Climate change, conflict and security scan

Analysis of current thinking

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December 2018 – March 2019

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Contents

1 Introduction

In this third instalment of ODI's climate change, conflict and security scan, we show that this quadrimester has witnessed the release of an astonishing array of new publications – reviewed through our summary of academic articles and grey literature, debates and announcements, and also conveyed through our summary of the blogosphere, and opinions found on Twitter. Many new authors appear in our bibliography, publishing on different aspects of the intersection of climate change, conflict and security. There is also a completely new list of top five individuals tweeting, thus revealing that the breadth of individuals and agencies engaging in the topic continues to expand.

Heavy-weight institutions continue to loom large in the policy discourse, publication of grey literature and the blogosphere. This four-month period saw reporting from the World Economic Forum (WEF), United Nations (UN) Security Council debates on the security implications of disasters, and the fourth Planetary Security Conference. Yet such high-profile forums are increasingly being complemented by evidence on the local experiences of the intersection of climate change, conflict and security. For example, through articles exploring the 'double vulnerability' of climate and conflict risk, with implications for humanitarian, development, peace-building and climate communities.

Across the blogosphere debate rages about the place of climate change in US national security priorities and there is continued academic analysis of the political discourse of climate change found in policy documents and statements. This complements analysis on international and transboundary dimensions of the climate security nexus, with literature pointing to potential ways forward for such challenges in the context of:

- territory allocation in the Arctic
- regional cooperation around shared natural resources in Africa and Asia
- understanding and responding to changing patterns of human mobility across borders.

Themes less prominent in previous scans that appear here include urban landscapes, human mobility, and rights and justice. This complements new evidence on the intersection of disasters with conflict and violence, this time drawing on themes of poverty, inequality and marginalisation.

As with the previous two scans, we aim to provide time-poor policy-makers, practitioners and academics with a summary of the new knowledge and evidence that has emerged over a four-month period. As described in the methodology for each section, the scan is not exhaustive but, in featuring 25 top blog posts, 39 publications from grey literature and 66 articles from the academic articles, we believe this provides a good starting point for anyone wanting to better understand the nexus.

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 how they engaged, for the period 1 December 2018 to 31 March 2019.

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 usable tweets were shortlisted for analysis.

Climate change, conflict and security on Twitter

Top 5 individuals

1. 
   @PaulEDawson
   Climate change influencer on Twitter

2. 
   @ASteiner
   Administrator, UNDP

3. 
   @abdulla_shahid
   Foreign Minister of Maldives

4. 
   @SigridKaag
   Netherlands Minister for Foreign Trade and Development Cooperation

   At the fourth Planetary Security Conference @PlanSecu in The Hague. We have no choice but to deal with #ClimateSecurity. We have the data, knowledge, technology and partnerships to make this happen! #Doable

5. 
   @jellsmoor
   Entrepreneur and writer

Top 10 institutions

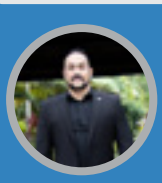
1. **@UNDP**
2. **@Planetary_Sec**
3. **@SIPRIorg**
4. **@BelgiumMFA**
5. **@CntrClimSec**
6. **@TRF_Stories**
7. **@GermanyUN**
8. **@UNGeneva**

   #Women on the frontlines of climate change need to be empowered to prevent & resolve increasing natural resource conflicts. A @UN project in Sudan shows encouraging results, but more needs to be done to address #WomenandPeace and #ClimateSecurity [1]

9. **@PlanSecu**
10. **@siwi_water**

Twitter engagement: hot topics

@sprasadfj
Ambassador and Permanent Representative of Fiji to the UN



@JLSousaSantos

Thanks @WiltonPark for hosting such a critical event. It was a privilege to provide an indigenous Pacific voice on the climate security panel. The Pacific should lead on climate security solutions and not be led. @ForumSEC @Cameron_Diver @spc_cps @CntrClimSec #climatesecurity

@UlrikaModeer
Assistant Secretary General & Director of Bureau of External Relations & Advocacy, UNDP

@MalinMobjork

The debate on climate-related security risks continues, rightly so. This is a debate that needs to be held in all kinds of organisations – also the UN Security Council – but even more important, it must inform actions mitigating present and future risks #ClimateSecurity

@UNDP
United Nations Development Programme

@TRF_Stories

The threat of worsening violence related to climate change extends to countries and regions not currently thought of as insecurity hotspots, such as the Caribbean #ClimateSecurity #Doable #PSC2019 #climate [2]

@camillaborn
Senior Policy Advisor, E3G

@UNDP

Climate-related disasters and extensive conflicts are on the rise and they affect human security and sustainable development. @UlrikaModeer explains why #ClimateSecurity is this years big global development mega-trend [3]

@RCClimate
Red Cross Red Crescent Climate Centre

@shiloh_fetzek

"Major armies and business have long been assessing climate change as threat multiplier – UN can't lag behind." Rosemary DiCarlo, @UN Under-Secretary-General for Political Affairs #climatesecurity #UNSC

1 https://postconflict.unep.ch/publications/Sudan_Gender_NRM2019.pdf
2 http://news.trust.org/item/20190219234215-xnh52/
3 https://www.undp.org/content/undp/en/home/blog/2019/why-does-the-un-focus-on-climate-related-security-risks-.html

Key events and initiatives

@UNDP

#ClimateChange, human security & development are interlinked. We must optimize nature-based solution to scale to prevent & reduce risks. See @ASteiner's remarks to the @UN #SecurityCouncil on addressing #ClimateSecurity [4]

@abdulla_shahid

Just about to address the #UNSC and will highlight the profound dangers that the #Maldives and other #SIDS face from #ClimateChange, specifically, on #climatesecurity. What we need now is more actions and less debates

@BelgiumMFA

"As decision-makers, we have a great responsibility and need to listen to the calls of future generations." #YouthForClimate #BelgiumUNSC Foreign Minister @DReynders underlines in the debate on #ClimateSecurity that #ClimateRisk should be included in the work of the #UNSC

25th January 2019

UN Security Council Debate

@UNDP

The climate crisis threatens human security & sustainable development. At the conclusion of @PlanSecu's #PSC2019, our @UlrikaModeer explains the importance of #ClimateSecurity for the successful realization of the #SDGs & #ClimateAction [5]

@jelslmoor

Dutch, Finnish, and New Zealand military officials at @PlanSecu report on the importance of #ClimateSecurity and the uses of #RenewableEnergy for defence purposes #Doable #PSC2019 #ClimateCrisis #PlannetarySecurity #EnergySecurity

@PlanSecu

Some elements in #climatesecurity to keep in mind in Caribbean SIDS:

- Ocean rise
- Warmer temperatures
- Increase in wind speed in hurricanes
- Decline in corals
- 3% - 4% of world tourism visits

#Doable #PSC2019

19th – 20th February 2019

Fourth Planetary Security Conference

@FlorianKrampe

Ahead of the upcoming @_AfricanUnion summit this month, SIPRI's @Aminga_Moraa and I make the case for an African Union Special Envoy for Climate Change and Security [6]

@UNDP

The Middle East and North Africa is already the most water insecure region and the most dependent on food imports. Temperature increase faster than the global average. Green financing to deliver #ClimateAmbition is a matter of #ClimateSecurity #AfricaClimateWeek [7]

18th – 22nd March 2019

Africa Climate Week

10th – 11th February 2019

32nd African Union Summit

Top 3 retweets

@PaulEDawson

"Climate change exacerbates vulnerabilities and inequalities, especially in situations of armed conflict, where countries, communities and populations are least prepared and least able to protect themselves" [8]
#ClimateSecurity

@PaulEDawson

"Citing concerns about the effects of climate change on national security, more than four dozen top-ranking military officials came out in opposition to the Trump administrations plan" [9]
#ClimateChange #Science #ClimateSecurity

@UNDP

Water is one of our century's top causes of inequality. It also unlocks barriers, especially for the world's rural women, who bear the weight of the global water crisis. See why nature is the solution to #WaterSecurity [10]
#ClimateSecurity #Climate4All

4 https://www.undp.org/content/undp/en/home/presscenter/speeches/2019/remarks-to-the-security-council.html
5 https://www.undp.org/content/undp/en/home/blog/2019/why-does-the-un-focus-on-climate-related-security-risks-.html?platform=hootsuite
6 https://www.sipri.org/commentary/essay/2019/need-african-union-special-envoy-climate-change-and-security
7 https://www.undp.org/content/undp/en/home/blog/2019/closing-the-green-finance-gap.html
8 https://insideclimatenews.org/news/30012019/worldwide-threat-assessment-climate-change-intelligence-agencies-national-security?utm_source=twitter&utm_medium=social
9 https://theconversation.com/veterans-are-concerned-about-climate-change-and-that-matters-110685?utm_source=twitter&utm_medium=twitterbutton
10 https://www.undp.org/content/undp/en/home/stories/the-answer-is-in-nature.html

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 25 blog posts on the topic that were published between 1 December and 31 March 2019.

3.1 Methodology

For the purposes of this research, blog posts have been defined as news or opinion articles categorised by search engines as discrete entries (articles), with 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 53 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 25 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.

3.2 The top 25 blog posts

Ranking	Blog post title	URL	Publisher	Total score	Rank
Blog post 1	The Pentagon calls climate change a national security threat. Trump isn't listening	https://www.vox.com/2019/1/18/18188153/pentagon-climate-change-military-trump-inhofe	Vox	65	1
Blog post 2	These are the biggest risks facing our world in 2019	https://www.weforum.org/agenda/2019/01/these-are-the-biggest-risks-facing-our-world-in-2019/	WEF	60	2
Blog post 3	Dems raise alarm over proposed White House climate council	https://thehill.com/policy/energy-environment/432207-democratic-lawmakers-raise-alarm-over-proposed-white-house-climate	The Hill	60	2
Blog post 4	'Climate Security' Panel May Give White House Skeptics New Voice	https://www.bloomberg.com/news/articles/2019-02-20/-climate security-panel-may-give-white-house-skeptics-new-voice	Bloomberg	59	4

Ranking	Blog post title	URL	Publisher	Total score	Rank
Blog post 5	Does the US need a 'presidential climate security committee'?	https://www.nationalgeographic.com/environment/2019/02/trump-presidential-climate security-committee/	National Geographic	57	5
Blog post 6	Climate change is a security threat. We must act now	https://www.weforum.org/agenda/2019/03/climate-change-is-a-security-threat-let-us-act-now/	WEF	56	6
Blog post 7	White House recruits researchers for 'adversarial' climate science review	https://www.sciencemag.org/news/2019/02/white-house-recruits-researchers-adversarial-climate-science-review	Science Magazine	55	7
Blog post 8	The world's coastal cities are going under. Here's how some are fighting back	https://www.weforum.org/agenda/2019/01/the-world-s-coastal-cities-are-going-under-here-is-how-some-are-fighting-back/	WEF	55	7
Blog post 9	World Bank group announces $200 billion over five years for climate action	https://www.worldbank.org/en/news/press-release/2018/12/03/world-bank-group-announces-200-billion-over-five-years-for-climate-action	The World Bank	45	9
Blog post 10	Here's how cities are tackling the risks of climate change	https://www.weforum.org/agenda/2019/03/what-do-we-know-about-climate-change-mitigation-in-cities/	WEF	42	10
Blog post 11	Climate change recognised as 'threat multiplier', UN Security Council debates its impact on peace	https://news.un.org/en/story/2019/01/1031322	UN News	41	11
Blog post 12	Water is a growing source of global conflict. Here's what we need to do	https://www.weforum.org/agenda/2019/03/water-is-a-growing-source-of-global-conflict-heres-what-we-need-to-do/	WEF	37	12
Blog post 13	This is what it's all about: building resilience and adapting to climate change in Africa	https://www.worldbank.org/en/news/feature/2019/03/07/this-is-what-its-all-about-building-resilience-and-adapting-to-climate-change-in-africa	The World Bank	33	13
Blog post 14	Climate change as a national security threat and what to do about it	https://warontherocks.com/2018/12/climate-change-as-a-national-security-threat-and-what-to-do-about-it/	War on the Rocks	32	14
Blog post 15	The geopolitical impact of China's approach to fighting climate change	https://www.weforum.org/agenda/2018/12/the-geopolitical-impact-of-china-s-approach-to-fighting-climate-change/	WEF	32	14
Blog post 16	We can't rid Asia of natural disasters. But we can prepare for them	https://www.weforum.org/agenda/2018/12/we-can-t-rid-asia-of-natural-disasters-but-we-can-prepare-for-them/	WEF	30	16
Blog post 17	Stepping up climate adaptation and resilience in Africa	https://www.worldbank.org/en/news/feature/2019/03/11/stepping-up-climate-adaptation-and-resilience-in-africa	The World Bank	29	17

Ranking	Blog post title	URL	Publisher	Total score	Rank
Blog post 18	The White House's climate committee red-teams reality	https://www.lawfareblog.com/white-houses-climate-committee-red-teams-reality	Lawfare	29	18
Blog post 19	Are our cities effectively planning for climate change?	https://www.weforum.org/agenda/2019/03/are-our-cities-effectively-planning-for-climate-change/	WEF	28	19
Blog post 20	World Economic Forum at Davos 2019: agenda possible?	https://www.thehansindia.com/posts/index/Opinion/2019-01-23/World-Economic-Forum-at-Davos-2019-Agenda-possible/480393	The Hans India	27	20
Blog post 21	Security council debates how climate disasters threaten international peace and security	https://www.newsecuritybeat.org/2019/02/security-council-debates-climate-disasters-threaten-international-peace-security/	New Security Beat	23	21
Blog post 22	UN Security Council divided on climate security link	https://www.france24.com/en/20190126-un-security-council-divided-climate security-link	France 24	23	21
Blog post 23	World Bank doubling aid to poor countries adapting to climate change	https://www.voanews.com/europe/world-bank-doubling-aid-poor-countries-adapting-climate-change	VOA News	21	23
Blog post 24	An African-owned initiative to manage natural disaster and climate risks	https://www.brookings.edu/blog/africa-in-focus/2019/03/14/an-african-owned-initiative-to-manage-natural-disaster-and-climate-risks/	Brookings Institution	13	24
Blog post 25	Figure of the week: fragile states are ripe for disasters	https://www.brookings.edu/blog/africa-in-focus/2019/02/08/figure-of-the-week-fragile-states-are-ripe-for-disasters/	Brookings Institution	10	25

3.3 Key events and policy announcements from the World Economic Forum, UN Security Council and World Bank

Summary
Blog posts linked to the WEF 2019 and the fourth UN Security Council debate on climate change featured prominently in this scan period, with blogs on the global economy and inequality, climate change, and water security and access. The period also included a blog outlining the World Bank's plans to substantially increase its funding for climate adaptation in Africa, South Asia and Latin America.

Given that the WEF 2019 and the fourth United Nations Security Council (UNSC) debate on climate change featured in the scan period for this document, it is perhaps unsurprising that blog posts linked to these events were a key feature. Three blog posts focus on the gathering of the world's rich and powerful at the annual WEF conference in Davos, Switzerland. For example, blog post 20 by Gopal (2019) notes that, along with economic concerns centred around the health of the global economy and inequality, climate change would also take centre stage – forming what Gopal refers to as the WEF Globalisation 4.0 agenda. Blog posts 2 and 12 – both published by the WEF – focus on climate change as a prominent feature within this year's Global Risks Report, launched in support of WEF 2019. The report ranks risks based on their likelihood and impact. In respect

to these two factors, Myers and Whiting (2019) (blog post 2) warn that environmental concerns have 'accounted for three of the top five risks by likelihood, and four by impact'. The report highlights how these risks do not act in 'isolation' but are often interconnected. For example, Myers and Whiting note the reference to biodiversity loss, with implications for health and socioeconomic development. The authors argue this could also result in a range of outcomes, including implications for regional security.

Similarly, blog post 12 focuses on how some of these risks might emerge. Considering water security – ranked among the top 5 risks within the Global Risks Report for the eighth year running – van der Heijden and Stinson (2019) state that factors such as poor water resource management, increased demand and the effects of climate change are likely to result in increased pressure on the world's water systems. While much has been written on the conflict risk between communities, other risks are also highlighted. The weaponisation of water by armed groups, along with emerging security threats such as cyber-attacks on water infrastructure, means that access to water will continue to be heavily securitised. The authors warn that water insecurity in the Sahel-Sahara region could further add to feelings of 'disenfranchisement' that could therefore provide a potential recruitment pool for jihadist groups. Although the authors advise that access to water is not a priority for some policy-makers, they do highlight that some progress is being made in trying to address clear security risks. For example, the *Water, Peace and Security Partnership* – a consortium of partners from research institutes, non-governmental organisations (NGOs) and universities – has developed a tool that helps identify areas at risk of conflict. According to van der Heijden and Stinson, the tool 'does not simply flash a warning light, but points to the factors that need to be addressed through capacity building and stakeholder engagement to mitigate the potential for conflict'. The authors continue by explaining that the tool aims to encourage working across silos and was presented to the UNSC in 2018.

As blog posts 11, 21 and 22 show, the UNSC continues to be at the heart of debates surrounding climate security, with the fourth debate taking place at the beginning of 2019. Covering the event, UN News (2019) notes the invitation of a member of the UN World Meteorological Organisation to address member states for the first time in the UNSC history. In his address to the council during the debate, Chief Scientist at the World Meteorological Society, Professor Pavel Kabat, issued the following warning:

> 'Climate change has a multitude of security impacts – rolling back the gains in nutrition and access to food; heightening the risk of wildfires and exacerbating air quality challenges; increasing the potential for water conflict; leading to more internal displacement and migration.'

The debate also included an intervention from a youth representative, specialising in environmental security research, whose recommendations for the council included the need for an assessment of the impacts of climate change on young people in areas such as unemployment, displacement, food insecurity and recruitment into armed groups.

However, as other posts reveal, there is still some resistance to the inclusion of climate change within the UNSC. In blog post 22, France 24 (2019) notes that representatives from both the US and Russia raised objections to the UNSC debating the topic. The Ambassador for Russia told the council it was 'counter-productive' to discuss the issue, given that its 'principal task was to react rapidly to menaces to international peace and security', while the Minister of Foreign Affairs for Belgium warned objectors that they would 'have to get used to' the topic being on the UNSC agenda.

Similarly, in blog post 21, Schaller and Pohl (2019) highlight that, through addressing security threats related to climate change, the role of the UNSC should be seen as 'complementary to the mandate and actions of the UNFCCC and other UN bodies'. The authors point to continued growing support for initiatives set up to address climate security, such as the Group of Friends on Climate Security established in the summer of 2018. Set up by Germany and Nauru,

the initiative now includes over 40 member states. Furthermore, with Germany taking up its position on the UNSC as a non-permanent member for 2019–2020, climate change is likely to continue being placed on the agenda. As with previous non-permanent members – Sweden and the Netherlands – Germany has made climate security a priority during its time on the council.

In addition to policy announcements covered in previous scans, the World Bank has announced plans to double its funding for climate adaptation to $200 billion over the next five years. Blog post 23 reveals that the focus will be on the poorest states within Africa, South Asia and Latin America. Funding will include support for disaster proof infrastructure, water security and climate smart agriculture. Furthermore, blog post 9 reveals that the funding will also focus on 'supporting higher quality forecasts, early warning systems and climate information services to better prepare 250 million people in 30 developing countries for climate risks'. Breaking down the finance, the blog post states that approximately half will come from 'direct finance' from the World Bank's International Development Association, and the International Bank for Reconstruction and Development. The remaining half will be generated from 'combined finance' from the World Bank's Multilateral Guarantee Agency and funds generated from the private sector.

3.4 Urban settings and resilience

Summary
Urban settings were another important concern over the period. Blog posts highlighted the climate risks faced by urban populations, and the steps cities are taking to adapt, including large-scale investment in flood defences and environmental measures such as land recovery and the restoration of mangroves and wetlands.

Urban settings are a feature within the blog posts published by the WEF. Beginning with blog post 8, Muggah (2019) provides some stark statistics on the risks faced by the world's urban population. It is estimated that in a 2 °C world, 'by 2050 at least 570 cities and some 800 million people will be exposed to rising seas and storm surges'. Asian cities such as Jakarta not only face these hazards, but also the double threat of sinking due to their growing size. The message is clear: those cities who fail to adapt will not survive.

However, Muggah indicates that cities across the globe are already rising to the challenge. This includes the investment of billions of dollars in improved flood defences and adopting environmental measures such as land recovery and the restoration of mangroves and wetlands. Others are considering more extreme measures of relocation. How cities adapt might also be a matter of perspective. In an example of what the author describes as the 'Dutch model', coastal cities such as Rotterdam are seeing climate change treated as not only a threat, but also an opportunity, in terms of investing in infrastructure, increasing biodiversity and providing an avenue for citizen engagement. This is similar to other geographical locations. For example, China's cities face the growing threat of sea level rises and flooding. Muggah reveals that an estimated 641 of the country's largest cities are now affected by flooding on a regular basis. In response, a growing number of the country's urban centres – 30 in total, including Beijing and Shanghai – are part of China's 'sponge city' initiative, which requires that '80% of all urban land is able to absorb or reuse 70% of storm water'.

While acknowledging the progress that cities have made, Olazabal (2019) challenges us to consider how effective urban adaptation measures are at reducing future risks, pointing to a study assessing whether adaptation plans are 'credible' in terms of funding, accurate climatic assessments and legitimacy among different levels of stakeholders. Drawing on conclusions from four case study sites in Durban, Quito, Copenhagen and Vancouver, Olazabel argues that more work is needed in areas such as:

- legitimacy among communities
- monitoring systems
- defining a 'sustainable budget'
- identifying risks and uncertainty associated with climate change.

Following on from this, Olazabal refers to a much larger study currently being undertaken by the Basque Centre for Climate Change, which is assessing adaptation measures across 136 coastal cities, seeking to understand the risk tolerances among urban planners. Olazabel accepts that not all risks can be avoided, thereby making the level of risk cities are prepared a critical dimension of adaptation planning. With results due to be published in 2020, the author believes the study will help cities 'improve their climate planning skills and adjust their strategies according to the climate change risks they may face in a future…'.

Regarding mitigation efforts being undertaken within cities, Lamb (2019) refers to a new study that helps identify trends within urban research. The study utilises computer-assisted methods to identify academic literature, cataloguing around 4,000 case study articles of climate mitigation within cities. This field of research has seen increased attention since its inclusion within the Intergovernmental Panel on Climate Change AR5 report. However, rather than taking advantage of this research for mitigation purposes, Lamb argues that lessons learnt have largely been 'anecdotal', also stating:

> There have been no systematic attempts to map out existing work, let alone synthesise it. We are generating hundreds of new case studies per month without even knowing what exists.

Lamb highlights one of the major biases identified within the study is that there is a tendency to focus on megacities, particularly those within the global north, but also China. Therefore, whilst cities in Europe, north America and China have received far greater attention, lessons from Africa and South America go undocumented. In terms of what this means in practice, Lamb makes the case that 'we know far less about dealing with climate change in rapidly growing cities – particularly smaller cities and those in the global south.' This is despite the fact that a larger proportion of the world's population are living in these kinds of settings. In addition, it means that we also risk overlooking cities which are 'rich in sustainability lessons'. Lamb concludes that not only will this new study help identify research gaps, but that it will also offer lessons of comparison between different urban locations with similar contextual settings.

3.5 Geographies in focus: Africa and Asia

Summary
Blog posts focusing on Africa and Asia were also prominent. Authors looked at the World Bank's efforts to address vulnerability to climate shocks, including through investment to improve crop yields and agricultural incomes in West Africa, alongside partnerships with key regional organisations, the private sector and the research community. Outside the World Bank, other posts focus on the newly released Brookings Institution report *Foresight Africa: Top Priorities for the Continent*, which highlights Africa's susceptibility to biological and hydrological disasters.

Blogs with an Asian focus covered the Global Resilience Platform's achievements and lessons learned over 2019, and the importance of social media platforms in developing early warning systems. Authors also stressed the importance of putting women at the centre of disaster risk reduction efforts. A blog post by Sheikh Hasina, the Prime Minister of Bangladesh, highlights the severity of the risks facing her country, and the economic burden climate change is imposing.

One blog post focuses on the 'hard' security implications of climate change, in particular the geopolitical ramifications of China's growing influence in this area as part of its Ecological Civilisation strategy. China has become a global leader in green technology and renewable energy both domestically and as part of the Belt and Road Initiative (BRI).

Within the top 25 blogs, blog posts focusing on both Africa and Asia are also prominent. Beginning with Africa, two blog posts focus on the World Bank's efforts to address vulnerability to climate shocks. In blog post 13, the World

Bank (2019a) announces it will increase 'direct adaptation climate finance', to reach $50 billion US dollars between 2021 and 2025. The World Bank (2019a) states that this initiative 'builds on the link between adaptation and development by promoting effective climate smart early actions that provide positive development outcomes': preventive rather than reactionary approaches. The World Bank has already made gains in this area, through programmes such as the *West Africa Agricultural Productivity Program*, which claims to have improved average crop yields and incomes by 30%, in addition to increasing food security for an estimated 50 million people. The blog post also highlights that the World Bank has been able to build partnerships with UN agencies and regional actors. In coordination with the African Union Commission and the United Nations Economic Commission for Africa, the World Bank has established the Africa Climate Resilient Investment Summit. This brings together actors ranging from national governments, the private sector and the research community, in order to help develop and share 'emerging best practices and promote the delivery of resilience to help the region step up on climate action'.

A second blog post by the World Bank (2019b) states that the Action Plan on Climate Change Adaptation and Resilience will work alongside the World Bank's other major initiative in the region: the Africa Climate Business Plan. This has already delivered $17 billion of finance targeting climate change, which the blog post states is 'double the target set for 2020'. While the initiative has already seen 'positive outcomes' where it has invested in climate smart agriculture and renewable energy, the World Bank states that it will continue to 'intensify commitments' for investment on the continent. This includes encouraging private sector investment in renewable energy and investments to climate proof sectors such as health, education and the economy. In addition to 'mainstreaming climate resilience and adaptation throughout its operations in the region', the World Bank has also been working directly with African countries to meet National Determined Contributions submitted as part of the Paris Agreement.

Outside the World Bank, other blog posts focus on insights from the chapter 'Fixing Fragility' within the newly released *Foresight Africa: Top Priorities for the Continent* in a 2019 report from the Brookings Institution, featuring content on the impact of natural-hazard related disasters. In blog post 25, Patel (2019) reiterates the widely accepted narrative that fragility is an amplifier of vulnerability to natural hazards. The chapter reveals trends showing that the region is highly susceptible to biological and hydrological disasters, with the latter covering floods and droughts. In relation to droughts, Patel states that the Africa has witnessed over half a million deaths between 1980 and 2018. While such disasters are significant in terms of loss of life, they also place a heavy burden on national economies, particularly those heavily dependent on agriculture. Patel concludes that, overall, the Foresight Africa report 'stresses the importance and critical need for private and public stakeholders to not only acknowledge their respective responsibility in fixing fragility, but also work together to achieve it'.

Following on from this, Beavogui (2019) in blog post 24 identifies that some progress has been made in addressing vulnerability to natural hazard-related disasters through insurance mechanisms such as the African Risk Capacity (ARC) agency, established by the African Union. This mechanism has been adopted by 16 African countries to date and used to 'scale up cash transfers, subsidise livestock feed, replenish depleted food reserves and distribute emergency food supplies'. However, while ARC should be viewed as a positive step, the effectiveness of the scheme is limited to low frequency and high impact disasters. Beavogui therefore urges African governments to develop new mechanisms that can work alongside current ones like ARC, but that account for varying degrees of frequency and severity in natural hazard-related disasters.

Several blog posts focused on Asia were published by the WEF during our scan period. Matthews and Nel (2019) focus on the Global Resilience Platform's achievements and lessons learned over the course of 2019, where it has worked in partnership with NGOs to build the resilience of the 'poor and most vulnerable' to

natural hazard-related disasters across Southeast Asia. As the blog post reveals, the Asia region is highly susceptible to natural hazards, which are the cause of '61% of new displacements' during 2017 and with an 'estimated 40% of global losses' likely to take place in the region over the coming years. The blog post lists three key takeaways from the Global Resilience Platform's work in the region. First, social media platforms have an important role to play in developing early warning systems in the future. This has certainly been the case in Jakarta, where a social media platform has provided communities with early warning information related to floods and a tool that allows them to report flood risks such as littering. Second, competing levels of government can hamper disaster risk reduction efforts. However, examples from One Architecture in the Philippines reveal that uniting local and national level government actors can have positive outcomes. Finally, given their role as primary caregivers who often rely on natural resource-based livelihoods, women are particularly vulnerable to natural hazards. However, work by the University of Potsdam in Vietnam reveals that placing women at the centre of disaster risk reduction efforts not only helps to reduce their vulnerability but can also act as an avenue for empowerment.

Blog post 6 is authored by Sheikh Hasina, the Prime Minister of Bangladesh, who highlights the severity of the risks facing her country. While Bangladesh has historically had to cope with natural hazards, the increase in severity and frequency is eroding communities, coping capacity. Alarmingly, Hasina (2019) notes that a third of Bangladesh's population risks being displaced due to sea level rises. Economically, climate change means that the country risks facing losses between 2% and 3% of its GDP per annum. In addition, while Hasina accepts that climate change presents a risk in terms of conflict, she does not envisage 'conventional warfare' and, instead, predicts that conflict will manifest in 'tensions simmer[ing] and sparking different forms of conflicts within communities'. However, as the blog post highlights, Bangladeshi farmers have risen to the challenge, helping develop a number of stress-tolerant crops. While there are technology and funds to help in this fight, Hasina argues that these communities alone cannot combat climate change, highlighting a need for more action from the world's wealthiest 'to act ambitiously against climate change' and calling for changes in 'our lifestyles, attitudes, systems and economies'.

Finally, blog post 15 focuses on the 'hard' security implications of climate change, namely the geopolitical ramifications of China's growing influence in the fight against climate change, developed through its Ecological Civilisation strategy. While the strategy was initially developed in response to the country's alarming levels of pollution, Pennington and Kastner (2018) argue that China is now in a position to 'shape energy markets and strengthen Beijing's broader geostrategic positioning'. Regarding the former, China has become a global leader in green technology and renewable energy, in terms of what it produces domestically and internationally through its investments as part of the Belt and Road Initiative (BRI). In terms of 'geostrategic positioning', Pennington and Kastner believe the rise in China's influence within the climate agenda – at the same time as a US withdrawal – could mean that China's system of governance proves to be an attractive alternative to 'fractured liberal democracy'. The authors explain that:

> If China's centralised system of government proves better equipped to address it [climate change]… then it could be harder for the global community to be critical of China's system of governance.

However, China's position of leadership on climate change presents domestic challenges. While the country has seen significant economic gains, this has come at a cost of being the world's largest polluter. Pennington and Kastner therefore ask: can China continue along a path of economic growth, while also leading the fight against climate change?

3.6 The US and national security: the debate continues

Summary
As with our previous scan, climate change and US national security feature heavily. Posts highlighted disagreements between the US military and the Trump administration around how best to deal with climate change, with reference to the 2019 US Department of Defense Report on *Effects of a Changing Climate to the Department of Defense*, which focuses on the impact of natural hazards on US military installations, and how recent events abroad have disrupted US military operations.

Climate change and US national security feature heavily, making up seven of the top 25 ranked blogs. In the highest ranked blog post, published by Vox, Ward (2019) provides further evidence that there continues to be a difference of opinion between the US military and the Trump administration in dealing with climate change. As Ward highlights, with reference to the 2019 *US Department of Defence Report on Effects of a Changing Climate to the Department of Defense*, the military continues to raise alarm about the implications for the US military at home and abroad. However, Ward damningly states that the Trump administration will 'continue to ignore the problem – all while the military is left to deal with the consequences as the climate continues to worsen'.

The report predominately focuses on the impact of natural hazards to US military installations within the US, but also refers to how recent events abroad have disrupted US military operations. Interestingly, this includes how the impact of changing weather conditions over the Mediterranean Sea have led to delays in casualty recovery and evacuation flights between Africa and Europe. Ward indicates that the report has not been without its critics. A major criticism from both within the climate security and political communities has been that, although the report highlights the risks, it does not go far enough in terms of how we can mitigate them.

Similar themes are also discussed in blog post 14, published in War on the Rocks. Here, Werrell and Femia (2018) refer to the Fourth National Climate Assessment (reviewed within Mayhew et al., 2019). This assessment highlights the security implications of climate change at home and abroad. The authors argue that since the last assessment in 2014, the security community in the US have increasingly expressed their concerns about climate change: since President Trump was elected, '[a]t least 19 military officials…have spoken publicly about the security implications of climate change…'. Werrell and Femia argue that this report is not only for '[t]ree huggers', highlighting that the assessment is not only the work of climate scientists, but also those concerned with national security. Therefore:

> If we take the judgement of our military seriously when it relates to other national security challenges, such as the proliferation of nuclear weapons and terrorism, why would we ignore their judgement on climate change?

Werrell and Femia recommend that the next assessment should be give attention to the security implications of migration, such as the potential for the rise in 'ethno-nationalist' politics in host communities.

The announcement of the proposed Presidential Committee on Climate Security has drawn significant interest in blog posts. Although the initiative was eventually cancelled in the summer of 2019, the idea of the committee has raised a debate surrounding the motives behind its creation. Such a move might have been considered positive – albeit at odds with the Trump administration's stance on climate change. However, as blog post 18 by Melton (2019) highlights, there have been concerns that the committee could be utilised to discredit climate science. There is a similar message from the authors of blog posts 3, 4 and 7, who, like Melton, raise concerns regarding the composition of the committee, which would have included a number of climate sceptics. These blog posts show that the committee would have been led by William Happer, the Senior Director within the National Security Council. In reference to this,

blog post 7, from Waldman (2019), reveals that Happer had once compared the '"demonization" of carbon dioxide to the genocide of the Jews during the Holocaust'. In addition, blog post 3, from Green (2019), states that lawmakers within Congress and the Senate have also raised their concerns regarding the committee's credibility –particularly its lack of transparency – with some suggesting the committee could be 'inappropriately influenced by special interests'.

Many blog posts considered in this review are sceptical about the committee and the motivations behind its formation. Despite its name, the blog posts we have reviewed are in agreement that the committee would or could represent a means to undermine the US military position on climate change. Melton (2019) refers to the initial proposal for the committee, which appears to question the findings of recent government reports highlighting the national security implications of climate change. Melton notes that questions have been raised around their accuracy due to a lack of 'rigorous independent and adversarial scientific peer review to examine the certainties and uncertainties of climate science, as well as the implications for national security'. Similarly, in blog post 5, Revkin (2019) argues that the use of language in the committee's main objective – 'adversarial' – is key. Quoting the former president of the American Meteorological Society William Gail, who states that unlike peer reviews, which seek to uncover the truth, an '[a]dversarial review seeks to primarily undermine the argument, not arrive at the truth'. Furthermore, Revkin reveals that the committee was proposed in the wake of the findings from the *Fourth National Climate Assessment and the Worldwide Threat Assessment of US Intelligence Community*. Both these reports were challenged by President Trump.

These views and concerns are shared by others within the climate security community in the US. Natter et al. (2019) refer to an interview with John Conger from the Center for Climate and Security, who warned that any underplaying of the security threat of climate change could undermine the arguments being put forward by many think tanks. In keeping with this, Revkin (2019) indicates that similar concerns have been shared by other colleagues at the Center for Climate and Security, such as Francesco Femia, who argues that we should encourage assessment of the security risks of climate change by 'credible climate and national security experts' but that this has not been the intention of the committee. Such critiques serve as a reminder that, while it is clear that an assessment of climate risks should be carried out, this needs to be underpinned by an attempt to be objective, rather than a politically motivated one.

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 Peace-building 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. A total of 39 publications are reviewed in this section.

4.2 Climate security agendas across different scales

4.2.1 International and regional level

The steps taken on the international stage and by regional actors to address both climate change and climate security were a prominent theme within the grey literature reviewed during this

Summary

International and regional steps to address climate change and climate security were a prominent theme in the grey literature reviewed during this scan period, with authors citing examples from the European Union, the African Union Peace and Security Council, the Arab League and the UN Security Council. The literature identified three key global policy processes: the UN Secretary-General's Climate Summit, diplomatic engagement by member states in the UN and regional organisations and the High-Level Political Forum.

One of the major challenges noted in the literature is that the siloed approaches many organisations adopt limit cooperation between sectors in development programmes, and within national and local governments. Focusing on Africa and locations of political significance to international donors also limits analysis.

The impact of climate change on national security was addressed in a series of papers issued by the US Government Accountability Office (GAO) highlighting the key role of the State Department, the US Agency for International Development and the Department of Defense in engaging with climate change as a potential driver of global migration; the need for greater progress in key areas; and the long-range emerging threats facing the US, including climate change. Similar issues were addressed in official documents issued by the Department of Defense and US intelligence agencies, and new legislation published by the US Senate established several climate-related positions within the executive branch.

scan period. In a report on Making Climate Security #Doable, written ahead of the Planetary Security Conference in February 2019, Smith et al. (2019) summarise the main trends on climate and security, concluding that geopolitical tensions had not deterred rising awareness and action on climate security among regional organisations at the time of writing. To demonstrate this, the authors of the report cite examples of debates held in key regional organisations, including the European Union, African Union Peace and Security Council, and the Arab League, all of which examined links between peace and climate, water, and security. Smith et al. identify three key interconnected changes at the UN system level:

1. The inclusion of calls for adequate climate risk assessment and management strategies in UNSC resolutions and by UNSC members at various events and forums.
2. The formation of a Climate Security Mechanism within the UN system.
3. The establishment of an independent Expert Working Group on Climate-related Security Risks.

Smith et al. highlight the critical role of leadership in continuing progress on climate security. They identify three crucial global policy processes that will help make climate security action in 2019 #Doable. These include the UN Secretary General's Climate Summit, maintaining short-term diplomatic engagement by member states in the UN, UNSC and regional organisations, and the High-Level Political Forum.

Wolfmaier and Vivekananda (2019) summarise the progress on the Hague declaration, signed at the Planetary Security Conference in 2017 in recognition of the need for greater action on climate security. They argue that despite the declaration being non-binding, progress has been achieved across six action areas:

- creating an institutional home for climate security
- coordinating migration and climate change responses
- promoting urban resilience
- supporting joint risk assessment in Lake Chad
- strengthening climate- and conflict-sensitive development in Mali
- supporting sustainable water strategies in Iraq.

As well as monitoring progress, Wolfmaier and Vivekananda also identify success factors, as well as challenges and gaps, for actions on climate and security:

- high-level political leadership, as exemplified by signatories of the Hague Declaration, which includes representatives from Swedish and German governments
- Sweden, the Netherlands and Germany all using membership of UNSC to push climate and security agendas
- the Peace and Security Council of the African Union, which convened an open session where members called for an AU Special Envoy for climate change and security.

One of the major challenges listed is that the siloed approaches adopted by many organisations lead to limited cooperation across sectors in development programmes, and within national and local governments. The continued focus on Africa and locations of political significance to international donors has led to the concern that issues of climate security are insufficiently addressed in the Middle East, South and South-East Asia. As a result, several fragile regions where climate impacts manifest are not well covered by donor activities. The authors conclude that while there are positive examples of steps in the right direction, 'rapid progress on action needs to follow' (ibid: 6).

In a letter addressed to the Secretary-General, Chargé d'affaires a.i. of the Permanent Mission of the Dominican Republic to the UN Marcos Montilla (2019) provides a chair's summary of the ministerial open debate on the theme 'Addressing the impacts of climate-related disasters on international peace and security', held 25 January 2019, under the Dominican Republic presidency of the Security Council. The letter notes that security impacts associated with

climate change were addressed to a greater extent in this meeting than during previous council discussions, with many delegates agreeing that the UNSC should recognise 'the existential threat that, in certain cases, climate change presents to international peace and security and to embrace its role in addressing those security impacts' (ibid: 5). Evidence from the debate suggests there has been some progress on the issue. Although some delegations continue to raise objections to climate change being debated within the UNSC, past concerns that the UNSC is encroaching on the mandates of other UN agencies appear to be diminishing. The letter outlines several policy recommendations highlighted by delegates, including calls for greater understanding of the impact of climate change associated risks and disasters on international peace and security. The letter also raises the need for better early warning systems through integrated risk assessments and risk management strategies at the national level, as well as by wider regional organisations including UN regional offices. Delegates also stress that developing countries require various forms of support to avert climate security threats and conflicts.

In 2019, UNEP (2019) launched a four-year programme aiming to translate theory on climate change and security into practice. This came to fruition in response to calls for greater global analysis of the interaction between climate change and stabilisation efforts in crisis-affected states, along with stronger action at the local level from organisations including G7, the European Union (EU) and the UNSC. The project is supported by the EU and is in partnership with the think-tank adelphi. It will be piloted in Sudan and Nepal, and will adopt a nexus approach between sustainable livelihoods, climate change, security and peace building to build resilience against climate-fragility risks.

In recognising that climate change will be among the future drivers of competition and conflict over land, and that the UN system must be prepared to address these emerging needs, the UN Secretary General (2019) authored the *UN Framework for Action*, which argues that land is relevant across the three pillars of the UN:

- peace and security combined, as a factor in conflict and resilience building
- human rights, through land-related human rights abuses
- development, as land management during the process is recognised as a preventative measure for conflict relapse.

The *UN Framework for Action* proposes that it 'helps to identify potential entry points to integrate land in conflict analyses, planning and assessment processes'. It also 'supports engagement of UN leadership and outlines key activities to consider in areas of UN work' (ibid: 2).

Food and Agriculture Organization (FAO) and World Food Programme (WFP) (2019) published a joint update for the UNSC on the drivers of acute food insecurity in the eight countries with the highest proportions of people in need of assistance, owing to the interconnectedness of conflict and climate shocks and hazards. The category of localised climate hazards is one of a number of drivers of severe food insecurity in the Lake Chad Basin countries, interacting with conflict and displacement. For instance, in the far north of Cameroon, where the security situation is still unstable, climate hazards and conflict have contributed to displacement of around 5% of all internally displaced persons (IDPs), refugees and returnees, with conflict responsible for the majority of displacement. Climate shocks, insecurity and displacement were also identified in the report as drivers of food insecurity in Somalia.

At the regional level, the Council of the European Union held a meeting in February 2019, setting out the EU's commitment to achieving its climate diplomacy targets. Recognising that climate change 'is a direct and existential threat, which will spare no country' (EU, 2019: 2), the Council has reiterated the EU's commitment to the Paris Agreement. In terms of concrete action, the Council has pointed out that the EU recognises the need to turn its 'own ambitious commitments for 2030 into concrete action and legislation' (ibid: 3). To do so, the EU is mapping out pathways to achieve a climate neutral transition in line with the Paris Agreement.

Recognising that climate change acts as threat multiplier, the Council has acknowledged that resilience building, disaster risk management, food and nutrition security, conflict prevention, and sustainable development are all pillars of climate risk management, along with mitigation and adaptation.

Environmental risks, including climate change, have featured prominently in the WEF's 2019 World Risks Report, authored by Collins et al. (2019). In this report, environmental risks score higher among the top ten risks than any other category, both in terms of likelihood and impact. Among these, failure of climate change mitigation and adaptation scored second among the top ten in terms of both likelihood and impact. Extreme weather events scored first among high likelihood risks and third among those of high impact. Furthermore, climate change was recognised as the top underlying driver of developments in the global risks landscape, and was identified as both a driver of risk in food insecurity and a magnifier of it for vulnerable populations and water insecurity in megacities, as well as biodiversity losses. As well as identifying risks, the report also identifies that climate change is increasingly driving low carbon infrastructure transitions, such as by fuelling growing investment in 'green infrastructure'.

In a letter addressed to leaders and citizens of the world, the Science and Security Board Bulletin of the Atomic Scientists (2019) warns that it is still two minutes to midnight according to their Doomsday Clock. Founded in mid-1940s by scientists involved in developing the first atomic weapons in the Manhattan project, the Doomsday Clock symbolises an assessment of threats to humanity and planet earth. In this letter, the board argues that 'humanity now faces two simultaneous existential threats' (ibid: 2): climate change and nuclear weapons. The board argues that steps such as US withdrawal from the Paris agreement undermine global progress on addressing climate change. Alongside physical threats, the board refers to information warfare as a risk amplifier, which has the capacity to undermine climate change science by spreading poorly informed anecdotes. The board warns that addressing climate change impacts requires an acceleration of decarbonisation efforts.

Highlighting both the risks and opportunities that the transition from fossil fuels to renewables presents, International Renewable Energy Agency (IRENA) (2019) warns that the geopolitical consequences of this energy transition have not been comprehensively considered within international fora. The agency also finds that energy transformation presents both daunting challenges – such as potential job losses in fossil-fuel dependent economies – and ample opportunities – including achieving energy independence for states reliant on energy imports. At the same time, IRENA concludes that energy transformations will result in decentralisation of power, while power dynamics between states will shift. Countries that have invested in renewables, such as China, will gain capacity. Meanwhile, the influence of countries that continue to depend on fossil fuels will fade.

4.2.2 National level

The impact of climate change on national security continues to be of increasing concern for agencies within the US government. The US Government Accountability Office (GAO) has published several papers on the climate change, conflict and security nexus. Its first report (2019a) reviews how three executive branches of the US government – specifically the Department of State, the US Agency for International Development and the Department of Defence – engage with climate change as a potential driver of global migration. The report finds that the impacts of climate on migration have been assessed in the plans and risk assessments of all three agencies. GAO (2019a) argues that the Department of State's decision to omit guidance to its country missions on including climate change risks as part of their country strategies means that it may fail to identify a climate change-migration nexus. It recommends that the Department of State should rectify this lack of provision. The Department of State has responded to this recommendation from the draft report by saying that it will give the option for missions to provide further data on climate resilience and any relevant information. The GAO report (2019a) also finds that, although none of the three branches had explicitly focused on the climate change and

migration nexus during the period considered, all three branches were involved with climate change related activities. Such activities can potentially address underlying factors interacting with climate change that may, in turn, influence individual decisions to migrate. The US Agency for International Development's adaptation programme, which increases resilience in Ethiopia, is as an example of such an activity.

In its second report, published as part of its High-Risk Series, GAO (2019b) argues that substantial efforts are needed to achieve greater progress on high-risk areas. Specifically, the report indicates that 'limiting the Federal Government's fiscal exposure by better managing climate risks' (ibid: 26) is among the high-risk areas that, at the time of writing, had not made sufficient progress against assessment criteria that would qualify it for removal from the High-Risk List. The GAO report highlights that this high-risk area partially met three criteria – including on leadership commitment, capacity and action plan – but did not meet two: on monitoring and demonstrating progress. GAO notes that 'the federal government had not made measurable progress to reduce its fiscal exposure to climate change since 2017 and, in some cases, had revoked prior policies designed to do so' (ibid: 49). GAO concludes that, to reduce fiscal exposure to climate change risks, government action is required in its various roles: as the insurer of property and crops; the provider of disaster aid; the owner or operator of infrastructure; the leader of a strategic plan that coordinates federal efforts and informs state, local and private-sector action; and the provider of data and technical assistance to decision makers. The report then provides an overview of progress across these five areas, outlining what remains to be done and where congressional action is needed.

In the third report, written for the Congressional Committee, GAO (2018) summarises long-range emerging threats facing the US, as identified by four federal agencies: the Department of Defence, the Department of State, the Department of Homeland Security and the Office of the Director of National Intelligence. Among events and demographic changes, climate change features simultaneously as a threat and as a threat driver. As a threat, climate change – when manifested directly in extreme weather events – can affect food security, energy resources and the healthcare sector. It can also have an impact when manifested indirectly through Arctic sea ice melting, which could 'potentially [increase] Russian and Chinese access to the region and [challenge] the freedom of navigation that the United States currently has' (ibid: 10). As a threat driver, climate change can potentially impact 'new and evolving diseases from the natural environment' (ibid: 4), which could lead to a pandemic.

In another publication, the US Department of Defence (2019) acknowledges that 'the effects of a changing climate are a national security issue with potential impacts on Department of Defence missions, operational plans, and installations' (ibid: 2). The Department of Defence argues that adaptation of present and future military operations to threats, including those arising from climate change, is necessary for the department to achieve its long-term strategic goals. The report aims to identify high risks to mission effectiveness on installations and operations by evaluating 'significant vulnerabilities from climate-related events' (ibid.). It finds that the majority of Department of Defence installations are highly vulnerable to three climate/weather impacts (whether current or future): recurrent flooding, drought and wildfires. Meanwhile, desertification concerns are more limited. The report also notes that installations that are not currently vulnerable may become so in the future.

In 2019, the US Senate (2019) published the Climate Security Act. The Act covers three areas, establishing several climate-related positions within US executive branches. First, it covers the position of the Climate Security Envoy within the State Department who will oversee responsibilities such as developing policy in relation to both domestic and international engagement on climate security. Second, it notes that the President 'shall conduct periodic comprehensive evaluations of present and ongoing disruptions to the global climate system' (ibid: 9), with a view to 'enhancing US' 'understanding on global climate disruptions' (ibid), which the President will make available

to the public. Third, the report establishes the position of Special Representative for the Arctic designated by the Secretary of State, whose role will include representing the US in multilateral fora and formulating the US response to international conflicts in the Arctic, among other responsibilities.

The impact of climate change on security is also of great concern to the US intelligence community. The National Intelligence Strategy of the United States of America (2019) notes that growing migration and urbanisation can increase pressure on already strained governments, causing social fragmentation and creating a fertile ground for radicalisation. Among other pressure points, the report identifies areas threatened by climate change and stresses that the intelligence community 'must be able to warn of their strategic effects and adapt to meet the changing mission needs in this increasingly unstable environment' (ibid: 5).

In his worldwide threat assessment for the US Intelligence Community, Coats (2019), who serves as the Director of US National Intelligence, argues that 'the United States will probably have to manage the impact of global human security challenges' (ibid: 21), including the adverse impacts of environmental degradation and climate change. Coats notes that regional climate change may render improvements in global health inadequate and leave countries vulnerable to flu pandemics and various other infectious disease outbreaks. The author also argues that climate change and environmental degradation 'are likely to fuel competition for resources, economic distress, and social discontent through 2019 and beyond', (ibid: 23), thereby endangering infrastructure, health, and both water and food security.

4.3 Climate-conflict dynamics in vulnerable geographies

Summary

Regarding specific vulnerable geographies, several articles were published on climate change, conflict and peace-building in Small Island Developing States (SIDS) in the Pacific, with other pieces focusing more narrowly on the Solomon Islands and Vanuatu. With regard to the Caribbean, analysis focused on preventative and preparatory capacity for climate change and security risks. Resilience and security also featured prominently during the regional consultation held in Aruba in December 2018.

Human security and vulnerability featured in several articles on the Sahel, with a particular focus on the role of local institutions in mitigating climate-related conflict and the environmental, economic and humanitarian dimensions of human security.

The Middle East was another focus. Issues covered included the consequences of climate change for water security and regional and national security in Jordan, Palestine and Israel and the destruction of the rural environment in Iraq by the armed group Islamic State (IS).

Literature on Asia in this review spanned a wide range of geographical areas, including the Mekong sub-region, with a particular focus on food security issues associated with climate change, land conflict in Indonesia, India, Nepal, the Philippines, Bangladesh and Cambodia and the links between climate change and conflict in Afghanistan. Another article explored measures to restore Indian wetlands.

4.3.1 Small Island Developing States

The Toda Peace Institute has published two articles concerning challenges associated with climate change, conflict and peace-building in the Small Island Developing States (SIDS) in the Pacific. An article by Higgins and Maesua (2019) focuses on localisation of efforts to deal with challenges of climate change and conflict during peace-building in the Solomon Islands. The authors argue that climate change happens in culturally- specific 'physical, economic, political, social, and cosmological worlds' (ibid: 2), so peace-building efforts dealing with the conflict impacts of climate change must engage with these perspectives. As both a SIDS and post-conflict state, the Solomon Islands are acutely vulnerable to the impacts of climate change. Higgins and Maesua warn that the detrimental impact of climate change on environmental conditions could negatively affect local capacity to deal with localised forms of conflict. In such cases, externally-driven adaptation and disaster risk reduction efforts could further exacerbate existing conflict dynamics. Furthermore, given the long-term potential of climate change to cause displacement, the authors recommend 'identifying places where dislocation and resettlement is occurring and conducting participatory conflict analysis' (ibid.) and addressing often-problematic state-community relations.

Like Higgins and Maesua, Davies (2019) focuses on the potential for conflict and avenues for conflict prevention and peace-building, this time in the Pacific state of Vanuatu. As a SIDS with a growing population, Vanuatu is particularly vulnerable to the impacts of climate change, with some of the country's citizens already forced to relocate and many facing livelihood insecurity. To minimise the potential for conflict, Davies puts forward recommendations at three levels: international, national and local. In terms of international policy, Davies argues that the UNSC should recognise climate change as a security threat. Vanuatu can play its role by bringing its case before the UNSC, 'pertaining to the damages and losses the nation has incurred through the impacts of climate change' (ibid: 16). Regarding the national level, Davies calls for the formulation of policy on resettlement and displacement to be rooted in international best practice. Finally, regarding the local level, Davies takes a similar approach to Higgins and Maesua, emphasising the wealth of experience in peace-building at the community level, arguing that it should be integrated into preventative peace-building disaster risk reduction approaches. It is suggested that local climate change narratives can also be used in a positive way to raise awareness of climate change impacts internationally, especially in developed countries.

The intersection of climate change and security has also been a focus of several authors writing on the SIDS in the Caribbean. Fetzek and Leighton-Barrett (2019) analyse preventative and preparatory capacity for climate change and security risks in the Caribbean. The authors provide an overview of climate hazard exposure and underlying security issues in the region before discussing climate as a security threat multiplier and identifying several key pathways to illustrate potential climate change–security dynamics. These include: economic contraction, violence and criminal activities; disaster impacts and political repercussions; food insecurity, livelihoods and social unrest; and regional security degradation. When it comes to climate risk management, Fetzek and Leighton-Barrett argue that 'integrating climate security into existing efforts would likely be more effective than standing up dedicated institutions aimed at addressing the climate security risk nexus' (ibid: 7). The authors highlight that the Caribbean has great foresight capacity and expertise that brings with it a responsibility to act, including greater cross-sectoral discussions and consolidation of regional institutional architecture, with the Caribbean Disaster and Emergency Management Agency/Planetary Security Initiative Plan of Action cited as a good practice example. Finally, Fetzek and Leighton-Barrett suggest that the Caribbean region has climate expertise that could be beneficial for other regions dealing with similar climate-related risks.

Resilience and security in the Caribbean were at the core of discussions during the 'Regional Consultation on Climate and Security in the Caribbean: A Roadmap to Resilience' held in Aruba in December 2018. The resulting

document authored by the Caribbean Disaster Emergency Management Agency (CDEMA) (2018) shows that the consultation brought together key stakeholders working in the fields of climate change, disaster risk reduction and regional and human security in the Caribbean. It notes that climate change, development and security issues require long-term engagement and that building resilience should be a continuous, adaptive, participatory process. Stakeholders at the consultation agreed on key outcomes 'including strengthening regional coordination, improving capacity (including financial mechanisms) and enhancing knowledge on climate and security; advancing food and water security and renewable energy transition; and advocating for stronger political support' (ibid: 1).

4.3.2 The Sahel

The Sahel region featured in the Munich Security report (2019), which was released in support of the Munich Security Conference held in March 2019. The region's security importance is accentuated by its inclusion in EU and US regional security strategies. In the context of deteriorating security across the region, climate change and other aspects of human security including population growth and urbanisation are identified in the report as events that exacerbate vulnerabilities.

Human security and vulnerability are the focus of several articles on the Sahel. Sartori and Fattibene (2019) provide an overview of regional climate change impacts across three dimensions of human security: environmental, economic and humanitarian. The authors note that all three have the potential to undermine human security, with factors such as poverty, hunger and underdevelopment all present in the Sahel. They note that 'from a security point of view, the Sahel is a laboratory of old and new forms of wars, violence and political conflict in which the boundaries between what is local and global, domestic and international, military and civilian, political and identitarian are blurred' (ibid: 1–2). The authors outline factors that contribute to fragility in the region and summarise important short-term and long-term priorities. In the short term, Sartori and Fattibene highlight the need to increase capacity for swift on-the-ground humanitarian intervention. Regarding the longer-term, the authors highlight priority action areas that involve cooperation across various scales of governance:

- addressing administrative, human and financial capacity issues
- enhancing agricultural resilience to prolonged external shocks
- addressing underdevelopment, particularly across the infrastructure sector
- striving for greater integration of regional efforts.

Mbaye and Bello (2019) make a case for the capacity of local institutions to mitigate climate-related conflict in the Sahel. The authors base their argument on the results of research on farmer-herder conflict in Niger, which illustrate that greater decentralisation of governance can be more effective in conflict mitigation than formal institutions of central government and relevant bodies. Local institutions gain results because, unlike central government (which is often overregulated and corrupt), they are trusted and respected by local populations. Mbaye and Bello maintain that 'as climate change puts more pressure on already fragile areas in the Sahel, it will become ever more important to find ways to nurture cooperation and peaceful resolutions to disputes over resources' (ibid: 63).

4.3.3 The Middle East

The Middle East has been another region of focus within the literature reviewed in this scan. A report by Eco Peace Middle East (2019) presents the outcomes of a series of regional and national roundtables in the Middle East, addressing the consequences of climate change on water security and regional and national security for Jordan, Palestine and Israel. The report outlines climate change effects on the broader Middle East and North Africa (MENA) region, before analysing the connection between climate change and security, including linkages between water, food and energy security and their implications for national and regional security. Eco Peace Middle East argues that there has been little effort to develop a regional response to climate related security risks, because

the three countries have not yet recognised the implications of climate change for their national security and that of their neighbours. Furthermore, existing bilateral agreements are insufficient to address climate-change related events. However, the security implications of climate change can be severe in an already politically volatile region. The authors propose five policy recommendations to address regional vulnerabilities to climate change, including settling natural water allocation between Israel and Palestine and promoting regional approaches to address climate change impacts.

In a report examining the destruction of the rural environment by the armed group Islamic State (IS) and its subsequent impact on people living off the land in Iraq, Amnesty International (2018) finds that the armed group often deliberately destroyed means of rural livelihoods, such as irrigation wells, orchards and electricity lines. The country is acutely vulnerable to extreme weather events, having experienced several severe droughts over the past few decades, and climate change will worsen the situation through reduction in annual precipitation. Considering the circumstances of IS's rise – the group used the plight of poor people in rural areas to win support – and the 'jobless and insecure vacuum that IS left behind' (ibid: 10), this situation could repeat itself without the proper rural reconstruction that has been identified as a key priority by Amnesty International (though the government of Iraq has not yet acted on this). In conclusion, Amnesty International advances a set of recommendations to the Government of Iraq, its Ministry of Agriculture and donors, stating support for the government and the UN Investigative Team. This includes creating favourable conditions for agriculture for farmers, including access to water resources.

4.3.4 Asia

Literature on Asia in this review spans a wide range of geographical areas. Montesclaros (2018) focuses on the Mekong sub-region of Cambodia, Laos, Myanmar and Vietnam, and argues that these countries are acutely vulnerable to food security issues associated with climate change. All four countries depend on agriculture for employment and income and have low capacity to purchase food when disruption to harvests occurs. Montescarlos highlights the potential of private investors to provide early warning technologies instead of adding these as cost-items in government budgets. The author points to existing good practice examples, such as Vietnam's decision to allow entry of a company producing drones that can spray pesticides over large areas in the country and Myanmar's regulation on drone registration and safe use: mutual learning opportunities that could ultimately enhance regional agricultural resilience and food security.

The Asian NGO Coalition for Agrarian Reform and Rural Development (ANGOC) (2019) has monitored land conflicts in six Asian countries, including Indonesia, India, Nepal, the Philippines, Bangladesh and Cambodia. Though the study did not specifically assess land conflicts and internal displacement associated with impacts of climate change, the resulting report acknowledges that climate change adds pressure on the inadequate land tenure systems in the six countries. In Bangladesh, for instance, climate change is an emerging issue that contributes to land and resource conflicts. Based on their analysis of drivers of conflicts and existing institutional arrangements to resolve these, ANGOC advances recommendations for relevant stakeholders, including governments and businesses, to resolve existing conflicts and minimise future land-related conflicts.

Price (2019) examines the current state of knowledge about the links between climate change and conflict in Afghanistan and a selection of other countries where such links have been reported, including Kenya, Iraq and Somalia. The author finds that although literature on the topic has been growing, it is still geographically biased towards certain areas – specifically the Sahel and East Africa – and that more research is necessary to examine the links between climate change and conflict in other locations, including Afghanistan.

In an article examining the status of urban wetlands, Kaul and Kumar (2018) take stock of restoration measures underway and future challenges in India. Kaul and Kumar contend that wetlands in the country face continued

degradation which has serious implications for water security. They argue that urbanisation is an engine of India's economic growth, and 'healthy wetlands play a crucial role in making cities and towns liveable' (ibid: 3). With most climate change impacts in India anticipated to be water-mediated and given that decreasing wetlands are leading to increasing water conflict in the cities, Kaul and Kumar argue that 'the role of wetlands in climate change demands urgent attention and integration in the mitigation and adaptation strategies' (ibid: 8).

4.4 'Double vulnerability' and displaced populations

Summary
Several studies in the grey literature explore the links between climate change and conflict, and the potential role of humanitarian actors in responding to this double vulnerability. Issues addressed in this area included cross-border movements from Somalia and Haiti into Kenya and Ethiopia and Brazil and Mexico respectively; the intersection of climate change and instability in sub-Saharan Africa, the Levant and the Pacific; and displacement in the context of slow-onset events, and the effects on conflict dynamics.

Peters et al. (2019) examine the potential role for humanitarian actors to address the climate change-conflict nexus. The authors argue that many populations in conflict areas are also exposed to climate change, thus living in the context of 'double vulnerability'. In order to provide at-risk populations with the required support to deal with climate change and variability, scaled-up climate adaptation action is needed in fragile and conflict settings. However, Peters et al. also note that 'this has been hard to put into practice, certainly for climate action' (ibid: 13). The authors therefore suggest that humanitarian delivery mechanisms could be deployed to support people facing climate risks, including those in conflict contexts. Given the urgency of the challenges associated with climate risks, Peters et al. call on humanitarian actors to assess their mission and mandate 'alongside a practical and grounded assessment of what adaptation and resilience mean in terms of operational practice in these highly challenging contexts' (ibid: 13).

Weerasinghe (2018) mentions evidence of 'cross-border movements in the context of conflict and/or violence' and 'disaster and/or the adverse effects of climate change (nexus dynamics)' (ibid: 1), but also argues there is limited research on the state practice of refugee-law-based international protections in such contexts. In an effort to address this knowledge gap, Weerasinghe examines responses to cross-border movement from Somalia and Haiti in four case study countries (namely, movement from Somalia into Kenya and Ethiopia, and movement from Haiti into Brazil and Mexico), presenting the climate-conflict nexus manifested in the 2010–2012 period. The nexus dynamics appear differently in the two countries of origin. In Somalia, pre-existing conflict (and response to it) arguably aggravated negative impacts of climate change and disaster during the period. Meanwhile, in Haiti, 'a disaster exacerbated pre-existing State fragility' (ibid: 2). Weerasinghe offers recommendations for United Nations High Commissioner for Refugees (UNHCR), states and others to help strengthen the implementation of refugee-law-based international protection in the context of climate change nexus dynamics.

Chin-Yee (2018) examines the intersection of climate change and instability among vulnerable populations in several case study areas, including sub-Saharan Africa, the Levant and the Pacific Islands. Chin-Yee also analyses the direction of future climate policies by examining existing climate policies in light of the Paris Agreement. The author demonstrates that multinational policy is crucial for the most vulnerable countries to address the domestic climate challenge, though national climate adaptation and mitigation policies will also be important.

In another publication reviewed in this scan, the Internal Displacement Monitoring Centre (IDMC) (2018) examines displacement in a changing climate, identifying four key ways this occurs in slow-onset events, which in some cases aggravate existing conflict

dynamics. Having identified knowledge gaps and research objectives, IDMC poses three questions for further investigation: unpacking the role of slow-onset events in triggering displacement, understanding the potential scale of displacement, and analysing displacement risk and policy responses. Acknowledging that drawing on cross-disciplinary expertise and research methods is crucial to address these complex questions, IDMC calls for new partners from across geographic areas – particularly Africa, the Americas, Asia and the Pacific – to embark on this ambitious research agenda.

4.5 Finance

Summary
The role of finance in addressing climate change impacts is also discussed. One report looked at how investors can integrate social impact and place-based financing into climate strategies, and areas where investors can contribute to a just transition. Other authors examine the possible role of China as a climate-responsible donor, particularly with regard to projects under the Belt and Road Initiative (BRI). An overview of adaptation financing in developing countries suggested several practical, short-term solutions to address knowledge gaps and increase investment, while also recognising that current levels of financing are insufficient.

4.5.1 Investor backed transitions, China's Belt and Road Initiative, and adaptive finance

The role of finance in addressing climate change impacts is discussed within the grey literature considered in this scan. For example, in a report looking at how investors can integrate social impact and place-based financing into climate strategies, Robins et al. (2019) present preliminary findings of a project with this aim in Yorkshire and the Humber, north England. The concept of a 'just transition' gained traction at the United Nations Climate Change Conference in 2018 (COP24), where the Silesia Declaration on the Just Transition, was adopted and supported by 53 countries, including the UK. With this in mind, Robins et al. identify five areas where investors can contribute to a just transition. These include:

- understanding the just transition
- sizing the scale of the challenge
- realising the impact on jobs for different sized companies
- appreciating different social and ethnic groups
- exploring the policy and market context
- identifying the areas for investor action
- setting out a checklist for further work.

Li and Ivleva (2019) turn our attention to climate financing by examining the possible role of China as a new climate-responsible donor. The authors highlight the strong role of fossil fuels in Chinese overseas energy investments, focusing on the high-carbon emitting projects that form part of the BRI. They also consider financial decision-making, zooming in on the significance of the establishment of the China International Development Cooperation Agency (CIDCA) in consolidating China's foreign aid agenda.

Li and Ivleva also outline opportunities for action from both Chinese and EU perspectives. From a Chinese perspective, they argue that green investments would support China's foreign policy agenda and that China itself would benefit from such investments through the BRI and improve its international position by adopting best practices in multilateral finance. From a European perspective, the authors highlight that understanding the geopolitical, environmental and social impact of China's overseas funding is crucial for pursuing European international priorities and realising the goals of the Paris Agreement in the BRI countries where China engages. They argue that engagement with CIDCA and other Chinese actors is vital in the promotion of European energy and the climate agenda, as well as best practices in multilateral finance.

Micale et al. (2018) provide an overview of the current state of adaptation climate finance in developing countries and suggest several practical, near-term solutions to address knowledge gaps and increase investment. The authors recognise

that the scale of current climate adaptation financing is insufficient to avoid the impacts of natural hazards triggered by climate change. Along with this, the definition of adaptation financing and measuring mechanisms remain elusive. Micale et al. recognise several, already identified, barriers that reduce adaptation efforts among both private and public investors. These include business model, context and internal capacity barriers and the authors point to specific solutions to address these impediments to investment. Micale et al. suggest some areas where developing country governments can facilitate adaptation financing, such as integrating adaptation within existing national planning and evaluation systems and assessing climate risk threats to sovereign debt, among others.

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 December 2018 and 31 March 2019. 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 our sourced literature has come from the designated scan period, except journal articles without a clear publication month but published in 2018 and 2019. 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.

5.2 Advancing theory and methods in climate security research

Summary
Several scholars analysed trends in research related to climate security, noting the predominance of quantitative analysis producing ambiguous and sometimes contradictory results. Other limitations highlighted include highly aggregated datasets, limited synthetic analysis and insufficient knowledge accumulation. There is also little consensus about the specific role of climate change in conflict risk. One case that has received particular interest within climate-security research is the conflict in Syria, with extensive research on the drought of 2006–2009. Here again, however, the scholarship is found to be inconclusive, and there is disagreement within the literature about the extent to which urban migration induced by the drought may have contributed to the subsequent conflict.

5.2.1 The state of the field

Reflecting on the current field of research related to climate security, several scholars have analysed trends and findings, and suggested directions for further study. Busby (2018) notes that studies on climate and security have predominantly used quantitative analysis, with ambiguous and sometimes contradictory results, and highlights that earlier literature has attempted to identify whether and how climate change is directly associated with violent conflict. Out of this debate, the author identifies key pathways of indirect or mediating factors for further consideration. For example, agricultural production may lower the opportunity costs of rebellion and food price spikes might cause grievances. Slowed economic growth may lower opportunity costs to violence, while also undermining state capacity to suppress it. Migration may also have an indirect link, potentially bringing conflict over limited resources, though Busby suggests such findings are largely inconclusive. Research on disasters has found disaster events may impact on economic growth, aggravate grievances between groups or, in some instances, contribute to peace. For example, if groups cooperate to survive a disaster or if a rebel group is weakened, inhibiting their ability to continue fighting. Additionally, international and domestic institutions may affect conflict onset depending on, for example, the distribution of services. It is also possible that institutions could mediate conflict by facilitating dispute resolution. Busby calls for more qualitative work, a focus on different security outcomes and for scholars to examine initiatives and factors that may 'dampen' conflict.

Gilmore et al. (2018) introduce a series of papers following a March 2018 workshop with experts from research and policy in the field of climate and conflict. Reflecting on this workshop, Gilmore et al. stress the need to complement quantitative studies with narratives and examples, suggesting a mixed method approach could be used to examine complex contextual factors. A shift to investigating policies and interventions for effectiveness in peace-building is also recommended. In this vein, Gilmore et al. propose that scholars and practitioners could conduct work in a more collaborative manner across disciplines. Finally, they contend that researchers could work to create models that help predict the onset and evolution of conflicts. Such predictive tools could be useful for decision-makers. Together, these approaches are encouraged to make research more readily accessible for policy. Although Gilmore et al. cite a continued lack of consensus in the field of climate security research, they encourage colleagues to see it as a reason for further research, rather than a deterrence or barrier.

In a review paper, Schweizer (2019) discusses how social science research on climate and conflict has suffered from a reliance on highly aggregated datasets, limited synthetic analysis and insufficient knowledge accumulation. There is relative agreement that heightened tensions are more likely in places that experience vulnerability to climate change along with poor adaptive capacities and existing conflict dynamics, such as high levels of inequality. Beyond this, Schweizer finds little consensus about the role of

climate change in conflict risk. To advance the field, Schweizer suggests combining climatic and socioeconomic study designs. This alternative approach would enable researchers to quantify a range of conflict outcomes in the context of climate change. The author contends that the field could benefit from system-theoretical modelling. This could include both quantitative and qualitative hypotheses and be flexible enough to include socioeconomic conditions and climate factors, to examine complex causal relationships. Schweizer suggests such approaches could address gaps and advance knowledge accumulation in climate security research.

5.2.2 Climate impacts on human security

One case that has received particular interest within climate security research is the conflict in Syria. Research on the drought of 2006–2009 has proliferated. This event preceded the most recent conflict, which started with protests in 2011. Ide (2018) reviews existing literature and finds that common arguments orientate around the notion that the severity of the drought resulted from climate change and negatively impacted livelihoods linked to the agricultural sector. This loss of livelihoods contributed to mass migration from rural to urban areas, which may have aggravated existing challenges of social service provision and availability of resources. Ide contributes to this debate, concluding that neither political and economic impacts nor impacts of the drought on agricultural incomes are understood well enough to be conclusive. For example, it is contested whether or how migration may have contributed to the protests or the civil war. Ide highlights that the Syria case illustrates shortcomings in this field of research. Principally, the author notes a lack of strong theory and few mixed methods studies that utilise quantitative and qualitative studies.

Miles-Novelo and Anderson (2019) offer a physiological and psychological perspective in examining the effect of climate change on violence. Reviewing existing research, they highlight three pathways through which rapid global warming might contribute to aggression and violence. First, there is the idea that hot temperatures are linked to an increase in aggressive thoughts or irritability, which can lead to an escalation of violence. Second, it is thought that climate change can impact children's development, making them more prone to violence through indirect pathways such as exposure to violence, food insecurity or economic deprivation. Finally, there is a proposition that migration associated with climate change could lead to tensions or violence between host and newcomer groups. Miles-Novelo and Anderson suggest that although climate may play a minor role compared to other factors precipitating conflict, it does impact individual and intergroup violence. They reason that as the effects of climate change become more severe, these conditions will be exacerbated.

5.3 Shifting boundaries and transitioning systems

Summary
Several studies reflect on the effects of climate change in changing landscapes as well as boundaries, with a particular focus on the governance of resources and shipping routes in the Arctic, where several countries have made claims for expanded territory. Other work examines river basins affected by climate change to explore whether areas governed by treaties are more or less likely to experience cooperation or conflict, and looks at how human and natural factors impact river systems over time.

Climate change adaptation and mitigation projects have been hailed for their potential to combat the negative impacts of climate change, but also criticised for their potentially negative or maladaptive impacts. One study in Cambodia found that climate change adaptation and mitigation projects actually undermined biodiversity, livelihoods and forest resources. Building on previous scholarship, other work looked critically at the Reducing Emissions from Deforestation and Forest Degradation (REDD+) programme, arguing that its planning and implementation had insufficiently considered smallholder farmers' interests or provided adequate compensation for lost agricultural outputs and reductions in the use of forest resources.

A set of articles highlight the importance of an international political economy perspective in discussing rising energy demands. The limited scholarship in this area has focused primarily on oil, rather than other forms of energy, and focuses on national governments, inter-governmental organisations and transnational corporations as the only actors in the energy sector at the expense of other actors, including local governments. Other work on this theme explores the political economy of various energy alternatives to fossil fuels, including hydropower, biofuel, biochar and nuclear.

5.3.1 Politics and conflict in climate-affected landscapes

The effects of climate change are already changing landscapes as well as boundaries, and will continue to do so, with potential geopolitical impacts. Aleskerov and Shvydun (2019) consider how the melting of Arctic ice impacts country boundaries. This threat has altered the accessibility of oil, gas and fish resources and opened shipping routes in the Arctic region. This changing landscape also presents potential for conflict between countries over demarcation of continental shelves under the Arctic Ocean. Governance in the Artic is determined by the eight Arctic countries that govern the region, under domestic laws as well as in accordance with the United Nations Convention on the Law of the Sea. Several countries have already made claims for expanded territory, and Aleskerov and Shvydun present a model for territory allocation that accounts for country preferences for main resources. They discuss dividing territories by single ownership or sharing them between countries and suggest two methods: one based on the proximity of a country to the territory in question and another based on country satisfaction. The latter considers whether countries are satisfied with the proposed allocation by comparing the utility of the areas allocated to a given country with the utility of non-allocated areas. The authors present this model as a tool to ease negotiations and improve efficient allocation of Arctic territory. The model aims to achieve territory allocation that is fair and satisfactory to as many parties as possible, thereby minimising potential conflict.

Dinar et al. (2019) have contributed to research on the link between water variability and conflict. Their study examined river basins affected by climate change to explore whether areas governed by treaties are more or less likely to experience cooperation or conflict. Using a large sample, the authors found mixed results, with limited evidence to support the claim that treaties promote cooperation between states. This improved when river basins were governed by multiple successive treaties. Dinar et al. suggest this could be the result of successive treaties addressing the shortcomings of the previous treaty. Furthermore, their results do not

support the argument that treaties reduce the risk of conflict. Noting nuance in their results, the authors caution against aggregating conflict and cooperation measurements, indicating that doing so might lead to misunderstandings about hydropolitics. Moreover, they point to contextual factors as key to understanding hydropolitical dynamics. For instance, when a river basin is more important to one country than the other in a given dyad, there is likely to be more conflict and less cooperation. Interestingly, the authors find that democratic states are associated with less cooperation, offering the explanation that democratic states may possess other avenues of regional cooperation that fall outside formal treaties governing river basins.

Macklin and Lewin (2019) consider the impact of human and non-human factors on river systems. They illustrate how landcover and cultivation practices have shaped rivers, changing sedimentation and human activity over time. Land management – as well as urbanisation, industrialisation, engineering of waterways, waste dispersal, mineral extraction and other human activities – have impacted river systems on a global scale across a long timeline. Meanwhile, hydroclimatic events such as floods or droughts have also changed river channels over time. Macklin and Lewin find that societies along rivers have generally been resilient throughout history, with differing responses to hydroclimatic shocks depending on factors such as engineering solutions or population growth. In a future of increasing climate stress on river systems, it is likely that societies will face great challenges to resilience. In addressing this future, the authors stress that climate impacts on river systems cannot be understood without accounting for the global histories of both the human and natural impacts that have shaped rivers to be as they are today. Understanding rivers in this way requires extended timelines and contextual models to account for a system's evolution.

5.3.2 Local dynamics of climate change adaptation and mitigation

Climate change adaptation and mitigation projects have been hailed for their potential to combat the negative impacts of climate change, but also noted for having potentially negative or maladaptive impacts. Examining three climate change adaptation and mitigation projects in Cambodia, Work et al. (2019) find conflicts across all three of the projects they analysed and reveal maladaptive results for physical, biological and cultural phenomena. Conflicts, including violence but also other visible actions taken against the projects, were found in response to power imbalances, inequitable distribution, improper procedures and failure to recognise community land use. Moreover, Work et al. suggest that the projects were merely framed as addressing climate change, and differed little from development initiatives. In execution, the project implementers disregarded safeguards such as monitoring, information sharing, community consultations or fair compensation. For example, monocrop planting in the name of climate change adaptation and mitigation replaced streams and existing forest areas. This undermined biodiversity, local livelihoods and local forest protections to the benefit of government ministries, companies and international nongovernmental organisations (INGOs) implementing the project. Work et al. highlight the pitfalls of overly optimistic or simplified climate change adaptation and mitigation, which could mean falling into development traps to the detriment of local communities.

A major climate change adaptation and mitigation mechanism is Reducing Emissions from Deforestation and Forest Degradation (REDD+) programming, including conservation and enhancement of forest carbon stocks and sustainable forest management. Duker et al. build on previous scholarship criticising these programmes for insufficiently including smallholder farmers' interests in plans and implementation. The authors focus on two case studies in Ethiopia and Indonesia that aim to address villager-driven deforestation. The REDD+ projects incentivise communities to conserve forests primarily through carbon credit income. Duker et al. have found that these incentives do not sufficiently compensate for lost agricultural outputs and forest use. Moreover, their research has indicated that funding is insecure and suggest that if deforestation reverses, benefits may no longer be attractive for buyers. Selection of participants

who receive REDD+ benefits is exclusive, as some villagers might be compensated for lost livelihood and land, while others are not. This could create potential tensions or trigger conflicts. Ultimately, this mismatch between farmers' needs and REDD+ outputs, as well as insecure and uneven benefits, has been found to lead to loss of livelihood and distrust or loss of interest from smallholder farmers towards the REDD+ projects.

5.3.3 A new political order in energy

Kuzemko et al. introduce a set of articles highlighting the importance of an international political economy perspective in the discussion of energy. As demand for energy continues to grow, a shift in global energy markets has led to utilisation of diverse sources, including both renewable and non-renewable energy sources. This diversification trend has meant changes in the geography of energy. For example, a shift to electrification has changed how energy is produced and transported. This has reshaped energy interests, with political impacts. Kuzemko et al. highlight that the limited existing scholarship in this field has focused primarily on oil, rather than other forms of energy. Governments, international governmental organisations and transnational corporations have been perceived as the only actors in the energy sector, and focus has been at the national level. The authors call for consideration of who energy systems serve and the greater number of actors in energy systems, as well as attention to dynamics at different levels, arguing that this enables better understanding of a) changes in energy systems and b) subsequent shifts in power relations between states and at a subnational scale between civil society and local authorities.

Contributing to the special issue, *New Directions in the IPE of Energy*, Kuzemko (2019) focuses on local dynamics of sustainable energy. World energy systems have increasingly included more renewables and enhanced storage technologies. With these changes, new actors have emerged, causing shifts in power dynamics. Kuzemko examines local governments as emerging actors in the sustainable energy sector. Contextual factors influence local governments' role in sustainable energy, such as personnel resources, learning and knowledge, financial resources, and private sector influence over public or decision-making autonomy in relation to national and global politics. Local governments also face obligations to ensure affordable and secure energy. Within this context, sustainable energy frontiers present great potential for local autonomy and action. The growing use and deployment of renewable energy supply has meant reduced costs, making these sources more accessible for local government actors. Renewables can also be generated at a smaller scale and dispersed more broadly, allowing for decentralised systems with potential to balance demand and generation in local energy markets. Kuzemko finds that local agency holds an important role in moving towards sustainability that is more equitable and inclusive.

Newell (2019) contributes another international political economy perspective to the journal's special issue on energy transitions. In response to human-induced climate change, a global transformation towards a low carbon economy is underway. Newell questions the links between power, production and order in this new global system. The actors who dominate and benefit from existing energy regimes also hold the power to address or reshape the system. Newell proposes that an international political economy lens could be applied to more critically question the role of governments as either progressive or regressive in energy transitions. From this point of departure, Newell suggests that new growth and investment in technology may take place without disrupting the existing system. Identifying this phenomenon as 'trasformismo,' the author examines how energy transitions may take place with limited means to reconfigure social and political power relations. The emerging global energy order, rather than becoming more inclusive, has merely led to a fragmenting and shifting of power. The author pushes for an understanding of how globalisation could create opportunities to destabilise the status quo, such as through the use of finance capital to accelerate energy transitions.

5.3.4 Energy markets to meet climate commitments

Hydropower development is most prominent in emerging economies. Polanco (2018) has analysed how this phenomenon is impacted by conflict, after conducting a case study in Colombia on hydropower in a context of violence. The author studied problems facing hydropower infrastructure already established in an area with little state presence, as well as high vulnerability within its population and rich natural resources. Polanco identified the dominant actors in this case as state organisations, the energy company and NGOs. For these actors, the environment was the most salient issue of concern, especially regarding the negative impacts of hydropower on downstream water flow. Challenges for the economy and society were also relevant. For example, the project created transportation problems, and these combined with relations between the local community, state organisations and the energy company. These occurred partly as a result of conflict, a lack of trust, economic opportunities and access to land for the local community members, and created challenges in project governance. Polanco concludes that, especially in the context of violence, hydropower projects could benefit from acknowledging and evaluating the impact of their management. Consideration for relationships, including equally distributing the costs and benefits among parties, could lend itself towards more sustainability.

Another renewable energy source emergent in global energy markets is biofuel. Samboko et al. (2019) consider biofuel production in southern Africa, where South Africa's plans for fuel blending will lead to regional demands for feedstocks and agricultural land. Facing constraints on their own land, the people of South Africa are likely to turn to more land-abundant countries such as Zambia for production. Samboko et al. observe that, despite promises of positive outcomes from such projects, biofuel production may have drawbacks for Zambia. The authors find that Zambia has adequate land, favourable water resources and close enough proximity to South Africa to be able to reasonably meet demands for biofuel projects. Furthermore, Zambia has an accommodating and attractive legal framework for agricultural development and investment, including for land acquisition. Drawing on evidence from similar projects, the authors suggest that, despite this, human displacement could be a major social impact and that processes to address social issues may not be in place or be adhered to. The biofuel projects could also aggravate food insecurity and provide little or no compensation for lost land. The authors conclude that, although parts of Zambia seem well suited for development of biofuel production, there is a risk that local households will be negatively impacted.

Shu (2019) presents biochar as an alternative for meeting energy demands and moving away from fossil fuels, suggesting it could also capture atmospheric CO^2 and address low soil carbon levels. Shu compares the costs and efficiency of different energy sources, outlining the benefits and drawbacks of certain systems. For example, Shu finds a strong case in favour of hydropower, but notes there is not enough global capacity to meet consumption demands. Wind and solar energy present challenges as intermittent sources of energy. The solution to this would be storage in batteries or conversion to another form of energy. However, batteries are expensive and highly toxic and corrosive, while storage of solar and wind energy as chemical energy or electricity are not economically viable options. Shu further notes that no countries are currently on track to sufficiently reduce emissions or to slow global warming. The author presents biochar as an alternative to address several of these challenges at once. Biochar would be produced by carbonising vegetation before it dies, helping to sequester CO^2 and thereby stabilise CO^2 levels. This biochar would then be buried in farm and ranch land, helping address low soil carbon and thereby increase soil productivity.

Thomas (2019) reviews the state of the nuclear energy sector. Light Water Reactor technology makes up the majority of power reactors globally. For decades, the US and UK have failed to deliver on promises of improved cost, safety and finance ability of Light Water Reactor designs. China and Russia, meanwhile, have emerged as the perceived future nuclear energy market suppliers for other countries. In light

of little independent authoritative information, Thomas considers the viability of this notion, demonstrating that Russia and China have largely failed to prove that their designs meet European or US regulation requirements. The author also argues that provision of financing is untested, costs may not necessarily be cheaper and government backing of the reactor sales is vulnerable to political changes. Moreover, China has had difficulty finding customers and Russia has struggled to scale-up production. Given these and other related findings, Thomas concludes it is unlikely that Russia and China will solve cost and construction uncertainties. Despite some governments' continued interest in pursuing this industry, Thomas finds this sector untenable and suggests that the existing Light Water Reactors in use today are unlikely to be replaced with improved designs after their lifetime.

5.4 International and national narratives on climate security

Summary
Other work during this period of the scan examines how US administrations have discussed climatic change in the public sphere, concluding that, under successive presidents, the focus has tended to be on the economy and national security, with the effects of climate change exacerbating political instability and turmoil. More broadly, states and international organisations often refer to climate change, security and maritime security in their political and governance agendas, though it was noted that research has yet to robustly establish links and dependencies between these issues.

5.4.1 State perspectives of environmental issues

In 2015, heavy precipitation overwhelmed the city of Alexandria's sewer and drainage systems, resulting in heavy flooding and the death of seven residents (Arefin, 2019). According to the Egyptian government, the floods were not caused by poor urban environmental governance or worsening climatic changes but were an act of terrorism. Drawing on geopolitical ecology, Arefin situates this study in urban political ecology, finding that repressive regimes can frame failures of urban environmental governance as terrorist acts, in order to further legitimise their administration. The Egyptian state described the 2015 flood disaster as a terrorist act, shifting blame away from its own government and further consolidating its rule. Arefin finds that Egypt has been neglectful of infrastructural development and investments in disaster preparedness. The author also indicates that the country has repressed environmental narratives in order to enhance the government's ability to dictate the causes and necessary responses to floods, as well as hide the impacts of governmental neglect regarding climate change in coastal cities.

Climate change represents a growing concern to society and the US presidency has long been at the centre of policy discussions and public discourse regarding the issue. Calderwood (2019) argues that it is essential to study how presidents have discussed climatic changes in the public sphere. In a content analysis study, the scholar examines invocations of climate change in the speeches of presidents George H. W. Bush, Bill Clinton, George W. Bush and Barack Obama. The author first identifies the three discursive approaches most likely to appear: a general environmental emphasis, foregrounding and sidestepping. Calderwood concludes that all presidents tend to focus on the economy and national security, and employ the foregrounding technique. Foregrounding occurs when a speaker shifts an audience's attention toward a specific interpretation of an issue to prevent other explanations from entering public debate. In addition, and more specifically, Democrats are more likely to apply a general environmental emphasis, while Republicans are more likely to sidestep the issue of climate change (or shift the discussion to different content that they are more confident and comfortable discussing).

Also examining the US standpoint in the public sphere, Burke (2018) analyses the first year and half of Trump's administration and the issues that have emerged in the national security system. In comparison to the previous

administration, where the National Security Strategy Report from 2015 considered climate change and the effects of global warming as a new national security threat, Trump took a sharp turn, arguing that in order to lift people out of poverty, developing countries will need to rely on fossil fuels and other sources of energy. In addition, the 2015 National Security Strategy Report also endorsed the Paris Climate Accords, which the Trump administration rejected, claiming that it compromises the sovereignty of American citizens. The study further invites examination of the advisory system and personnel that are responsible for addressing and responding to the challenges as well as how this approach relates to Trump's own personal method as a decision-maker.

Further focusing on state narratives of environmental issues, La Shier and Stanish (2019) reveal that in 2010 the US Department of Defence officially recognised climate change as an important factor that will shape the future security environment and therefore its national security planning. The Department of Defence recognised that even though climate change in itself does not cause conflict, the phenomenon can exacerbate political instability and turmoil, further challenging the US response to extreme weather events, delivering humanitarian assistance and preserving national security. The authors argue that, to address these issues, executive agencies and the Congress will have to support the current development and implementation of policies to reduce the military's greenhouse gas emissions, but also adapt its facilities, personnel and missions for the rising challenge of climate change. According to La Shier and Stanish, even though the Department of Defence has demonstrated willingness and capacity to address the issue, further collaboration is needed between entities such as local communities, civil society organisations, scientists and foreign governments.

5.4.2 Climate change and international organisations

States and international organisations often refer to climate change and security, and maritime security in their political and governance agendas. However, research has yet to robustly establish interlinkages and dependencies between the two issues. In a study employing the corpus linguistic method, Germond and Ha (2019) use the International Maritime Organization's public documents as a case study to explore the narrative linking climate change impacts and the occurrence of maritime criminality. The International Maritime Organization has been selected by the authors due to its high profile as a leading international institution that deals with maritime affairs, and its interests and competencies in both climate change at sea and in maritime security issues. While the authors note that there is little in the way of a narrative connecting the two issues, textual data from their study shows a direct relationship between climate change and migration, and migration and maritime security, indicating an indirect linkage between the two main phenomena. Germond and Ha suggest that, for academics, these findings provide an opportunity to further conceptualise the dependencies between climate change and maritime security and to quantify the synergies between them. Practitioners can also benefit from such scientific advances and contribute to further exploring the interlinkages between climate change and maritime security.

From another international standpoint, Krampe and Mobjörk (2018) show new approaches for dealing with climate-related security risks in four regional intergovernmental organisations in Asia and Africa, including the Association of Southeast Asian Nations – ASEAN (South East Asia), South Asian Association for Regional Cooperation – SAARC (South Asia), Economic Community of West African States – ECOWAS (West Africa) and Intergovernmental Authority on Development – IGAD (East Africa). Considering that climatic changes do not follow national borders, but are transnational, security risks can go beyond the responsibility and ability of national governments. As a result, regional as well as global intergovernmental organisations are starting to play an increasingly important role in mitigating and adapting to climate-related security issues. Along those lines, the authors argue that more attention is needed not only to Western-based intergovernmental organisations, which has been a common practice so far, but also to regional organisations based in fragile

and developing countries, in order to acquire a more holistic understanding of the emerging challenges. Krampe and Mobjörk show that the regional security context and vulnerability to climate change highly determines the way in which climate-related security risks are framed, along with any thematic focus, such as disaster management and food security. Their findings also suggest that, as opposed to the state security-focused perspective of Western regional intergovernmental organisations, the risks identified by their counterparts in Asia and Africa often relate to livelihood conditions and development, in agreement with regional understandings of peace and security.

On the topic of regional organisations, an article by Dupont (2019) explores the role the EU has played in championing the case of climate security. By analysing speech acts and policy action Dupont (2019) describes how the EU has become a 'collective agent of securitisation', with this culminating in a new 'securitised status quo' being reached in the mid to late 2000s, when climate change was placed firmly on the security agenda of the EU. Dupont notes that there has been an increasing securitising of climate change since the early 1990s, a dynamic that accelerated in the early 2000s. This was marked by a process of securitised speech acts, followed by policy outputs. Dupont argues that the acceleration was influenced by a 'preceptory event' in the form of the US decision to withdraw from the Kyoto agreement. This is said to have forced the EU to take on more of a leadership role.

It is this form of event that may provide the catalyst to overcome what Dupont sees as a stagnation in the 'securitised status quo', where policy ambition has failed to keep up with the discourse around climate security. Dupont explains that events such as the global financial crisis, conflict, migration, terrorism and internal factions within the EU have all resulted in a 'crowded policy space'. However, Dupont argues that the decision by the US to withdraw from the Paris Agreement could again 'invigorate securitisation moves towards a new status quo' (ibid: 385). Dupont argues that this kind of process offers an area of further research, in a bid to fully understand how these types of events spur these kinds of reactions.

Analysing familiar territory, an article by Conca (2019) explores what role there is for the UNSC in the fight against climate change. The article notes that, while the UNSC has debated climate change for over 10 years – often meeting resistance from selected UN members – this has yet to result in any significant action. However, the question of what role the UNSC can play is again being asked in light of recent developments, such as those taken by non-permanent members to raise the issue as part of their elected mandates, and the creation of the Group of Friends on Climate Security. Issues remain regarding the current state of research focused on the role climate change plays in relation to conflict, with Conca highlighting both inconclusive evidence and biases as obstacles. Concerns have also been raised regarding whether climate change fits within the mandate of the UNSC, and concerns from developing countries about issues of sovereignty and non-intervention. Other questions have focused on the council's ability to respond to issues that require a 'system wide response', in a UN system defined as a 'politically fractious bureaucratic landscape, marked by rivalries and turf wars among specialised agencies, funds and programmes' (ibid: 10).

Conca provides examples of progress, which include discussions about a Special Representative on Climate Security under the office of the UN Secretary General, which could help combat objections concerned with the extension of the UNSC mandate. In addition, discussions about the security implications of climate change have moved on from generalised statements to include discussions of 'tangible assessments' in both conflict and post-conflict environments, such as UNSC resolutions on Lake Chad. However, Conca concludes that the politically charged atmosphere underpinning major power relations means that the likelihood of the UNSC moving forward on the issue as 'one' might be optimistic. That said, Conca argues that, historically, the council has found innovative ways of adapting to the global context, which includes peacekeeping during the Cold War, and the new security landscape that defines the post 9-11 era.

5.5 Environmental security and natural resource management

Summary
Several scholars address the complex and interlinked security risks that climate change and climate variability could pose. The literature argues that state-centric approaches are insufficient to explain current insecurities linked to environmental change, while also calling for enhanced regional and international responsibility and collaboration, including from the perspective of international law. In terms of natural resource management, articles reviewed here address fisheries and water management, and look at the crucial role played by local actors and communities in climate change adaptation and risk reduction projects. One ethnographic evaluation in rural areas of Malawi demonstrates the need for a more complex understanding of the relationship between elites and communities. Another article looks at the changing roles and realities of pastoralist communities in the Horn of Africa and the Sahel to argue that, despite facing many challenges, pastoralism has great transformative potential, and that greater efforts should be made to harness this.

Conflicts over natural resource management are expected to escalate as climate change impacts coincide with socioeconomic changes; Nepal in particular is noted as one of the most climate vulnerable countries in the world. The Adaptive Learning and Deliberation approach adopted in the country is regarded in the literature as having seen a high degree of success, though it will need to be reframed and adapted before being applied to other contexts. For example, it may not be feasible in highly sensitive areas where open discussion and critical enquiry are not part of the political culture. Other research on local collective action over natural resources in Bangladesh and Nepal shows how many natural resource conflicts can be resolved through enhanced cooperation.

5.5.1 Environmental security and international and regional cooperation

Climate change and climate variability could pose new complex and interlinked security risks in contrast to traditional security approaches centred on state and military security. Narwaria (2019) argues that state-centric approaches are insufficient to explain current insecurities linked to environmental change and livelihood strategies of humans at a local level, as well as the broader impact of environmental changes on societies. In line with previous research, Narwaria suggests an environmental security framework based on the interlinkages between ecological and human domains is required to better explain current security risks. Narwaria provides examples from South Asia, especially Bangladesh and India. Both countries face similar environmental challenges, such as direct threats to biodiversity, air-pollution, vulnerability to floods, cyclones, riverbank erosions and other disasters. These risks are interlinked with intrastate migration, infrastructure deficiencies and poverty. Narwaria calls for holistic responses to these intertwined security risks, which would benefit from improved regional collaborative strategies and solutions. In addition, advances in regional cooperation could help support sustainable development strategies, knowledge sharing, regional disaster management systems and improved data collection.

There is a call for enhanced regional and international responsibility and collaboration to address climate change. Nollkaemper (2018) examines international collaboration and the duality of shared responsibility from the perspective of international law. The author argues that shared responsibility is key to providing good governance of climate change, conservation of natural resources and peace-keeping. However, less attention is devoted to the implications of the notion of shared responsibility. Nollkaemper finds if this is not regulated, it can lead to a diffusion of responsibility that can undermine the effectiveness of global governance and generate new sets of responsibility gaps. This is so in three respects. First, it can complicate the assessment of accountability of public authority. Second, it can adversely affect protection of the rights

of injured parties. Third, diffusion can also undermine incentives for individual actors' performance of obligations and therefore the achievement of set objectives. Nollkaemper argues that it is particularly important to take the latter into account when addressing transborder problems such as climate change. In turn, this makes it important to both understand the reasons for diffusion of responsibility and to strengthen tools and principles in international law that can help mitigate adverse effects. Nollkaemper puts forward three principles to address this: the principle of shared responsibility for the same wrongful act, shared responsibility based on cumulation, and responsibility based on participation in concerted action.

5.5.2 Sustainability related to fisheries and water management

Sustainable natural resource management is crucial to ensure livelihood and food security. Plagányi (2019) addresses current knowledge on assessments and the sustainable productivity of fisheries. The productivity of fisheries has already globally declined by 4.1% between 1930–2010, with some regions more affected than others. In addition, climate change is likely to reduce the yield and alter the composition of fisheries even further. Plagányi states that it is necessary to improve the accuracy of current assessments and future projections model assessments of climate impacts on global food production. Such assessments should include region-specific projection models and stock assessment meta-analyses that account for model assumptions, uncertainties and biases. As a complement to model assessments of fisheries' productivity and to ensure future sustainable fisheries, Plagányi (2019) advocates for sustainable resource management strategies that are context-specific, along with risk-based management policies that can, for example, prevent overfishing.

Historically investigating Iran's water management strategies, Saataz (2019) teases out lessons learned, wrongdoings and positive aspects of sustainable water managements in different time periods, uncovering a record of sustainable water management and development practices of water resources. Nonetheless, Saataz is concerned about the many water related issues the country is currently facing, such as water shortage, groundwater over-extraction and water quality deterioration. To some extent, current water insecurities can be traced back to earlier water policy implementations. Saataz contends that, if we are to learn from past wrongdoings and minimise future water stress, there is a need for sustainable water management policies to account for health, environmental, climatological, financial, technical, political, social and cultural circumstances. Finally, Saataz (2019) acknowledges the importance of learning from and protecting traditional water management practices, balancing top-down decision making with:

- contextual understanding and respect for local communities
- improving methods to monitor and assess water management projects prior to implementation
- developing rigorous data on water resources.

5.5.3 Resilience and complexities: the role of context, local leaders and traditional communities

In addition to designing sustainable resource management strategies, actors and communities play important roles in the implementation process. Kita (2019) looks into the role of local elites, specifically the institution of chieftaincy in Malawi, in climate change adaptation and disaster risk reduction projects. Through ethnographic evaluations conducted in rural districts in Malawi, Kita finds that neither co-opting nor countering chiefs in the implementation of disaster risk reduction or climate change adaptation projects prevent elite capture or influence. Further, Kita (2019) finds that elite capture of communal resources is not in itself problematic for a fair distribution of these resources to communities. For example, in disaster risk reduction projects where chiefs were co-opted out of the official distribution of food aid, they still administered a re-distribution of those resources. In some projects, this led to further marginalisation of vulnerable community groups. However, in other cases, chiefs re-distributed aid throughout the whole community, where the resilience strategy and

culture was already embedded. Meanwhile, Kita (2019) demonstrates the need for a more complex understanding of the relationship between elites and communities, highlighting the following important factors of influence when it comes to the outcome of disaster risk reduction and climate change adaptation projects:

- the personalities of community chiefs
- elite-communal relations
- power-dynamics between elites
- communal agency and resilience.

Addressing traditional groups' vulnerability, agency and resilience to climate change and conflict, an article from *Population and Development Review* (Anon, 2018) looks at the changing roles and realities of pastoralist communities in the horn of Africa and the Sahel. Pastoralists' livelihoods have already been affected by climate variability and change, as well as by conflicts and other insecurities. They are often portrayed as vulnerable and conflict prone. Nevertheless, this particular document provides a more complex and diverse image of pastoralists and stresses the need to address their coping strategies within a modern and globalised world. For example, some pastoralists have developed resilient and peaceful adaptive strategies to climate change, such as combining traditional livestock husbandry with farming, or urban settlements with traditional migration routes. Other examples of adaptive strategies involve complex security risks both faced by pastoralists (and, at times, produced by them). These include increased violent pastoral-farmer conflicts and the influence and presence of transnational jihadist groups in pastoralist areas. Groups such as Al Shabaab and Boko Haram often take advantage of the widespread poverty and relative absence of state authorities in pastoralist areas in order to recruit members and/or launch attacks on security forces and civilians. Further, this document provides evidence of increased activities of a small section of this group known as 'new fringe pastoralists', who engage in behaviour such as human and drug trafficking. Nevertheless, this article argues that, despite not being free from challenges, pastoralism generally has great transformative potential and more efforts should be made to harness this. The article goes on to highlight the need for specific policies and strategies that aim to integrate pastoralists into national, regional and international value chains.

The preceding articles in this section provide examples of the importance of complex and contextual ways of understanding local realities. Conversely, Appiah (2019) addresses the levels of policy implementation ambivalence related to the achievement of SDG 13 regarding urgent and ambitious climate action, in Sub-Saharan Africa. Through a systematic review of secondary data on sub-Saharan Africa and particularly Ghana, Appiah identifies a gap between research outputs and recommendations, and policy implementation of climate change mitigation and adaptation strategies. Appiah (2019) finds that current research provides data offering the necessary strong support and justification for nations to implement climate-smart strategies to tackle food insecurities in the region, such as:

- provision of irrigation systems
- cultivating drought resistant crops
- diversifying crops
- education
- and information sharing with farmers.

However, concerned institutions and agencies (local and national) have been lagging behind in the implementation of climate-smart strategies.

5.5.4 Food security, land tenure and conflict

Departing from previous studies focusing on the effects of food security on the outbreak of conflict, Ujunwa et al. (2019) examine the effects of conflict intensity on food security in West Africa. By using annualised panel data (2005–2015) on conflict intensity and food production (specifically of crops, forestry and livestock), Ujunwa et al. find that increased conflict intensity has a significant negative effect on food production. The results also indicate that present and past conflict intensities could lead to food insecurity in West Africa. Finally, Ujunwa et al. highlight the need for policies on food security to incorporate analysis and responses geared towards minimising the effects of violent conflicts on food production.

Meanwhile, Safarzynska (2018) finds that common pool resource research has paid little attention to the impact of uncertainty on intergroup conflicts over resources. To address this gap, this author uses an experimental design with 288 students in Warsaw and Vienna, to test the causal relationship between resource uncertainty, intergroup conflict and intragroup cooperation in common-pool resource dilemmas. The design considers conflicts produced by greed and specifically focuses on the probability of intergroup conflicts over resources. They examine how harvesting from the common pool of renewable resources was affected by 1) resource uncertainty (shocks destroying part of resources) and 2) intergroup conflict. The results reveal that resource uncertainty can ignite intergroup conflicts over resources. Further, the danger of sudden resource depletion encourages resource conservation. As a general rule, Safarzynska finds that while conflict can promote intragroup cooperation, this is dependent on past conflicts. In the event of a victory, groups appear to harvest more. Meanwhile, groups tend to reduce resource extraction in the aftermath of a defeat. Safarzynska stresses the need for more research on common pool resources in relation to climate change and conflict.

Finally, Froese and Schilling (2019) review current research on climate change and conflict in the context of altered resources of land. Specific attention is given to the indirect effects caused by climate change adaptation and mitigation projects. Findings suggest that the influence of climate change adaptation on land use and conflict in urban areas can be affected by gentrification, forced relocation and land scarcity. Further, they find that maladaptation practices can bear double disadvantages for already marginalised people. Regarding mitigation strategies such as REDD+ and large-scale wind power plants, Froese and Schilling find the following potential sources of conflict: conflicting or unclear land tenure, land rights and unmet expectations of financial and employment benefits. Froese and Schilling recommend that REDD+ projects should be carefully designed to allow for context-sensitive analysis, and suggest substantial cross-policy cooperation in order to mitigate conflicts. Finally, they call for future research and policies that enable the development of conflict-sensitive approaches to climate change mitigation and adaptation interventions.

5.5.5 Conflict resolution and cooperation

Conflicts over natural resource management are expected to escalate as climate change impacts coincide with changing socioeconomic contexts. Indeed, in Nepal – which is identified as one of the most climate vulnerable countries in the world – increasing cases of conflict over forest and water resources have been reported, attributed to 'poorly defined resource tenure and poor governance, particularly in relation to the changing pattern of local livelihoods and shifting political regimes' (Ojha et al., 2019: S108). Improved ways to facilitate cooperation among conflicting stakeholders are therefore necessary, as standard methods have previously failed to address the underlying socioeconomic drivers of conflict. Ojha et al. therefore promote an 'Adaptive Learning and Deliberation' process to mitigate conflict, foster cooperation and challenge the underlying exclusionary provisions of forest and water institutions in Nepalese society. The Adaptive Learning and Deliberation approach has proceeded through the research team's initial engagement with community leadership and marginal groups, to cultivate and nurture reflective attitudes towards the ongoing conflicts. Subsequently, collaborative enquiry has been used to:

- provide information on the causes and consequences of conflict
- develop a better and shared understanding of the resource supply
- and promote equitable distribution arrangements.

Dialogues at different levels of resource governance have been utilised in order to catalyse institutional rearrangements and engage stakeholders in meaningful dialogue. The Adaptive Learning and Deliberation approach has seen high degrees of success in the Nepalese context of strong institutions, with a democratic policy environment that allows for the expression of opinions. However, the authors caution that the Adaptive Learning and Deliberation will need

to be reframed and adapted according to the context where it is applied. For example, it may not be feasible in highly sensitive areas where open discussion and critical enquiry are not part of the political context.

Sultana et al. (2019) similarly focus on the potential for climate stresses to exacerbate local conflicts over natural resources, in addition to the role of policy and adaptation and the neglect of enhanced cooperation opportunities. Through participatory action research on 79 case studies of local collective action over natural resources in Bangladesh and Nepal, Sultana et al. demonstrate that many natural resource conflicts can be resolved through enhanced cooperation. However, this will require the support of an 'enabling environment for participatory dialogue, external facilitation, flexible responses to context and recognition of disadvantaged stakeholder interests' (ibid: S94). Transforming conflict towards greater cooperation will therefore necessitate social and institutional changes supported by adaptation policies that focus 'less on physical works and more on enabling factors such as negotiation, local institutions, knowledge and incentives' (ibid: S94). Moreover, the authors also discuss instances where efforts to claim rights can spur increased cooperation among disadvantaged and marginalised groups. Thus, conflict can be understood as part of a dynamic process of transformation. Greater participation of grassroots stakeholders within policy debates is called for in order to diversify stakeholder discussions and enable harnessing of local initiatives in natural resource management and adaptation. Adaptation policies in Bangladesh that favour sectoral and project-based initiatives and large-scale government interventions may therefore evolve to take lessons from Nepalese initiatives that encourage a coordinated approach and locally owned flexible adaptation policies.

Also analysing local expressions of conflict, Roth et al. (2019) look at the promotion of cooperation. The authors also consider the 'community resilience' discourse in relation to water (in)security in the peri-urban spaces of the South-Asian cities of Khulna, Gurugram, Hyderabad and Kathmandu. These peri-urban water insecurities are found to be 'co-produced by urbanisation, population growth, climate change and sociopolitical and institutional processes at multiple scales' (ibid: S79). Here, such water insecurities are often cast into a climate discourse of climate-induced vulnerability that necessitates the adaptation or creation of 'community resilience' as the solution. However, the authors argue that this focus on 'community resilience' risks neglecting the ways that water insecurity problems are produced, reproduced and experienced by populations within specific socioeconomic, political and policy contexts. Policies should therefore build on awareness that peri-urban insecurities are primarily 'socially and politically produced through urbanisation and development strategies, policy choices and priorities, power relations and decision-making processes dominated by elite interests' (ibid: S91). Researchers and policy actors need to be much more critical of reductionist framings, rather than offering 'technocratic politics of intervention' and climate change framed policies that are universalistic, de-contextualised and depoliticised. They should also pay attention to the 'local experiences and perception of water insecurity and other vulnerabilities, understood in a context of power relations, social and political agency, inequality and poverty' (ibid: S91).

5.6 The intersection of disasters, politics and violence

Summary
Building on the concept of 'slow violence' – which describes creeping environmental degradation – one of the studies reviewed during this scan period introduces the concept of 'micro disasters' through the everyday problems linked to a lack of development. These relatively small-scale but nevertheless dangerous disasters are deemed to have serious consequences for marginalised communities, and are more pressing problems than much larger mega disasters. Such micro disasters are however often unremarked due to their smaller scale and lack of media attention, and affected people are not provided with formal aid.

Other research investigates how the interaction between disasters and vulnerability connects with more direct forms of violence, particularly communal violence and violence against women, though the evidence cited suggests that extreme disaster events do not in the main meaningfully affect levels of collective violence, and may even encourage cooperation and the prevention or de-escalation of conflict.

Other research emphasises the politics of disaster response. One empirical analysis on post-disaster housing reconstruction in Sri Lanka following the 2004 Indian Ocean tsunami finds that housing construction increased levels of violence due to conflict over the allocation of aid. Conversely, one study exploring the politics of post-drought aid in Ethiopia revealed concerns around government control of information and decision-making processes and the politicisation of aid to advance a particular set of interests. Another study, looking at the management of dead bodies, suggests that aid practitioners need a better understanding of how to deal properly with the dead, for example not burying them in mass graves, which prevents identification and undermines the dignity of victims and their families.

5.6.1 The intersection of pre- and post-disaster vulnerabilities and violence

Willett (2019) explores the impacts of environmental disasters by conducting in-depth interviews in poor communities in Kenya. Building on the concept of 'slow violence' – which describes creeping environmental degradation – Willett (2019) introduces the concept of 'micro disasters' through the 'everyday problems linked to lack of development' (ibid: 143) stemming from environmental changes. These relatively small-scale but nevertheless dangerous disasters carry serious consequences for marginalised communities in developing countries. Affected people included in this study reported that micro disasters were even more pressing problems in their lives than mega disasters. However, more generally, micro disasters are often 'hidden', due to their smaller scale and lack of media attention, and affected people are not provided with formal aid.

In the absence of formal aid and other forms of targeted support, micro disasters act as 'threat multipliers for the poor' (ibid: 141) where affected people lose both survival and income-generating assets and do not have the means to recover. Whereas most disaster research and humanitarian aid focuses on mega disasters impacting whole communities, micro disasters disproportionately and specifically impact the poorest individuals within marginalised communities. The author contends that this understanding should be integrated into studies of environmental degradation and disasters, and used to better tailor aid to those who need it most.

Other research has investigated how the interaction between disasters and vulnerabilities connects with more direct forms of violence. For example, Brzoska (2018) conducted a review of existing research to disentangle the varied impacts of disasters, along with the associated political and humanitarian interventions on collective violence. The literature reviewed shows that extreme disaster events, irrespective of magnitude, may be linked to collective violence in certain locations that feature particular conditions. Extreme disaster events may lead to an escalation or lengthening of armed conflict where it is already occurring; in other

places, such events may precipitate the onset of communal or more diffuse forms of violence.

Despite these linkages, the author purports that most extreme disaster events do not meaningfully impact collective violence even where the pre-conditions for conflict exist. Beyond this, extreme disaster events may even encourage cooperation and the prevention or de-escalation of conflict in more limited locations. These findings reflect conclusions from the broader literature that disasters do not themselves create conflict, but may magnify or accelerate conditions and dynamics already present or developing. This research provides evidence that disaster-related policies – before, during and after disaster – have the potential to influence conflict processes and dynamics. With careful planning and implementation, these policies or interventions may prevent or de-escalate conflict, but there have also been cases where such interventions bring unintended negative consequences.

Original research by Nguyen (2019) focuses on patterns of post-disaster violence against women, including sexual abuse in Eastern Visayas of the Philippines after Super Typhoon Haiyan in 2013. Through interviews with sexually abused women and girls and other stakeholders, the author found that violence against women is not elevated because of disasters alone, but is in larger part due to pre-existing socially constructed gender inequalities and vulnerabilities. Women are not inherently victims, but their pre-existing vulnerabilities expose them to greater threats of harm, insecurity and violence. Climate disasters and crises exacerbate these gendered vulnerabilities, with women and girls reduced to 'bare life' (ibid: 422) when people are struggling to survive and normal systems and institutions are suspended. In the wake of the typhoon, damaged infrastructure, poor living conditions and inadequate security services are cited as some of the emergency conditions that put women and girls at greater risk of violence. This risk is compounded when men turn to violence as a way to cope with their inability to fulfil their own gendered role as household provider and reassert their authority. The author suggests that interventions attempting to curb post-disaster violence against women should focus on the social and cultural root causes of this violence rather than post-disaster conditions.

Similar research by Bermudez et al. (2019) qualitatively investigated the intersecting drivers of violence against women, violence against children and non-partner violence in Côteaux, Haiti, after Hurricane Matthew in 2016. Through in-depth interviews, the authors identified the following drivers of interpersonal violence: 'the accumulation of daily stressors, loss of power/control, learned behaviour (intergenerational cycle of abuse), and gender norms' (ibid: 182). These drivers were exacerbated in the post-hurricane humanitarian crisis setting, which was characterised by economic hardship, loss of employment and food insecurity. When such mounting stressors exceed coping capacity, they can lead to feelings of loss of control and violent reactions both within and outside of the home. In crisis settings, the government is unlikely to respond sufficiently to violence, which discourages reporting and encourages further cycles of violence and vigilante justice. Bermudez et al. find that traditional gender norms and lack of education are at the root of much violence, while households following more relaxed and egalitarian gender roles reporting less violence. Multisectoral interventions should consider the specific needs at the individual and household levels and work with communities to shift social and cultural norms through educational programs.

5.6.2 Disasters, violence and the politics of response

Other research moves away from vulnerabilities and emphasises the politics of disaster response and the consequences for patterns of violence. To sharpen an understanding of the relationship between disasters and intrastate violence, Kikuta (2019) has centred an empirical analysis on post-disaster housing reconstruction in Sri Lanka following the 2004 Indian Ocean Tsunami. Following an instrumental variable approach, the study finds that the post-disaster construction of houses – and not the destruction of houses from disaster – increased the number of violent events in a given subnational location. The author draws from bargaining theory to explain that an infusion of post-disaster housing reconstruction

and emergency aid may incentivise parties to the conflict to direct those funds to suit their strategic interests and accumulate power, thereby destabilising the existing power balance. Adversaries may employ the use of violence to prevent an unfavourable shift in the power balance and their bargaining position. The author suggests that the international community focuses interventions on preserving the pre-disaster power balance in an effort to stymie the intensification of post-disaster violence as parties vie for resources and power.

Considered in the opposite direction, conflict dynamics also carry ramifications for disaster response. Exploring the politics of post-drought aid in the low-intensity conflict and authoritarian context of Ethiopia in 2016, Desportes et al. (2019) interviewed numerous stakeholders to explore the 'frontstage' and 'backstage' behaviour of international and national non-governmental actors in the 'humanitarian theatre'. Their qualitative analysis shows that the 'frontstage' or official stance of their interviewees emphasised effective and successful co-governance of the humanitarian response. However, 'backstage' personal reflections revealed concerns about how the Ethiopian government had controlled information and decision-making processes and politicised aid, as well as how the political unrest and state of emergency had impacted humanitarian response. These concerns suggest that the government of Ethiopia has instrumentalised humanitarian aid to advance their political agenda, and distributed or withheld it to punish or reward disaster-affected populations. Humanitarian actors are afforded little space to operate or even express dissent, so the gap between Desportes et al.'s interviewees' 'frontstage' and 'backstage' commentary reflects a tension between needing to balance humanitarian response with maintaining a long-term relationship with the Ethiopian government.

Another essential aspect of disaster and conflict response in addition to housing reconstruction and aid distribution is the management of the dead. Cordner (2018) outlines lessons learned in humanitarian forensic science since the International Committee of the Red Cross (ICRC) launched 'The Missing' initiative in 2003. Humanitarian forensic science seeks to support 'the right of families to know the fate of their relatives' (ibid: 641), including a confirmation of their death and the circumstances, which is established under international humanitarian law. When this right to know is not met on a large scale, efforts to build peace may be hampered. Cordner's lessons learned include the following:

- Humanitarian forensic science must attempt to identify human remains, which is linked with broader justice efforts.
- Large-scale disasters, including conflicts, present unique challenges to humanitarian forensic science. Forensic action in these large-scale settings may necessitate the involvement of a broader range of actors, including first responders and civil society.
- All responders must understand how to deal properly with dead bodies; for example, they should not bury them in mass graves, which prevents identification and dignity for victims and their families.
- More general forensic capacities must be improved in order to achieve the objectives of humanitarian forensic science.

Considering the management of the dead as an issue affecting health security in the Asia-Pacific region, Farrell (2018) probes the securitisation and desecuritisation of this domain in the regional response to the 2004 Indian Ocean Tsunami. In particular, the author focuses on the initial recovery of the dead and disaster victim identification, drawing from examples in Thailand and Sri Lanka. Framed as a threat to regional health security, the securitisation of the management of the dead may help achieve action where capacity, infrastructure and resources to manage recovery and identification on such a massive scale are low. However, securitisation also undermines established humanitarian standards, procedures and practices by justifying exceptional measures and imposing certain restrictions. For example, not following standard procedures can magnify the grief of relatives of victims, who are then provided with minimal psychosocial support. Thus, the author argues that 'it is vital that a shift toward desecuritisation takes place once the immediate

threat is under control' (ibid: 552). In a desecuritised context, there is more latitude to promote human security and enhance resilience for individuals and communities.

Finally, emerging regional health challenges in East Asia set the stage for Caballero-Anthony's (2018) study of how the Association of Southeast Asian Nations (ASEAN) approaches global health and security. The East Asian region faces new patterns of communicable and non-communicable, as well as climate-related, diseases, and these patterns are coupled with rapid demographic changes. Caballero-Anthony argues that if regional health governance is to meet these challenges and effectively pursue health security, cooperation in the region should not rely on the 'security' framing that prioritises the security of the state. To this end, ASEAN has made progress in reorienting its approach to governance towards more diverse framings of human security, development and human rights. However, further regional cooperation is necessary in terms of sharing data and information, and the region may need to reconsider regional norms of domestic non-interference. Also essential is the advancement of such normative frameworks, together with building the collective capacity of the region to address health threats and promote human well-being more comprehensively.

5.7 Human mobility and the links to natural hazards, health and foreign aid

Summary

While narratives linking climate change, conflict and migration are relatively common in peace and conflict research, there is still limited empirical evidence and theoretical foundations to support these claims. There is also little clear evidence that development aid substantially deters emigration from poor countries. One quantitative assessment reviewing data on refugee flows finds that climatic conditions can play a significant role in increasing the likelihood of asylum-seeking. Along similar lines, another study examines the causes and consequences of migration for women from Odisha in India, which observes that illiterate and semi-literate married women who do not own land are the most likely to migrate. The drivers identified include lack of employment and employable skills, as well as repeated floods and cyclones and reduced agricultural production. The study also shows how migration can be a coping strategy during periods of environmental stress.

Despite a lack of systematic evidence, claims of a causal link between migration and the transmission of infectious diseases remain popular among opponents of immigration, leading one scholar to argue for advocacy based on human rights considerations rather than public health concerns.

Even though narratives that link climatic changes, conflict and migration are relatively common in peace and conflict research, there is still limited empirical evidence and theoretical foundations to support these claims. In a quantitative assessment, Abel et al. (2019) have reviewed the bilateral refugee flow data for 157 countries from 2006 to 2015. Considering that migration is a complex and multi-faceted process, driven by multiple factors, the study aims to examine the interaction between environmental (drought severity) and political (conflict) drivers as determinants of forced migration, measured by the number of asylum seeker applications in the receiving countries. The review finds that climatic conditions played a significant role in increasing the likelihood of asylum seeking by affecting drought severity. The authors argue that droughts combined with poor resource management during the period studied, and this potentially led to crop failure and an increased scarcity of resources, which then likely exacerbated the risk of armed conflict. However, the estimated effect of climate on conflict risk and asylum-seeking flows is only valid in consideration of the shorter 2010–2012 period and for countries in Western Asia and Northern Africa. It also does not support the causal linkage for the full 2006–2015 period under study. According to Abel et al., this might be due to this limited window of time being characterised by a major inflow of asylum seekers from countries affected by the Arab Spring, as well as armed conflict in sub-Saharan Africa.

Along similar lines, Patel and Giri (2019) examine the causes and consequences of migration for women from the coastal district of Odisha, India. The study observes that illiterate and semi-illiterate married women who do not own land are the most likely candidates to migrate. In line with other studies, Patel and Giri find that migration is a multi-faceted process, driven by various factors simultaneously. In the case of women in the district of Odisha, push factors for departure include lack of employment opportunities and employable skills, but also repeated occurrence of floods and cyclones, and consequent reduction of agricultural production. The decision to migrate is usually taken on a household basis by a man as the head. The study also demonstrates that migration could be a coping strategy during times of environmental challenges, bringing positive but also negative changes for women, with positive outcomes including new employment opportunities, raised income levels, and improved standards of living and higher education. However, concerns associated with inter-district migration include fear of eviction due to encroachment, compromised safety and security, and prevalence of low-paying unskilled jobs.

Given the current picture of emerging and polarising public debates on migration, Clark and Horton (2018) bring attention to the UCL–*Lancet* Commission on Migration and Health from 2018, which lays out a research agenda aiming to ensure the health and well-being of migrants. The Commission outlines that migrant policies can feasibly promote liberal public health approaches to migration and global mobility. It provides evidence to debunk anecdotes and myths that feed negative perceptions of migrants and argues for the creation of new solutions regarding how to deal with current migration challenges. Relatedly, Clark and Horton propose a three-fold solution to addressing common fears about immigration and the current lack of policies to address them. According to the authors, part of the solution should entail stronger appeal to and conversation about the common values we share in terms of human dignity. Public health policies also need to be accompanied by strong economic and political strategies that strengthen vulnerable groups. In this sense, the Commission aims to create a platform for discussing issues and solutions regarding health and migration, where migrants' participation should become a key part of the conversation.

Despite a lack of systematic evidence to support it, claiming there is a causal link between migrants and the transmission of infectious diseases remains a popular argument used by those who oppose immigration. In a short comment, Ammar (2018), the Director General of the Lebanese Ministry of Public Health, emphasises the importance of the health and well-being of host communities, and suggests this can be better achieved by providing universal access to healthcare without discrimination, as opposed to restrictive immigration policies.

Furthermore, Ammar argues that despite the UCL–*Lancet* Commission on Migration and Health providing ongoing evidence for reasons to support migrants, arguments centred on human rights should lead. Ammar also suggests creating a global platform to hold political leaders accountable regarding their obligations to international human rights law.

Clemens and Postel (2018) review existing evidence related to the macro-level relationship between development aid targeting the 'root causes' of migration – addressing factors such as economic development, employment and education – and overall levels of migration. The authors conclude that studies have so far failed to provide clear evidence in favour of development aid substantially deterring emigration from poor countries. Some recent literature finds no effect of bilateral aid share on migration, whereas a few quantitative studies have found that development aid inflows tend to have the opposite effect and raise net emigration from the average poor countries to high-income Organisation for Economic Co-operation and Development (OECD) member states. However, evidence suggests that poor countries managing to offer job opportunities to young workers can reduce emigration likelihood in the short-term and temporarily protect families from potential economic shocks. Second, Clemens and Postel suggest that greater, more accessible and transparent documentation on development aid programming is needed in order to help researchers and policy-makers understand the effects of aid in various contexts on the ground. Finally, aid seeking efforts should focus not only on simply deterring migration but also on fostering cooperation between migrant and host communities, ensuring easier transition and maximising mutually beneficial outcomes for everyone involved. In this sense, a substantial shift in aid agencies' mandate is strongly recommended.

5.8 Urban landscapes

Summary
Literature on urban climate resilience has a tendency to emphasise 'good planning' as the solution to the increasing risk of flooding in Asia's megacities. However, some scholars have argued that, in India's largest coastal cities, there is a contradiction between growing awareness of climate-induced flood risk within resilience plans and 'destructive' development practices, the political economy of urban governance and a failure to address the drivers of vulnerability that leave marginalised communities exposed.

5.8.1 Drivers of vulnerability, maladaptation and conflict

Literature on urban climate resilience has a tendency to emphasise 'good planning' as the solution to the increasing risk of flooding within Asia's megacities. However, Weinstein et al. (2019) argue that in the context of India's largest coastal cities Mumbai and Kolkata, which face some of the most severe threats from climate-induced flooding, there is a contradiction between the growing awareness of climate-induced flood risk within resilience plans, and the unabated and unchallenged continuation of 'destructive' development practices. The authors argue that the Municipal Co-operation of Mumbai city development plan released in 2018 continues to promote 'development-driven economic growth ... some of it located in ecologically sensitive areas … as the way to make Mumbai a 'global city' (ibid: 274). This is suggested to have resulted from the separation of resilience planning and development politics. This, in turn, ensures risk-exacerbating practices remain firmly

entrenched by the rhetorical promotion of 'the "co-benefits" of sustainable development to avoid conflicts between economic development imperatives and flood risk reduction' (ibid: 275). Weinstein et al. therefore conclude that, although cities may adopt the 'language of resilience' in high-level plans and strategies, this may distract from elite-led environmentally destructive development practices. Planning discourses should therefore provide closer critical reflection of how dynamics are shaped, and reshaped, by processes of climate change.

Goh (2019) similarly finds that the 'threat of flooding in cities is often compounded by political and economic decisions made on watershed management, land development and water infrastructure and provisioning' (ibid: 250). Using the case study of Jakarta, Indonesia, Goh argues that a conflict has ensued between the city's 'objectives for development and modernisation, and the struggles of marginalised residents living in low-lying coastal and riverine areas' (ibid: 250). The author then points to the greater risks faced by marginalised, poor urban residents living in kampung settlements located along the coastline, canals and rivers and how they are also villainised by city officials, who claim they cause the flooding by throwing waste into the waterways. In the context of sinking cities, the importance of framing and understanding a) who guides the analysis of environmental problems and b) the priority of solutions is made clear, as 'flooding takes on different forms depending on one's point of view' (ibid: 251). In order to overcome partisan planning efforts, Goh promotes the use of a 'multivalent view that centres on the most critical and grounded explorations of social relationships and projective agency of those most often driving the concepts behind large-scale urban and environmental plans' (ibid: 269).

Salim et al. (2019) also find that the chronic - flooding of cities will continue to be exacerbated by climate change processes such as sea-level rise and increased rainfall. By once again taking the example of Jakarta, the authors argue that the government's attempted solution to flooding, the Great Garuda project, fails to address its root causes, as well as the primary drivers of vulnerability. The Great Garuda project envisions the construction of a giant sea wall to create several large, freshwater lagoons that will reduce the risk of flooding whilst simultaneously enhancing 'Jakarta's status as a 'world city' [and] 'improving the economy of the metropolitan region and country as a whole' (ibid: 63). However, the authors argue that, through the incorporation of the language of 'climate change', the Great Garuda project has allowed sociopolitical elites to circumvent political reforms established following the downfall of the Suharto regime. They also suggest that this allows them to elicit new sites for cronyism and capital accumulation within the pervasive pattern of private-led development. This is particularly ironic given that the main driver of flooding within Jakarta is found to be land-subsidence resulting from the unregulated development of the capital. The Great Garuda project is therefore considered an 'attempt to solve the wrong problem' (ibid: 65), and results in 'maladaptation' that leaves the city more vulnerable to both flooding and climate change in the future while also contributing to 'increased erosion of existing islands, loss of livelihoods for fisherman and coral reef destruction'.

5.9 Rights and justice

Summary
Several authors point to issues of rights and justice, including as part of the legal apparatus of the UN, specifically the 2007 UN Declaration on the Rights of Indigenous Peoples (UNDRIP), and under the REDD+ programme. The literature reviewed here is critical, pointing to the programme's failure to tackle the domination of governmental actors and influential civil society groups in decision-making and participation, with examples from Nepal and Vietnam. In some instances this may create tensions or conflict.

5.9.1 Issues of rights and justice, with examples from REDD+

The issue of indigenous peoples' environmental rights within the UN legal apparatus has been examined by Giunta (2019), with particular consideration given to the 2007 UN Declaration

on the Rights of Indigenous Peoples (UNDRIP). Despite recognising the UNDRIP as the most comprehensive international instrument for protecting the rights of indigenous people, article 29 of the UNDRIP is found to be plagued with systematic problems. Giunta finds that article 29 does not provide adequate definitions for 'the environment, its management and accountability for environmental violations' (ibid: 149), in addition to lacking a legally binding agreement and being limited by pre-existing implementation gaps between policy and action. Furthermore, the failure of article 29 to provide effective environmental-rights protection for indigenous peoples is argued to be apparent within the development of international law following the adoption of the Declaration. For example, the following are all cited as evidence of its inability to provide adequate protection for these groups:

- conflicts between indigenous peoples
- environmental rights and sustainable development
- climate change
- trade law
- lack of expertise, coherence and integration between international environmental law and human rights (ibid: 166).

Giunta therefore suggests that, in order to fulfil our global responsibility to protect the environmental rights of indigenous peoples, article 29 should be made legally binding, while the UNDRIP should capitalise on the political appetite of leaders such as President Macron to create an official UN body provided with the authority to support both comprehensive legal or practical solutions.

Through a case study of the ongoing debates outlined above, Satyal et al. (2019) analyse the impacts of the REDD+ project, an international policy aimed towards 'incentivising forest conservation and management and improving forest governance' (ibid: S8) in spaces of participation and representation within Nepal. In terms of positives, they find that REDD+ is based on the principles of fair procedures and equitable benefit sharing, and designed to provide a new platform for debating forest governance and rights. However, it has failed to tackle the domination of governmental actors and influential civil society groups in spaces of decision-making and participation within Nepal. The networks and forums promoted by the REDD+ project are found to be inefficient, failing to accommodate the diversity of interests, priorities and needs of other actors or marginalised groups, such as Dalits and women's organisations. These weaknesses are found to be inherently related to the uneven power relations and wider sociopolitical factors that consistently influence the dynamics of participation, with the REDD+ project more often found to reproduce political power than transform it. Satyal et al. therefore suggest that, to provide a progressive vision for itself, REDD+ must go beyond that which has been done before, to provide innovative means of participation that include greater recognition of the 'values, practices and concerns of marginalised groups' (ibid: S18), while also instilling those messages within project implementation, alongside processes of collaborative learning. This must be accompanied by adjacent changes in wider sociopolitical structures and processes, to ensure REDD+ is based on principles of social justice, along with equity and fairness, providing equal opportunities and spaces for participation from all kinds of non-state actors, with particular attention given to marginalised social groups.

Hoang et al. (2019) also provide an analysis of the REDD+ project, focusing on the context of the Lâm Đồng province in Vietnam and contemplating how the project often reflects the influence of the 'specific historical, political–economic [context], including pre-existing conflicts over forests and power relations' (ibid: S32). Similar to the analysis provided above by Giunta (2019), Hoang et al. find persistent exclusion of indigenous groups, despite the adoption of the global REDD+ safeguards during the 16th Conference of the Parties (COP 16) in Cancun (2010). These were designed to provide unprecedented global recognition of indigenous peoples' and local communities' customary rights, and specifically included the increase of indigenous peoples' effective participation in forest governance and a stated need to include their knowledge within management designs. These were not made legally binding and, as such, there has been a renewal and intensification of competing claims

over who is legitimately entitled to govern the forests among different social actors. The authors therefore conclude that the politics of justice, particularly the different rights and expectations of local people in conjunction with existing power relations, must be acknowledged if the REDD+ project is to be successful. They also argue this will avoid the reproduction of injustices in access to, and control over, forest resources at the local level.

Lending weight to the analyses above, Joshi et al. (2019) also find that projects implemented in an attempt to mitigate climate change run the risk of perpetuating uneven power relations that reinforce the marginalisation and exclusion of local groups. Through the use of case studies, Joshi et al. demonstrate that hydroelectric projects are implemented in fragile democracies to address the neoliberal economic concerns of the traditional associated unions between the following actors:

- the state
- formal civil society
- political parties
- the private sector.

This focus occurs at the expense of environmental challenges, with the projects creating several new conflicts. It is postulated that despite claims that climate change interventions happen in an overall framework of participatory, inclusive environmental governance, this is rarely the case in relation to hydropower development. Their study reveals that the rare success experienced by the people's movement 'Affected Citizens of Teesta' in North Sikkim was only achieved because it operated outside established systems and structures, and because the actors did not speak in the material language of dams and development. allowing them to challenge the traditional associations of power. However, in the Darjeeling region, the formal NGOs were unable to distance themselves from the dominant global 'epistemic climate coalitions'. This was owing to their entanglement in the 'service delivery paradigm', where they could do little else but collaborate in a web of 'consensual governance' in the absence of a functional political democracy and lack of civil society. The authors hold this up in order to question the 'rhetoric of partnerships' promoted within the climate discourse, with ethnic-fractures and local politics found to divide rather than unite, which only serves to reinforce the unequal partnerships between states, markets, local communities and civil society.

5.9.2 The need for new approaches to protect rights and justice

In a consideration of the uneven distribution of climate change impacts on rural women's agro-based livelihoods and food security in Zimbabwe, Muchacha (2019) highlights the need to address underlying power relations and structural factors in purported solutions. Women's agro-based livelihoods and food security are found to be disproportionately affected by a culmination of 'deeply entrenched structural inequalities, unbalanced power relations and, consequently, the unequal distribution of access to the means of production and limited choices' (ibid: 60). Muchacha suggests that 'green social work' is better positioned to address the gendered implications of climate change than 'ecological social work' perspectives. This is because the latter predominantly focus on the protection of the environment, while the former is more holistic in nature, enabling social workers to address 'multidimensional issues that underlie environmental crises, such as gender inequality, access to and the distribution of resources, and poverty' (ibid: 69). It is suggested that this green social work provides a crucial focus on 'policy formation, political engagement, the protection of the environment and strengthening the resilience and coping strategies of communities' (ibid: X69), also advocating the role of women in such processes.

Utilising the storytelling work of Hogan, Harrison (2019) also demonstrates the need for a holistic approach that provides a more accurate understanding of environmental crises like climate change, examining how environmental injustices are linked to a 'long history of violence and trauma in indigenous communities' (ibid: 2). Harrison reiterates Hogan's novel depiction of the Dakota Access Pipeline (DAPL), which is 'designed to move about half a million barrels of crude oil per day out of North Dakota's Bakken oil fields' (ibid: 2). This has spurred

the #NoDAPL movement, led by the Standing Rock Sioux, with hundreds of Native nations standing alongside thousands of non-native allies to protect water, cultural sites and indigenous sovereignty. However, Harrison cautions against the dangers of these environmental 'allyships'. This is similar to the views expressed above by Joshi et al. (2019), particularly in terms of their 'potential to result in the overlooking of historical and geographical contexts that condition indigenous experiences of injustice' (ibid: 2). It is feared that such causes can result in indigenous communities becoming 'pawns' in the much larger – and present – fight against climate change, ignoring the 'long history of violence and trauma' (ibid.) experienced by indigenous communities.

Méndez (2019) once again provides an analysis of the political processes of grassroot mobilisation against the structural violence of neoliberalism experienced within the context of Mexico. Méndez suggests that the 7.1 magnitude earthquake experienced on 19 September 2017 in Mexico City and the surrounding states of Chiapas, Oaxaca, Puebla and Morelos activated memories of the 'emergence of Mexican civil society' exactly 32 years before. The earthquake is argued to have produced a 'disjuncture': a deeper crisis of representation concerning the scale of socio-environmental violence in neoliberal Mexico, where some of the most environmentally affected groups have been able to organise and strike alliances with critical academic communities or socially concerned scientists. The formation of 'The National Assembly of the Environmentally Affected (AANA)' is argued to be of critical importance in this struggle. This is composed of a nationwide network of Mexican communities and organisations. The earthquake is therefore argued to have resulted in a partial refiguration, producing a crack 'through which grassroot voices may finally enter a phase of hegemonic struggle whilst, at the same time calling into question the framework of hegemony as such' (ibid: 86).

The importance of including detailed analysis at the community level, in order for policy to have a significant impact, is addressed by Silka (2019) with regard to the experiences of immigrants. The importance of this is argued because of the expected rise in levels of immigration in response to global crises, such as climate change, conflict and economic instability. Silka suggests that including the highly complex community level in psychological research is vital for connecting the study of the macro level of the country with the micro level of the individual. The micro level is seen as the sphere where everyday activities – affecting both immigrants and host communities – take place, which can influence actions of prejudice and discrimination. It is hoped that understanding this in more detail will mean policies that impact on immigrants' lives can be developed in a more informed manner.

The need to uphold ownership rights of indigenous communities over their natural resources, and the importance of integrating their indigenous knowledge within comprehensive solutions, is discussed by Latchmore et al. (2018) in relation to local indigenous water security in Canada. Through a comprehensive literature review, they find that indigenous communities in Canada are often subject to poor water quality and water advisories. As such, there needs to be a new framing of local water security in order to overcome the dominance of western science-based approaches with 'little to no consultation or dialogue with those communities most impacted, and without regard for culture' (ibid: 1). The authors subsequently conclude:

1. There is a need to create sustainable and meaningful solutions that can be owned by communities, enabling them to reclaim their water stewardship roles.
2. To do this, the complementary multi-disciplinary research methods, participatory approaches and tools that engage both indigenous knowledge and western science must inform interventions, policies, regulations and legislation.

6 Reflections from a quadrimester

Marking the third scan in the series, we can see a hive of activity on the intersection of climate change, conflict and security during the December 2018 to March 2019 period. This signals that the theme is here to stay as an important policy agenda for 2019 and well beyond. The quadrimester included a suite of events, each exploring different entry points to the nexus: from high-level political engagement at the UN Security Council debate in January 2019 through to regional convening at the Africa Climate Week in March 2019. The fourth Planetary Security Conference was also convened in this period, with a subsequent flurry of activity on twitter and the blogosphere. Interestingly, while the 'top 10 institutions' on twitter has included some repetition from the past scans, this one reveals an entirely new 'top 5 individuals' for the topic, two of whom are ministers – for the Maldives and for the Netherlands.

During this quadrimester, the blogosphere was populated by posts concerned with US political interest and engagement in the topic of climate change, and highlighting White House responses to climate change as a national security threat. The top 10 blog posts were dominated by American political wrangling about what an appropriate response to the security risks of climate change could or should be, and the importance of dealing with climate risks at large, stemming from the WEF. The inclusion of the World Meteorological Organisation at the UN Security Council, and Germany's position as non-permanent member, signal that climate change is likely to continue being placed on the agenda, despite continued resistance from other member states. In contrast, a few solutions-oriented posts reached the shortlist, calling for resilience building in Africa, effective urban planning for climate change, and preparedness for disaster in Asia.

In line with previous scans, a wealth of grey literature has been published throughout the quadrimester. Widely shared, the Planetary Security Conference stocktake of action and trends on 'Making Climate Security #Doable' is a useful summary of action on the topic. At the national level, the US released several papers reviewing how executive branches of government engage with climate change as a potential driver of conflict and security risks. In contrast, this scan has seen the release of several publications focused on climate–conflict dynamics from a vulnerability perspective: a welcome contribution to the existing body of knowledge of the nexus. These include an exploration of climate change and conflict prevention and peace-building in SIDS and, with this, greater emphasis on the role of resilience building as a way forward – for example, in the context of climate change and security in the Caribbean.

While nonetheless valuable, the continued release of grey literature exploring climate change, conflict and security in the Sahel is starting to receive criticism for limiting the breadth of examples, knowledge and experience in the climate change – conflict nexus. There have also been increasing calls for more research in other geographical areas, including the Middle East and South Asia.

Finally, academic literature continues to be incredibly varied, reflecting the all-encompassing nature of climate variability and change, and the multifaceted nature of the term 'conflict'. To demonstrate this breadth, newly released articles range from physiological and psychological analysis of the relationship between rapid global warming and aggression and violence, through to

considerations of models for territory allocation in the Arctic region as a means to support international negotiations and minimise political conflict. The literature also shows that research is beginning to adopt mix methods – qualitative and quantitative – to try to fully understand the relationship between climate and conflict.

A number of articles point to an increasing realisation that, without adequate consideration of existing or potential conflict, climate change adaptation and mitigation projects risk doing more harm than good. This was the case in a set of Cambodian projects that reinforced power imbalances, inequitable distribution of resources and community land practices. Similar concerns have been raised about some REDD+ projects in Ethiopia and Indonesia, along with some opportunities for advancing biofuel production in southern Africa.

The intersection of natural hazard-related disasters, politics and violence remains a strong theme in this scan, with literature exploring:

- 'micro disasters', where small-scale disaster events in the context of poverty and marginalisation can be 'threat multipliers for the poor'
- the links between disasters, vulnerabilities and direct forms of violence
- the connection between extreme disaster events and collective violence
- sexual and gender-based violence in post-disaster situations.

What remains clear from the emerging literature is that research into individual cases helps deepen our collective understanding of the climate change, disaster and conflict nexus – particularly the detrimental impacts. But there remains a long way to go in terms of genuinely understanding what types of climate change adaptation, mitigation and disaster risk reduction actions will realistically enable more proactive, preventative action in conflict-affected contexts.

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