on climate sensitive natural resources to a certain extent'.

Recognising the vulnerability that fragile contexts face in relation to environmental change and natural hazard-related disasters, blog posts 4 and 8, by the Brookings Institute, consider the steps to be taken to move countries from a state of fragility to one of sustainable development. In a bid to understand 'what works?', blog post 4 reveals concerns that fragile states are likely to be left behind by the SDGs and that these contexts are caught in perpetual cycles of crises that the existing aid paradigm fails to address. In addition to setting more realistic timeframes to allow nations to exit fragility, Ingram and Papoulidis (2018a) set out limitations and current practices offering hope for the future. Alongside adopting a 'resilience lens' to address fragility in a more holistic manner, the authors suggest that those working in areas such as stabilisation and conflict prevention are increasingly thinking in terms of 'how risks of disaster, destitution and conflict interact and mutually reinforce one another…'. However, in sectors more traditionally associated with resilience – such as DRR – fragile contexts continue to be ignored. Other areas of improvement have included calls:

- to move away from best-practice approaches, in favour of adaptive development that accounts for 'complex and fast-changing fragile contexts'
- to accept that interventions are not purely technical exercises but are shaped by the political economy in which they take place
- for more coordination between different stakeholders and multiple development programmes that are able to consider the underlying drivers of fragility, while at the same being able to absorb unexpected shocks.

An earlier post by the same authors (blog post 8) offers an overview of the self-reliance approach that the United States Agency for International Development (USAID) takes to addressing fragility. Reiterating the point that fragile states are affected by a number of concerns – including vulnerability to 'natural disasters' – Ingram and Papoulidis (2018b) emphasise that the initiative aims to provide states with the tools to effectively 'handle their own development challenges without U.S. foreign assistance'. A test for states to be able to achieve this will be measured in their 'commitment and capacity' to both liberal democracy and inclusive development. While Ingram and Papoulidis believe this may offer opportunities for USAID to move away from siloed and piecemeal programming, they are cautious about the language of 'commitment' to liberal democracy, stating that this is strikingly familiar to the best-practice approach criticised earlier. They argue that the priority for governments attempting to exit fragility should not be to develop a western model of statehood; they should, instead, apply a risk informed approach that focuses on strengthening the ability of the state to withstand shocks and stresses.

The release of the IPCC 1.5 Degree Report has also prompted blog posts on geoengineering. Referring to an extract from the IPCC report, Mayer (2018) states that Solar Radiation Management is increasingly seen as a means to maintain global temperature rises below catastrophic levels (see blog post 19). However, while technological solutions may seem obvious, opportunities need to be weighed up against risks, particularly in the absence of regional and international regulatory bodies. Mayer also raises concerns about Solar Radiation Management possibly masking more fundamental questions about long-term solutions to address the impacts of climate change and also those of Solar Radiation Management on human and natural systems. Finally, on the matter of geopolitics, Mayer argues that the use of Solar Radiation Management is likely to replicate current imbalances within global climate discussions. Those most vulnerable to climate change impacts are likely to have a 'limited voice' in the use of

such technology, whereas the world's greatest polluters – who also wield the most political power – are likely to have more influence over decisions taken on the use of such technology.

Blog post 3 is another source focused on the role of technology in mitigating the effects of climate change. The piece considers the risks associated with sourcing minerals used in low carbon technologies. While those associated with conflict minerals are not new, a spotlight is increasingly being placed on those connected to green technologies. Hill (2018) draws on discussions with one of the authors of a newly released IISD report from Church and Crawford (2018), warning that a significant number of minerals utilised in low carbon technologies are sourced from contexts deemed 'fragile and corrupt' by Transparency International and the Fragile States Index. Furthermore, the majority of these minerals are not included within conflict mineral legislation. Despite these concerns, Hill argues that governments and the public are placing increasing pressure on companies to source responsibly within supply chains. In turn, Hill indicates this could echo the pressure being placed on financial institutes to de-invest in fossil fuels. A key takeaway from the report is that the future does not lie in avoiding these markets, but in ensuring responsible sourcing in ways that contribute to sustainable development.

Blog post 21 also considers how poorer countries' transitions towards a greener economy should be managed, this time focusing on the role trade unions can play in ensuring transitions are 'just'. Transitions towards a low carbon future present clear environmental benefits as well as economic opportunities; Gausi (2018) points to evidence that, by 2030, at least 18 million jobs could be tied to such a transition. Indicating the progress that has been made, this blog post presents evidence from a conference organised by international trade union organisations. However, Gausi also argues that there is still work to be done in ensuring that this benefit is harnessed for the good of workers rather than just the interests of investors. For example, representatives from Haiti have raised concerns about a lack of recognition for unions and workers' rights.

Gausi also highlights that change must come from within trade unions, who often do not recognise that they too offer a platform for climate action. In contexts such as Indonesia, there is a difficult balancing act between climate action and immediate concerns such as wages and workers' rights. Unions therefore face difficult trade-offs between advocating the interests of their members and the 'common good' to be achieved in addressing climate change; as one member from the Philippines conveys: 'the best jobs are not always green jobs', given the earning potential related to fossil fuels.

Another dominant theme within the blog posts considered in this scan concerns the US and national security. Commentators continue to highlight the disconnect between the US military's concern and the Trump administration's disregard for addressing climate change. This can be seen in blog post 13, where Schewe (2018) highlights that the US military continues to frame climate change as a national security concern and has become all too aware of the risks, citing both damage and forced evacuations from military bases as a result of hurricanes Florence and Michael. Schewe suggests that having the military convey messages of concern about climate change can help to transmit a sense of urgency and credibility, especially among the public, and enable access to resources at the military's disposal. Schewe also warns that caution should be exercised, particularly in terms of the responses that securitising climate change generates. Solutions to the challenge of climate change can be found in cooperation between states and non-military means. However, framing this challenge as a national security concern could have the opposite effect, resulting in states adopting a 'overly nationalistic and militarized response'. Furthermore, narratives that purport population displacement as a security threat could further fuel negative stereotypes of human mobility.

Schewe offers what is described as a 'compromise', through military alliances such as NATO. Multilateral organisations, such as this, offer an opportunity for member states to act collectively in terms of resources and research. For example, NATO is already working effectively on disaster relief and in mediating disputes in the

Arctic. Whether this is an indication of the future leads to the issue of domestic politics, where political elites have the power to build or reduce the credibility of multilateral institutions such as NATO and the UN.

In a similar vein, concerns surrounding US military installations are considered within blog post 9. The Trump administration's reservations towards addressing climate change did not prevent the John McCain National Defense Authorization Act from being passed, which further demonstrates how seriously the US military are taking climate risks. The new legislation requires all US military bases to include a 'master plan examination of energy security and resilience.' This underlines the military's concerns about energy security and serves as a means to protect military infrastructure against future risks, such as tidal floods. The legislation obligates the military to consider the impacts on existing and new infrastructure. The arrival of the legislation comes at a time of increased recognition of the vulnerability of US military bases – particularly in coastal regions – and how this can result in significant economic losses.

Other policy developments within the US have not been as welcomed by some commentators. In blog post 5, Carbonell et al. (2018) criticise the Trump administration's Affordable Clean Energy Plan as 'neither clean nor affordable'. The authors criticise the plan for ignoring scientific health concerns about air quality, along with its failure to set quantitative levels of pollution and dismissal of the benefits of renewable energy sources, in favour of continued reliance on power stations powered by coal. The authors argue that, unlike previous plans such as the Clean Power Plan, the Trump administration's Affordable Clean Energy Plan will not save US citizens money, and will result in costs of up to $10.8 billion by 2030. They also warn that, by underestimating the true costs of climate pollution to the environment, the plan 'ignores … [that] potentially destabilising impacts of climate change around the world can imperil America's own national security and economic prosperity…'.

While the previous blog posts considered in this scan depict little concern from within

the Trump administration to address climate change, blog post 6 reveals a different approach towards the development programmes of the US geopolitical rivals. Here, Neuhauseur (2018) explores concerns about China's 'climate aid', which supports green projects in poorer countries and forms part of the wider Belt and Road Initiative. The green credentials of such investments have been questioned, but it is also recognised that they play a role in furthering China's global influence. The US Secretary of State has referred to China's foreign investment as 'predatory' and Neuhauseur argues that Chinese foreign investment presents high risks to nations who are unable to meet debt repayments, providing China with 'an opening to seize control of the project, giving them a foothold in foreign land'. However, at a time where there is increasing pressure on poorer countries to meet global climate targets and address vulnerability to climate impacts, the offer of Chinese investment might be difficult to turn down – especially given that the US has withdrawn from international commitments.

3.5 New developments: new research collaborations, artificial intelligence and food security

During the scan period, a number of blog posts – both news and opinion based – publicised new developments. Blog post 20 reports on the launch of the Stockholm Climate Security Hub, a consortium involving the Swedish Foreign Ministry, Stockholm Environment Institute, Stockholm International Water Institute, Stockholm International Peace Institute and Stockholm Resilience Centre. In this post, Mead (2018) explains that the initiative was developed to 'enhance cooperation on research and analysis on climate security, communicate the latest knowledge in the field, promote policy dialogue and provide evidence-based support to policy-makers, the UN and other international organisations'.

Blog post 11, from the World Bank (2018), encourages readers to think beyond physical infrastructure when it comes to the reconstruction of the world's urban environments in the aftermath of conflict and

natural hazard-related disasters. The post argues that urban resilience relies, not only on the reconstruction of physical structures, but the social capital on which they are built. With this in mind, the World Bank and the United Nations Educational, Scientific and Cultural Organization have developed the CURE framework – Culture in City Reconstruction and Recovery. The article also contends that both the reconstruction of heritage sites and the development of new centres of culture not only promote economic recovery, but can facilitate reconciliation. Without a consideration of what the World Bank refers to as the 'X Factor' of culture, there is a danger that the recovery and sustainable development of urban areas will be undermined. This blog post also reveals that the United Nations Educational, Scientific and Cultural Organization and the World Bank are planning to utilise to the CURE framework as part of the reconstruction of Mosul, Iraq.

Additionally, the World Bank is part of another collaborative initiative for developing an early warning system to predict the outbreak of famine. The highest placed blog post within the *Washington Post* (blog post 1) reveals that, along with the International Committee of the Red Cross and the UN, the World Bank is teaming up with tech giants such as Google, Microsoft and Amazon in developing the Famine Action Mechanism: an 'algorithm that will use analytics to identify areas that are most likely to experience extreme food shortages'. Blog post 1 quotes the president of Microsoft, Brad Smith, who argues that areas such as '[a]rtificial intelligence and machine learning hold huge promise for forecasting and detecting early signs of food shortages, like crop failures, droughts, natural disasters and conflicts'. It is hoped that by utilising tools such as the Famine Action Mechanism, the international community will be able to unlock relief funding quicker – a process that the author Peter Holley argues is often dependent on accurate forecasting.

Similarly, blog post 2 highlights how food security is a major concern for many of the UN agencies, exacerbated by awareness of growing populations. The international community are therefore concerned about how to deliver 'more nutritious food at affordable prices'. Conveying the findings of a new report by the Food and Agriculture Organization of the United Nations (FAO) and the International Food Policy Research Institute, Kurtenbach (2018) highlights how conflict and poverty are resulting in 820 million people suffering from food insecurity. And, while greater food production may seem like an obvious solution, this is 'easier said than done' in reality. The blog post identifies Asia and the Pacific as among the most food insecure regions, with development challenges such as urbanisation placing additional pressure on the availability of land. Moreover, Kurtenbach warns that unsustainable farming production will lead to 'permanent damage to ecosystems', also highlighting that the report is already warning that we 'have outstripped Earth's carrying capacity in terms of land, water and climate change'.

4 Climate change, conflict and security within the grey literature

This section examines the intersection between climate change, conflict and security within the grey literature. The review includes publications from:

- research and private sector institutions
- humanitarian, development and UN agencies
- national governments.

4.1 Methodology

In searching the grey literature, we followed several steps. The first involved two separate Google searches for the terms "climate change" AND conflict and "climate security". From the results generated, we identified and collated the first usable 25 results published within the designated scan period from each of the searches. In addition, we undertook a focused review of selected specialist online sites: Climate Diplomacy, the Centre for Climate and Security, Environmental Peacebuilding Association, New Security Beat and the Planetary Security Initiative. The results were shortlisted based on the criteria of relevance and then summarised and presented according to a set of emerging themes.

4.2 Theoretical framings and risk

While climate change is increasingly framed as a security issue, there remains little consensus about its relationship with security or the desirability of linking the two. McDonald (2018) draws attention to the ongoing debate emerging between those theorists of critical security studies

Key points
- There remains little consensus about the relationship between climate change and security, or the desirability of linking the two in current practice.
- The impacts of climate change are increasingly viewed as global security risks with far-reaching implications for human and natural systems. These impacts also potentially influence the causes and dynamics of violent conflict.
- The transnational nature of climate-related security risks will require efforts from intergovernmental organisations, aggressive policy action and adaptation measures entailing a rapid shift away from fossil fuels. All these measures may result in macro-fiscal challenges. However, the long-term effects of untempered climate change will have far greater cost implications.

who highlight the security implications of climate change and those who express caution in linking climate with security concerns. McDonald takes the former view, arguing that analysis consistent with the critical security studies tradition has successfully been brought to bear on the climate-change security nexus by examining the scope of security threats, exploring the contested meanings of 'climate security' and engaging with the key questions and dilemmas associated with linking the two, both in theory and in practice.

Through a systematic literature review of climate-conflict research on South Asia and Southeast Asia, Nordqvist and Krampe (2018) also find that the impacts of climate change may be viewed as security risks with implications for both human and natural systems with impacts expected to have a profuse effect on the causes and dynamics of violent conflict in the region. This effect may be substantial when:

- 'it leads to a deterioration in people's livelihoods'
- 'it influences the tactical considerations of armed groups'
- 'elites use it to exploit social vulnerabilities and resources'
- it increases levels of migration and displacement of people.

Nordqvist and Krampe suggest that these mechanisms may be more prevalent in certain contexts according to socio-economic, conflict or climatic dynamics, concluding that further research is needed in both regions.

Also considering the transnational character of climate-related security risks is a policy brief from the Toda Peace Institute (2018). This presents findings from an international workshop 'Climate Change and Conflict in the Pacific: Prevention, Management, and the Enhancement of Community Resilience' held in Auckland, New Zealand, in Autumn 2018. This workshop bought together international experts on climate change and security, policy-makers, local peace building practitioners and civil society actors in the Pacific, to address a) the local and international challenges and b) the potential conflict linkages posed by climatic uncertainty in Oceania. The key goal of the workshop was to set out a framework for research to:

- inform policy
- promote vertical and horizontal dialogue between researchers, governments, social agencies and people in the region
- endorse real-world initiatives to address climate change, as one of the region's most pressing issues.

In an effort to transcend what several participants of the workshop viewed as an overly western-based state-centric approach, it was agreed that future research and policy efforts on the climate change-conflict nexus will require different areas of expertise to be brought together, including international experts, representatives of the Pacific communities, Pacific academics, civil society, state agencies and churches. Other key takeaways from the workshop included the need to: address climate change in a conflict-sensitive manner; coordinate activities at church, civil society and community levels with policy-makers, through climate change action that is both bottom-up and top-down; integrate indigenous and traditional knowledge with western and scientific knowledge; and decolonise climate change language.

In their own analysis of international climate-related security risks, Krampe et al. (2018) also find that the need to respond adequately often goes beyond the capacity of national governments, with this creating challenges for (and increasing the relevance of) intergovernmental organisations. Here, the authors argue that it is important to understand regional climate-related security risks and to analyse how regional intergovernmental organisations are developing capacities to deal with them. They support this point through a concise analysis of four regional intergovernmental organisations policy frameworks and institutional discourses. Their report considers the following intergovernmental organisations:

- two located in Asia: the Association of Southeast Asian Nations and the South Asian Association for Regional Cooperation
- two located in Africa: the Economic Community of West African States and the Intergovernmental Authority on Development.

Through this analysis, Krampe et al. find that some organisations have been considering climate security for several decades. The Intergovernmental Authority on Development, for example, was established to deal with the primary concern of climate-related security risks presented by drought, while other organisations, such as the Association of Southeast Asian

Nations, were founded to identify climate-related security risks as a direct challenge within their mandate to promote prosperity and stability. Overall, Krampe et al. analysis finds that a region's security context and vulnerability to climate change directly affect the framings of climate-security risks.

Aon (2018) also conveys that climate change is 'one of the biggest threats' that society must contend with. While governments have stated a commitment to reduce greenhouse gas emissions and their subsequent damaging effects, it is evident that more combative policy action will be required to avoid their most disastrous effects. To meet stated targets, this must be accompanied by a rapid shift away from a reliance on fossil fuels. However, Aon's report suggests this could have significant implications for the health of the global economy. While recognising the cumulative long-term effects of uninterrupted climate change are likely to be highly damaging, the report recognises that 'the economic transformation and transitions required to deal with climatic challenges may also cause short-term pain' (ibid: 3) for those investors who are unprepared. By considering four alternative scenarios (ranging from no mitigation to a smooth transition to a green economy) and their potential impacts on asset and pension scheme funding levels, Aon reflects on how insurers and other financial institutions will be impacted by climate change. Within its scenario modelling, Aon takes the overriding view that enough progress will be made to mitigate and adapt to climate change in order to avoid the most disastrous outcomes. However, given current scientific information and the limited action taken to tackle climate change so far, Aon suggests the risks are currently skewed towards a poor climate change outcome. The organisation therefore argues that responsible investment practices will be critical instruments in the fight against climate change. These practices will need to be underpinned by a better understanding of asset allocation decisions and robust investment portfolios and pension schemes that are able to adapt to change, due to being better positioned to deliver the best-risk adjusted outcomes.

Also drawing attention to the significant macro-fiscal challenges posed by climate change,

Kireyev (2018) focuses on the challenges and costs of mitigation and adaptation policies in Djibouti. Djibouti suffers from an arid climate and a continuous risk of water stresses and desertification, which is expected to be compounded by climate change. Vulnerability to climate change is found to be enhanced by:

- deficiencies in water resource management, land use planning and building codes
- social, environmental and financial protection schemes
- risk management public policies
- environmental degradation and contamination.

Consequently, the financial costs of climate change are expected to be significant, with the overall cost of mitigation and adaptation far exceeding the resources currently available to the government. Kireyev therefore concludes that authorities must factor in expenditure related to climate change adaptation and mitigation into medium- and long-term fiscal projects and policy options. Investment in adaptation may now offer benefits, such as long-term reduced costs, while prolonged inaction on climate change could lead to structural and human resource losses.

4.3 Geopolitics and national security

While geopolitical concerns surrounding climate change are longstanding – such as those connected to the Arctic passage – Neal (2018) draws attention to the under-appreciated interplay between the international climate agenda and the global trade system. They suggest that the traditional global trade system has been founded on an ethos of an open flow of goods and services, with disciplining tariffs, trade-distorting subsidies and regulations. However, tension is becoming increasingly apparent between this 'traditional approach and the need of governments to address climate change through the use of potentially trade-distorting regulations and green subsidies' (ibid: 9). Policy-makers therefore face the challenge of how to maintain relatively free and undistorted trade, while still providing countries with room to

Key points
- Climate change, together with its associated risks, produces emerging tensions within the global trade system, challenging policy-makers to consider how to maintain relatively free, and undistorted trade, while still allowing countries sufficient policy space to implement effective measures to combat climate change.
- To provide adequate policy responses, analysis of climate impacts must move beyond narrow perspectives that look at one parameter at a time. In turn, they should view climate effects as phenomena that occur within complex and interlinking systems, where nature and environment interact with society in unpredictable and non-linear ways.
- Climate change brings a vast number of geopolitical and national security concerns for states to contend with. These include:
  - the exacerbation of existing vulnerabilities, presenting growing challenges to human health and quality of life
  - a vast increase in the demand for international development and humanitarian assistance
  - damage to crucial military and other forms of infrastructure
  - large-scale shifts in the global availability and prices of a wide range of agricultural, energy and other goods.

implement the necessary measures to combat climate change. Neal argues that there is a clear need for policy-makers to better coordinate the legal regimes governing climate and trade and ensure that they evolve in complementary ways. Despite recognising that international trade law and institutions will not be the primary vehicles for advancing the international climate agenda, Neal's report also argues that more could, and should, be done to ensure the trade regime supports climate goals. It also stresses the need for frameworks that are more responsive to the urgent problem of climate change.

Meanwhile, Schaar (2018) suggests that the following phenomena associated with climate change will differ depending on locality:

- shifts in temperature, precipitation, weather patterns and variability
- the incidence and seriousness of extreme events such as storms, floods and heatwaves.

Meanwhile, the impacts of the above will have different but potentially profound effects depending on the dynamics and functioning of the societies in which they play out. By focusing on the wider Mediterranean region, Schaar demonstrates that discussions about climate change mitigation strategies are determined by the region's great biophysical, socioeconomic and political diversity. In particular, the region is both a major oil exporter, exposed to the uncertain evolution of energy markets, and a region where temperatures and rainfall will change more drastically than in many other parts of the globe. Moreover, Schaar suggests climate change will find its greatest expression in political turmoil, armed conflict and deep environmental crisis, and that an extreme dependence on other regions for food and water already provide a challenging context. To offer adequate policy responses, analysis of climate impacts must move beyond narrow perspectives that look at one parameter at a time. In turn, they should view climate effects occurring within complex and interlinking systems, where nature and environment interact with society in unpredictable and non-linear ways. Such adequate policy responses must identify robust elements that are relevant under a range of potential scenarios. These will protect people and build societal resilience in the mid to long term. Schaar argues that we have seen little of these deliberate and detailed policy designs in the region, so far.

In terms of national security and geopolitical arrangements, Droge (2018) argues that Germany must utilise its non-permanent seat on the UN Security Council in 2019 and 2020 to promote diplomatic efforts with the potential to 'improve information flows for countries

suffering from climate change impacts' (ibid: 1). This will support regions facing climate fragility and include building a dialogue across institutions both within and outside the UN. However, Droge fears that Germany's interest in climate change and willingness to debate and prepare for its security implications will face three challenges:

1. adding value and distributing benefits for all parties involved, for both the poorer countries and the permanent five countries of the Security Council.
2. matching ambitions to take decisions in anticipation of future incidents related to climate change, using the available resources.
3. managing expectations regarding what progress on issues of climate-security is viable within the Security Council over the two-year period.

Also focusing on the geopolitical arrangements necessary to combat climate change from a security perspective, a report from the EU-Australia Forum (2018) argues that climate change should be securitised and thus treated as a security issue. The report contends that Australia should follow the EU's lead, which has emerged as a champion of the climate security norm, providing numerous examples, culminating in the 2018 EU Foreign Affairs Council's adoption of its latest conclusions on climate diplomacy. These include:

• calling for further mainstreaming of the nexus between climate change and security in policy dialogue
• conflict prevention
• development and humanitarian action
• disaster risk strategies.

The EU-Australia report finds Australia to be far less advanced in acknowledging the prospects of increasing climate security for their national interests and recommends that the Australian government develops a document such as a climate security white paper to guide a coordinated whole-of-government response to climate change risks. It is argued that climate security would fall neatly within the new

EU-Australia Framework Agreement and would constitute a dimension of climate change policy where Australia-EU dialogue and cooperation would be particularly beneficial.

Providing analysis of similar concerns within neighbouring New Zealand, a report provided by New Zealand's Ministry of Defence (2018) recognises climate change as one of the 'greatest security challenges for New Zealand defence in the coming decades' (ibid: 3). This is due to the intensifying impacts of climate change being expected to continually test community resilience and contribute to heightened security challenges across the wider Pacific region. The ministry's report finds the links between climate change and conflict to be 'indirect, but demonstrable' (ibid), with the effects of climate change projected to extrapolate both social and environmental issues, with significant contributions seen in both low-level and more violent conflict. The future impacts of climate change are projected to require more humanitarian assistance, disaster relief and stability operations. This will create more frequent and concurrent operational commitments for the New Zealand Defence Force, which will test its capacity to respond.

In the National Climate Assessment Report, Smith et al. (2018) similarly find that US international interests such as: 'economics and trade; international development and humanitarian assistance; national security; and transboundary resources will be affected by climate change with long-term changes in climate potentially leading to large-scale alterations in the global availability and prices of a wide range of goods' (ibid: 108). US investments in international development are likely to be undermined by more 'frequent and intense extreme events' natural-hazard related disasters.

These events can impede developmental efforts and result in greater demand for US humanitarian assistance and disaster relief. Climate change, variability and extreme events are found to provide increased risks to national security through direct impacts on US military infrastructure and – more broadly – through the relationship between climate-related stress on society and conflict, with climate variability being shown to affect conflict through numerous intermediate processes. These include

resource competition, commodity price shocks and food insecurity. Finally, changes in weather and climate patterns have been found to pose new challenges for the management of shared and transboundary resources requiring bilateral agreements and public-private partnerships that incorporate climate risk and adaptive management into both their short- and long-term strategies.

4.4 Climate and disaster resilience in fragile and conflict-affected contexts

The need to consider both the building of resilience and the addressing of security risks related to climate change is also a topic of discussion within the grey literature. Buhaug (2018) suggests three recent events have informed thinking about climate security. These are:

• meteorological records – set in 2018 across the northern hemisphere – of heatwaves, droughts and wildfires
• the European migrant crisis
• the 2011 Arab Spring.

In Buhaug's report, extreme weather events are found to pose real threats to human security and well-being, with climate change expected to make things worse. This is particularly the case in societies where people currently live on the margins and lack the necessary skills and resources to cope on their own. Buhaug, however, finds little evidence that climate conditions are an important direct cause of armed conflict, suggesting that the dominant causes of violent conflict in future years are likely to remain political in nature: related to issues such as equality, representation and economic well-being. Climate change may affect some of these drivers, notably those that are tied to agricultural production and livelihood security. This may hamper development more generally while also being unlikely to result in violent conflict in the absence of other prevailing conflict-promoting conditions. Buhaug conversely recognises that armed conflict is the biggest threat to human development. The international community should therefore increase its investment in finding

Key points
• The dominant causes of violent conflict in future years are likely to remain political in nature: related to issues such as equality, representation and economic well-being. Climate change may affect some of these drivers and hamper development more generally, but it is unlikely to result in violent conflict in the absence of other prevailing conflict-promoting conditions.
• There is a need to adopt a human rights approach to DRR that is capable of supporting social, economic and political change in a way that tackles inequality and inequitable resource distribution. The post-disaster space should also be utilised as a means to alter the dynamics of peace and conflict, and redress power imbalances in favour of disaster risk governance approaches that centre poor people.
• When states face fragility and climate risks simultaneously, the risks and challenges are compounded; responding to high exposure to risks requiring substantial resources, infrastructure and mobilisation can exceed state capacity and social capital. Addressing climate risks in fragile states should therefore look to adopt strategies that enhance resilience while also tackling fragility.
• Climate change has multifaceted implications and, as such, is not merely a technical problem in need of a technical solution; rather it is a socio-political one in need of joint-risk analysis.
• Responses to climate change in conflict settings will need to consider multiple entry points for approaches that build the resilience of vulnerable groups against security risks related to climate change in contexts of legitimacy deficits and individual country risk landscapes.

lasting solutions to ongoing conflicts and avoid new ones breaking out. The findings in Buhaug's report conclude that the best way to minimise the

security threat imposed by future climate change is to address and resolve the dominant causes of contemporary wars.

Turning attention to climate-related disasters, Peters and Peters (2018) argue that there is a moral imperative to deliver DRR in contexts experiencing violent conflict where disaster vulnerabilities are high, particularly given the prevalence of violent conflict across the Africa and Arab regions. Peters and Peters find that violent conflict presents acute challenges to the design and implementation of the strategies necessary to achieve the Sendai Framework for Disaster Risk Reduction. This suggests that a more critical approach is needed to ensure that, at a minimum, DRR measures do not inadvertently reinforce vulnerabilities and potentially contribute to the conditions for peace. Peters and Peters suggest that, in order to understand and act on disaster risks in contexts of violent conflict, the inherently political nature of disaster risk must be taken into account through the adaptation of DRR policies, programmes and strategies. They subsequently argue for the adoption of a human rights approach to DRR that is capable of supporting social, economic and political change in a way that tackles inequality and inequitable resource distribution. They stress that the post-disaster space should be utilised to alter the dynamics of peace and conflict and redress power imbalances, in favour of approaches to disaster risk governance that centre poor people.

In their 'Integrated Strategic Environmental Assessment in Post-Crisis Countries' report, UN Environment (2018) provides a similar discussion about the importance of utilising the opportunities of post-crisis recovery to minimise environmental impacts and build resilience to disaster, climate and conflict. The report provides a 'step-by-step practical guide for countries in post-crisis situations to undertake integrated Strategic Environmental Assessment' (ibid: 5). It does this by building on an approach that emerged from the post-crisis and development process of the Northern Province of Sri Lanka following 33 years of conflict. The report's authors subsequently suggest that 'Opportunity Maps' have led to collective decision-making, reducing the potential for land and resource

use conflicts, disaster risks and, ultimately, to the declaration of new protected areas. They argue these may be of use in similar situations in other contexts. In addition, UN Environment has also found that data collection processes have helped to build trust, consensus and databases on key environmental sensitivities and hazards, also enhancing planning capacities. This suggests these should therefore be utilised in the implementation of Strategic Environmental Assessment elsewhere.

Moran et al. (2018) provide a highly detailed analysis of the intersection between state fragility and climate risks. Here, the authors find that states facing a high exposure to climatic hazards are often subject to numerous other challenges, including physical and livelihood risks that may force states to redirect resources to human response efforts. This places great strain on the capacity of states that, in many cases, are still struggling to provide democratic institutions and services that meet public need. Meanwhile, fragility can hinder many aspects of a state's capacity and legitimacy. A key tenet of this report's argument is that when states face fragility and climate risks simultaneously, the risks and challenges are compounded; here, responding to a single event can place considerable pressure on resources available to the state. Furthermore, 'a country that has high exposure to multiple, diverse hazards will require resources, infrastructure and mobilisation many times over to address each of these individual hazards and their impacts' (ibid: 3). For a highly fragile state, these multiple and diverse threats will require responses that can exceed state capacity and social capital. Fragility is therefore argued to be an important dimension in understanding the nexus between climate and conflict risks. Potential instability in fragile states is thought to be embedded in forms of governance and existing political compositions at the local, national and regional levels, all of which can be affected by the strains that climate stresses and fragility introduce to people and their governments. When considering how to combat these challenges, Moran et al. argue that addressing climate risks in fragile states could facilitate successful initiatives that both enhance resilience and reduce fragility. They

elaborate that that these state actions respond to public needs for reducing climate vulnerabilities, and are found to 'simultaneously reduce both climate risks and the legitimacy deficits that often contribute most heavily to fragility' (ibid: 3).

Continuing discussions about the challenges faced by fragile states and the need to reduce conflict within them, Stark et al. (2018) provide a contextual case study of the ongoing PEACE III Cooperative Agreement, funded by USAID. The programme was designed to respond to the challenges arising in arid and semi-arid lands along the borders between Kenya and its neighbours, which has borne witness to ongoing conflict among pastoralists and agro-pastoralist communities. PEACE III aims to promote stability in the region by strengthening the relationship between communities and local governments in cross-border areas and improving the ability of regional and national institutions to respond rapidly and effectively to conflict. The initiative is based on a model of encouraging and strengthening both horizontal and vertical linkages among local, national and regional institutions, as well as partner organisations and communities. It has been mainly effective in helping reduce and mitigate conflict, especially large-scale or escalatory violence in the Karamoja region. The programme's efforts have provided important support for an emerging and growing network of peace committees, women's groups, youth groups and traditional leaders across both pastoralist and agro-pastoralist communities. Using these cooperative linkages, the project team for the case study in question was able to circulate new norms and practices for the management of natural resources and conflict, while this also constituted a set of structures for collaborative learning and decision-making that would be capable of building an agenda for resilience that could be arrived at inductively, rather than prescriptively.

The Expert Working Group on Climate Related Security Risks (2018) identify a complex risk landscape within Iraq, owing to security risks from post-ISIS conflict risks, terrorism, socio-political and economic challenges, in addition to climate security risks. This complex landscape is underwritten by a number of hydrological limitations, along with increasing temperatures and extreme weather events. These place pressure on basic resources and undermine livelihood security for the population. Iraq is therefore found to be one of the Middle East's most climate-vulnerable countries. The Expert Working Group's report identifies five priority climate-related security risks facing Iraq:

- the potential for diminished agricultural livelihoods to increase support for terrorist groups
- insufficient governance capacity to address and respond to climate change and environmental degradation
- an increased dependence on water flows from riparian neighbours
- increased levels of mass displacement and forced migration
- heightened communal tensions over access to food and water.

The report recommends a course of action for the UN Assistance Mission to Iraq and other international bodies, to address these challenges. This includes the use of 'scenario-based workshops to build Iraqi capacity and understanding of the short- and medium-term climate-related security risks' (ibid: 2). It also encompasses the provision of technical support for regional dialogues to address water and environmental challenges, along with the integration of climate-induced displacement, economic vulnerability and socioeconomic instability into post-ISIS recovery plans.

4.5 Food and water security

Gleick and Iceland (2018) find that a wide range of water-related risks have the potential to undermine human well-being and can contribute to political instability. This can, in turn, undermine national, regional and global security. Water crises are therefore seen to fundamentally contribute to instability, creating a need for multifaceted responses. This, the authors argue, is of vital importance, given that water demand is increasing sharply in many regions due to population growth and economic expansion. Meanwhile, climate change is expected to 'alter the timing of water availability and increase

the severity of drought and flood events' (ibid: 2) in the mid-latitude regions. Furthermore, the destruction of the natural habitat and the untreated discharge of municipal, industrial and agricultural wastewater is rendering much of the available surface and groundwater untreatable. Gleick and Iceland reason that a combination of these increasing pressures are undermining water security and may simultaneously contribute to conflict, migration and food insecurity in many parts of the 'developing world'.

De Bruin et al. (2018) also present findings to support the thesis that current water insecurity is likely to continue to increase as a result of not only climate change, but also economic development, population growth and poor water resource management. By exploring the relationship between water, climate and conflict risk through reviewing more than 200 publications and reports, the authors shed light on the differing views present in the literature on the role of water in relation to political or violent conflict. They identify three varying groups of study. First, there are studies that underline the direct role of climate and water in political or violent conflict. These have a tendency to link resource scarcity directly to conflict. Second, there are studies that are less explicit about the direct role of water in conflict, often concluding that water is a subdominant factor in a mix of determining factors such as population density, demographics, inequalities and ethnic fractionalisation. Finally, they identify another kind of research, this time highlighting the strategic value of water for both cooperation or conflict. Therefore, rather than a cause of conflict, water is militarised. Overall, De Bruin's report finds the second group of studies to be the most reflective of the ongoing reality, finding that water-related conflict risk is often characterised by the following:

- an absence of stable institutions or effective governance
- a deepening of poverty and inequalities
- a fuelling of feelings of grievances
- unequal distribution of remaining resources or aid.

Key points

- A wide range of water-related risks have the potential to undermine human well-being and can contribute to political instability, which in turn can undermine national, regional and global security. Water crises are therefore seen to fundamentally contribute to instability and, as such, multifaceted responses will be needed.
- Water-related conflict is often characterised by: an absence of stable institutions or effective governance; a deepening of poverty and inequalities, fuelling feelings of grievances; and unequal distribution of remaining resources of aid resources. Institutional failures to address water-related challenges can act as risk multipliers, compounding existing situations of fragility, while improvements to water management may contribute to resilience.
- The cumulative effects of climate change undermine all dimensions of food security, including availability, access, utilisation and stability. This means actions and solutions need to be accelerated and scaled up to strengthen the resilience and adaptive capacity of food systems, nutrition and people's livelihoods.
- In order to 'leave no one behind', actors will increasingly have to work in fragile contexts, where the devastating consequences of conflict and resulting levels of human suffering have vastly increased in recent years.

The authors conclude that these four factors should be explicitly considered when developing adequate strategies to reduce conflict risk in the context of water and climate.

An analysis of the relationship between fragility and conflict is also provided by FAO and the World Bank (2018). This report describes how the inability of governments to address

water security can act as 'risk multipliers, compounding existing situations of fragility, while improvements to water management may contribute to resilience' (ibid: ix). Failure to uncover solutions to water challenges is found to aggravate fragility by:

- challenging ecosystems
- straining livelihood security
- exacerbating existing grievances and tensions
- compounding socioeconomic risks related to poor governance and marginalisation
- triggering social friction, unrest and violent conflict.

However, fragility also makes it harder to address water security, giving rise to a vicious cycle, where fragility makes it more difficult for water management to be effective; at the same time, the impacts of water issues increase, eroding government legitimacy and destabilising fragile contexts. Similar to other reports discussed above, this one does not infer a direct casual linkage between water crises, social tensions or unrest. Rather, it suggests that water issues interact with a range of factors in complex and often unpredictable ways to drive fragility. The authors argue that addressing water and fragility issues will therefore require the primary focus on immediate, reactive responses to shift to a balanced long-term approach that builds on growth-oriented resilience to shocks and protracted crises. This should be focused on sustainable, efficient and equitable management of water and service delivery.

FAO et al. (2018a) suggest that, similar to its impact on rising water insecurity, climate change is having a negative effect on food security. They find that food insecurity simultaneously contributes to obesity, as well as undernutrition and malnutrition, which are increasingly found to co-exist within many countries. Exposure to more complex, frequent and intense climate extremes are shown to increasingly threaten to erode and reverse gains made in ending hunger and malnutrition. In addition to conflict, these are found to be key drivers behind the increase in global hunger and among the leading causes of severe food crises. The authors therefore find that the cumulative effects of changes in climate are undermining all dimensions of food security, including availability, access, utilisation and stability. In response, FAO et al. suggest that actions to meet the cumulative effects of climate change need to be accelerated and scaled up in order to strengthen the resilience and adaptive capacity of food systems, people's livelihoods and nutrition. This acceleration must be founded upon increased partnerships and large-scale funding of integrated DRR and management, as well as climate change adaptation programmes that incorporate short-, medium- and long-term planning.

Correspondingly, Concern Worldwide (2018) finds that in order to meet their commitment to 'leave no one behind', the organisation's efforts will increasingly have to be focused within fragile contexts, where the effects of conflict and levels of human suffering have recently significantly increased. The report finds that severe insecurity limits movement and, in some cases, leads to near-total reliance on food aid. In addition, the research also highlights that the impact of conflict on food security is unequally distributed within households and communities, with the gendered dimensions of conflict and hunger appearing to be particularly stark. Finally, similar to the previous study, the authors find that conflict can severely disrupt traditional coping strategies and mutual support systems, which can in turn further exacerbate food insecurity, with national-level political contexts indirectly fuelling a vicious cycle of poverty and localised violence. The report therefore concludes with a number of recommendations to reduce the impact of conflict on food security. These include the need for humanitarian and development actors to work in a conflict-sensitive manner; to implement programmes that are highly attuned to gender and social relations; to support community-owned resilience-building activities; and to tackle the inter-connected impacts of conflict, climate change and natural hazard-related disasters on food security.

Von Grebmer et al. (2018) also draw attention to the challenges of providing global food security and question whether the world will be able to achieve the aspirations laid out in the SDGs to end hunger, achieve food security and improved nutrition, and promote sustainable

agriculture by 2030. They find that hunger varies enormously by region, with rates of undernourishment found to be extremely high in both South Asia and Africa (south of the Sahara). Within the report, an in-depth analysis of the relationship between forced migration and hunger is provided, with the two found to be intertwined and affecting some of the poorest and most conflict-ridden regions of the world. Hunger is highlighted as both a cause and consequence of forced migration, with food-insecure displaced peoples requiring support in four key areas:

- a recognition of hunger and displacement as political problems
- the adoption of more holistic approaches to displacement
- the provision of assistance to food-insecure displaced people in their region of origin
- an acknowledgement of the resilience of the displaced population, with this providing the basis of support.

The report concludes that focus should be placed on 'those countries and groups of people who need of the most support, also providing long-term solutions for displaced people and engaging in greater responsibility sharing at an international level' (ibid: 5).

4.6   Displacement and migration

Food security has also been discussed in relation to migration. FAO et al. (2018b) examine the 'complex interlinkages between migration, agriculture, food security and rural development, and the factors that determine rural people's decisions to migrate, such as economic factors, employment opportunities, conflict, poverty, hunger, environmental degradation and climate shocks' (ibid: iii). The authors find the relationship between food security and migration can be 1) direct, when individuals are forced to move as a result of food insecurity or 2) indirect, where linkages between agriculture, food security and migration result in the use of migration as a strategy to overcome income uncertainties and food insecurity risks. In conclusion, improved agricultural and social policies are viewed as

Key points
- The relationship between food security and migration can be direct, when people lack options to escape hunger and may feel compelled to move. It can also be indirect, with people migrating to overcome income uncertainties and food insecurity risks.
- There is a growing awareness among national climate policy actors regarding the need to include human mobility dimensions in the context of climate change, with efforts to create synergies between climate, environmental concerns and migration, as these will be necessary to overcome substantial gaps related to policy coherence and the broader development process.
- Some countries, such as Vanuatu, have already begun attempts to mainstream displacement and mobility considerations within key sectoral areas of government.

necessary to address the challenges of migration and to capitalise on the opportunities presented by current trends.

Also on the topic of migration, but switching focus to national policy, a study by the International Organization for Migration (IOM) (2018) considers the growing consideration of human mobility in the context of climate change by policy-makers. The report finds that, despite efforts to create synergies between climate and environmental concerns and migration, there are substantial gaps related to policy coherence and the broader development process. The authors find some good practice in countries (for example, Botswana, Ghana, Kenya, Nigeria, Uganda, Haiti and France) predicted to face an increase in migration levels owing to climate change, with some having already drafted specialised policies. However, they indicate that such cases are limited in number. Furthermore, the authors suggest that the Global Compact for Safe, Orderly and Regular Migration is the most comprehensive agreement negotiated on international migration, given its inclusion

of climate change and environmental factors. IOM believe this policy achievement could be used to encourage a review of existing mobility policy frameworks, similar to those outlined in the Global Compact for Safe, Orderly and Regular Migration, while new mobility policy frameworks could also be developed on the basis of the Global Compact for Migration, opening the opportunity to further mainstream climate and environmental dimensions.

Baronchelli and Ricciuti (2018) similarly analyse the relationship between climate change and migration, through a detailed case study of rice production in rural households in Vietnam. Given Vietnam's reliance on rice as a staple food, the negative impact of increasing minimum temperature on rice crops has been found to drive migration, due to fewer job opportunities in agriculture. This, the authors argue, has two important implications for the development of Vietnamese rural households:

1. Policy-makers must fully understand the link between climate variations, agricultural production and migration, in order to predict future population movements.
2. The excessive dependence of Vietnamese households on rice production in an increasingly volatile climate may have severe consequences.

Baronchelli and Ricciuti therefore encourage the adoption of alternative crops that may be more resistant to climate variations, in tandem with the introduction of ad hoc policies to support the most climate-sensitive households.

The Vanuatu National Disaster Office (2018) has attempted to mainstream displacement and mobility considerations, as suggested above, into key areas of the Government of Vanuatu, through its National Policy on Climate Change and Disaster Induced Displacement. This policy has been created in response to the increasing need to evacuate people facing floods, cyclones and other hazards. It has also been shaped to address requests for assistance from those communities facing eviction and land conflicts, who have been under-served by policy gaps. It does this in

terms of reducing the causes of displacement and protecting people when it occurs. The national policy aims to facilitate increased collaboration between emergency, development planners and the Government of Vanuatu, in order to address the needs of all communities affected by displacement. The policy aims to address displacement risks within the broader context of sociocultural arrangements common within Vanuatu, including traditional and customary land arrangements, development pressures and rural migration. The concept of 'disaster' within the document is understood as broad, including a range of crises affecting communities' decisions to migrate, such as evictions, land conflicts and development-induced displacement. Finally, the policy aims to ensure that 'all those affected by displacement, including the host communities, are included in national development planning and have equal opportunities to participate and share in the country's growing security, wealth and prosperity' (ibid: 7).

On an interrelated note, Boyd et al. (2018) provide an assessment of the nexus between modern slavery, environmental destruction and climate change. There are multiple findings within their review of the literature. First, they propose that modern slavery practices contribute to further multi-scalar environmental destruction and perpetuate climate change as 'forms of debt bondage, illegal or informal channels of labour are utilised to meet the persistent and continued interests of consumers in the Global North' (ibid: 7). However, they also suggest that increasing environmental pressures in the form of natural-hazard related disasters in the Global South can 'exacerbate existing vulnerabilities and inequalities of local populations that may render them susceptible to exploitative labour practices' (ibid: 11). This nexus has been found to emerge in relation to specific geographical locations, including in Brazil and Indonesia, and the authors argue this is often related to 'climate-induced migration'. This has taken place through studies focused on industries such as charcoal, cattle and palm oil production, in addition to being identified as most prevalent in four main sectors: fisheries, fields, forests and factories.

4.7 Energy transition and geoengineering

In the 'Geopolitics of Energy Transformation', Goldthau et al. (2018) view the transformation of the energy system as a global phenomenon that progresses far too slowly to halt climate change, yet provides immediate positive effects for human security. An increasingly electrified energy system is seen to offer a reduced dependence on fossil fuel supply chains and strengthened access to energy that indirectly promotes national and international security. However, geopolitically, such an energy transformation reinforces a shift away from traditional security policies and geographic influence towards the control of the flow of goods, knowledge, capital and information. The global energy transformation is therefore seen as tantamount to systemic change, producing a spatially differentiated, fragmented energy system that neatly fits into an increasingly multipolar world underpinned by a more protectionist stance towards trade. However, this is not without challenges, as mercantilist energy policies present the threat of spiralling rivalries between 'energy blocks', as states strive to privatise competitive advantages and technology rents. This means sustainable and long-term transformation dividends are only able to be reaped if a liberal trade regime successfully secures transnational supply chains and guarantees access to technology and know-how.

In a similar analysis of this transition to a low-carbon economy, Church and Crawford (2018) consider how the renewable energy technologies required to facilitate this shift are heavily dependent on mineral and metal resources that are often located in states considered as either fragile or corrupt. The authors illuminate how the sourcing of these inputs will determine whether this transition supports peaceful and sustainable development in the countries where reserves are naturally located, or if their sourcing 'reinforces weak governance, exacerbating local tensions and grievances' (ibid: 5). The extraction of these resources therefore presents potential hotspots for increased fragility, conflict and violence in the future, given increased mineral extraction. Church and Crawford argue that, in order to meet the SDGs and climate change mitigation – while at the same time avoiding conflict – the supply chains of these resources 'must be governed in a way that is responsible, accountable and transparent' (ibid: v). This requires concerted collective action from civil society, the private sector and governments.

Considering issues surrounding geoengineering, Barrett et al. (2018) provide an analysis of SRM as an additional proposed means to respond to climate change. They follow this with an argument that if SRM technologies were to be developed successfully and used, they could reduce global temperatures by reflecting a small percentage of incoming sunlight. However, the development of SRM technologies remains highly 'speculative and contentious'. First, it needs to overcome large technical hurdles. SRM could also create its own risks in climatic, environmental, social, geopolitical and ethical spheres. Finally, even research efforts and exploratory discussions of SRM could detract from attempts to address via mitigation and adaptation. Ultimately, the report from Barrett et al. makes a case that a

Key points
- Sustainable and long-term transformation within the energy system towards a more electrified system will require a liberal trade regime to successfully secure transnational supply chains, as well as guarantee access to technology and know-how.
- The supply chains of the strategic minerals needed for a transition towards a low-carbon economy must be governed in a way that is responsible, accountable and transparent. This requires concerted collective action from civil society, the private sector and governments.
- Solar engineering (SRM) is increasingly viewed as an additional proposed means to respond to climate change. However, this technology may create its own risks and research should therefore follow a precautionary approach.

balance must be struck in SRM governance so as not to obstruct SRM research altogether, while at the same time avoiding research that could directly or indirectly harm people in the future. The authors therefore suggest that SRM should be considered as part of a broader portfolio of climate responses rather than as an alternative to climate change mitigation and adaptation. Transparent evaluation of the risks, burdens and benefits of SRM must be carried out with the insurance of robust governance before any consideration of deployment. The authors argue that the governance of SRM goes beyond just formal regulation, and needs to include a wide-range of formal and informal mechanisms for determining the use of SRM.

The issues raised by solar engineering – including those involved in building, operating and maintaining large technological systems – are also highlighted by Chhetri et al. (2018), with particular attention paid to the institutional architecture, standards and best operating practices. The authors provide a similar argument to the one provided above, suggesting that the unknowns surrounding solar engineering deployment demand a precautionary approach. However, they find that nations and regions remain divided in their understanding of what a 'precautionary approach' means in reality, even when this is agreed to be a desirable basis for governance (ibid: 5). The legitimacy of governance depends on the perception that decision-making institutions are impartial and fair in their judgements. However, judgements as to what constitutes an unbiased process rests on a set of culturally-specific civic beliefs, which will vary from country to country. SRM governance will therefore have to strike a balance between geographically diverse regions in order to remain legitimate.

5   Climate change, conflict and security within the academic literature

This section examines the academic literature on climate change, conflict and security published between 1 August 2018 and 30 November 2018. It covers both qualitative and quantitative studies.

5.1   Methodology

The academic literature has been sourced from the International Bibliography of Social Sciences (IBSS). This database has been selected as it compiles journals from a range of publishers and is considered more independent than those tied to individual publishers. The database has been scrutinised to ensure it contains publication titles relevant to this topic – namely, those that have previously published special issues on this theme: *Current Climate Change Reports, Climatic Change, Geopolitics, Disasters, Journal of Peace Research* and *Political Geography*. Where the titles have not appeared, a manual search for relevant publications has been carried out within the missing publication titles.

The database has been interrogated using a set of pre-selected keywords – climate change, climate change adaptation, climate change mitigation, natural hazards, climate extremes, climate variability and disasters, in combination with each of the following secondary terms: conflict, violence, security, peace and fragility. In addition, the key phrase 'climate security' has been searched as a standalone term.

All literature sourced comes from the designated scan period, except journal articles

without a clear publication month but published in 2018. These have been tracked to ensure they do not appear in future scans. In addition, some publications have an academic journal publication date and a separate date corresponding to when they first appeared online. Where this is the case, articles have been included on the basis of the date of academic publication.

Journals have been compiled and recorded, with a shortlist created on the basis of a 'relevance' criterion. The shortlisted articles have been grouped into themes, and this has become the organising structure for the summary below. In total, 48 articles have been assessed and summarised.

5.2   Causation and theoretical frameworks within climate security

5.2.1   Local dynamics of conflict
Climate-security research has highlighted the importance of focusing on the subnational, local nature of conflict. Linke et al. (2018) have furthered this through an examination of local-level conflict dynamics under drought conditions – how social contexts shape attitudes that can lead to violence and the potential of local institutions to alleviate it. Their work also allows for specific examples of local institutions to be assessed: how official and unofficial rules governing natural resource use can impact the use of violence. For the study documented in their article, Linke et al. conducted surveys in

Key points

- The importance of focusing on the subnational, local nature of conflict in both data collection and the formulation of responses is recommended, with local institutions found to have a unique potential to alleviate violence.
- There is a need for greater disaggregation of understanding social dynamics within the climate-conflict nexus due to the unequal distribution of social vulnerability within different groups of populations. This can be facilitated by interpreting vulnerability from varied perspectives, in addition to the inclusion and participation of different stakeholders in understanding the impacts of large-infrastructure projects.
- In order to implement successful energy system changes, we should understand that energy systems comprise both technological and social systems, which are complex and account for different goal and implementation levels.

Kenya on individual experiences and attitudes towards the use of violence, precipitation change and rules of resources use. The authors discovered that, under drought conditions, there is modest increase in support for violence. Importantly, Linke et al. also found that local official and unofficial rules help ameliorate these effects. This suggests that such regulations can relieve stress between households resulting from environmental change and rainfall shortages.

Harari and Ferrara (2018) further highlight the importance of local data. The authors have localised their study in three key ways: accounting for spatial and temporal dimensions of conflict within countries; modelling climate events in terms of localised shocks relative to the growing season, rather than a yearly average; and accounting for local specifics of soil properties by using a measure of drought including precipitation effects, potential evaporation and temperature. Using econometric techniques, Harari and Ferrara's findings support previous studies indicating that local agriculture-relevant shocks may impact conflict. The authors find

that conflicts are more likely to spill across locations at ethnic borders and that the effects of agriculture-relevant weather shocks are highly localised. Differentiating between the types of conflict relevant for these weather shocks, the authors' research highlights that battles and rebel recruitment persist longer than riots and that battles and violence against civilians are spread over space. The perpetrators involved tend to be political militias and rioters, often attacking government or rebel groups. The effects of agriculture-relevant weather shocks also reveal violence against rioters, protestors and civilians by government forces and political militia. As a result, Harari and Ferrara suggest that more favourable weather during growing seasons may decrease the risk of conflict, but that it does not have an impact outside the growing season.

5.2.2 Diverse social impacts of climate events

The academic and popular literature often associates 'Youth bulges' with a heightened risk of conflict. Flückiger and Ludwig (2018) have explored this phenomenon related to drought incidence. Their journal article highlights that droughts in rural sub-Saharan Africa can lead to reduced agricultural output and income, and that droughts negatively impact child survival and subsequently influence age group sizes. Using a measurement of drought that includes precipitation, temperature and soil condition measurements, Flückiger and Ludwig's research has tested the theories for three separate age groups within the 'youth' age range. Their study reveals that recruitment for civil conflict is facilitated within the 15–19 age group, but not others. The authors suggest that this may occur because young people aged between 15 and 19 in rural sub-Saharan Africa are transitioning to the labour market. If the labour market is unable to absorb a large volume of prospective workers, a 'youth bulge' could cause a bottleneck and result in a higher number of marginalised youths. Therefore, the risk of conflict might increase as this effect enlarges the potential pool of recruits and lowers the opportunity costs of engaging in civil conflict.

Highlighting the importance of greater disaggregation in understanding social dynamics within the climate-conflict nexus, Climent-Gil

et al. (2018) present a case study of social vulnerability related to large infrastructure projects. Their study follows previous findings that risk is partially determined by the social vulnerability of different groups in a population. That is, risk is distributed unequally based on exposure to an impact and level of social vulnerability. They expand on this concept by proposing that vulnerability is both structural and acquired, and that it has social, economic and political aspects at the state, community and individual levels. Applying this method of social vulnerability analysis in the study underpinning their article in the *Environmental Impact Assessment Review* journal, Climent et al. examined a large dam project in Chile, looking at how vulnerability influences associated risk. Their results demonstrate that vulnerability persists, not only during the operation of, but also at the closure of a project. They also indicate that interventions accounting for this longer-term impact could help reduce the socioeconomic risks posed by large infrastructure projects. The authors emphasise that the key to understanding the dynamic impacts of such projects is interpreting vulnerability from varied perspectives, with participation of different stakeholders.

5.2.3   Focusing and localising energy systems

Balest et al. (2018) state that energy systems include 'sources, technologies, and products for energy production, distribution, and consumption' (ibid: 170). Expanding on this, the authors have examined support and opposition for energy system change, looking at societal acceptance and conflict in energy systems. They stress that energy systems are more than technological processes: they are also composed of social dimensions within a given territory. In the case of changes to energy systems, people and groups make choices, react and take actions to achieve transitions, such as changing to renewable sources of energy. Balest et al. suggest that understanding energy systems as both technological and social systems allows energy system changes and development to be more site-specific and build on the social components of a project. Their study has found that local

populations tend to transition from centralised energy systems to ones that are more distributed, producing local renewable sources and consuming local energy. These trends recognise that the complexity of energy systems occurs not only between individual actors and collectives, but also between processes and networks.

Furthermore, energy systems are increasingly understood to be complex and to account for different levels of goals and implementation. Biresselioglu et al. (2018) have addressed this complexity by assessing policy frameworks for effectiveness and efficiency of states in achieving targets, comparing individual EU member states and the potential of the EU as a whole for achieving their energy and climate targets set for 2020. Although their study has found the EU to have inefficient performance during 2010–2012, it does show a consistent increase in achievement towards the targets. The improved efficiency for individual member states suggests there is potential for the EU as a whole to progress towards the goals of reduced generation of greenhouse gas emissions and increased renewable energy consumption and energy efficiency, respectively. The authors highlight that countries broadly expected to perform well also tend to set more ambitious targets and may therefore have less efficient performance than countries with lower baseline achievements or with less ambitious targets. They also suggest that countries should evaluate their policies for effective implementation to achieve state targets as a means to advance the greater EU's energy and climate targets.

5.3   Concerns of national security and processes of securitisation

5.3.1   Environmental security, UK national security strategy and lessons from the 19th century

The risks associated with climate change are often transboundary in nature, requiring a collective response among neighbouring states. How states can be encouraged to adopt a more 'cooperative and adaptive' conception of security, such as environmental security – as opposed to narrow focus on national security – has been explored by Grumbine (2018). This

Key points

- The transboundary nature of climate-risk will require a more collective response among neighbouring states, in addition to the adoption of a more cooperative and adaptive conception of security. This should encourage states to recognise that following a strategy of self-interest will present a direct threat to stability within their borders.

- A solution is presented in the conceptualisation of 'environmental security'. This goes beyond a narrow focus on national security, to provide a framework for considering multiple drivers of ecological and social change. It also allows a framing of risk as a transboundary issue; however, its adoption has been hampered by inertia among national governments regarding the adoption of non-traditional forms of security.

- The framing of 'disasters' within UK national security policy, emphasising a humanitarian response, as opposed to an increased focus on DRR, needs to be reconsidered. This is vital, on account of the implications and repercussions for departmental responsibility and funding allocations, along with the nature of the solutions and responses proposed.

took place through a case study of the Mekong river basin, helping illustrate the obstacles to such a transition. Grumbine (2018) argues that the Mekong river basin currently faces six stressors that require the cooperation of its member states: ecosystem degradation, food, energy, water, development and climate change. Grumbine (2018) also contends that adopting an environmental security narrative offers certain advantages. First, it provides a framework for considering multiple drivers of ecological and social change. Second, adopting a form of security that frames risk as a transboundary issue may encourage states to acknowledge that following a strategy of self-interest will present a direct threat to stability within their borders.

However, whether these collective challenges will result in more cooperative behaviour is questionable. In general, Grumbine notes that the adoption of environmental security has been hampered by inertia among national governments regarding the adoption of non-traditional forms of security. There also remains a geographical imbalance. While environmental security may have gained some traction in the US and Europe, this has not been the case in other parts of the world. In relation to the Mekong river basin states, Grumbine lists the following reasons as obstacles to collective action: differential projected impacts and these being seen as distant phenomena in the future. In addition, any change to the current state of inertia will require support from the region's major power broker, China. Grumbine argues that China's influence in the region could act as either a catalyst or obstacle for change.

Regarding the topic of processes of securitisation, an article by Peters (2018) uses a national and international policy context to explore whether climate change has been securitised, and to what extent processes of securitisation constitute a full securitisation, as described by prominent academics. Peters builds on this line of enquiry by exploring the consideration of disasters within the UN Security Council and UK security policy. Peters argues that, up until now, there has been little attempt to understand the framing of disasters within the climate security discourse, and seeks to rectify this. Comparing the inclusion of disasters within the UN Security Council from 2007–2017 and UK security policy from 1997–2015, Peters highlights a notable difference between the two: while the framing of climate change within the UN Security Council has been articulated through the view of disasters as a security risk, this is not the case within UK security policy.

Peters argues that climate change is framed as a security concern within UK security policy, but references to 'disasters' (meaning natural hazard-related disasters) are discursively different. Domestically, disasters are framed under civil emergencies but, internationally, they are considered in terms of humanitarian response and the military's capacity to act. Although such debates lend themselves to academic discussion,

Peters argues that this also has repercussions in terms of the departmental responsibility, funding allocation and nature of solutions and responses proposed. Too often, the UK's emphasis on responding to disasters abroad has narrowly centred attention on humanitarian response while 'less consideration is given to action on DRR as a possible solution' (ibid: S210), even though ex-ante measures are considered 'at-home' in relation to UK flood risk.

How the world's militaries respond to future security scenarios in an era of changing climate may actually lie in lessons from the past. For example, Jamison (2018) argues that an early example of naval intelligence gathering can be found in the historical US Exploring Expedition mission towards the middle of the 19th century. In a bid to extend US interests abroad through 'extend[ing] the empire of commerce and science' (ibid: 705), this mission drew on the expertise of the scientific community to chart the Pacific Ocean in terms of its politics, climate and geography. Jamison also argues that the mission unintentionally represented an early expression of 'information war', highlighting the US navy's first attempt to understand the Pacific as an 'maritime operational environment' (ibid). Importantly, the mission provides an important practical example for today's military planners, demonstrating collaboration between the intelligence and the scientific community in the collection of environmental data. There are geopolitical impacts from climate change in opening up the arctic and redefining coastlines, and on global fish stocks. Jamison suggests these impacts all present challenges to the US navy's strategic environment. Therefore, early examples such as the US Exploring Expedition highlight the achievements of collaboration between the military and the scientific community that could prove invaluable in meeting these emerging risks.

5.4 Migration and displacement

5.4.1 Climate-migration-security nexus

The climate-migration-security nexus continues to be a focal point of debate, particularly regarding the concerns of the Global North. Conflict, climate change and the relative political and economic stability of Europe mean it will continue to be an attractive destination

Key points
- The climate-migration security nexus continues to be a focal point of debate, particularly regarding the concerns of the Global North, with conflict and climate change elsewhere arguably highlighting the relative political and economic security of Europe, thereby helping it retain its status as an attractive destination for migration. Steps must therefore be taken to ensure the successful assimilation of new arrivals and prevent inter-group conflicts.
- Alarmist predictions of climate change resulting in large increases in the numbers of migrants are unlikely to occur; distances travelled are likely to be short and internal, with decisions to migrate found to be related to complex socioeconomic conditions. Such decisions are also governed by institutions, networks and other social structures, in both the sending and receiving areas.
- There is a need for renewed efforts to increase the attention paid to internally displaced peoples (IDPs) within the international agenda and address underlying causes within interventions, as stipulated in the SDGs. IDPs should also be included within national development strategies and climate adaptation programming at the national level.

for migrants. With this in mind, Panno (2018) argues that how successful Europe is at assimilating new arrivals will have important implications for preventing intergroup conflicts. Incorporating social-psychological analysis within state policy may help European societies achieve this. Referring to social dominance theory, Panno describes how individuals with higher levels of 'social dominance orientation' are more inclined towards the preservation of social hierarchies in relation to intergroup or interpersonal relations, and therefore tend to be supportive of a conservative vision of society based on maintaining the status quo. Panno also identifies a gap within current research, arguing that there has been a failure to unpack

the factors that determine 'social dominance orientation' and negative attitudes towards new arrivals. The argument put forward here is that the happier the individual the more likely they are to show both 'pro-social' and 'adaptive behaviour', in addition to supporting greater equality within society.

In testing this theory, Panno draws on data from the European Social Survey. This contains demographics, personality dispositions and attitudes towards immigration. Results from this study support the argument that happiness has played a key role in fostering positive attitudes and challenging 'social dominance orientation' towards immigration. Therefore, a key question is 'how does the state nurture happiness within its society?' One area Panno identifies is the promotion of economic security through safety nets, such as welfare, and greater protection from market forces. Happiness could also be promoted through public health interventions that target individual mental health well-being.

However, Telford (2018) warns that attempts to assimilate new arrivals into Europe could be undermined by how narratives on the climate-migration-security nexus frame certain populations, especially at a time when we are seeing a 'push to securitise within and around Europe' (ibid: 276). Referring to evidence from US and EU climate security discourses, Telford finds that future security narratives related to migration carry certain 'identity constructions', particularly in relation to migration. Telford argues that warnings surrounding future migration from the Middle East and North Africa region to the EU are underpinned by particular 'racial logics', whereby certain populations – in this case Muslim and African men – are identified as carrying a 'latent capacity' towards radicalisation and terrorism. In turn, the reaction is to call for 'exclusionary polices of containment' (ibid: 276).

Critiquing the current thinking surrounding the links between climate change, migration and conflict, Koubi et al. (2018) highlight that, despite migration often being referred to as a climate security risk, there is currently a lack of evidence supporting how the two are linked. The authors state that narratives are often 'deterministic' in implying 'that all types of environmental change lead to conflict and that all environmental migrants are equally prone to conflictive behaviour' (ibid: 906). This leads Koubi et al. to argue that if we are to understand the climate-migration-security nexus, we need to consider both the speed of environmental change and its association with an individual's conflict perception. The authors define the latter as the attitudes that shape an individual's 'willingness' to engage in violent action. They also argue that these can be influenced by factors such as economic hardship, conflict and environmental change.

The study underpinning the article from Koubi et al. drew on individual level survey data to test the authors' initial beliefs that these factors are likely to be developed over time, with the greatest risk of conflict amongst those displaced as a result of slow environmental change, rather than in quick response to a single event. The logic here is that, over long periods, individuals are likely to become aware of their state of deprivation and adaptive capacity in relation to others. The authors' results 'strongly and robustly' support their argument (ibid: 929) and they conclude that while individuals carry a level of conflict risk in certain circumstances, there should be a renewed focus on unpacking why they decide to leave and what encourages the transition towards an individual's decision to engage in collective violent action.

An article based on a study by Riosmena et al. (2018), looking into the impacts of environmental factors on outmigration to the US, provides a means to illustrate the complexity surrounding the climate-migration link. Identifying a gap within previous studies on migration patterns, the study used data sets from two periods of recorded migration from Mexico to the US during 1995–1999 and 2005 2009. Choosing this date range allowed the authors to select a broader set of conditions in both Mexico and the US to be tested. The results are consistent with past studies into the link between climate change and migration, showing that the former is unlikely to lead to a large increase in the number of migrants, as the distances travelled are likely to be short and internal, and that decisions

to migrate are determined by socioeconomic conditions. Interestingly, where the study does identify patterns of outmigration, the profiles are not uniform but at different ends of the vulnerability scale.

Using a broad data set also allowed the authors to test whether conditions in the US – in relation to both economic and immigration control – impacted on the levels of outmigration from Mexico. The two periods tested were defined by comparably different contexts in terms of labour demands and immigration controls. While the study found that 'climate migration' showed some 'sensitivi[ty]' to destination area controls, this was either in line with other forms of migration, or in some cases less pronounced. Overall, Riosmena et al. warn against alarmist predictions of climate change resulting in large numbers of migrants, as has been the case with regard to other forms of migration. Individual decision-making is highly complex and governed by 'institutions, networks and other social structures' in both the sending and receiving areas (ibid: 482).

5.4.2 Internal displacement and human security

Switching the focus from the security implications of population movements to considerations of human security, we have found several articles using the 20th anniversary of the establishment of the Guiding Principles of Internal Displacement to assess where we are now in addressing concerns of IDPs. The multitude of factors involved include conflict, political instability and natural hazard related disasters. These are listed as contributing to what Bilak and Shai (2018) describe as 'some of the highest rates of internal displacement the world has ever seen' (ibid: 49). At a time when attention is focused on refugees and migration, the authors call for renewed efforts to increase the attention paid to IDPs within the international agenda. At the national level, there is a need to include IDPs within national development strategies and climate adaptation programming, in addition to greater investment in DRR. In general, Bilak and Shai (2018) suggest that more needs to be done in terms of understanding both the causes and effects of displacement, which each account for how factors such as conflict and natural

hazard-related disasters converge. Responses also call for the development of interventions that move beyond simply addressing symptoms and addressing underlying causes. For the international community, this will call for political efforts – such as justice, human rights, conflict resolution and peacebuilding – when dealing with those states that are at the root of displacement.

Although more work is needed, there is evidence to suggest that, since the establishment of the Guiding Principles of Internal Displacement, conventions seeking to address IDPs have evolved in relation to regional contexts. One example here would be the creation of the African Union Convention for the Protection and Assistance of Displaced Persons – also known as the Kampala Convention. Adeola (2018) argues that such developments have been built on the foundations of the Guiding Principles by adapting to the African context. In line with the Guiding Principles, the Kampala Convention includes legal protection for those intentionally displaced for their protection, ensuring that this is 'carried out in due process of the law … fulfilling all minimal procedures' (ibid: 16). However, unlike the Guiding Principles, the Kampala Convention 'explicitly recog[nises] climate change' by including 'minimum standards' in cases of those displaced as a result of climate change and natural hazard related disasters (ibid.).

Along a similar line of argument, Habte and Kweon (2018) highlight that, in Ethiopia, both natural hazard-related disasters and conflict have led to a significant increase in IDPs, particularly in the country's Somali Regional state. Habte and Kweon also state that, while humanitarian response has provided some relief, there is a need to move towards a more development-focused approach. Some progress has been made in the establishment of the Durable Solutions Working Group, which has been critical in the development of the 'regional durable solutions strategy' (ibid: 41) for the Somali Regional State. However, the authors argue that current national frameworks – such as Disaster Risk Management policy – fail to address either the humanitarian or development needs of IDPs. For progress to be achieved, there needs to be greater cohesion between stakeholders led by leadership of the

state, a consideration of the limited resources and technical capacity, and better data collection. In addition, there is a call for 'strategic dialogue to de-sensitise and de-politicise discussions around internal displacement' (ibid.). In the past, 'government sensitivities' surrounding the issue have hampered data collection. Furthermore, in terms of the root causes of vulnerability, the state has often used the role of natural hazards to deflect attention away from its limited record on development progress.

Internationally, recognising the importance of including IDPs within national development plans stipulated within the SDGs is seen as a commitment to addressing the needs of those displaced by disasters and conflict. Part of this commitment includes tackling not only the symptoms of crises, but also long-term solutions to the vulnerability of IDPs. Zeender (2018) contends that, if this is to be achieved, we need to see greater cooperation between development and humanitarian actors. Zeender also highlights that there are notable examples – Afghanistan, Iraq, Nigeria and Ukraine – where we see the inclusion of the needs of IDPs within 'road maps' for achieving the SDGs. However, Zeender argues that there are several entry points that can ensure this achieved across a wider set of contexts. First, there need to be greater linkages between different stakeholders, that include not only national and international actors, but also IDPs. This recommendation also includes the appointment of a 'high-level focal point to coordinate action' (ibid: 26). Second, there is a need for improved national statistical systems that account for estimates of IDP numbers, along with the needs and situations in their areas of origin. Finally, there should be a continuation of UN support for those countries with a high number of IDPs.

Where states either fail to protect their civilians or perpetrate violations of their human rights, the responsibility falls on the international community to act. However, international interventions dealing with IDPs can often expose a contradiction between what is expected of international actors and what occurs in practice. Benhura and Naida (2018) suggest that this contradiction is determined by the power dynamics between three key actors in relation to

IDPs, the state, non-governmental organisations and humanitarians. In circumstances where the state either fails to respond or is the cause displacement, laws governing the treatment of IDPs, such as the Kampala Convention, stipulate that it is the responsibility of international actors to respond to the needs of the displaced population. This humanitarian intervention could take the form of long-term solutions that address IDPs' vulnerabilities.

Benhura and Naida draw on the case of the responses to the displacement of populations as a result of Operation Murambatsvina in Zimbabwe. Here, both the state and humanitarian actors 'failed to provide the displaced populations with durable solutions to their displacement' (ibid: 2) and there are reportedly two main factors that typically underpin this inertia. First, in a bid to remain politically neutral, international actors are often reluctant to 'enfor[ce] their positions' (ibid: 14). Second, Benhura and Naida (2018) argue that, while international law in the form of R2P exists to protect civilians, the non-governmental organisations present during Operation Murambatsvina stated that the 'high thresholds set…' [had] 'provided an excuse for a lack of intervention to alleviate the challenges of internal displacement in Zimbabwe' (ibid.).

5.5 Tensions within natural resource management

5.5.1 Overlapping systems of governance
Using the example of the Greater Aural region in Cambodia, Hunsberger et al. (2018) have explored the dynamics of resource conflicts related to biofuel production and water irrigation projects centred on mitigation and adaptation measures respectively. The authors maintain that this region provides a perfect case site, given the growth in land use supporting the two activities and a history of natural resources shaping conflict and power dynamics within the region. In their evaluation of their findings, Hunsberger et al. conclude that 'climate change strategies are now deeply entangled with resource conflicts in the greater Aural region' (ibid: 309). Their study aligns with a growing body of research highlighting the importance of sociopolitical and

Key points

- Climate change strategies are found to be deeply entangled with natural resource conflicts and, as such, there is a need to consider the overlapping sociopolitical, historical and environmental dynamics that can shape natural resource management and conflict in the form of different scales of governance at the national, regional and international levels. This can take place through a 'landscape analysis approach' that considers the overlapping dynamics of the above in addition to the ripple effects into other geographical locations and the delayed effects of policy.

- Managing the risks of conflict and natural resource management requires increased consideration of how to foster cooperation amongst communities, with equitable resource management playing an important role in peacebuilding strategies that is not reflected in current programmes.

- Adaptation and mitigation policies can be perceived as top-down projects that involve little consultation with surrounding communities, and have therefore resulted in continued local opposition. Greater attention should be paid to the impacts on local communities, through 'constellation analysis' or the application of a political ecology approach to community engagements. Such approaches foster dynamic and inclusive interactions between different stakeholders and alleviate tensions by identifying and predicting social and cultural concerns.

- There are security implications and risks associated with geo-engineering technology, with even the research itself carrying risks, as leaders may view it as a 'silver bullet solution' and subsequently minimise climate mitigation efforts.

historical factors over environmental ones in understanding the relationship between climate change and conflict.

Within their study, Hunsberger et al. advocate a landscape analysis approach. Rather than considering these sites in isolation, we must also consider the ripple effects into other geographical locations and the delayed impacts of polices. For example, water access and quality may be affected further downstream from irrigation dams and agricultural processes.

Following on from this example, Schilling et al. (2018a) also consider the overlapping dynamics that can shape natural resource management and conflict, this time in the form of different scales of governance. The authors argue that there is a gap in analysis in the three main bodies of literature dominating the topic: 'resource curse', environmental security and land grabs. Referring to environmental security, which includes those security risks associated with climate change, Schilling et al. argue that quantitative studies only consider risks at the national level. Conversely, the focus of qualitative studies, while representing a departure by considering local dynamics, tends to ignore the influence of 'supra-local levels' of governance. The authors argue that if we are to fully appreciate the risks associated with natural resources and conflict, we must consider the interaction between governance structures at the local, subnational and international levels. We should also look at how these structures influence each other in terms of natural resource management.

Fox (2018) offers one example of how national and regional politics can become intertwined in local conflicts over natural resources. The study detailed in the article focused on violent clashes in Laikipia country, Kenya, which took place in 2017 between elite landowners – primarily foreign or Kenyan nationals of European descent – and subsistence land users drawn primarily from pastoralist communities. While there is evidence to suggest that good relations can exist between the two communities, it is also clear that Kenyan politicians are willing to draw on negative perceptions of minority landownership in a bid to secure political support. Fox argues that this development has to considered within wider political change in Kenya. Though the political sphere within the country has become more democratic, devolution has resulted in politics becoming increasingly 'ethnicised' (ibid: 474).

To highlight this, the article draws on the example of the 2017 election of MP Matthew Lempurkel, who in an attempt to build his support base amongst pastoralist communities, 'mobilis[ed] anti-white sentiment' (ibid: 474). The MP offered land to communities in neighbouring counties already suffering from the effects of drought, resulting in the movement of their livestock onto land within Laikipia County, sparking violent clashes with local landowners. Fox argues that these sociopolitical dynamics are occurring at a time when 'climate change, foreign investment and population growth are placing unprecedented pressure on land' (ibid: 475).

Managing the risk of conflict associated with climate change and natural resource management may also require us to consider more of what works in fostering cooperation amongst communities. Hellin et al. (2018) make the case that, while much has been written on conflict risks, 'there is little documentation regarding the positive role of collective natural resource management efforts to reduce conflict' (ibid: 1). This has happened despite the recognition that equitable resource management can play an important role in peacebuilding strategies. This is not necessarily reflected in current programmes targeting adaptation and mitigation, which are often focused on practical rather than social aspects of their implementation.

To highlight the potential of climate adaptation programmes in developing cooperation within post-conflict settings, Hellin et al. draw on the example of the Buena Milpa agricultural development project in the western highlands of Guatemala. The authors take the view that, despite a context characterised by conflict and an erosion of community relations, the project has been able to build community resilience. The project was developed in accordance with a conceptual framework targeting three key areas of governance interventions that support collective action institutions, also focusing on the action area that determines outcomes from these institutions. The dynamics of this are typically defined by actors, their resources, existing rules, patterns of conflict and cooperation, which decide 'favourable' outcomes from collective action. Regarding the latter, Hellin et al. identify that building

links and investing in local non-governmental organisations has been critical, especially in a context where community trust in outsiders has been low.

5.5.2 Food and water security

Another issue raised within the academic literature during this quadrimester was the role of natural resource management in relation to food and water security. Beginning with food security, the feasibility of efforts to combat land degradation through international frameworks related to current development projections has been considered by Wolf et al. (2018), with the authors highlighting the pressures of climate change, unsustainable farming practices and urbanisation as drivers of land degradation. In this article, Wolf et al. warn that this scenario is only likely to worsen with the effects of climate change, population growth and alterations in human diets. While recognising that international frameworks aimed towards land restoration and protection have good aims, the authors also warn that they need to be considered in relation to other land use pressures, such as agriculture and housing. With this in mind, Wolf et al. have developed an aggregate model that considers these frameworks against several development pathways. Through this, they have found that where land protection and restoration have made the greatest gains, there has been an intensification and expansion of land use elsewhere. The authors conclude that these frameworks must coincide with 'sustainable socioeconomic development' in the form of sustainable agriculture production and a reduction in the demand for livestock products.

Also considering the impact of competing demands on the global food system, Shcherbakova and Shcherbakov (2018) examine the role of states acting as food 'guarantors' to solve the global food crises. Population growth, changes in consumption patterns and increased demand for biofuels are each listed as contributing factors. In addition, the authors indicate that the effects of climate change and access to water are adding to these problems. These dynamics are creating issues, not only in terms of affordability but also in driving inflation. These are also leading to a food

deficit, where a growing number of countries rely on a smaller number of states acting as food exporters. These issues are having a profound impact on food security in Asia, where development has been matched by an increased in demand of new food staples – including the demand for meat – which places pressure on the Asian food system. Climate change is also increasingly cited as a major driver of food insecurity in Asia.

Considering the role of Russia as a food 'guarantor', Scherbakova and Scherberkov argue that, while climate change may have disastrous effects elsewhere, this could also open up new opportunities for Russia, in terms of opening up more productive land, new efficient trade routes and improved climatic conditions for growing crops. As well as potentially providing increased food security within Asia, utilising such changes may also allow Russia the room to diversify its economy away from a dependency on fossil fuel exports, to one that also takes advantage of the growing demand of food imports within Asia.

These dynamics are also illustrated by a study focused on the effects of water insecurity in the Middle East and North Africa region. Developing a 'water budget' model, Mazzoni et al. (2018) consider both the climatic and socioeconomic impacts on water availability in the two regions between 2016 and 2050. While these effects will not be consistent across the region as this period plays out, the authors suggest that a number of countries will witness a significant decrease in water availability by the end this period. They also describe how these affects are largely driven by human activity on the environment – such as population growth, lack of investment and demands relating to food production – rather than climatic factors.

Mazzoni et al. warn that such scenarios are likely to have implications in terms of 'socio economic instabilities' that are unlikely to be equitably distributed across the region. For example, among the region's poorer states, rises in food production costs and prices, along with increased livelihood insecurity within societies dependent on the agricultural sector, could place an increasing strain on poorer states within the region. However, Mazzoni et al. also argue that, while the region's richer nations may have greater capacity to mitigate these effects, variations across household income mean that, again, these effects are unlikely to be equal.

5.5.3   Adaptation and mitigation policy

Switching our focus towards the management of resources in relation to polices that seek to alleviate the effects of climate change, we can see that the social impacts of adaptation and mitigation polices continue to be a concern within the academic literature. Huesca-Pérez et al. (2018) reveal that projects that are perceived as 'top-down' and involve little consultation with surrounding communities have resulted in continued local opposition to the development of wind farms in Oaxaca, Mexico. The authors argue that, while such projects require an Environment Impact Assessment, there are no national requirements in Mexico to consider the social impacts of such projects. The authors' case study site revealed that there was little public consultation, especially among the region's indigenous population. While such assessments should include the consideration of social impacts, research has questioned whether Environment Impact Assessments are able to fully capture these complexities. The authors advocate their own approach used within the study: a 'constellation analysis' that unearthed local concerns to wind park developments within the region. This process stemmed from focus group discussions, interviews with all relevant stakeholders and case study research. Huesca-Pérez et al. argue that such models could be incorporated into the early stages of future assessments and alleviate tensions with local communities, by 'identify[ing] and predict[ing] social and cultural concerns' (ibid: 493).

Along a similar line of enquiry, Schilling et al. (2018b) identify a current gap in the research regarding the impact of wind park developments on communities in Africa. Along with the exploitation of oil reserves, the development of wind energy represents an opportunity to meet Kenya's energy needs. However, greater consideration should be given to the impact on local communities surrounding the projects. From their study, the authors have discerned two sets of conflict risk:

- tensions between the communities and the wind farming company in question

- the aggravation of existing tensions between communities.

In both these cases, disillusionment as a result of lack of employment opportunities appears to have been a key driver of conflict.

As part of their study's recommendations, Schilling et al. identify entry points across the various stakeholders. For wind generation companies, areas to address include job creation for the local community and managing expectations in terms of employment opportunities. For the Kenyan national government, benefits generated from such developments should be reinvested within local development. Finally, for local communities, the authors advocate the importance of non-violent means to express their grievances. This could take place through existing subnational governance structures, but should also include a forum bringing together all levels of stakeholders to discuss their concerns.

The issue of how policy developed at the international level is realised at the national and local levels is also considered by Wallbott and Florian-Rivero (2018) in relation to REDD+ (Reducing Emissions from Deforestation and Forest Degradation) initiatives in Costa Rica and the engagement of indigenous communities. Such programmes include a number of stakeholders from the international, national and local levels. In addition, these initiatives are also vulnerable to land grabs, exclusion and conflict escalation. As a result, REDD+ initiatives carry the risk of competing interests that carry the potential for conflict. The authors explain that, while REDD+ initiatives offer certain safeguards, these are developed internationally. Therefore, attention needs to be given to how these are realised domestically. Applying a political ecology approach to community engagement within REDD+ initiatives, the authors have sought to uncover how international norms have been implemented domestically in Costa Rica.

The study behind this journal article found that interactions between the different stakeholders was far more dynamic and inclusive. The initiative also promoted the internal social processes that typically force national societies to look inwards and consider how the state interacts with its indigenous communities. This led to the creation of a 'platform' to facilitate discussions between indigenous communities and the state. Finally, given that REDD+ is taken first and foremost from the international level, which has frameworks that may not easily translate into local cultures, Wallbott and Florian-Rivero argue that 'culture mediators… [acted] as transmitters between different levels, world views and language systems' (ibid: 512)

Drawing our focus outwards to consider the impact of mitigation efforts may have on geopolitical relations, we point to an article by Halstead (2018). This considers the security implications associated with geoengineering technology in the form of Stratospheric Aerosol Injection. Governance determining the use of such technology remains uncertain in an international system governed by the self-interest of states. Halstead argues there is a risk that such technology may be used to 'politicise the weather', resulting in unequal effects and the risk of some climate extremes being blamed on an individual state's use of the technology. All of these factors could result in increased tensions between states.

Interestingly, while the security implications of geoengineering warrant further research, Halstead warns that research itself carries risks. Where research leads to positive depictions of Stratospheric Aerosol Injections, leaders may come to view it as a 'silver bullet solution', minimising climate mitigation efforts. Halstead therefore argues that 'further research is justified provided that extensive efforts are made to reduce mitigation obstruction risk' (ibid: 75), advocating research that is security centred rather than environmental. Halstead reasons that this will raise awareness of the risks involved, leading to greater caution in advocating the use of geoengineering than if there had been a focus on the environmental effects, which largely tend to emphasise the positive benefits of such technology.

5.6 Disasters, politics and violence

5.6.1 The politics of disasters
Of the literature reviewed in this scan on disasters and climate-related disasters, most notable is a *Disasters* Special Issue volume 42,

number S2 released in October 2018 focused on the politics of disasters – including those that are climate-related – in conflict areas. Edited by Siddiqi (2018), the collection of articles addresses a critical gap in disasters studies where 'relatively little is known about how disasters in conflict areas are created and discursively framed' (ibid: 161). Siddiqi begins with an overview of the view of disasters in international security discussions centred on the UN Security Council and the disaster diplomacy hypothesis, focusing on the causal links between disaster events and a deepening of conflict or opportunities for peace. This is followed by an argument for a move away from the establishment of causal links. Siddiqi also suggests that a more politically engaged discussion on the politics of disasters is required. Indeed, the 'absence of "politics" from the wider debate on disasters in conflict areas is not just a benign oversight, but is in fact the politics of disasters in conflict areas' (ibid.).

Among others, the *Disasters* Special Issue includes articles from Siddiqi and Canuday (2018), Branch (2018), Walch (2018) and Field (2018). These are summarised below.

Siddiqi and Canuday (2018) critique and advance the concept of the social contract through an exploration of disasters in the Philippines. Here, they find that, contrary to normative constructions of the state-citizen social contract rupturing in times of insurgency and secessionist movements, an alter and shift are reproduced through 'highly differentiated experiences of "disaster citizenship" for people living amidst conflict' (ibid: 215). In contrast to the growing body of research in post-disaster situations, Siddiqi and Canuday explore how citizenship is affected by climate and disaster events, including exploring 'insurgent capture' of post-disaster space. They also suggest that 'the unequal and exclusionary geographies of state intervention expose the malleable resilience of the postcolonial social contract' (ibid: 216). The implications are that disaster, climate and development interventions risk reproducing inequalities and injustices prevalent in social contracts unless they recognise the context specific nature of the manifestation of the state-citizen contract.

Branch (2018) pushes back against the framing of climate change and disasters as a

Key points
- There is a critical gap in disaster studies in terms of relatively little being known about how disasters in conflict areas are created and discursively framed. A more politically engaged discussion about the politics of disasters is therefore required to begin to unpack the nature of conflict contexts as a means to better understand where and when DRR and climate change adaptation programmes may be viable and under what entry points.
- Where natural hazard-related disasters and conflict collide, national governance structures and national and international humanitarian resources can face additional pressures, which in turn exacerbate the risks faced by affected populations. However, constructions of 'pure' humanitarian crises and 'good projects' are used to justify redeployment away from more complex conflict crises.
- The gendered dimensions of natural hazards, climate change and conflict – including their impacts on structural and interpersonal violence against women and girls – necessitates gender-responsive mitigation and adaptation strategies within a holistic approach that recognises the structural inequalities they face, in line with international agreements such as the Sendai Framework for Disaster Risk Reduction.

consequence of 'global nature in upheaval' and global climate change, instead looking at it as a product of 'ongoing, longstanding multi-scalar processes of devastation produced by histories of human engagement with the environment, including that of war' (ibid: 306). In this light, Branch rejects the description of dichotomies (future/past, global/local and natural/social) and advances a construction of climate change disasters as the outcome of histories and lived experiences occurring in specific contexts. Under this construction, war is part of those histories, as is environmental violence; as such, 'war can be an integral part of these histories, and so one needs to incorporate conflict into understanding

of climate change in new ways' (ibid: 308). Explored through the empirical context of drought in Uganda, Branch is able to show how political violence and destructive environmental change intertwine, prompting a rethink of the vulnerability/hazard entry point to climate change and disaster studies.

In a study of DRR and climate change adaptation during armed conflict, Walch (2018) presents a conceptual typology based on rebel groups' territorial control and the strength of informal institutions. This typology articulates three political orders amid conflict: rebel stability, informal stability and a fragmented landscape. The typology is used to argue that greater consideration of conflict contexts is required for DRR, climate change and development interventions to be better tailored to their context – ultimately with the aim of being more effective and efficient programmes. Examples from Mali and the Philippines are used to explore the typology and elucidate its value, namely that DRR and climate change adaptation are viable under conditions where rebel groups control territory and enjoy good relations with communities. In contrast, where rebel groups do not hold territorial control and informal institutions are weak, DRR and climate change adaptation programmes are unlikely to be tenable or have the desired positive impact. In a third category, where rebel groups do not hold territorial control but robust informal institutions exist, those institutions can provide an entry point for interventions, even during wartime. The value of the article is to encourage an unpacking of the nature of conflict contexts as a means to better understand where and when DRR and climate change adaptation programmes may be viable and under what entry points.

The final paper from the *Disasters* Special Issue to be covered in this sub-section is authored by Field (2018). This explores how simultaneous natural hazard-related disasters and conflict can put additional pressure on the same national governance structures, and national and international humanitarian resources, which in turn exacerbates the risks faced by affected populations. Unlike the other articles in the *Disasters* special issue, which explore the links between conflict and disaster vulnerabilities,

Field puts emphasis on response mechanisms and institutions and the rationalities behind decisions to redeploy away from conflict areas – in this case in Mindanao, during Typhoon Haiyan in 2013. In the context of the Philippines, this is what Field terms, 'divided disasters'; it is an exploration of '…the impacts of a simultaneous conflict and natural hazard-induced disaster, when they occur in *different* locations within the same state' (ibid: 266). Field's research reveals how agencies construct the notion of a 'pure' humanitarian crisis in the case of Typhoon Haiyan, and use that construction of a 'good project' to justify redeployment – away from the more complex conflict crisis in Mindanao.

5.6.2 Interpersonal and structural violence

The gendered dimensions of natural hazards, climate change and conflict – including their impacts on structural and interpersonal violence against women and girls, and their social reproduction roles or their health – emerge together to form another key theme that attracts a lot of attention in the academic literature. This calls for gender-responsive mitigation and adaptation strategies, in line with international agreements such as the Sendai Framework for Disaster Risk Reduction. Nguyen and Rydstrom (2018) examine men's violence against women, both prior to and in the wake of natural hazards in Southeast Asia, where more than one in three women are subjected to intimate partner violence. They argue for a holistic approach to the study of violence that recognises it as a critical component of the structural violence that women face in their daily life, where they are devalued and subordinated to the power of men. While natural hazards can exacerbate women's vulnerability, their impact is context-specific and shaped by government and civil society efforts to combat violence before, during and after the crisis. Using ethnographic material from the Philippines and Viet Nam in the aftermath of the 2013 typhoons Haiyan and Nari, the authors consider the increased levels of violence against women during and after the typhoon in the Philippines, with women reportedly experiencing violence, both from their partner in the domestic sphere and from military and security personnel (who were expected to protect and support

survivors) in public spaces. Although violence prevention measures existed, local authorities continued to promote a culture of blaming women and accepting the perpetration of violence. In contrast, violence did not reportedly increase in Viet Nam, as pre-disaster government strategies had positive effects on disaster-related violence against women.

Staying on the topic of the Philippines, where millions of people have been displaced by both natural hazards and armed conflict, Tanyag (2018) also emphasises the continuum between women's vulnerabilities in such crisis situations and the material and cultural barriers that harm their well-being in everyday lives, by focusing on their care responsibilities and sexual and reproductive health and rights. The gendered division of labour results in women and girls disproportionately shouldering the burden of domestic and care responsibilities. Feminist political economy analyses have shown that, while women's social reproductive labour is essential for the daily survival of their households and communities, it is economically devalued, taken for granted and thus invisible. Meanwhile, material and ideological restrictions do not allow women to make decisions about their sexual and reproductive health, access services or enjoy a healthy and violence-free life. In times of conflict and environmental disaster, women are still expected to operate as shock-absorbers and to engage in self-sacrifice to meet intensified care demands, filling the gaps of poor infrastructure and weak state capacity, while their bodily autonomy and physical needs are persistently neglected in recovery efforts. There are detrimental consequences to this in terms of high female mortality rates and long-term health problems: 'when a heightened feminisation of survival is matched by an absence of contributions to replenish and sustain the health and well-being of women and girls during and after crisis', argues Tanyag, it leads to the 'depletion of women's bodies' (ibid: 656). Echoing the aforementioned arguments of Nguyen and Rydstrom (2018), Tanyag also contends that the mitigation of the gendered impact of crises should start before the crisis occurs, with the promotion of sexual and reproductive health and rights central to sustaining peace and advancing gender equality.

Drawing on human rights principles, another article in the *Disasters* Special Issue, from Ensor et al. (2018), calls for a rights-based approach to resilience practice in conflict and post-conflict settings affected by climate change and disaster risks. Understood as the capacity to adapt in anticipation of or in response to risk, resilience often becomes, in practice, a technical exercise that overlooks the economic and social dimensions of that adaptive capacity. However, resilience interventions sometimes fail to consider the power relations shaping how climate risks are understood and managed and who controls relevant resources and decision-making. These end up reproducing and normalising existing inequalities, promoting marginalisation and contributing to more vulnerability, risk, violence and conflict. Using the case of post-conflict Timor-Leste – with a particular focus on groups whose rights have traditionally been ignored, including women – the authors illustrate the need for a rights-based resilience approach that examines relations at different scales, from the individual to the local and the state. This 'politicised form of resilience practice' pays 'greater attention to the social' and sets two priorities: to recognise and address the narratives and procedures that legitimise structural inequalities and exclusion in each context, and to incorporate actions that could lead to more equitable and inclusive political and social arrangements. Consequently, this form of resilience 'reduces, rather than reinforces, risk and social conflict' (ibid: S300–301).

5.7 Climate politics

5.7.1 Polarising debates, the Global South and geopolitical cooperation

Research by Lucas and Warman (2018) draws attention to how polarisation in environmental conflicts obstructs decision-making at all scales. They combine a social study of citizens in Hobart, Australia with a case study of recent forestry debates in Tasmania, to help identify 'ruts' that dominate environmental debates. Their findings demonstrate that polarised attitudes

surrounding disputes over natural resources in this case were divided between:

- those who argued for the intrinsic value of nature above its worth as an economic resource
- those whose predominant concern was maintaining social order and traditional authority.

Lucas and Warman conceptualise 'ruts' as a set of polarising social constructs. In their study, these were found to comprise 'storylines that appeal to certain values and definitions of the environment and are tied to the social identities of certain groups of people' (ibid: 1001) and perpetuated through long-standing discourse coalitions. From such findings, the authors suggest that 'negotiating space' at the sub-political level may therefore be better suited to the disruption of polarisation rather than in consulting with traditional democratic authorities. However, they also recognise that '[e]ffective risk negotiation between polarized discourse coalitions requires a mutual understanding of the multiple socially constructed nature of risk' (ibid: 998). They conclude that in both the political and economic environment, what they describe as 'disruptive bumps' can

facilitate the formation of new coalitions and storylines that help to shift the 'discourse out of the ruts of polarisation' (ibid: 1001).

Lucas (2018) expands on the previous study to consider how climate change is also a partisan issue, with increasingly polarised responses seen in Anglophone countries such as Australia. Once again using Hobart as a point of study, the author utilises the survey results of 522 citizens to examine the human values driving both attitudes of concern and unconcern towards climate change. Concurrently, the study indicates that '[h]igh levels of climate change concern are associated strongly associated with a care for nature, suggesting that climate change is seen primarily as a threat to the environment rather than humanity' (ibid: 298). Unconcern, however, is found to be categorised into two opposing groups with conflicting values:

- those who prioritise national security in the form of promoting national economic interests, social order and tradition
- those who value freedom of choice and the ability to make their own decisions.

Lucas argues that their study of human values moves beyond the dichotomy of associating

left-wing political affiliations with care for the environment and right-wing ones with a maintenance of the status quo to create more inclusive narratives about climate change. These focus on the commonalities that may 'help shift people out of the patterns or beliefs that sustain such polarised and decisive responses to climate change' (ibid: 307).

Attention within climate change mitigation politics is increasingly drawn to the Global South, predicted to become among the biggest emitters due to high population and economic growth. For example, Kane and Boulle (2018) consider the case study of the Mitigation Action Plans and Scenarios (MAPS) programme, which worked in coalition with climate change mitigation and the development policy-making in five countries: Brazil, Chile, Colombia, Peru and South Africa, between 2010 and 2015. In this article the authors examine change in the commitment of decision-makers to mitigate against climate change through 'government mandated stakeholder processes', generating evidence for how a low-carbon transition may take place. The authors argue that unlike previous north-south knowledge-sharing arrangements characterised by a dominance of the north, the MAPS programme has utilised a co-production of knowledge approach. This presents an example of southern theory that emphasises the need for the south to theorise by connecting policies and processes. The idea of de-contextualised climate change mitigation planning driven by northern consultants was questioned throughout the implementation of MAPS, thus challenging the 'orthodoxy of northern-centric global knowledge production' (ibid: 1183). Meanwhile the aspects of planning that tend to be significant in the south were exemplified. These significant aspects include:

- proactive work with political instability and conflict
- the contexts of resource constraints
- the importance of utilising theory and practice that is rooted in local contexts and reliant on local skills and capacities.

Enhanced south-south cooperation, along with the opportunities and obstacles it presents,

has also been illustrated by Sims (2018), who argues that the challenges of development are becoming increasingly difficult to address due to 'enduring and deepening forms of socioeconomic inequality, climate change denial, persistent conflict and mass displacement' (ibid: 147). Meanwhile, new forms of poverty are emerging through the same means that have resulted in prosperity for others. Sims therefore suggests there is a need to 'do-development-differently' by utilising what is referred to as 'dialogical approaches to learning' that will encourage 'citizen scholars' who are capable of playing a both a constitutive role in social transformation and can work collaboratively in achieving positive social change.

The need to conceptualise a changing global political economy produced by a rising Global South and examine the challenges it currently faces is also contextualised by Shaw's (2018) discussion of the future of the G20. Challenges here include:

- the rise of China and non-state and trans-state actors
- new regionalisms
- environmental risks and climate change
- new technologies and alterations in patterns of transnational crime.

Shaw therefore suggests five changes to potentially inform conversations within the G20. In turn, these may naturally lead towards a greater privileging of the Global South and methods of global governance. These changes could take place in areas such as economics, diplomacy, security and the environment. The numerous unprecedented challenges faced by the EU are similarly analysed by Petteri (2018). These include:

- the rise of populism in the west and uncertainties about the future of the liberal international order
- tensions and reform pressures in international trade
- climate change and extreme weather events
- pressures from increased migration in the Middle East and North Africa
- increased hybrid and cyber attacks

- problems associated with the UK expected departure from the EU.

Petteri therefore concludes that the EU must move towards becoming increasingly unified and strong, to be capable of representing its member states on the international stage. This unification will also be needed for it to provide 'increased security for the well-being for its citizens than each member state could provide on its own' (ibid: 142).

The need for increased inter-connectivity and cooperation within geopolitical arenas is similarly analysed by Yu (2018) in discussing the Belt and Road Initiative. This refers to the EU's experience of the Trans-European Network for Energy in China as a means of addressing policy changes. These include market competitiveness, climate change and the security of supply through energy infrastructure networks. As a development framework, the Belt and Road Initiative displays strong geo-political and geo-economic dimensions through its aim to 'promote interconnectivity and cooperation in infrastructure, policy, trade, finance and culture among Eurasian countries' (ibid: 251). This is found to be similar to the EU's objectives within the Trans-European Network for Energy, which was developed in order to create an integrated energy market, and also reinforce the economic and social cohesion and connection of those regions considered to be on its periphery. Yu also finds that the EU experience has illustrated several obstacles to the creation of an infrastructural network that the Belt and Road Initiative will need to overcome. These include: asymmetrical policy priorities among different countries, financing challenges associated with investment risks and the lack of a multilateral legal framework.

5.7.2   Structural inequalities and human rights

Specific groups of women, such as those who are indigenous or living in pastoral communities, face increased vulnerabilities due to intersecting inequalities and compounded disadvantages. Drawing on qualitative research with pastoralist women in Western India, Venkatasubramanian and Rammarain (2018) also highlight that climate change exacerbates gender inequalities, especially in terms of the gender division of labour. Although pastoral communities are important for rural livelihoods, their needs are often neglected in national climate policies and their gendered adaptation experiences remain unexamined. Pastoral women play a pivotal role, as they are not only responsible for household management and care, but also maintain the livestock in their communities and market animal products. While the women interviewed by Venkatasubramanian and Rammarain had never heard of the term 'climate change', they explicitly noted unreliable weather patterns that had resulted in poor quality and shortage of fodder, low milk production, and cattle diseases. The two traditional adaptation pathways were the shift in livestock profile from large stock to small stock and seasonal migration. These were constrained by the institutional and socioeconomic context, including market preference for buffalo or cattle milk products, degradation or privatisation of common lands, and lack of government support. These constraints intensified women's work burden and time poverty: the increase in large stock forced them to spend longer hours to feed, clean and milk it, while they also had to walk longer distances to collect fodder, fuelwood and water and to reach milk markets.

Within the Pan-American context, indigenous people and those of African descent face greater disadvantage. Presenting the Pan American Health Organization (PAHO) Commission on Equity and Health Inequities in the Americas, Marmot (2018) acknowledges the following structural drivers as threats to people's right to a full, healthy and dignified life:

- climate change
- environmental threats
- relationships with land
- the legacy of colonialism and racism, along with political and socioeconomic inequalities.

The intersection of poverty with being indigenous, female and displaced from land appears to maximise vulnerability and confer greater health disadvantage in the region.

Along a similar line of enquiry, Waldron (2018) uses the concept of environmental

violence to describe the cumulative impacts of economic, social, political and health inequalities rooted in colonialism, white supremacy, class exploitation and patriarchy. In turn, the article discusses how these disproportionately affect the bodies and lives of indigenous and black women in Canada. The interaction of gender, race, class and other social identities makes these groups of women more vulnerable to poverty, land dispossession and exploitation, trauma and violence, and greater exposure to environmental risks such as climate change, water contamination and pollution. Indigenous women and black women often lack the skills, resources and support systems needed, also tending to occupy the lower ranks of the labour market, while living in in segregated neighbourhoods close to hazardous sites or in unhealthy and toxic environments. They also face increased insecurity and marginalisation, leading to poor health and well-being. Consequently, they are at the forefront of grassroots social and environmental justice movements, which are often centred on the impacts of violence, land dispossession and resource exploitation, affirming indigenous rights to sovereignty, and mobilising communities against environmental risks and human rights violations.

Waldron (2018) makes explicit reference to ecofeminism, a social movement that links gender justice with environmental justice and provides a useful framework to understand the interconnections of sexism, racism and other social inequalities with the domination of nature and the impacts of climate change. Regarding this topic, an introduction of a Special Issue dedicated to the ecofeminist philosopher, Victoria Davion, by Stephens (2018) outlines some key issues in ecofeminism. As a philosophical theory, this term brings feminism and environmentalism together to provide a lens for analysing how gender and environmental problems are conceptually and materially connected to social oppression and inequality. It also promotes more sustainable and moral ways of living. As a political movement, it prompts land and environmental protectors to take action to mitigate climate change. It also emphasises the need to use international climate frameworks and human rights laws to better protect ecofeminist activists who are threatened (sometimes even with murder) and hold their oppressors accountable.

6 Reflections from a quadrimester

Discussions about climate change, resilience, conflict and security continue to feature in regional and international policy spaces, including high-profile forums such as the UN General Assembly. As these take place, we see stronger connections being made to the need to address climate security challenges and the attainment of the SDGs. However, with the exception of the Climate Security Risk Assessment, there remains little in the way of an actionable programme to advise on how best to tackle current and emerging risks, or how to adapt climate change adaptation and mitigation interventions to different types of conflict contexts. There also isn't much in the way of grounded evidence on the lived experiences of those at the intersection of such threats. A regression of national positions on climate change, namely within the US, has in some ways curtailed discussions, with a continuation of opinion pieces, blog posts and grey literature repeating the mantra that climate change is the biggest threat of our time.

In addition to the political setbacks, this scan has revealed a number of areas of concern. Several blog posts have pointed to the growing fears associated with transition risk, namely that taking a technocratic approach to the use of new technologies could further marginalise those who currently have little influence on the way in which technologies are used, and to what benefit. A greater consideration of the politics of technology transfer is required, along with the recognition that the materials required within low carbon technologies may be sourced from 'fragile and corrupt' contexts, and that such minerals are not included in the conflict mineral legislation.

Despite these challenges, a number of stakeholder groups offer opportunities for new collaborations and action that warrant further consideration. One such opportunity is to undertake work to understand the role of trade unions in supporting transitions towards greener economies in ways that work with rather than alienate or marginalise workers and their rights. Another is to look at the role of intergovernmental organisations in tackling the transnational character of climate-related security risks. This is a potentially under-utilised stakeholder group warranting exploration as a key ally in supporting and enabling governments to take action to enhance policy frameworks, institutional discourses and, ultimately, action on the ground for at-risk populations at the coalface of climate and conflict risk.

Evidence collated throughout the quadrimester has revealed a sustained engagement from military and foreign policy stakeholders, with the EU, Germany, Australia and New Zealand all releasing documents reaffirming the belief that climate change is a major defence threat for the coming decades. They also underline that this directly affects infrastructure and operations, as well as patterns of climate extremes and disasters that may warrant military support. Moreover, military and military think tanks continue to emphasise the risks associated with potential shifts in geopolitical relations owing to the long-term impact of climate change on energy, trade and goods.

The themes starting to emerge in the literature include – but are not limited to – issues of transboundary risk and transition risk (transition to low carbon economies). Looking ahead, it is likely that these will continue to feature as a

matter of concern for governments everywhere in the world. Moreover, the drive to better understand the complex and interconnected relationship between vulnerability and exposure to multiple threats and risks is both overtly and implicitly growing. Concepts such as risk-informed sustainable development are likely to continue to be developed as the climate-security cadre become more visible within the development, humanitarian, climate and peace agenda and the links between the two continue to be debated and refined.

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