Report

Climate change, conflict and fragility

Information and analysis to support programme design scoping for the Climate and Resilience Framework Programme (CLARE)

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Acknowledgements

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Acronyms

ADB	Asian Development Bank
ANGOC	Asian NGO Coalition for Agrarian Reform and Rural Development
AU	African Union
BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters
CARIAA	Collaborative Adaptation Research Initiative in Africa and Asia
CBO	community-based organisation
CCAM	climate change adaptation and mitigation
CDEMA	Caribbean Disaster Emergency Management Agency
CDKN	Climate and Development Knowledge Network
CEESP	Commission on Environmental, Economic and Social Policy
CIEL	Center for International Environmental Law
CIFOR	Center for International Forestry Research
CLARE	Climate and Resilience Framework Programme
CMIP	Coupled Model Intercomparison Project
COP	Conference of Parties
CSO	civil society organisation
CURE	Culture in City Reconstruction and Recovery
DECCMA	Deltas, Vulnerability and Climate Change: Migration and Adaptation
DFID	Department for International Development
DNH	Do No Harm
DRC	Democratic Republic of Congo
DRR	disaster risk reduction
DPPA	Department of Political and Peacebuilding Affairs (United Nations)
ESPA	Ecosystem Services for Poverty Alleviation
EU	European Union
FACSs	fragile and conflict-affected states
FAM	Famine Action Mechanism
FAO	Food and Agriculture Organization of the United Nations
FCAC	fragile and conflict-affected contexts
FEWS NET	Famine Early Warning Systems Network
FLEGT-VPA	Forest Law Enforcement, Governance and Trade –Voluntary Participation Agreements
FOLU	Food and Land Use Coalition
FPIC	free, prior and informed consent
FRACTAL	Future Resilience for African Cities and Lands
FSIN	Food Security Information Network
FSMS	Fragile States Metric System
G5	Group of Five
G7	Group of Seven
GAO	United States Government Accountability Office
GAR	Global Assessment Report on Disaster Risk Reduction
GBM	Ganges Brahmaputra Meghna

GBV	gender-based violence
GCS	Global Comparative Study
GEF	Global Environment Fund
GRAF	Global Risk Assessment Framework
HSAF	Hydropower Sustainability Assessment Forum
HUGE	Human Gender and Environmental Framework
HyCRISTAL	Integrating Hydro-Climate Science into Policy Decisions for Climate-Resilient Infrastructure and Livelihoods in East Africa
IATI	International Aid Transparency Initiative
IDAM	Interdisciplinary Dam Assessment Model
IDP	internally displaced person
IDFC	International Development Finance Club
IDMC	Internal Displacement Monitoring Centre
IDRC	International Development Research Centre
IFRC	International Federation of Red Cross and Red Crescent Societies
INGO	international non-governmental organisation
INDC	Intended Nationally Determined Contributions
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IISD	International Institute for Sustainable Development
IUCN	International Union for Conservation of Nature
KFPE	Commission for Research Partnerships with Developing Countries
LEDS GP	Low Emission Development Strategies Global Partnership
LGBTQI	lesbian, gay, bisexual, transgender, queer and intersex
M&E	monitoring and evaluation
MENA	Middle East and North Africa
MHDRA	Multi-Hazard Disaster Risk Assessment
NDMA	national disaster management agency
NGO	non-governmental organisation
ODA	official development assistance
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OECD DAC	OECD Development Assistance Committee
PA	Protected Areas
PAC	Practical Action Consulting
PCDMB	Post-Conflict and Disaster Management Branch
PES	Payments for Ecosystem Services
PSI	Planetary Security Initiative
REAP	Risk-informed Early Action Partnership
REDD+	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
SDG	Sustainable Development Goal
SIDS	small island developing states
SIPRI	Stockholm International Peace Research Institute
SREX	Special report on managing the risks of extreme events and disasters to advance climate change adaptation
ToR	terms of reference
UK	United Kingdom

US	United States of America
USAID	United States Agency for International Development
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNDRR	United Nations Office for Disaster Risk Reduction
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UNSC	United Nations Security Council
UNSG	United Nations Secretary-General
WACA	West Africa Coastal Areas Management Program
WASH	water, sanitation and hygiene
WCD	World Commission on Dams
WEF	World Economic Forum
WPS	Water, Peace and Security Partnership
WWF-DRC	World Wide Fund for Nature – Democratic Republic of Congo

1 Introduction

This report is an input to the scoping phase of the Climate and Resilience Framework Programme (CLARE) of the UK Department for International Development (DFID), in partnership with the International Development Research Centre (IDRC).

Prepared by the Overseas Development Institute (ODI) (chapters 1, 2, 3, 4, 5, 6, 7) and Practical Action Consulting (PAC) (chapter 4), the report responds to DFID and IDRC's request for a literature review focused on climate resilience in fragile and conflict-affected countries. In the terms of reference (ToR), it is noted that:

> *conflict, fragility and environmental vulnerability are threatening the achievement of the SDGs [Sustainable Development Goals], particularly SDG Goal 1 to End Poverty, and SDG Goal 2, to End Hunger. In 2017, 19 countries were classified as being in protracted crisis, characterised by conflict, weak governance, and a high prevalence of natural disasters. Countries with the greatest humanitarian need are also those where 59% of extremely poor people (442 million) live affected by fragility, environmental vulnerability or both. In 2010, a third of the world's extreme poor lived in these countries. In 2018 this proportion has increased to one half and is expected to rise to two-thirds by 2030.*

The objectives of this report are to:

- review available evidence and learning
- map and outline the work that stakeholders are undertaking in these areas
- develop recommendations on priority research areas and questions
- provide inputs into a synthesis workshop to bring together and discuss the results of this and other analyses commissioned during the programme scoping stage to inform decisions by DFID and IDRC on the focus and design of the implementation phase of CLARE.

This report has provided DFID, IDRC and the author team with the opportunity to interrogate the themes of relevance to CLARE. The themes were mutually agreed as climate risk (including future projected climate change and expected impacts), fragility, conflict, disaster risk reduction (DRR), environmental scarcity, and natural resource management issues. The report also seeks to identify the gaps in the evidence base, and/or lack of consensus in the literature, and where opportunities lie for investing in further research.

In this paper, there is a strong focus on the human losses and impacts related to climate extremes and events and slow-onset climate change, whether through direct damage to people's health, places of residence and work, and access to food and supplies, or through damage to the natural resource base on which people depend for fresh water, crops, fodder, fibre and other ecosystem services. Following a chapter on cross-cutting themes, we have organised the paper to begin with evidence on 'disasters' (chapters 3 and 4), focusing more on fast-onset events and thereafter 'natural resources', focusing on slow-onset changes in the environment and their human impacts (chapter 5). This is then followed by an examination of the evidence on the impacts of climate change adaptation and mitigation on conflict and what is known about making such programmes more conflict sensitive (chapter 6).

2 Methodology and definitions

This chapter provides a brief outline of the methodology employed, as well as the definitions adopted.

2.1 Review of literature

The research team drew on the library of articles collated through ODI's climate change, conflict and security scans. The scans systematically identify and review a wide range of grey and academic literature, blogs and social media coverage over a four-month period. Three scans have been produced, reviewing more than 300 articles. This database of literature was drawn upon in the initial stages of this review, together with the pre-existing analysis of that available literature (as articulated in the scans).

Thematic leads for each of the chapters of this report also reviewed additional topical literature not picked up on the ODI scans. This included articles that were published preceding or following the scan period (1 April 2018 to 31 March 2019), and topics shortlisted for inclusion by DFID/IDRC and ODI/PAC, which were not included in the scans. More than 250 articles were shortlisted and are cited in this report.

As such, it must be noted that this is a retrospective review. Socioeconomic and political contexts, as well as the nature of hazards and natural resource use, are rapidly evolving in fragile and conflict-affected contexts (FCAC). Some evidence lines will have evolved or be outdated. This places some limitations on programming recommendations.

2.2 Key informant interviews

Key informant interviews were conducted in November and December 2019, to help supplement and verify the findings from the secondary literature search. Specific attention was paid to individuals with expertise on climate change adaptation and mitigation finance – the areas where there was the least published material. Interviews were also used to bolster the literature exercise mapping current initiatives – where available information online was lacking. Thus, the key informant interviews were centred on the themes covered in chapter 6, as this is a particularly fast-moving area and targeted investigation was required through primary research. Interviewees were identified through snowball sampling. Interviews were conducted using semi-structured questions designed to reflect interviewees' core competencies.

Interviews were also conducted between November 2019 and February 2020 with agencies and networks, including the Climate Security Working Group, the Stockholm International Peace Research Institute (SIPRI), the United Nations Office for Disaster Risk Reduction (UNDRR), TMP Systems, the Environmental Law Institute, the Disaster Displacement Task Team, the Environmental Peacebuilding Association, the International Institute for Sustainable Development (IISD), as well as a number of independent consultants.

2.3 Definitions

The articles reviewed use a diversity of definitions and concepts to understand, describe and analyse terms related to climate change and weather/climate-related hazards, natural hazards, disasters, conflict and resilience. We have drawn these definitions from the authoritative sources – namely the Intergovernmental Panel on Climate Change (IPCC) reports, UNDRR and the Organisation for Economic Co-operation and Development (OECD) – most widely referenced by the articles we reviewed. Where relevant, commentary has been provided on the use of different terms and definitions. In complement, to provide a degree of continuity, the authorship team utilised the following definitions to guide the review.

Fragility: Based on the team's initial scan of the literature, we adopted the definition of fragility and its relation to violence as given in the OECD report, *States of fragility 2016: understanding violence* (OECD, 2016: 21–23). However, we also note that our review may occasionally take us into bodies of literature slightly outside the fragile states listed there. For example, for countries such as Colombia and Mexico, there may be germane literature on the nexus of climate change and climate risks, natural resource bases and conflict, even though these countries do not fall within the OECD definition of fragile and conflict-affected states. Please note that in this report, we have used the acronym 'FCAC' for 'fragile and conflict-affected contexts' because it is a more widely used acronym. However, we do look at what may be better termed 'fragile and conflict-affected *areas'* (meaning that we include conflict-affected areas outside the OECD definition where the literature leads us to interesting and useful material).

Violence: For the purposes of this review, we adopted the definition of violence given in the OECD report, which incorporates both 'political violence' and 'social violence', referring to 'a broader manifestation of grievances, criminal behaviours and interpersonal violence in society' (OECD, 2016: 20).

Conflict: We filtered specifically for instances of violent conflict in the literature review and adhered to the definition used in DFID's 2010 report, *Building peaceful states and societies: a DFID practice paper* and its 2007 policy paper, *Preventing violent conflict*. Thus: 'non-violent conflict is normal and healthy in a pluralistic society. But without mechanisms to resolve conflict, it can easily lead to violence' (DFID, 2010: 15). In addition:

> *Conflict is the pursuit of contrary or seemingly incompatible interests – whether between individuals, groups or countries ... In states with good governance, strong civil society and robust political and social systems where human rights are protected, conflicting interests are managed, and ways found for groups to pursue their goals peacefully. Where there is poor governance, however, grievances, disillusionment, competition for resources and disputes are more likely to become violent. (DFID, 2007: 6–7)*

Geographic scope: The above working definitions also allow us to go beyond a country-level approach in the review and incorporate sub-national contexts. Sub-national literature and case studies are important because they give us key insights into climate and conflict dynamics, which may not always stand out in a country-level view. Sub-national case studies may also provide evidence that can inform efforts to scale up resilience measures.

Climate: Climate, in a narrow sense, is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities (e.g. precipitation, minimum temperatures, etc.) over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization (adapted from IPCC, 2019a: 807).

Climate variability: In our review, this term shall refer to the variations in the means and other statistics (such as extremes, standard deviations, etc.) of the climate on all spatial and temporal timescales beyond

those of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability) like El Niño, or influenced by anthropogenic climate change and/or natural external forces, such as shifts in solar cycles (adapted from IPCC, 2019a: 809).

Climate change: Climate change refers to a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. The United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity … [and] ... is in addition to natural climate variability observed over comparable time periods' (IPCC, 2019a: 808).

Extreme weather event: Extreme weather events and their relation to conflict, fragility and resilience figure prominently in this review. These are defined as an event that is statistically rare, as rare or rarer than the 10th or 90th percentile of the probability distribution estimated from observations. Persistence of an extreme weather event over a season or more may be called an *extreme climate event* (definition adapted from IPCC, 2014: 1765).

However, as will be discussed in the third chapter, climate analysis is not necessarily robust in many conflict–climate studies and climate statistics not often appropriately applied. Therefore, a more relaxed definition is necessary when interpreting studies mentioned in the review. An event that causes significant damage may not be considered statistically extreme by climate science standards; this is a good indication that vulnerability, exposure and capacity contexts are more responsible for the negative impacts than the event itself. As such, where such an event leads to outcomes that are considered to be disasters, it shall be considered an 'extreme event' even if it does not meet climate statistics definitions. Furthermore, given the dearth of robust climate analysis in many studies, it is difficult to assess the attribution of climate change to an extreme event, or whether such a particular event is within the bounds of natural variability. Many of the studies assessed automatically assumed that every extreme was 'caused' by climate change. Even less attention was paid to how shifts in seasons and overall regional climate means over the next few decades will interact with local socioeconomic, cultural, political and environmental contexts – as will be discussed in the parallel CLARE scoping report, *Enabling climate science use to better support resilience and adaptation practice: rapid evidence assessment for the CLARE programme.*

Disaster: We have used the commonly employed UNDRR (2017) definition of disaster as:

> *A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts. Annotations: The effect of the disaster can be immediate and localized, but is often widespread and could last for a long period of time. The effect may test or exceed the capacity of a community or society to cope using its own resources, and therefore may require assistance from external sources, which could include neighbouring jurisdictions, or those at the national or international levels.*

There are some parallel definitional and methodological challenges to weather/climate-related hazards (including extreme events) with how disasters are defined, quantified or qualified in various studies or by various actors. While many of the articles we reviewed make reference to definitions used by the IPCC or UNDRR, the actual definitions used to guide analysis and frame findings was found to diverge significantly in practice.

Simonovic (2016: 85) notes that most definitions of disaster are related to the negative impacts of a hazard:

> *'Disaster risk' and 'disaster losses' are essentially our interpretations of the negative economic and social consequences of natural events. Human judgment is*

subject to value systems that different groups of people may have and therefore these terms may be subject to different definitions.

Records of 'losses and damages' data are not consistent among governments, aid agencies or insurers, for example (OECD, 2018). DRR and climate adaptation economics researchers will use different quantitative methods for estimating direct and indirect costs that are not necessarily comparable to more qualitative methods for examining 'serious disruption'; not all losses and damages are quantifiable (e.g. cultural disruption, knock-on impacts on mental health and wellbeing, and so on) and it may not be ethical to try to quantify them (see Mechler et al., 2019 for an overview of the discourses). While it might not be desirable for complete standardisation of definitions of 'disaster' in various studies, nonetheless, this can make it challenging to compare studies examining the links between disasters triggered by natural hazards and/or environmental degradation and violent conflict.

The caveats on/around definitions, and how they are framed and measured by different stakeholders – e.g. researchers from different disciplines such as DRR or climate change adaptation, social or physical scientists, conflict and security, and so on – have implications for how these groups make links between conflict, 'natural' disasters (including those influenced by climate change) and environmental degradation. Narratives and discourses matter, as the value judgements of various actors will influence what types of programmes are put forward and how they are operated. The ethics and values components of the links between conflict, natural hazard (including climate-related) -natural resource management links do need to be kept strongly in mind when reading the evidence, gaps and recommendations presented throughout this report.

3 Cross-cutting issues

3.1 Introduction

This chapter highlights some of the cross-cutting issues and the historical and current evidence base underpinning the relationships between conflict, natural resource management and climate variability and change in fragile contexts, as well as the complex interactions between the three that hinge upon socioeconomic and political contexts.

It is broken down into four sections, which:

- give a brief history of research examining the linkages between disasters and conflict

- highlight how societal structural inequalities and intersecting vulnerability, capacity and exposure factors are driving impacts and generating disaster and conflict risks (further explored in chapters 4 and 5), and the need to take an intersectional approach in policy and programming

- explore the place for climate attribution and sensitivity analysis

- recognise the need for a more multiple disciplinary approach to DRR, climate change adaptation and conflict and humanitarian action in research and programming.

Environmental degradation caused by humans (including climate change), coupled with major societal changes such as urbanisation, continues to place pressure on natural resources needed for people to access food, water, energy and livelihoods. This chapter highlights the growing need for knowledge about how shocks and stressors may influence conflict risks in fragile areas, and the need to develop risk-informed strategies for dealing with them. It also stresses the need to take an intersectional approach through a risk-based lens to help generate knowledge on these linked risk drivers and to develop resilient and sustainable programmes in fragile and conflict-affected areas.

3.2 Cross-cutting issues: from historical to recent perspectives and back again

Violent conflict is a complex phenomenon driven by multiple factors. The linking of environmental pressures with conflict, particularly over natural resources and environmental degradation, emerged as a scientific and policy concern some 30 years ago (Homer-Dixon, 1991; Westing, 1986). Even before then, the natural hazards and disasters community began exploring the links between various types of conflict, from community-level to civil war, and 'natural' disasters (Dynes and Quarantelli, 1971). As awareness of climate change continues to grow, there have been questions about its role in relation to conflict and security – not only through shifts in extreme weather/climate events, but also in overall seasons, with some areas 'tipping' into entirely new climates.

Early researchers, such as Dynes and Quarantelli (1971) and Stallings (1988), noted that evidence is mixed as to where violent conflict is likely to occur as a response during one or more of the three stages of a 'natural' disaster – immediate emergency following a hazard event, and post-emergency medium

to long term. Stallings (1988: 570) describes how 'aspects of social structure and human agency rather than "nature" alone influence the probability, severity, and consequences of natural disasters', including the likelihood of conflict. And where conflict has occurred, it has tended to be in the post-emergency periods in contexts where socioeconomic inequality is high, institutions are weak, and conflict and power struggles between 'official and unofficial decision makers' and other non-state actors already existed prior to the hazard event – including in ability to have political dissent and for collective action (Stallings, 1988; Nel and Righarts, 2008).

Some studies in the late 1990s and early 2000s lost sight of the earlier work and attempted to directly attribute every weather and climate extreme to climate change and directly link these events with increases in conflict (Detges, 2017; McCullough et al., 2019). Yet the failure of such studies to concretely demonstrate a direct link, as well as a growing evidence base, has led to a return to some of the earlier insights that climate variability and change, and environmental degradation, act as intermediary sources of conflict risk and threat multipliers, but not as direct causes.

The evidence base underpinning the relationships between violent conflict, natural resource management, and climate variability and change in fragile contexts at sub-national to transboundary scales points to complex interactions between the three that hinge upon socioeconomic and political contexts. Trying to directly link violent conflict, climate variability and change, and natural resource pressures ignores the antecedent conditions that allow particular risks to become reality (see chapters 4 and 5) and is influencing political discourses and programming to address risks (see remaining chapters). In particular, those discourses that are securitising climate change in conflict areas are running the risk of criminalising certain populations (discussed in chapter 4; McCullough et al., 2019; Peters et al., 2020).

3.3 Intersectional vulnerabilities, exposures and capacities: systemic inequalities contribute to disaster and conflict risks

As noted in the definition of 'disaster' in chapter 2, the risk of disaster, disasters themselves and all their subsequent cascading risks result from the interaction of the hazard – be that a drought, earthquake or typhoon – with the underlying vulnerability, exposure and capacity contexts of various groups of people and the infrastructure, services and ecosystems on which they rely (see Figure 1). As we outline here and discuss further throughout the report, it is the intersection of multiple factors that enable the outcomes of a climate-related or other natural hazard to become a disaster and/or that lead to conditions where conflict might arise.

Researchers have furthered explorations of the role of structural societal inequalities in conflict and in leading to disaster outcomes. Crenshaw (1989; 1991) introduced the concept of intersectionality, recognising that people can experience 'simultaneous' or 'interlocking' oppressions – for instance, racism and sexism – and that failing to look at different intersecting factors neglects people's different realities, needs, interests and capacities; and the fact that these will change over time (Chaplin et al., 2019). Taking an intersectional approach to reducing vulnerability and building resilience to natural hazards, extreme and slow-onset climate events (including those influenced by climate change), conflict and fragility helps challenge the 'one-size-fits-all' approach. It is a way of capturing the interaction between categories of social difference (such as gender, age, socioeconomic status, ethnicity, caste, disability, sexual orientation and geography (among others)) and how these affect 'individuals, social practices, cultures, institutions and power relationships in different contexts' (Lovell et al., 2019: 10).

There remain wide discrepancies in how different groups of people experience hazards and conflict. Marginalised groups – including people with disabilities, women, children, older persons, minority and indigenous groups (among others) – tend to be disproportionately affected by natural hazards, including climate-related hazards, conflict and fragility. This is due to structural inequalities in society, and the different social, economic, cultural, political and environmental contexts in which people live (Lovell et al., 2019). These are the same factors that intersect to create the exclusions and inequalities that shape

vulnerabilities and differentiated exposure to hazards and conflict, and influence people's capacity to prepare for, cope with and respond to all types of shocks and stresses (Chaplin et al., 2019). Experiences will also vary depending on whether people have pre-existing vulnerabilities, or whether vulnerabilities have been caused or exacerbated by the shock or stress through secondary impact chains.

Figure 1　　The relationships between hazards (climate-related), vulnerability and exposure that give rise to climate risk
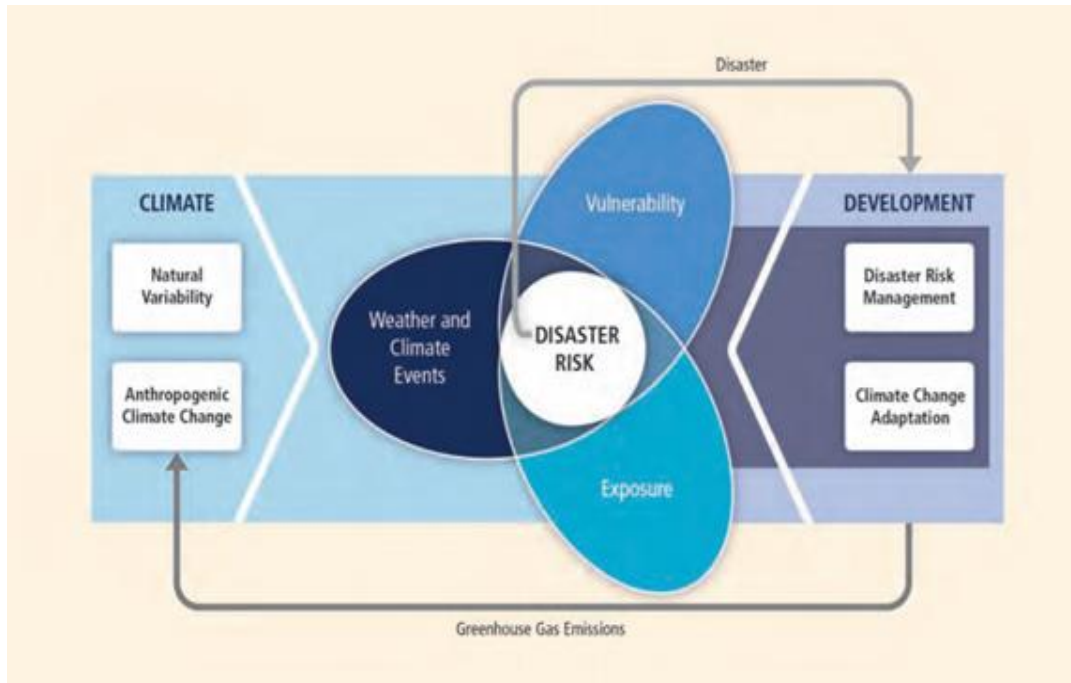
Source: IPCC, 2012: 2.

Rapidly changing development contexts in various fragile states – including demographics, urbanisation, shifting economies, access to technologies and digital divides (including access to information and the growing influence of social media) – also strongly shape how existing socioeconomic and political inequalities evolve in various conflict and fragile contexts. In some areas, fragility might be decreasing through some of these factors, while in others it might be increasing. For instance, as people move to cities and/or gain access to different ideas through social media, gender and disability norms are being challenged and cultural framings on DRR are evolving (Cannon, 2015; Gaillard et al., 2015). Nevertheless, there is a lack of clarity about how rapid social change processes are shaping vulnerabilities and capacities (there is more on exposure), including along gender, age and disability lines, and social conditions are often treated as somewhat static in climate impacts research.

Exposure – literally the presence of people, livelihoods and the assets and systems on which they depend in places that experience hazards or conflict (adapted from IPCC, 2019a: 813) – is as differentiated as vulnerability and capacities. 'Place inequalities - such as the level of urbanisation, growth rates and economic vitality' (Cutter et al., 2003: 243) vary among groups of people. For instance, it has long been noted that poorer populations are often forced to live in informal, often temporary settlements within urban settings in unsafe housing, which does not comply with building regulations (increasing exposure to geohazards) (Schofield et al., 2019); many of these settlements are situated in floodplains (flood exposure), and often have inadequate ventilation and sanitation (e.g. exposure to extreme heat and disease outbreaks) (see, for example, Otto-Zimmerman, 2010). Women and girls, elderly people and those with chronic illness or disability face differentiated exposures to non-disabled males, and often

have limited access to critical services and systems that they need to promote their well-being and longer-term development outcomes, influencing their capacity to manage shocks and stresses (Diwakar et al., 2019).

It is these differentiated vulnerabilities, capacities and exposures related to systematic inequalities that give rise to variable lived impacts during and post-hazard (including whether the hazard will lead to disaster) or conflict event (see also chapter 4). Disasters and conflict can affect people both directly (through the effects on household poverty trajectories and individual deprivation, injury and death), and indirectly (through the effects on services and systems central to a person's well-being and long-term development, including health, nutrition, water, sanitation and hygiene (WASH), education, mental health and domestic violence) (Diwakar et al., 2019; Pfefferbaum et al., 2014). Moreover, the secondary impacts and the coping strategies people adopt after a disaster or in times of fragility or conflict have a profound effect on a person's well-being and ability to recover and respond to different shocks and stresses in future. For instance, there are often elevated levels of interpersonal violence, human trafficking, child marriage, civil unrest, and increased burden of work for women and others looking after their household and dependants.

Empirical evidence bases are weak, however. Small sample sizes and limited time periods, as well as poor observational datasets (e.g. differing definitions of conflict, disasters and reporting standards; climate and natural resource observations; tracking of human mobility, etc.) have hampered the statistical robustness of attribution and sensitivity models (Nel and Righarts, 2008; Detges, 2017). This limits our ability to measure the outcomes of programmes designed to address one or more of these interlinked factors to determine how they have enabled (or not) resilience, and for whom – as discussed in subsequent chapters.

There is a need to champion systematic and longitudinal data collection, disaggregated by sex, age, economic status, ethnicity, caste and disability, and to build methodologies and tools to better capture the complexities of intersecting inequalities and poverty dynamics (and how these shape vulnerability, capacity and exposure), which can be used to inform decision-making and implementation. Moreover, an inclusive and human rights-based approach is needed in the design and delivery of all policies and programmes, to help address structural inequalities and intersecting vulnerability, capacity and exposure factors, and to help enhance protection and development outcomes for the most marginalised people.

There is also a need for better understanding of how various populations participate in socio-cultural change, how their vulnerabilities, capacities and exposure are shaped by aspects of social change, and how resilience can be promoted as divides widen. These considerations need to be included through a risk-informed approach to tackle chronic poverty, to stop people falling into poverty and to sustain poverty escapes (Shepherd et al., 2014; Opitz-Stapleton et al., 2019). Nevertheless, there is a tension in policy and programming between approaches that subscribe to the ethos of 'inclusion for all' and the need to target specific disadvantaged groups (Chaplin et al., 2019).

3.4 Climate and environmental analysis, including attribution and sensitivity analysis

Much recent research on climate and conflict has tended to attribute climate change as the cause of every single climate-related hazard in areas of conflict (Detges, 2017; McCullough et al., 2019), even though the individual hazard event might be due to natural variability alone. Proper climate analysis, including attribution and sensitivity analysis, continues to be lacking in many climate-conflict studies, as highlighted in some of the case study boxes throughout the chapters (see, for example, chapter 5) and in the evidence gap reviews. Improper climate analysis and/or failure to conduct climate attribution analysis potentially undermines the validity of findings purporting specific relationships between weather/climate-related events and trends (including as influenced by climate change), conflict, disasters and natural resource management.

This is not to say, however, that climate change is not altering climate-related natural hazards. Many historical and current climate-related events were/are still within the range of natural climate variability. However, climate change is already observably influencing the duration, frequency, intensity and spatial extent of primary natural hazards like severe storms or heatwaves, and contributing to flooding and various types of drought (secondary hazards); it will also shift seasons and weather patterns, as highlighted in multiple IPCC reports and scientific studies. The severity and extent of climate risks are differentiated at scales ranging from the individual to the international, and are continually evolving as the pace and extent of climate change shifts, as do socioeconomic and political conditions (as previously highlighted).

Climate services need to be included in programmes seeking to support development, DRR and climate adaptation and mitigation in FCAC. The required elements for such climate services include:

- Embedding climate scientists within multidisciplinary teams to conduct robust, yet project-appropriate climate analysis in support of project research-to-action aims. A science-driven evidence agenda will not be helpful; any climate services provided must be user-driven and science-informed.

This requires that:

- Climate scientists must have experience in various social science techniques (e.g. surveys, interviews, focus groups, etc.) and be able to collaborate with social scientists to scope and continuously assess:

  - the perceived needs of various project stakeholders for specific types of weather and climate analysis and information based on goals and balance this against:

    - actual capacities to use the information

    - actual needs as iteratively and adaptively reflected in programming research and activities

    - availability of climate data.

- Climate scientists must be able to translate the information and analysis to fit project aims. Furthermore, they must be able to clearly articulate the strengths and weaknesses of the weather/climate information and say how it should *not* be used. Inappropriate use of the information may lead to invalid research findings and/or create or exacerbate negative outcomes from programme actions (i.e. unintended consequences) that end up reducing people's resilience.

All these activities should be conducted through continuous engagement and communication with various project stakeholders.

Finally, there needs to be better coordination and integration of environmental scientists within studies examining the links between natural resource management, conflict and disasters. There is a need to draw from existing biology, biogeochemistry, hydrology and marine biology studies through an environmental services element similar to the required climate services, in which biologists and/or environmental scientists work within multidisciplinary teams. Monitoring of environmental conditions, such as soil erosion or water supplies, is necessary for tracking where human use patterns are creating undue strain on local ecosystems that could have serious livelihood and well-being repercussions, and that reduce the capacity of the ecosystem to buffer certain natural hazard impacts. This service should also enhance understanding of the potential links and feedback between environmental degradation, natural resource management, shifting climates and shifting social structures – and how these could contribute to disasters and/or conflict.

3.5 Improving usability and relevance of predictive and decision support models

There are a number of existing predictive and decision support models for climate change and conflict, including a mapping of current technologies, methods and innovation. Where possible, we have indicated the limitations of these models to predict climate-related conflicts or supporting decisions; however, it must be noted that several of these models are still under development and that the literature does not usually report examples of or learning from failures compared to successes. Thus, more examination would be required to understand the pros and cons of each model.

While there are a number of models, their credibility and salience for decision-makers designing programming is not guaranteed. One interviewee expressed scepticism towards quantitative predictive, early warning and risk assessment systems as these tend not to evaluate second, third or fourth order effects, and often do not include limitations or discuss uncertainties of the analyses produced. Many models also fail to capture qualitative social and cultural dynamics. Moreover, the interviewee argued that integrated climate and security risk assessments should consider carefully integrating situated on-the-ground knowledge, to be able to lead to concrete decisions and make a difference on the ground. Nonetheless, some existing toolsets, frameworks and datasets are emerging as attempts to begin addressing some of the evidence gaps identified throughout this report.

- **Programming approach:** The new joint programme by United Nations Environment (UNEP) and adelphi, Strengthening Resilience to Climate-Fragility Risks, will, by design, address the nexus of sustainable livelihoods, climate, security and peace-building (UNEP, 2019).

- **Risk assessment:** The Complex Emergencies and Political Stability in Asia programme at the University of Texas, Austin, has developed a Complex Emergencies Dashboard to map climate security vulnerability in South and Southeast Asia. It adopts an approach where the internal datasets on climate exposure, population density, household resilience and governance can be overlaid with external datasets, such as terrorist events, to create climate security hotspots. While useful, caution must be used in determining direct causality between the datasets (Smith et al., 2018). Similarly, in Spain, the Basque Centre for Climate Change has developed maps that represent climate, conflict and socioeconomic characteristics across Africa (Cappelli et al., 2018).

- **Recovery and reconstruction:** Highlighting the opportunities offered by post-crisis recovery to minimise environmental impacts and build resilience to disasters, climate impacts and conflict, UNEP (2018a) has developed a step-by-step practical guide to undertaking integrated Strategic Environmental Assessments. Part of the approach is to create 'opportunity maps' for collective decision-making. These have been developed and used in Sri Lanka's Northern Province following 33 years of conflict; they have led to collective decision-making, reduced land and resource use conflicts, and, ultimately, the declaration of new protected areas.

- **Cities:** The Clingendael Institute in the Netherlands has developed a Climate Security Resilience Monitor, which draws data from the UN-Habitat City Prosperity Index and 100 Resilient Cities' City Resilience Index to quantify resilience within urban areas in fragile contexts (Rademaker et al., 2018). Focusing on cultural capital reconstruction, the World Bank and UNESCO have developed the Culture in City Reconstruction and Recovery (CURE) framework to focus on both physical infrastructure and social capital reconstruction in the aftermath of conflict and natural hazard-related disasters. Both institutions are planning to use the framework to rebuild Mosul in Iraq (World Bank, 2018a).

- **Local level:** Ojha et al. (2019) have developed the Adaptive Learning and Deliberation approach and applied it in Nepal to mitigate conflict (due to poorly defined resource tenure, poor governance and increasing climate impacts) and foster cooperation among local communities over forest and water resources. The approach entails fostering reflective attitudes towards ongoing conflicts between community leadership and marginal groups, to better understand the causes and consequences of the conflict and promote equitable distribution arrangements. The dialogues have

been promoted at different levels of resource governance, with high degrees of reported success. The authors, however, caution that the approach may not work or may need to be adopted in highly sensitive areas, where open discussion and critical enquiry are not part of the political context.

- **Early warning systems:** The International Federation of Red Cross and Red Crescent Societies (IFRC) has utilised climate science forecasts to enable triggers for the release funding so that food, water and hygiene kits can be distributed ahead of impact (Friends of Europe, 2018). The IFRC is also working with the UN, the World Bank, Google, Microsoft and Amazon to develop the Famine Action Mechanism (FAM), which aims to unlock relief funding more quickly (Holley, 2018). FAM is an algorithm powered by artificial intelligence and machine learning to detect early signs of food shortages, such as crop failures, droughts, natural hazards and conflicts. It has many similarities to the existing Famine Early Warning Systems Network (FEWS NET, 2019); see Box 1.

Box 1   WPS Global Early Warning Tool

The Water, Peace and Security (WPS) partnership has recently launched the Global Early Warning Tool – a predictive system that will allow global, national and local decision-makers and stakeholders to intervene and help defuse conflicts before blood is shed. The tool analyses patterns of violent conflict using machine learning in combination with more than 80 environmental, economic and social variables going back 20 years, and then compares those patterns to current conditions in Africa, the Middle East, and South and Southeast Asia to pinpoint potential hotspots. It is able to predict conflict (defined as organised violence resulting in at least 10 fatalities over a 12-month period) up to a year in advance using a random forest model.

The developers of the tool are transparent and clear about the limitations and uncertainties of the underlying predictive model. In fact, they state that, 'Overall, the model captures 86% of future conflicts, successfully forecasting over 9 out of every 10 ongoing conflicts and 6 out of 10 emerging conflicts. The trade-off for this high recall is low precision for emerging conflicts. Around 80% of all emerging conflict forecasts represent false positives, that is, instances where conflict was forecast but did not actually occur. *Note*: on-going conflicts have both high recall and high precision (<1% were false positives). Like an initial medical screening, our model is optimised to flag all concerning cases for further analysis. In other words, we would rather wrongly forecast the presence of conflict than incorrectly forecast its absence (i.e. "peace", in the strictly negative sense). For this reason, we prioritise recall over the other metrics. The downside to this decision is that our model is likely to overestimate conflict.'

So the tool has a high percentage of 'mistakes' in predicting new conflicts, but its creators explain that results should be considered as a 'first screening' using a large 'net', which will require further analysis to make decisions on the individual conflict case identified.

Source: WPS, 2019.

3.6 Transdisciplinarity and cross-sectoral working

That disastrous outcomes are occurring post climate-related hazard and, in some contexts, contributing to further incidences of violent conflict, again points to structural inequalities and intersecting vulnerability, capacity and exposure factors as driving impacts and generating disaster and conflict risks. As human-caused environmental degradation (including climate change), coupled with massive societal change such as urbanisation, continues to place pressures on the natural resources needed for livelihoods

and food-energy-water security, there is a growing need for knowledge about how increasing shocks and stressors may influence conflict risks in fragile areas, and to develop risk-informed strategies for dealing with them.

A programme of action is required which looks at multiple hazards in the context of rapidly evolving socioeconomic contexts and how these influence conflict risks in fragile areas and can interact with development programmes and policies. Clearly, how development is conducted is critical to managing risks to people, livelihoods and assets, as well as the infrastructure and ecosystems on which they depend. Development cannot be made resilient or sustainable without considering a broader range of threats – beyond just natural hazards – and how these threats together pose complex risks to and opportunities for development. Development activities might tackle, ignore or amplify intersectional trade-offs and differentiated opportunities and risks (Opitz-Stapleton et al., 2019; Peters et al., 2020). This could include the risks of exacerbating conflict or marginalising particular groups, as described in section 6.2, 'Evidence of DRR, climate change adaptation and mitigation programming and policies exacerbating conflict'.

Using an intersectional approach through a risk-informed development lens is particularly important in generating knowledge on these linked risk drivers and for developing resilient and sustainable programmes in fragile and conflict-affected areas. This lens advocates that socioeconomic development, as a decision process, should ideally have three aims (see also Figure):

1. Avoid creating complex risks through poor development choices.

2. Reduce complex risks by using development to reduce gender, age, ability, and ethnic group differentiated vulnerability and exposure through increased resilience.

3. Promote constant and iterative learning to monitor changing conditions and build foresight capacities to anticipate and manage novel threats and risks, and take advantage of new opportunities.

Figure 2   Risk-informed development aims
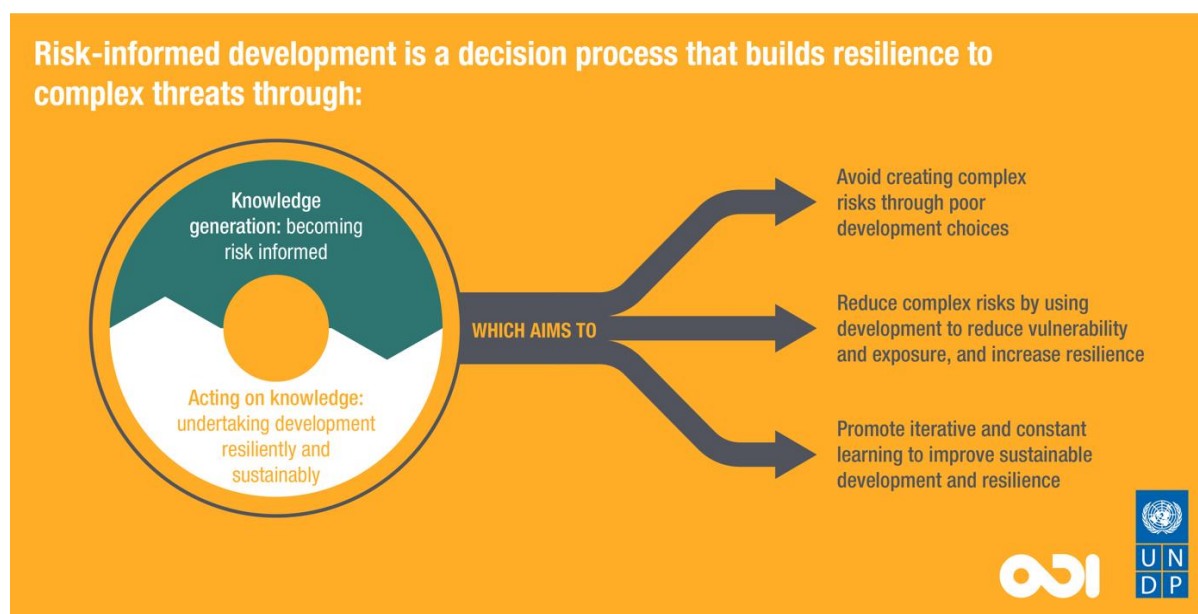
Source: Opitz-Stapleton et al., 2019.

There has been a demonstrable shift from reactive response efforts towards a more integrated and risk-informed approach to development, with clearly some gap between ideation and action. Similarly, there has been a move towards more decentralised governance in many countries, where local governments

are expected to have a better understanding of the local context and appropriate local development solutions. Nevertheless, challenges remain around capacity, coordination and resources for delivering policies and programmes that aim to build resilience to natural hazards and climate change, peace-building and conflict prevention/management at scale (Lovell et al., 2019).

The first step is for national policy-makers and international donors, investors and businesses to openly acknowledge that these trade-offs exist. Making the choices these trade-offs demand means comparing and prioritising risks and impacts (Opitz-Stapleton et al., 2019). But what is considered a risk or opportunity, to whom, and how it should be appraised and treated is a value judgement. An individual's culture, life experiences, background and education all influence what they consider risky, and their ability to tolerate, reduce or transfer perceived risks. Decision-makers, businesses and individuals accept a certain degree of risk on the assumption that the decision will bring significant benefits (such as approving urban development in a flood-prone area because of the perceived economic benefits, or an individual choosing to move in search of work). Risks may not be systematically assessed or understood, or they may be ignored.

Deciding what constitutes an 'acceptable' level of risk involves not only scientific and technological assessments of potential impacts that will be unequally distributed, but also cost–benefit analyses and ethical and political considerations, and acceptability to the public. This is a challenging ask; politics can be partisan and public opinion can be easily swayed. Risk perception and risk tolerance are subjective and value-laden, and this influences what is considered a risk and the amount of uncertainty involved in that judgement (Opitz-Stapleton et al., 2019).

There is a need to ensure better data-sharing, lesson-sharing, coherence and coordination between sectoral ministries working on these areas (often in silos) and key stakeholders (formal and informal), and for more effective integration across levels of governance from national, sub-national and local levels to scale up action around the transdisciplinary approaches needed to deliver sustainable solutions (Lovell et al., 2019). The case studies in chapter 6 'Climate finance for adaptation in fragile and conflict contexts', highlight shifts in research and programmatic thinking.

This review examines evidence gaps in addition to what is known, from multiple disciplinary perspectives, including DRR, climate adaptation and conflict and humanitarian research and programmes. The subsequent chapters take a people-centred and intersectional approach to vulnerability reduction and resilience-building in the context of climate change, natural resource management and natural hazards. We will review tools and approaches used to support climate adaptation and DRR in FCAC and sub-national contexts, including experience of conflict-sensitive climate adaptation and DRR programming. This will draw on lessons from humanitarian and development agencies working on mainstreaming conflict sensitivity through the DFID Conflict Sensitivity Consortium (CSC).[1] We aim to cross-fertilise these ideas with insights from the natural resource management field, to suggest promising research and programme frontiers.

Where possible throughout the different chapters the authors will provide evidence of how existing literature explores:

- different factors of exclusion, inequality, vulnerability and capacity in the context of people's ability to manage and respond to natural hazards, including those related to climate variability and influenced by climate change, conflict and fragility;

- the secondary impacts of conflict, climate variability and change, natural resource management and natural hazards on inter-personal violence and on the coping strategies used by households to help them deal with these events;

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[1] DFID's Conflict Sensitivity Consortium is a global network of organisations and individuals that brings together 'actors in the fields of development, humanitarian, peacebuilding, security, research and business using conflict sensitivity at policy, organizational and programmatic level… [which] identifies synergies and facilitates collaboration and coordination among organizations dealing with conflict sensitivity' (CSC-Hub, n.d.).

- what methodologies and strategies are being used to understand exposure, vulnerability, inequality and poverty dynamics in the context of climate variability and change, natural resource management and under conditions of conflict and fragility;

- case studies/best practice where governments or organisations have attempted to take an integrated, inclusive and equitable approach to building resilience to climate change, natural hazards, natural resource management, conflict and fragility in policy and practice, and what we can learn from these.

4 Hazard- and climate-related disasters and conflict

This chapter reviews and summarises the available information, evidence and gaps on what types of disaster risk management actions are viable and appropriate in FCAC to address climate-related and hazard-related disasters. It considers how communities living in such contexts experience and manage climate and disaster risk, and how policy and practice for DRR has responded to date.

Here, the term 'climate-related' encompasses a spectrum of weather/climate events from rapid-onset, short duration extremes to slow-onset, long-duration events (e.g. droughts and sea-level rise), whether these are entirely within natural variability or where claimed as being attributed to climate change – even if proper attribution analysis is lacking.

4.1 State of the evidence: do climate-related disasters lead to conflict?

Since the 1990s and more extensively throughout the 2000s, various scientific communities have explored whether, how, and to what extent disasters instigate or escalate violent conflict. Earlier studies on the nexus of climate, security and fragility predominantly focused on quantitative analysis seeking to establish a direct causal link between climate change or weather/climate extremes and conflicts (Busby, 2018; Koubi, 2018). This literature produced ambiguous and often contradictory results. Research has since shifted from attribution to understanding the dynamics between climate-related hazards and the political and socioeconomic drivers of conflict.

Literature suggesting that climate-related disasters do increase violent conflict outcomes are routinely cited in policy papers and dialogues, including in national security strategies and at the UN Security Council. Much of this literature attributes climate change in particular extreme events, such as droughts. Problematically, however, it does not always undertake robust climate analysis nor explore shifts in disaster event severity through time as a function of climate or socioeconomic and political change – an area thus warranting further research (see section 4.1.2 on climate security).

Other bodies of literature indicate that disasters do not universally lead to conflict; some articles find that disasters do contribute to conflict, while others find that disasters lend toward cooperation. In a review of current literature, Xu et al. (2016, in Peters et al., 2019b: 9) find that 'disasters do not directly lead to social conflict, but can do so indirectly through their adverse impacts on society and by increasing social risk'. It is worth noting that what does not feature prominently in the literature is the 'potentially mitigating role of DRR' nor linked climate change adaptation action in reducing or exacerbating conflict risk (more on this later).

A substantial number of articles assess whether disasters lead to conflict or increase its intensity, and many such as Nel and Righarts (2008) find that 'disasters have been found to increase the risk of civil conflict in the short and medium term in low- and middle income countries'. Other studies find that even where cooperation and collaboration ensue in the immediate post-disaster context – while

emergency activities are underway – later on, social conflict can increase (Carroll et al., 2006, and Dynes and Quarentelli, 1975, in Peters et al., 2019b).

In more extreme cases of social change, there are empirical examples of disaster events providing political impetus and space in which political movements can accelerate their agenda. This relationship between disasters and political legitimacy is complex, and time- and place-specific. Examples of this interesting dynamic include the increased support for the Sandinista revolution in Nicaragua following the 1972 earthquake, which resulted in the overthrow of the Somoza dictatorship. In other cases, statistical studies find that higher numbers of disaster survivors can lead to increased risk of conflict owing to higher numbers of people with grievances – and that this is more likely in developing countries than democratic countries (Bhavnani, 2006). Other studies find that 'rapid-onset climate-related disasters, such as storms and floods, appear to have a small impact on civil unrest on average, but closer analysis … reveals that they have a highly variable effect on violent civil unrest through generating both cooperative and conflictual behaviours' (Nardulli et al., 2015, in Peters et al., 2019b: 10). Note that by climate science standards, floods and storms have timescales that lend them to be described more as weather-related hazards, but this distinction is lost in many studies such as in Nardulli et al. Further evidence is provided in Box 2.

Box 2   The multifaceted relationship between disasters and conflict

'Other studies investigate the variable impacts of disasters on conflict and political stability relative to the political and social systems in place. Rapid-onset disasters are statistically correlated with the onset of political instability, particularly in transitional states with weak institutions and limited capacity to resolve conflicts peacefully (Omelicheva, 2011); climate-related disasters, such as heatwaves and droughts, are correlated with armed conflict in highly ethnically fractionalised countries (Schleussner et al., 2016). In a study of Haiti after the 2010 earthquake, Marcelin (2011) linked the re-emergence of gangs in the Cité Soleil shanty town with political, social and economic exclusion and the inability of a weak government to address increasing violence in the area. In Chile after the 2010 earthquake, Carlin et al. (2014) found that the disaster eroded a relatively new democracy, and the post-earthquake crisis period led to violent political and social conflicts along with other undesirable effects, but also strengthened social networks.

There is also evidence that some political regimes may become more repressive following disasters. Wood and Wright (2016) find that disasters can increase regime repression, particularly in areas most affected by disaster, because disasters can provide an opportunity to express grievances, both around the disaster itself, and more generally. This in turn can prompt a more assertive government response to suppress threats and maintain control.'

Source: Peters et al., 2019b: 10.

Studies are providing an initial characterisation of the different effects of climate-related extremes (e.g. shocks like typhoons) and trends (e.g. stresses such as seasonal temperature increases) on individual and collective propensity for violence and conflict (see Box 3). Koubi et al. (2018) 'strongly and robustly' find that people displaced by environmental stresses are more prone to conflict compared to those displaced by shocks, as over time people become aware of their state of deprivation and low adaptive capacity in relation to better-off people. Brzoska's (2018) findings align with the literature that disasters do not themselves create conflict. Their research also suggests that disaster events may lead to an escalation or prolongation of armed conflict where it is already occurring, but they may also encourage cooperation and de-escalation of conflict in limited areas for reconstruction purposes. Linke et al. (2018) reach similar conclusions in their study in Kenya, where violence or 'violent attitudes' only moderately increase due to droughts. Miles-Novelo and Anderson (2019) summarise a few

psychological pathways through which climate-related hazards (they attribute these to climate change) influence individual violence.

Box 3 Case study: Climate change as a threat multiplier in Lake Chad

The Lake Chad Risk Assessment highlights the role of climate change in the current crisis.

Lake Chad is caught in a conflict trap. It is experiencing one of the world's worst humanitarian emergencies, with an estimated 10.7 million people in need of assistance. A G7 mandated report from adelphi demonstrates, for the first time, how climate change is interacting with the conflict and compounds the crisis, and sets out how these challenges might be overcome.

The report, *Shoring up stability*, shows that climate change and conflict dynamics create a feedback loop where climate change impacts seed additional pressures while conflict undermines communities' abilities to cope. It concludes that the impacts of climate change have to be tackled as part of peace-building efforts as well as humanitarian aid and development cooperation if the region is to break free of the conflict trap. In doing so, the Lake Chad basin can once again become an engine for sustainable livelihoods and stability in the region.

This independent report is the first of its kind on the Lake Chad region and a pioneer of climate-fragility risk assessments globally. Supported by the German and Dutch governments, it is the product of an intensive two-year period of interdisciplinary research across Cameroon, Chad, Niger and Nigeria. It combines long-term hydrological data from the Lake Chad basin as well as brand new analysis of 20 years of satellite observations. It also builds on more than 200 interviews with community members, including past and present members of armed groups, as well as experts and officials.

Source: Vivekananda et al. (2019).

The importance of natural climate variability and change on hazard profiles has been elucidated in numerous scientific reports. Of particular note was the IPCC *Special report on managing the risks of extreme events and disasters to advance climate change adaptation* (known as SREX) (IPCC, 2012), and accompanying regional and thematic summaries from the Climate and Development Knowledge Network (CDKN) (available online at cdkn.org/srex). The SREX was significant, making clear the inherent links between action on climate change adaptation and disaster risk management as inherent components of broader development processes, both of which can act to reduce exposure and vulnerability and increase resilience 'to the potential adverse impacts of climate extremes' (IPCC, 2012: 2).

Conditions of conflict have been shown to increase exposure and vulnerability to climate-related disasters because capacities and capabilities to cope with current impacts and anticipated risks are typically lower in conflict settings (Harris et al., 2013) (see Figure 3). The way in which these manifest vary significantly depending on the context. Because disaster risk is, in part, a social construction (see Figure 1, Figure 2 and chapter 3), risk factors are themselves political. Individuals and families living in locations highly exposed to flooding or landslide may have settled there because that land is cheaper and they had few alternatives. In the case of Mocoa in Colombia, women and children displaced by armed groups settled on the only affordable land, an area that in 2017 was hit by a landslide, killing hundreds and leaving many more homeless (Siddiqi et al., 2019). Exposure to violent conflict can alter and hinder access to livelihood opportunities, such as limiting access to water and grazing land in the context of sub-Saharan Africa. It can displace communities from their livelihoods entirely, as in the case of the Rohingya who fled Myanmar into Bangladesh, or Venezuelans who fled into Colombia,

throughout 2018–2019. Such displacements can put communities at higher risk of experiencing natural and climate-related disasters, or other forms of violence (Opitz-Stapleton et al., 2019).

Figure 3   The role of violence, conflict and fragility in the construction of disaster risk
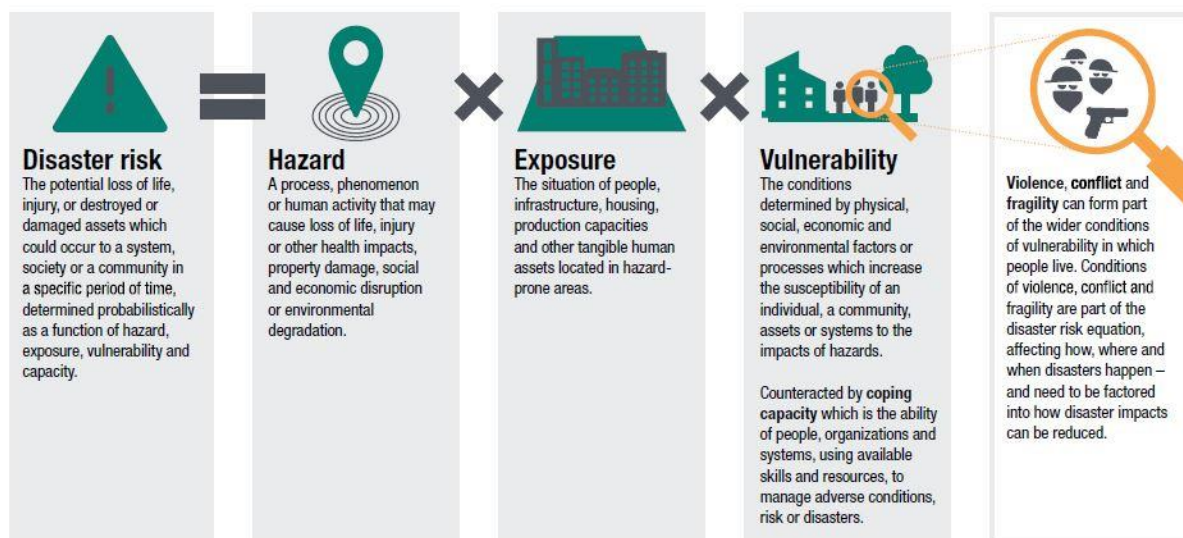
Source: Peters, 2019a: 16.

The biennial Global Assessment Report on Disaster Risk Reduction (GAR) has routinely included considerations of climate change in relation to changing hazard and exposure profiles, but also in relation to the potential value of coherence across the post-2015 agendas. The language of 'climate emergency' is used to stress that 'non-linear change in hazard intensity and frequency is already a reality. Affecting the intensive and extensive nature of risk, climate change can generate more powerful storms, exacerbate coastal flooding, and bring higher temperatures and longer droughts' (UNDRR, 2019). The GAR19 calls for local to national DRR plans – as articulated in Target E of the Sendai Framework – to 'integrate near-term climate change scenarios' (UNDRR, 2019). This is complemented by a chapter (chapter 13) on 'integration between disaster risk reduction and national climate adaptation strategies and plans'. In practice policy coherence – horizontal, vertical, spatial and temporal – has been mixed with significant progress in just a few regions, namely Asia and the Pacific (United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2018c).

Despite the empirical examples pointing to the operational realities and severity of the challenge, what does not yet exist is a clear picture of the types of risk management actions that are viable and appropriate for different conflict settings. Piecemeal efforts have been moving in this direction – such as the recent 'when disasters and conflict collide' research project by ODI – but this is marginal in comparison to the scale of the challenge. The World Economic Forum (WEF) (2019), for example, has pointed to the consequences of inaction on linked climate, disaster and conflict risk, including an escalation of compound and complex risk, with warnings of increased poverty and crisis. One such consequence is the potential for conflict and security risks to be triggered or exacerbated by climate-related disasters, which is explored further in this chapter.

4.1.1 Geographical focus of evidence gaps on DRR, climate and conflict

Mapping of recent literature on the nexus of climate-related factors and conflict, informed by ODI's Climate Change, Conflict and Security scans (Peters and Mayhew, 2019), reveals that current attention to climate security problems has tended to focus on the Sahel and East Africa region due to the political significance that these places have for international donors (Price, 2019). Although certainly not

exhaustive, the reviewed literature has highlighted gaps in knowledge and actions in a number of countries and regions:

- *The Middle East and North Africa (MENA) region*: there has been little effort to develop a regional approach to climate security risks despite the transboundary nature of climate-related impacts on water, food, energy and livelihoods. For instance, settling water allocation problems between Israel and Palestine would greatly contribute to mitigating conflict risks (EcoPeace Middle East, 2019), and could increase the climate resilience of both in the long term. In Iraq, present policies pay limited attention to the climate security problem despite increasing challenges posed by climate change for water, security and development (von Lossow, 2018).

- *Pakistan and Sri Lanka*: necessitate more joint risk analysis and scenarios, joint early warning and response, and building capacity of local actors, despite increased efforts in each country respectively to feature climate security within training and increase resources to disaster response (Ghazi and Fleishman, 2018).

- *Africa*: needs better climate risk assessment and management strategies and stronger shared institutions and mechanisms for conflict resolution among national and regional groups (Amani Africa, 2018). Specifically, there is an increasing trend of violence associated with natural resource and livelihood security in North-Eastern Nigeria in the Lake Chad region. The Government of Mali and the UN have been called on to invest in adequate risk assessment and management strategies by UN Security Council Resolution 2423, focused on the Mopti region in the Inner Niger Delta, where poor resource management has exacerbated conflict over access to natural resources (Ursu, 2018).

- *Afghanistan*: is a country where climate and security links are poorly understood (Price, 2019).

4.1.2 Climate-related disasters and security risks, and evidence gaps

This section briefly summarises the literature and action seeking to tackle security risks that could arise during or after climate-related disasters. This topic is important as it reflects the way the climate–security–disaster nexus is being portrayed in high-level policy debates, such as the UN Security Council. The focus is on the Sahel, the region on which much of the current literature is centred.

Debates regarding the real and potential security implications of climate-related impacts (including those influenced by climate change), and the securitisation of climate change as a result of those debates, have proliferated significantly since the inclusion of climate change on the UN Security Council agenda in 2007. Much analysis focuses on whether or not climate change has been securitised (Trombetta, 2008; Youngs, 2014; Peters and Mayhew, 2016; Warner and Boas, 2017). In an analysis of the inclusion of climate change in the UN Security Council debates and in UK security policy, Peters (2018: 196) finds that climate change has been partially securitised, if securitisation is understood to refer to a 'gradual process wherein political choices are made to frame certain issues in particular ways. Climate change has been reframed from a purely developmental and environmental concern to one that impels foreign policy and security domains.'

Less explored are the ways in which 'disasters' – namely climate-related disasters – are used as part of that political discourse in political debates on climate change and conflict and security, from the mid-2010s, in UN and member state interventions at the UN Security Council and General Assembly. Analysis by Peters (2018) finds that the act of citing high-impact disasters was an important discursive instrument in international debates on climate change and linked security risks, and featured heavily in UN Security Council debates. Examples of the narratives include 'extreme weather events' leading to 'dangerous security vacuums' (UN Secretary-General, 2011), of 'climate-change driven migration's potential to incite conflict' (UN Secretary-General (UNSG), 2007), and drought and flooding leading to the 'destabilisation of whole societies' (UN Security Council (UNSC), 2007). It should be noted, however, that actual empirical evidence to support such discourses is limited – particularly robust climate change attribution analysis; and notwithstanding the growing body of evidence that direct linkages are not likely to be found, as discussed further in this chapter.

Another common argument used to link climate and conflict is that climate change indirectly lowers the opportunity cost for violence or recruitment by armed groups, leading to more conflict. Koubi (2018) theorises that climate-driven economic downturns can increase perceived inequality and lead to conflict. However, identifying common patterns between disasters, conflict and peace outcomes is problematic, as Peters et al. (2019b: 10) argue:

> *Various authors (e.g. Uzoechina, 2009; Walch, 2018) have suggested that disaster risk and conflict tend to be mutually reinforcing. However, the interplay between the two, as well as additional social, economic, political and environmental factors, makes interactions complex and difficult to disentangle. Where conflicts and disasters are long-term, embedded processes, the relationship is even more complex and intertwined, and isolating dependent and independent factors becomes problematic.*

Chapter 5 also further explores conflict, natural resource management and climate-related factor evidence from a security lens. The OECD's *States of fragility* report (2016) (see Figure 4) shows that homicide and battle deaths are largely the same in contexts with moderate and high environmental fragility, and that there is no distinct relationship between differing levels of environmental fragility and interpersonal violence. However, armed conflict and terrorism are more prevalent in moderate and highly environmentally fragile contexts.

Figure 4   Environmental dimensions contributing to different types of fragility and violence
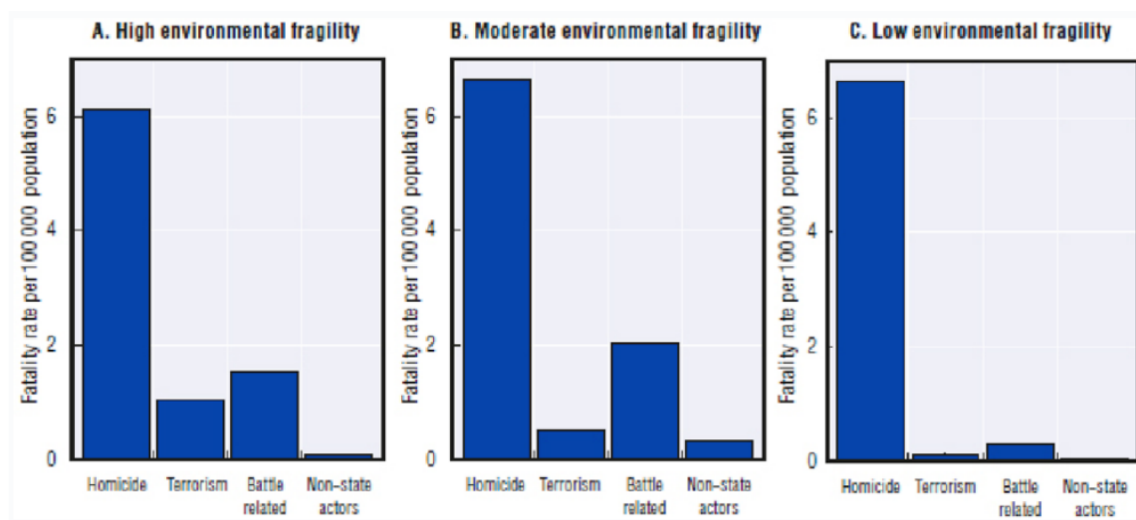
Source: OECD, 2016.

OECD (2016) concludes that 'the relationship between environmental risks and fragility related to violence can be complicated' and that research studies have been contradictory. OECD cites one meta-analysis of more than 60 studies on the link between climate change and conflict, which finds that 'the magnitude of climate change's influence on conflict is substantial and statistically significant at many levels of geographical aggregation. According to this study, one standard deviation increase in temperature or extreme rainfall increases the frequency of interpersonal violence by 4% and increases inter-group conflict by 14% (Hsiang, Burke, and Miguel, 2013). But other studies question this research, underlining the mixed and inconclusive results from scientific research on climate change and conflict (Buhaug et al., 2014).'

Ide and Scheffran (2014: 265) analyse some two-dozen large sample size studies on the links between climate change and conflict, choosing those which cover more than one country and appear in the peer-

reviewed literature. They find that 'statistical investigations on the link between adverse environmental changes and violent conflict are similarly inconclusive'. Similarly, inconclusive results appear for the body of available individual country/territorial case studies.

Owain and Maslin (2018) compare social, economic and climate data and violence in East Africa over several decades and investigate whether any underlying drivers are more highly correlated with population displacement. They conclude that, in terms of 'total numbers of displaced people' (ibid: 1), contextual factors – economic performance, population growth and political stability – play a far more important role than climatic factors. A correlation is found between increased population movement and periods of drought.

Research examining the relationship between climate change, weather/climate-related hazards, and conflict, stability and violence has burgeoned since the early 2010s. In some respects, the nature of the topic has forced an interdisciplinary approach, but at the same time created a new silo of specialist climate security research (see Box 4). With all of these examples, however, there is a lack of robust climate analysis using appropriate statistical techniques to evaluate trends in extreme events and/or the detection and attribution of a climate change signal.

The CNA Cooperation Military Advisory Board (2007) language of a 'threat multiplier' is often used to imply that climate change will create impacts beyond government capacities, exacerbating pre-existing and instigating new government and stability challenges in already 'volatile' regions. Since the mid-2000s, the use of such language and linking of climate-related disasters to potential conflict exacerbation has continued. The prominent G7-commissioned report (Rüttinger et al., 2015: 34), *A new climate for peace,* argued: 'Extreme weather events and disasters will exacerbate fragility challenges and can increase people's vulnerability and grievances, especially in conflict affected situations. The relationship between disasters and fragility is often mutually reinforcing; disasters put additional stress on stretched governance systems, decrease economic opportunities, reduce resources, and displace people.' Similar sentiments were echoed by the *Global risks report 2019* (WEF, 2019)*,* which refers to flood and coastal storm impacts, including security risks, migration and displacement.

Critiques have been levied on the disjointedness of the literature – namely that evidence and analysis of the security impacts of disasters and of climate change (including climate-related disasters that might have been influenced by climate change) remain disconnected (Peters et al., 2019b). Moreover, looking ahead:

> *While some are doubling down on fine-tuning quantitative models and methodological approaches, Vivekananda et al. (2014) point out that establishing causality between climate change and conflict is of little use either to governments or to actors involved in peacebuilding work. Instead, they argue that more emphasis should be placed on understanding, enabling and promoting 'pathways between climatic changes and peace in fragile and conflict-affected societies' (Vivekananda et al., 2014: 488). They also suggest that, while there may be a connection between climate change, vulnerability and conflict, there may also be a virtuous cycle between climate change, resilience and peace. This can be achieved through 'peace-positive' climate change adaptation efforts and 'climate proof' peacebuilding and development. Within the disaster risk reduction community, Stein and Walch (2017) have offered related arguments on how the Sendai Framework for Disaster Risk Reduction can be used for conflict prevention and sustaining peace ... Others suggest that research should probe more deeply into causal pathways; Sakaguchi et al. (2017: 624), for example, argue that 'a more disaggregated understanding of the causal pathway is necessary to inform interventions that may reduce the incidence of violent conflict'. Research on vulnerabilities and the social contract lends itself more to actionable inroads for interventions and provides more insights into breaking disaster–conflict pathways and bolstering disaster–peace pathways. (Peters et al., 2019b: 15–16)*

Box 4   Overview of the climate-security literature

The climate-security literature tends to focus particularly on the Levant, the Sahel and the Horn of Africa. While analysis draws from multiple disciplines, the insights and analysis of climate scientists is a frequently missing contribution to such literature, leading to critiques of the conclusions drawn. For example, Kelley et al. (2015) examine anthropogenic climate change-influenced drought as a primary driver of the Syrian conflict – though this has been disputed through more robust analysis by Selby et al., 2017. Raleigh and Kniveton (2012) conclude that extreme rainfall anomalies in either direction (i.e. drought or too much rainfall) were accompanied by increased communal violence in East Africa (1997–2009) – though the rainfall analysis was not over a statistically long enough period to adequately establish departures from the long-term mean or of the correct spatial scale to conflict data. One global meta-analysis (Burke et al., 2015) found that deviations from mean temperature and precipitation patterns increase interpersonal and intergroup conflict risk – though they take a very broad definition of interpersonal (domestic violence, road rage, assault, murder and rape) and intergroup (riots, ethnic violence, land invasions, gang violence, civil war, coups and other forms of political instability) conflict.

Climate change has also been cited as having the potential to increase the risk of civil conflict through its multiplying effects on other mitigating factors (Bergholt and Lujala, 2012; Koubi et al., 2012). This argument echoes suggestions in the literature on disasters and conflict that disasters may exacerbate conflict factors already present within a society (e.g. Harris et al., 2013; Omelicheva, 2011). This overlap is perhaps unsurprising given that these studies often use climate-related disasters (rapid- and/or slow-onset) as a proxy for climate change, even if actual climate change attribution analysis is lacking.

With all of these studies, it is worth pointing out that the robustness and quality of climate analysis is highly variable, potentially impacting the reliability of conclusions drawn. And even where the climate analysis may seem robust, spatial and temporal aggregation of climate variables can affect analysis and findings.

This is particularly evident in the frequently cited Kelley et al. (2015) study attributing anthropogenic climate change as a significant influence in the Syrian drought, claiming this contributed to the conflict. However, their analysis is an area-average of whole Fertile Crescent mean temperatures and winter precipitation between 1931 and 2008, not Syria-specific climate analysis, as pointed out by Selby et al. (2017). Nor are Kelley et al. consistent in their definition of the drought's duration, using three different time periods. As Selby et al. point out, these two discrepancies make it difficult to validate Kelley et al.'s claims. Additionally, Selby et al. found that not all places in Syria experienced rainfall deficits from 2006/07 to 2008/09, and there is not a uniform drying trend (applying appropriate statistical methods) across the Fertile Crescent. Yet, Kelley et al.'s study continues to be cited as providing conclusive evidence of the role of climate change in the Syrian drought and conflict.

Similarly, Burke et al. (2015) use an extremely broad definition of climate as encompassing events lasting only a 'few hours', climatic indices such as a Palmer Drought Severity Index, to water variability in order to accommodate a greater number of studies in their meta-review. This makes cross-comparison of studies through meta-analysis problematic, as does their broad definition of conflict. It also ignores the very real differences in timescales and statistical techniques needed for handling extreme events versus seasonal to decadal climate shifts. Uncertainties and errors in the original study's 'climate analysis' will propagate into the Burke et al. (2015) study.

Source: adapted from Peters et al., 2019b: 14, with additional discussion by Opitz-Stapleton.

The potential for DRR, including risk reduction to climate-related disasters, to contribute towards peace is underexplored. In policy commitments, such as the African regional strategies on DRR, links are made between climate change adaptation, DRR and conflict prevention (African Union Commission, 2016) and yet progress through implementation has been slow to materialise due to lack of financial and technical support. Links also feature in think tank reports, such as A new climate for peace (Rüttinger et al., 2015: ix), which suggests that: 'Disaster risk reduction and effective disaster management efforts can … provide opportunities to improve resilience to climate-fragility risks and build peace', and the OECD States of fragility 2018 report, which suggests that 'Disaster risk reduction and disaster management initiatives offer opportunities, if done properly, to address climate-related fragility risks and build peace' (Vivekananda, 2018: 62). In high-level security discussions, Japan is often among the few governments to explicitly mention the Sendai Framework as an existing policy agreement that offers opportunities for action on reducing climate-related disaster risks. The US Working Group on Climate, Nuclear, and Security Affairs (Parthemore and Nolan, 2018) argues that climate and nuclear hazards have separate multilateral regimes, yet security challenges encompassing both are concentrated in certain countries such as India, Iran and Pakistan. They call for climate and nuclear security risk assessments to be included in the US National Climate Assessment and the IPCC reports. But on the whole, the potential to utilise DRR proactively as part of a broader preventive agenda to avert the potential conflict and security risks of climate-related disasters is largely underexplored. In the case of Chad, for example, this argument has been made recently (see Peters et al., 2019a).

Linking to the broader debate on the benefits of securitising the climate, the literature highlights different interpretations of climate security, and some concerns and operational consequences arising from them. Cons (2018) finds that international non-governmental organisations (INGOs) operating in the Bangladesh delta are following an idea of 'emplacement' – i.e. mitigating climate out-migrations to richer countries, which does not reflect the needs of the local population that are focused on livelihood security. Krampe and Mobjörk (2018) share these findings and show that regional security context and vulnerabilities to climate change determine how climate-security risks are framed. While Asian and African INGOs tend to identify livelihood and development risks, western INGOs have a more traditional understanding of climate security as state or military security, encompassing issues of migration, displacement and violent conflicts. Interesting in this respect is the framing that the United States Agency for International Development (USAID) takes to addressing fragility. USAID promotes a self-reliance approach on the part of affected states, which is measured in their 'commitment and capacity' to both liberal democracy and inclusive development. Ingram and Papoulidis (2018a; 2018b) have criticised this approach as the priority for governments attempting to exit fragility should not be to develop a western model of statehood, but to increase the ability to withstand shocks and stresses.

Though limited in empirical evidence, nascent literature suggests that there is potential for DRR approaches to contribute towards conflict prevention and peace-building (Stein and Walch, 2017; Peters et al., 2019e; Mena et al., 2019). Such ideas stem from empirical evidence that disasters and violence conflicts that occur in the same location can result from similar vulnerabilities (Wisner, 2009; Harris et al., 2013), that 'disasters are threat multipliers for fragility' (OECD, 2018: 61), and that there can be conflict implications from disaster events. Thus, logic flows that DRR could contribute to some aspects of conflict prevention, through the reduction of disaster risk and impacts in conflict contexts, and linked disaster and conflict reduction interventions. This is the case in Afghanistan, for example, where reforestation projects are utilising conflict resolution and management committees to achieve joint disaster reduction and peace outcomes (Mena et al., 2019). As stated in much of the new literature in this field (such as Peters et al., 2019e), empirical testing is required, not least because many of the grounded examples of NGO interventions in conflict contexts have not been independently verified.

Finally, there are examples of disaster vulnerability being used as a tool in warfare, from a seven-year cloud seeding campaign by the United States in Cambodia and Vietnam in an effort to increase rainfall and subsequent landslides in order to disrupt supply lines (Marktanner et al., 2015), through to political drivers of increased vulnerability as a factor behind famine in Africa (de Waal, 1997).

4.1.3 The impact of conflict on climate- and hazard-related intersectional disaster vulnerabilities and exposure, and vice versa

There is a body of literature exploring the way in which inequality and marginalisation – based on race, ethnicity, class, gender, sexual orientation, and religion, among others – can make some groups more vulnerable to disasters than others, as we touched on in the first chapter. Such intersectional dimensions are as relevant for developing as for developed contexts. For example, long-term public underinvestment in social services has been noted as a driver of vulnerability for communities affected by Hurricane Katrina in the United States in 2005 (Quinn, 2006). In contexts experiencing weak or ineffective disaster risk governance, linked to issues of violent or armed conflict, the protections provided to citizens by the state in the aftermath of a disaster may be limited and insufficient.

For the first time, in 2019 the GAR sought to include explicit recognition of the additional challenges of reducing climate and disaster risk in 'fragile and complex risk contexts' (UNDRR, 2019: chapter 15). Explicit recognition is also given to vulnerable persons and groups in contexts of compound disaster and conflict risk, where 'Disaster and conflict often lead to a higher rate of GBV [gender-based violence], putting women, girls and lesbian, gay, bisexual, transgender and intergender communities at heightened risk in these contexts' (ibid: 414). A number of empirical cases are cited, including conflict-displaced populations such as Rohingya displaced to shelters highly exposed to landslide and flooding (ibid: 414–415). The chapter was informed by a call for papers. However, the limited robust empirical evidence garnered through the call for paper process suggests that there is little documented understanding of how to adapt linked climate change adaptation and DRR strategies to conflict contexts or of integrating consequences of conflict, including displacement. Yet, while this shift has advanced the status of knowledge and enabled better-informed decision-making, the evidence on climate change as a threat multiplier itself warrants more research.

Abuses on an individual level are evident in disasters in conflict contexts. This includes sexual and gender-based violence, which often increases in disaster situations (see Brody et al., 2008; UNDP, 2011; IFRC, 2016, in Peters et al., 2019b). Evidence of pre-existing gender-based violence increasing in the aftermath of major events is rife – including after Hurricane Mitch in Nicaragua and Honduras in 1998, in Kashmir following the 2005 earthquake (see Peters et al., 2019b), and in tsunamis in Bangladesh, Myanmar and Samoa (IFRC, 2016). In the example of the 2004 Indian Ocean tsunami, Fisher (2010) found that pre-existing gender-based violence owing to conflict and displacement increased in the post-tsunami chaos and insecurity.

There is limited evidence of the impact of climate-related disasters on patterns of sexual and gender-based violence, or of the potential effectiveness of preventive measures. Evidence that does exist suggests that sexual and gender-based violence is increasing with climate-related disasters in some contexts. Focusing on the Pacific, UN Women found a 300% increase in new domestic violence following two tropical cyclones in Tafe Province in Vanuatu in 2011. This is a societal problem: 'In addition to violating human rights, violence impedes development gains, as it undermines physical and mental health, prevents women from assuming leadership and decision-making roles, and impacts the economy through increased health expenditure and reduced productivity. This threatens achievement of sustainable development' (UN Women, n.d.).

Nguyen (2019) finds that violence against women in Eastern Visayas (Philippines) was not elevated because of the typhoon-related disaster, but was in large part due to pre-existing socially constructed gender inequalities and vulnerabilities. A report from World Vision (2018) points to the lack of safeguards for displaced women and girls in 10 case study sites across East Africa as a problem when disasters or conflicts compound the vulnerability of women and girls. In a review of secondary literature, Lee (2018) finds that few global sources provide statistics for gender-based violence in pre- and post-disaster situations, which may suggest a corresponding neglect of gender-based violence considerations in disaster management. The European Commission et al. (2018) has called for understanding the specific recovery needs (going beyond physical reconstruction) to be conflict-sensitive, to include institutional failings, drivers of conflict and cultural heritage (which are often targeted during conflict).

The negative impact of climate change on patterns of sexual and gender-based violence is not limited to sudden-onset disasters. UN Women argues that climate change is a 'serious aggravator' of gender-based violence in a range of contexts, owing in part to its multiple spatial and temporal impacts on the agricultural sector and the resulting loss of income, as well as increased stress and psychological and social pressure (UNFCCC, 2019). Moreover, evidence in Chad from the Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) programme reveals how more than 35% of women have been victims of physical, psychological and/or sexual violence at the hands of their partners … Violence against women and girls is not necessarily perpetrated in times of conflict and by combatants only. The most reported forms of violence (child marriages, physical and sexual assault by known perpetrators, polygamy, and the denial of resources and opportunities) all have adverse impacts on survivors' reproductive health and on their ability to secure their livelihoods (Le Masson et al., 2018). Further research is required in a greater diversity of conflict settings to better understand patterns of interpersonal violence and changing climate conditions.

4.1.4 A history of DRR and its links to climate action

Disaster studies have, since the 1970s, emphasised that disasters are 'unnatural', resulting from the interaction of a hazard with exposure and vulnerability (Wisner et al., 2004). Over the past half a century, understanding of and action on DRR have advanced significantly – namely, through deeper scientific understanding of hazards and exposure, vulnerability and capacities. Prior to the 1990s, emphasis remained on delivering humanitarian response in the aftermath of natural hazard-related disasters – and in the absence of effective DRR, this continues today, particularly in FCAC.

The 1990s marked the International Decade for Disaster Reduction (UN Resolution 42/169), and the initiation of an international process to begin developing a framework for DRR. The 2000s began with the endorsement of the International Strategy for Disaster Reduction (UN Resolution 54/219), and a general recognition of the need to go beyond a focus on disaster response to a more proactive approach that encapsulated prevention, risk reduction and preparedness. Continued evidence of high-impact events, such as the 2004 Indian Ocean tsunami, kept DRR high on the political agenda, and in 2005 the Hyogo Framework for Action 2005–2015 began (UNISDR, 2005). The Hyogo Framework, and accompanying institutional and convening arrangements to help track progress on the commitments – such as the Global Platform on Disaster Reduction, and UNISDR (now UNDRR) – shifted attention towards risk reduction efforts at local and national levels by establishing the necessary institutional arrangements, enhancing early warning and preparedness, and building a culture of safety.

The established and maturing links between weather/climate-related hazards and climate change prompted inclusion of text in the Hyogo Framework to encourage integration of climate knowledge into understanding of hazards, linked action on risk reduction and climate adaptation, and use of climate risk information by disaster planners (UNISDR, 2005: 11, 15). Despite over a decade of implementation, progress against the Hyogo Framework 'priorities for action' was mixed (for a review, see Wilkinson et al., 2017). In short, while a significant volume of DRR-related activities was undertaken throughout the framework's implementation period, more progress was still required. Efforts to ensure that development trajectories are risk-informed, that a systematic approach to risk reduction is adopted through all sectoral investment, planning and implementation decisions and processes, and that long-term strategies for institutional change are in place, backed by adequate financing (ibid.) contributed to a second DRR framework, the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015). This was the first of a suite of international agreements to be negotiated that year as part of Agenda 2030. The Sendai Framework marked an evolution of understanding and action on disasters. Together with a set of seven quantitative targets, the framework takes a more cross-sectoral, multi-hazard and all-of-society approach, with the ambition to deliver not just a reduction of disaster risk and losses, but to enable and strengthen disaster resilience. The scope of hazards is expanded beyond natural hazards, to include biological, environmental, geological and geophysical, hydrometeorological and technological hazards. Moreover, there is explicit recognition that 'Several hazards are socionatural, in that they are associated with a combination of natural and anthropogenic factors, including environmental degradation and climate change' (UNDRR, 2017). Throughout the framework, numerous references are made to climate change as exacerbating the frequency and intensity of hazards

contributing to disasters, thus acting as an underlying risk driver (UNISDR, 2015: 10). Emphasis is placed on the potential value of coordination and collaboration between parties engaged in delivering the Sendai Framework and those engaged in the UNFCCC (noting that the Sendai negotiations preceded the Paris Agreement).

Of the cross-cutting issues identified for this paper, it is worth noting that the Sendai Framework includes reference to the linked ambitions of sustainable ecosystem management and environmental and natural resource management and DRR (UNISDR, 2015: 20). Moreover, given the transboundary nature of disaster risk and impacts, states are encouraged to engage in regional and sub-regional strategies and mechanisms for risk reduction across national borders (ibid: 18). Special reference is made to transboundary cooperation in relation to ecosystem-based approaches, and in dealing with epidemics and displacement risk (ibid.).

Disaster studies and action on DRR – in part owing grounding in social sciences – have traditionally paid significant attention to intersectional vulnerability and impacts from hazards. The Sendai Framework makes this explicit, with one of the core implementing principles as follows (guiding principle d): 'Disaster risk reduction requires an all-of-society engagement and partnership. It also requires empowerment and inclusive, accessible and non-discriminatory participation, paying special attention to people disproportionately affected by disasters, especially the poorest. A gender, age, disability and cultural perspective should be integrated in all policies and practices, and women and youth leadership should be promoted. In this context, special attention should be paid to the improvement of organized voluntary work of citizens' (UNISDR, 2015: 13).

Progress towards the Hyogo Framework lagged in FCAC, as with the attainment of the Millennium Development Goals (MDGs) at large, and preliminary evidence suggests that FCAC are also lagging behind in their contribution to the attainment of the Sendai Framework targets (Peters, 2019a). Further analysis is required to explicitly understand the barriers and constraints to advancing DRR in FCAC, and to identify realistic timeframes and priorities for action to accelerate progress prior to 2030. Part of the challenge is that explicit inclusion of issues of violence, conflict and fragility in DRR efforts have long been neglected, and at times actively excluded and highly politicised.

Hesitancy to explicitly include issues of violence, conflict and fragility in international disaster frameworks stems in part from the separation of UN agencies and government departmental mandates and responsibilities, wherein international negotiations are confined to issues of natural hazards, and are seen to be stepping outside their mandate if they go beyond this. Government representation in regional and international DRR forums is typically through the national disaster management agency, which focuses on disaster response and, increasingly, preparedness and risk reduction – certainly not issues of conflict, socioeconomic development or the politics associated with social, violent or armed conflict. In the negotiations, advocates for text that explicitly recognises conflict and violence as underlying drivers of vulnerability to disaster risk were vocal. However, during the Sendai negotiations, this tension came to the fore (see Peters, 2019b, episode 1), wherein states were concerned that inclusion of language associated with conflict could undermine sovereignty by opening the door to legitimising international interference in domestic affairs. Peters (2017) outlines further reasons why, including: DRR being dominated by physical sciences and relatively apolitical study of hazards; prioritisation of peace and security over risk reduction in FCAC and thus lack of funding for DRR in these contexts; the state-centric nature of conventional approaches to DRR; and the ability and willingness of governments in FCAC to engage in issues of DRR.

Since the negotiations, progress on enhancing disaster risk governance capacities in FCAC has lagged, prompting renewed interest and ambition to better support governments and agencies to build disaster resilience in challenging operating contexts. In practice, this has included calls for greater recognition of risk management – to natural hazards, including those that are climate-related – spanning humanitarian and development action, and the need for linked programme and investment decisions. DFID's Risk-informed Early Action Partnership (REAP) programme and accompanying investment provide an opportunity for advancements in this area, though specific attention is still required to address the evidence and practice gaps on climate-related disasters in FCAC.

4.2 Evolving policy landscape for DRR

Establishing local to national DRR strategies has been a global policy priority (McElroy, 2017), articulated in Target (e) of the Sendai Framework, the soonest with a deadline of 2020. But little attention has been paid to how issues of fragility and conflict could or should be reflected in the design and articulation of DRR strategies. A review of DRR frameworks at the global, regional and national levels finds significant variations (Peters et al., 2019d). While reference to issues of violence, conflict and fragility are sparse in the Hyogo and Sendai frameworks, inclusions of such terms in regional and national disaster frameworks varies. This ranges from no reference to any terms related to conflict within the Colombian DRR legal frameworks and implementation plans – despite being a country that has long been contending with violent conflict (Siddiqi et al., 2019) – through to the Africa Regional Strategy for Disaster Risk Reduction chaperoned by the African Union declaring that one objective of their programme of action is to: 'Strengthen coherence and integration between disaster risk reduction, climate change adaptation and mitigation, ecosystem management, conflict and fragility, and other development imperatives' (African Union Commission, 2016: 7).

Though several guidance documents exist to support governments in the design of DRR strategies – namely by UNDRR – none include specific guidance on how to consider and adapt DRR strategies for fragile and conflict-affected areas. Nor are there adapted monitoring frameworks capable of tracking linked improvements and regressions in disaster risk and conflict dynamics. There are some initiatives trying to encourage a more holistic approach to understanding and acting on risk. One is the international monitoring mechanism for the Sendai Framework and linked Agenda 2030, the Global Risk Assessment Framework (GRAF). The GRAF 'aims to improve the understanding and management of current and future risks, at all scales, to better manage uncertainties and mobilise people, innovation and finance by:

- fostering interdisciplinary systems thinking, with shared metrics and shared understanding;
- enabling the identification of anomalies and precursor signals, as well as the correlations and dependencies of risks and actors to enable decision makers to act.' (GRAF, n.d.)

A major challenge in advancing the climate security agenda, as characterised by the Hague declaration on Planetary Security, is that the siloed approaches adopted by many organisations lead to limited cooperation across sectors in development programmes, and within national and local governments (Wolfmaier and Vivekananda, 2019). An area of practice where this problem is receiving attention is at the intersection of DRR and humanitarianism, where the increased complexity created by the interaction of disasters and conflicts requires new ways of thinking and doing. Ingram and Papoulidis (2018a) identify this shift in thinking happening among humanitarians (working in stabilisation and conflict prevention) and less so among those working in traditional sectors associated with resilience and DRR.

Field (2018) provides an example of this, by illustrating the case of Typhoon Haiyan in the Philippines in 2013. Agencies involved in disaster response adopted the notion of a 'pure humanitarian crisis' for the typhoon – and thus considered it a 'good project' – and pulled resources and moved away from conflict-affected areas in other parts of the country.

Peters et al. (2019c) share this assessment, as it has been hard for climate action to address the climate change–conflict nexus in practice. The authors argue that humanitarians are well-placed to support populations in areas of disasters and conflict, and calls on them to (re-)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). Some evidence of the benefits of better understanding the conflict contexts in which DRR operates is provided by Walch (2018a; 2018b). By studying Mali and the Philippines, Walch shows that: (i) DRR and adaptation is viable in places where rebel groups control territory and enjoy good relations with communities; (ii) they are not viable or will not have good impacts where rebel groups do not have territorial control and where informal institutions are weak; and (iii) in places where rebel groups do not have territorial control but robust informal institutions exist, these offer entry points even during wartime.

4.2.1 Conversely, can a disaster event provide opportunities to enhance peace?

Here, the literature tends to focus on individual disaster events, and to explore changing socio-political outcomes in the post-disaster space. While some empirical cases find increased social, political and even armed conflict (see above) in the post-disaster space, others find opportunities for peace (see Box 5). There is no robust analysis of the extent to which disaster events can provide opportunities to enhance peace. Nor has there been a critical analysis of the methodologies employed in academic articles on this topic, and thus the ability for lessons or findings to be readily applicable elsewhere. As Box 5 reveals, the findings are mixed.

Box 5   Can disasters lead to increased political legitimacy, cooperation or peace?

'One econometric study of floods and storms between 1980 and 2007 showed that these hydrometeorological disasters did not lead to an increased risk of armed civil conflict, but they did have a significant negative impact on economic growth (Bergholt and Lujala, 2012). Noting that weather/climate-related disasters, such as storms, floods, droughts, extreme temperatures, wildfires and landslides, have become more frequent in recent decades, Slettebak (2012) conducted a global study to see if such disasters led to an increase in the risk of civil war from 1950 to 2012. Using multivariate methods, the study found that disasters, particularly drought, actually decreased the risk of civil war by unifying the population and giving governments an opportunity to display competence. In a study of post-earthquake El Salvador, some political leaders emerged from disaster stronger, due to public perceptions of traits such as capability, competence and compassion (Olson and Gawronski, 2010). In other instances, disasters can serve as 'coordinating devices' for anti-government protests by creating concentrations of displaced people and enabling organisation and coordination, which can in turn threaten a political leader's hold on power (Flores and Smith, 2013: 843).'

Source: Peters et al., 2019d: 11.

A number of studies have shown that in the aftermath of a disaster, public perceptions are just as important as what actually happened during disaster response, in order to understand the impact that disaster events can have on state–society relations. This is particularly the case where civil society expectations of what a government could or should provide differ from actual support received. In a number of sub-national cases, including in India following the 2014 floods, public anger over inadequate state response to flooding resulted in the ruling parties losing subsequent elections.

A body of literature stemming from the Kelman and Koukis (2000) essay on 'disaster diplomacy' explores whether and how the post-disaster space could offer opportunities for instigating or accelerating cooperative or diplomatic processes. Many of the cases explored are international in scale, and focus on 'formal and public interstate diplomatic interactions after a major natural disaster, and how these interactions can ameliorate international conflict or tension' (Kelman and Koukis, 2000, in Peters et al., 2019b: 12). Cases cited include: Greek–Turkish relations following the 1999 earthquake; India and Pakistan following the 2005 earthquake; Eritrea and Ethiopia following the 1999–2002 droughts; and Sri Lanka and Aceh following the 2004 Indian Ocean tsunami. Common across the examples is the finding that the post-disaster space can, in some cases, support diplomacy through empathy, building foundations for trust and cooperation, and shared experiences of loss. But where 'conflict structures survive the disaster', limited or no notable progress in peace may result.

What requires further exploration are the ways in which disasters may affect relations beyond formal diplomatic interactions – to better understand changing public perceptions of opposing groups, changes

in armed group behaviour before and after disaster events, and the impact of changing resource availability for recruitment to armed groups. Currently, the literature seems to have settled on the idea that 'disasters and related activities do not create or resolve conflicts, especially over the long term, and that the foundations for peace must already be present for disaster diplomacy to have any significant short-term impact' (Kelman et al., 2018, in Peters et al., 2019b: 13). Given the prevalence and likely increase in weather/climate-related disasters in FCAC, the ideas associated with utilising opportunities for peace in the post-disaster space require further research.

Beyond diplomacy, an evidence base is needed which can better understand the potential role of DRR and climate change adaptation efforts in supporting conditions for peace. There is increasing demand at the regional level in Africa and Asia where inter-governmental dialogues have recently hosted discussions on the potential for utilising the Sendai Framework to enhance conflict prevention. Moreover, there are interesting examples emerging of utilising natural hazard-related risks as entry points for joint UN missions in politically sensitive contexts, such as the 2018 joint UN mission to the Democratic People's Republic of Korea.

Almost a decade ago, a United Nations Development Programme (UNDP) report, *Disaster-conflict interface: comparative experiences,* sought to raise visibility for the co-location of natural hazards and violent conflict, but analysis of empirical examples remains limited and those that exist 'come from different unconnected disciplines' (UNDP, 2011: 7). This remains the case today. Moreover, attempts to try and understand the relative contribution of action on DRR and conflict prevention – such as Peters et al. (2019e) – are stifled by lack of robust empirical evidence, even though anecdotal evidence suggests there are opportunities for linked action (see OECD, 2018; UNDRR, 2019; Peters, 2019a).

4.3 The reproduction of systemic risk through post-disaster processes

This section seeks to convey how attempts to 'build back better' in the aftermath of a disaster event can reproduce pre-existing inequalities and marginalisation, unintentionally and intentionally. It also touches on ideas associated with 'disaster capitalism', together with intersectional considerations related to evidence on interpersonal violence in post-disaster contexts. Finally, we also point to emerging evidence suggesting that sexual and gender-based violence may be increasing as a consequence of additional stresses on lives and livelihoods resulting from changes in the climate.

This sub-theme is pertinent as it directly links to emerging programmatic and policy discussions on the need to scale up DRR action in protracted crisis settings, as part of the ambition to improve work across the humanitarian–development–peace nexus. Cyclical shocks which create and maintain crisis settings are routinely provided with emergency response, but growing concerns that needs will continue to rise in light of climate variability, extremes and change, have prompted renewed conversations about the possibility of embedding risk reduction measures more proactively into responses to protracted crisis settings. This is a new line of enquiry being taken up by UNDRR throughout 2020.

For example, despite the rhetoric of 'building back better' – the idea that the post-disaster space offers opportunities to rebalance citizens' rights to protection and safety from disaster risk – there is evidence that systemic risk can actually be reproduced through post-disaster reconstruction processes. Following the 2004 Indian Ocean tsunami, for example, coastal land has been redeveloped, increasing the economic vulnerability of those who previously depended on the sea for their livelihoods; land had, in some cases, been classified as part of a buffer zone but later used for commercial purposes, including hotels (Kennedy et al., 2008; Human Rights Watch, 2018, in Peters et al., 2019b). Some academics have argued that there needs to be a reimagining of the concept of 'build back better' to one of 'build back safer', to overcome the challenge that 'better' has multiple interpretations and has been used to advance economic development at the cost of poorer communities' livelihoods and homes.

The observation and critique that governments may use crises to their political advantage – be they the result of natural hazards or conflict – has been the focus of Klein's influential 2007 book, *The shock doctrine.* Using a range of empirical cases, Klein revealed how crises have been used to push through unpopular political and economic changes, particularly neoliberal economic policies: 'Governments – as well as international lenders and investors – take advantage of collective disorientation and treat disasters as "exciting market opportunities"' (Klein, 2007: 6). Dubbed 'disaster capitalism', examples from Haiti, Sri Lanka, the Philippines and Indonesia repeatedly reveal that crisis situations triggered by natural hazards such as tsunamis, earthquakes and typhoons provide the space through which land is appropriated – particularly from poor communities – and used for private businesses, including tourism.

4.4 Gaps in the evidence base

A recent review of more than 300 articles on natural hazards, disasters and conflict (Peters et al., 2019b) reveals a substantial number of gaps and inconsistencies in the evidence base, which warrant attention (see Box 6). Relative to other topics, the volume of evidence on the disaster–conflict interface is limited, and even less so on the additional complexity of climate variability and change. Thus, there is '… relatively limited understanding of how disasters interact with, and unfold in, conflict-affected areas' (Siddiqi, 2018: S161), and even less for climate-related disaster risks. As the review by Peters et al. (2019b: 29) finds: 'Grey literature has numerous examples of community based and non-government actors engaging in DRR in conflict contexts, but this has not been recorded, verified or shared in ways that advance DRR practice. Despite decades of quantitative and qualitative research focused on attribution, we still understand very little about the relationship between disaster and conflict, and there is very little guidance on how to confront and seek to alter this relationship with a view to accelerating disaster resilience.'

In part because of the complexities of each and every disaster and conflict situation, finding replicable lessons is extremely challenging. Moreover, evidence has thus far been primarily post-disaster-event specific, neglecting much-needed longitudinal studies that trace long-term changes in vulnerability and exposure to a range of threats and hazards – including climate-related and climate change-influenced, natural hazard and conflict. Furthermore, there are a plethora of 'theoretical studies debating whether disasters exacerbate or mitigate existing conflicts, or cause or prevent new ones. Little scholarship exists on how DRR can effectively be implemented in fragile or conflict-affected contexts (and even less on lessons learned, or what was tried and failed)' (Peters et al., 2019b: 29). Recommendations for bolstering the evidence base include the need to undertake the following actions:

- **Harness operational learning to deepen understanding of the benefits and limitations of DRR in FCAC:** There is an urgent need to conduct a '… systematic review of evidence … to catalogue and synthesise practical examples of DRR interventions by "type" (hazard focus, point in the disaster management cycle, scale, etc.) alongside a typology of conflict. This would help deepen understanding of what has been tried and what has been learnt, and to use that understanding to inform investment decisions and operational design and delivery in other contexts experiencing similar challenges' (Peters, 2019a: 47). Given that funding for DRR interventions is negligible, extending this recommendation to include climate and disaster resilience would likely harvest a greater result. Important here is to ensure that the review is conducted by an independent research agency, to offer more robust conclusions than are available at present – which largely stem from implementing NGOs' own experiences reported through grey literature.

- **Learn from affected people's experiences and coping capacities and how they deal with linked climate, disaster and conflict risk:** There is a significant lack of evidence on affected populations' perceptions of risk, the various factors that affect their decision-making, the trade-offs associated with prioritising some threats and hazards over others, and risk tolerance (Opitz-Stapleton et al., 2019). Longitudinal studies and life histories would be useful methodologies here, to help deepen our understanding of changing experiences over an individual's life course. Where such approaches

have been adopted to combine local climatology, disaster impacts, poverty dynamics and well-being – as in Diwakar et al. (2019) in India and Kenya – novel findings are revealed about how it may be possible to curb impoverishment, and to build adaptive capacity and sustain escape from poverty.

Research conducted on these themes would go some way towards broadening the concentration of existing evidence, which is centred on post-disaster situations of high-impact events, and those which are primarily rural in nature. Further ideas for plugging the evidence gap can be found in Box 6.

Box 6   Evidence and practice gaps on the climate–disasters–conflict interface

Building on normative approaches: continuing on the same path

- 'There is a need for a systematic review of evidence that organises practical examples of interventions by DRR 'type' (hazard type, intervention, etc.) alongside a typology of conflict to better understand what's been tried and learned, and what can be tailored to support application in other contexts experiencing similar challenges. There is an equal need to articulate the extent to which the replication of lessons to other contexts and projects is feasible, given the context specificity of disaster-conflict situations.

- A more action-oriented research agenda will require further work to expand the breadth of examples and depth of analysis of the role of conflict in undermining conventional approaches to DRR – positioning these across the continuum from working 'in' to working 'on' conflict. This may also help inform a deeper understanding of the range of alternative entry points to DRR in conflict contexts, with a view to developing a more thorough understanding of what's been tried already.

- A substantial proportion of grey literature derives from NGO projects that aim to build community resilience to intersecting disaster and conflict risk. What has not been undertaken is a thorough analysis of the design, delivery and sustainability of nongovernmental DRR actions in relation to formal DRR structures. The assumption is that non-governmental actors are stepping in to complement or backfill state actions on DRR, but better understanding is required of how those interventions affect citizens' perceptions of the state, and their viability and sustainability. An independent review is required, including returning to the site of community-based DRR project-based interventions, to better understand what works and what doesn't in non-state interventions designed to support communities to be disaster-resilient in conflict-affected contexts. Assessments of whether interventions were 'successful' should reflect the expectations and ambitions of affected communities.

Sidestepping normative approaches to DRR: encouraging a different perspective

- There remains much we don't know about people's lived experiences of the intersection of disasters and conflict. Starting with the active and participatory role of individuals and communities in situations of disasters and violent conflict (Molenaar, 2011) may enable a greater understanding of what people actually do in such situations. Independent research, including longitudinal studies, could unpack those experiences, with an emphasis on the choices and trade-offs of the actions that people take, and why they take them. This could provide a more grounded starting point from which to design interventions complementary to people's coping capacities in the face of disaster and conflict risk.

Box 6 (cont.)   Evidence and practice gaps on the climate–disasters–conflict interface

- Little work has been done to connect people's lived experiences, individual agency-led interventions, sub-national or national structures for DRR and national and international policy commitments. As such, there is a need to link the ambition to build disaster resilience across scales, from individual to international. Such an analysis needs to be deeply intertwined with analysis of conflict dynamics across scales to understand where there are viable entry points, barriers or points of contention. Such an analysis may lead to alternative approaches to those we have at present – including drawing on ideas of hybrid governance or institutional bricolage (Cleaver, 2012). The literature makes reference to poorly designed DRR strategies having negative impacts on conflict dynamics, but this has not been robustly investigated. Agency-related reputational risks aside, there could be value in reviewing monitoring and evaluation project documents to identify cases where this can be either substantiated or rebutted, with a view to providing lessons to inform future design. Conversely, more emphasis on examples where effective DRR has improved perceptions of government (Walch, 2018).

- By extension, based on the continuum described above, a deeper understanding of the potential for DRR to contribute to peacebuilding, conflict prevention and conflict resolution is required. A collaborative research process utilising 'conflict' and 'disaster' specialists would help in cross-fertilising knowledge and ensuring that any claims of the contribution of DRR to ambitions for peace are valid and substantiated. DRR could be implemented as a process/transition from minimum or community-based DRR to more institutionalised, national and sustainable DRR adapting to conflict dynamics, post-conflict conditions and fragility.

- The current evidence base is concentrated on disaster events as the entry point for analysis, with a focus on local-scale disaster impacts. A longer-term historical perspective (akin to Artur, 2018), which includes emphasis on the evolution of national policy architectures for DRR, would help in producing recommendations for policy and practice that reset expectations of what can be achieved over what particular timescale; in the Philippines, for example, it took more than 25 years for the government to move from reactive emergency response to proactive disaster risk management policy and practice.

Pushing the boundaries of what we know

- DRR in conflict contexts could consider taking a more explicitly political stance and building on social movements to explore the transformative potential of holding those in positions of power to account and utilising DRR as an entry point for reworking power relationships to reduce risks.

- Many communities experiencing the 'double vulnerability' of disaster and conflict risk are 'off the radar': we know little about them, and they may have vastly different ideas about what disaster resilience does or could look like. This may include experiences of disasters and DRR in areas under the control of non-state armed groups. There has been little research exploring the role of alternative governance mechanisms and parallel governance structures specifically in contexts of violence and armed conflict, and the implications for understanding and acting on disasters, and subsequently for the opportunities for and limitations of DRR.

- There is also a gap in our understanding of what happens at the sub-national scale, and specifically the provincial level, on the disaster–conflict nexus (what Mena et al. (2019) refers to as the meso level): for example, at the level of the local commander, warlord, or mid-range authority.

4.5 Collaboration and coherence of action on peace and security, emergency relief and long-term sustainability

There is a substantial disconnect between evidence and action on natural hazard-related disasters, disaster more broadly (encompassing the breadth of hazards listed under the Sendai Framework, including biological, environmental, geological and geophysical, hydrometeorological and technological hazards), climate variability and change, and issues of violence, conflict and fragility. Given the evidence that intersecting vulnerabilities amplify risks that arise from how those vulnerabilities interact with these hazards, the disconnect is unhelpful, particularly given current and future trends that point towards an amplification of compound and complex risk in FCAC.

Operationally, a number of recommendations have been posited that warrant attention (Peters, 2019a: 46–47). These include the need to establish a Community of Practice, and develop an integrated cadre of experts. We explore both these ideas briefly below.

Formalise a community of practice and establish an annual conference on climate and disaster risk in conflict contexts: Given the significant evidence gaps in this area, as an extension of the 'learning journey' currently being undertaken by DFID, there is a need to provide space to undertake research and technical advisory work specifically on climate-related disasters in conflict. An informal network is already in existence – convened by a collaboration of think tanks, NGOs, government representatives and UN agencies – but is unfunded. With funding, there could be more systematic and inclusive discussions on the intersection of linked risks, together with a formal space for convening humanitarian, peace, development and climate experts. Given that the evidence base requires significantly more investment, convening an annual conference on this intersection, together with specialised academic journals to increase the quality of research in this area, would be of great benefit. This conference could be linked to the UK's hosting of the COP26, and subsequently linked to the convening cycle of the Global Platform on Disaster Risk Reduction. Organised by a secretariat, an online presence is required, and other means of information sharing such as a newsletter, podcasts, and in-person convening spaces.

Develop an integrated cadre of climate, DRR and conflict specialists supported by training: As part of the intended deliverables of the Community of Practice, it could develop an integrated cadre of experts. This would involve bringing together expertise in disasters, climate, conflict and peace, and upskilling across the board on related competencies, and updating of guidance and practice notes used by programme managers and technical advisors. Development of e-learning and training courses would be beneficial as well as the extension of current 'learning journeys' to encompass a broader array of

linked threats and hazards. Only with upskilled managers and advisors will it be possible to begin exploring means to design programmes with linked climate, disaster and peace outcomes. For example, integrating disaster and climate risk into post-conflict reconstruction programmes as in Syria. Furthermore, other '… opportunities include using an integrated cadre of DRR and conflict specialists for early action and preparedness programmes around disaster and conflict risk in contexts such as Haiti, Myanmar and the Horn of Africa. Over time, disaster and conflict expertise should be made mandatory in all stages of intervention design and delivery in contexts where hazard and conflict risks are high' (Peters, 2019a: 45).

COP26 should be utilised as a space to showcase the beginnings of such an endeavour, presenting a proactive rebuttal to the negative focus of much of the climate security work to date, which tends to centre on the likelihood of increased violent conflict and displacement. A more integrated approach to this topic would begin to action the 'innovative approaches' articulated in a recent set of recommendations (see Source:), which responds to calls for better linking of the development, humanitarian and peace divide – the 'triple nexus' – by the OECD, WEF, UN and others.

If there is appetite to 'trial unorthodox approaches' (see Figure 5), then learning from affected people's experiences and coping capacities would be greatly advanced by new research exploring how disasters, including climate-related disasters, are experienced in contexts controlled by non-state armed groups. This includes areas such as Taliban-controlled Afghanistan, Mindanao in the Philippines, and border areas of Myanmar. Moreover, '… there is a gap in our understanding of what happens at the subnational scale, i.e. the provincial level, on the disaster–conflict nexus. For example, small commander, warlords, mid-range authorities: these actors operate in relation to slow- and fast onset disaster risk' (Peters, 2019a: 47).

Integrating conflict considerations into DRR and climate change adaptation (and mitigation) strategies and implementation plans – and vice versa: Governments and agencies wishing to better address issues of violence, conflict and fragility in disaster and climate strategies and plans, are, at present, unsupported. A set of worked examples, guidance notes and best practices are required that can demonstrate the process and changed outputs which result from integrating conflict considerations into such plans. Where measures to work in armed and violent conflict contexts have been integrated into plans – such as in Afghanistan, Lebanon and the Philippines – research is required that can explore how this changes implementation practice and disaster resilience outcomes. Where learning processes are ongoing, such as in Guinea Bissau and Cameroon, an accompaniment process would be useful to enable lessons to be learned that can be shared with other governments.

Priority should be given to national and regional actors who have already written linked climate, disaster and conflict prevention action into their priorities for action. This includes, for example, the African Union. Translating ambition into action would be a remarkable step forward in breaking down current policy and practice silos. Doing so would require a range of support mechanisms such as a technical advisory group and call-down capacity. Other entry points include utilising existing disaster risk networks such as the Making Cities Resilient network, to ensure a focus on urban risk profiles. Finally, including aspects of conflict into the Sendai Framework monitoring process would help to institutionalise the tracking of linked disaster and conflict dynamics.

Investing in DRR and climate change adaptation in FCAC: To complement the recommendations listed in the climate finance section of this report, several actions could help mature action on climate and disaster risk in FCAC. This includes donors reviewing their investment portfolio to systematically understand and identify means to accelerate climate and disaster resilience. At its simplest, this means increasing investment into such contexts: 'Reviews should aim to provide donors with recommendations for enhancing investment opportunities in DRR, as well as new or additional safeguards for ensuring that investments do not exacerbate societal tensions; for donors who already systematically consider conflict dynamics in DRR investments this may be minimal work, but for others it may require a substantive overhaul of current processes and protocol' (Peters, 2019a: 44).

Figure 5   The continuum of options for action

Business as usual

The default: continue with business as usual approaches, extending current DRR policy, finance and practice to conflict contexts.

Adjust conventional approaches

Make conventional DRR more effective in conflict contexts by making small tweaks to better reflect societal and operational realities. At a minimum, this could include integrating do no harm principles or embedding conflict analysis into DRR planning cycles.

Pursue innovative approaches

Design strategies and plans to achieve DRR outcomes in ways that recognise disaster and conflict risk as a product of their context – and DRR interventions as part of that context. Embed conflict-sensitive approaches into DRR processes; link DRR with peacebuilding and conflict prevention approaches; embed both disaster and conflict expertise in all post-disaster and post-conflict response, recovery, rehabilitation and reconstruction technical teams.

Trial unorthodox approaches

Actively gather evidence that may lead to solutions beyond the current system. Push the boundaries of what DRR stakeholders think they know, how they act and who they collaborate with. This could include working with non-state armed groups on disaster prevention and preparedness. Or providing legal support to indigenous groups to protect their rights where state and private sector interests are increasing their exposure and vulnerability to disaster risk.

Source: Peters, 2019a: 43.

To mature project and programme design, guidelines and systems are required which ensure that conflict analysis is systematically integrated into climate and disaster portfolios, and vice versa – issues of natural hazards, hazards more broadly, and climate-related hazards inclusive of the growing influence of climate change, need to be visibly integrated into humanitarian, conflict and peace portfolios. More adventurous ideas include the recommendation to have a 'multi-donor pooled fund for disasters and peace … provid[ing] financial and technical advisory support to governments on policy design, build the capacity of national disaster management agencies, implement projects with improved monitoring processes that link tracking of changes in disaster and conflict risk and pursue independent research to ply evidence gaps' (Peters, 2019a: 45).

5 Climate-related conflicts over natural resources

This chapter reviews and summarises the available information, evidence and gaps on the underlying drivers, causes and dynamics of conflicts over natural resources (land, water) and systems (e.g. grazing land/pasture, landscapes, forests) linked to climate-related hazards and climate change in FCAC. It discusses:

- the potential enablers for ecosystem-based climate resilience, adaptation and mitigation investments, which can drive improved governance, local people's well-being and climate outcomes
- the opportunities for cooperation among non-state, state and multilateral actors to strengthen rights, accountability, peace-building, and climate resilience, adaptation and mitigation in these contexts
- how resilience can be strengthened at the local, national, transboundary, regional and international levels in a way that enables collaborative pro-poor approaches.

5.1 State of the evidence: high-level overview

Academic and grey literature, and many global and regional policy fora in the past two decades, have asked the question: *To what extent does the climate and its impacts on natural resources (land, water, species, ecosystems) contribute to conflict?* Here, the 'climate lens' has been used to assess the role of both climate-related hazards and, where attributed, climate change. Efforts to answer this question have led to many studies that focus on *natural resource scarcity* and try to establish causal chains among resource scarcity, climate change and conflict. For example, researchers have investigated: Does climate-related resource scarcity drive conflict? Does resource scarcity (in one place) spur migration, which sparks conflict in the migrants' destination? Understanding these relationships better can inform how we work to halt, manage, mitigate or even reverse resource scarcity along with other, compounding drivers of conflict and fragility in resource-poor contexts.

An equally important but rather separate body of literature, policy and practice asks: *How does fragility and poor governance in natural resource-abundant contexts spur resource extraction, and associated environmental degradation and conflict?* And what are the implications for climate change, development (and biodiversity)? Understanding these relationships better can inform how we work to halt natural resource-related conflict and the misery it creates, while supporting environmental protection that strengthens climate change adaptation and mitigation, and human development.

The state of the evidence on links among natural resources, climate and conflict may be summarised as follows:

- **Climatic factors affect the condition of ecosystems and affect 'nature's contributions to people'** but climate (and climate change specifically) is one of many drivers of ecosystem degradation.
- **In this context, climatic factors are understood as a *contributor* to ecosystem degradation**. In multiple instances in the academic and grey literature, climatic factors are referred to as a 'magnifier' of existing risks.

There is strong evidence in the literature for a correlation between ecosystem degradation and decreased human well-being on a global scale (see, for instance, IPBES, 2019). Furthermore, locally, people may manage ecosystems (especially in the short term) to improve one or more dimensions of their well-being, but often at the expense of other social and ecological benefits. At these smaller scales, 'it is now clear that trade-offs are more likely than win-wins within and between poverty reduction and environmental management' (see Schreckenberg et al., 2018, summarising evidence from the Ecosystem Services for Poverty Alleviation (ESPA) programme).

Endeavours to link increasing natural resource scarcity and consequent poverty with increases in social and political conflict have tended to yield inconclusive or contradictory results. The foremost reason why increases in resource scarcity and depressed means of livelihood and well-being may not necessarily lead to conflict and violence is that other factors can mitigate (or exacerbate) the risks of violence. Factors cited in the literature include: the presence or absence of mediating community institutions; economic development; historic ethnic or inter-group tensions; infrastructure and/or security personnel to allow safe passage for displaced persons, migrants or seasonal workers, etc.

Studies have been inconsistent in their treatment of conflict and violence when investigating the climate–natural resource–poverty–conflict nexus (e.g. variously looking at interpersonal, inter-group, inter-ethnic violence, terrorism, membership of insurgent groups, etc.). In the past 5–10 years, the issue of different metrics of conflict has become better recognised; however, there is a need to apply more consistent, comparable metrics across in-depth, case-based research.

Case studies have tended to focus on the contribution of climate-related extremes to the nexus of resource scarcity, poverty and conflict, not climate change as scientifically defined (see section 2.3). In a majority of studies, the contribution of 'climate change' is not measured as scientifically defined by the anthropogenic climate signal in a meteorological event or as evidenced in slow-onset phenomena such as sea level rise and its impacts.

On climate change, specifically, the IPCC (2019b) finds with only low confidence that climate change and its interaction with land degradation will be a source of conflict in the decades to come (due to weak evidence and weak scientific agreement).

We reach the same conclusion as Scheffran and Battaglini (2011: S28), namely: 'Contrary to the increasing attention, the research literature does not provide sufficient evidence to support a clear causal relationship between climate impacts, security and conflict. The issue is complex and covers highly uncertain future developments.'

Lucrative (commercially valuable) carbon-rich natural resources can be the cause of competition that often turns violent in fragile contexts where the rule of law is poorly established and corruption and rent-seeking are rife. In these cases (e.g. parts of the Amazon region, central Africa, Southeast Asia), fragility and conflict go hand-in-hand with deforestation and natural resource degradation.

Degradation of carbon-rich environments drives up greenhouse gas emissions and undermines the potential for climate change adaptation and resilience, as well as numerous other development goals (Chaturvedi et al., 2019). Illegal extraction and trade in lucrative timber is particularly relevant; although land use changes associated with other forms of resource extraction such as illegal mining may also be significant in climate terms. Such environments pose significant risks for researchers wishing to investigate and expose the dynamics, as well as for development actors who wish to invest in solutions to ecosystem degradation and its associated conflicts.

There is increasing evidence that poorly designed climate change adaptation and mitigation interventions can exacerbate inequalities in societies, decrease the well-being of some groups of people and – sometimes – contribute to conflict. But in highly natural resource-dependent contexts, well-designed climate change adaptation and mitigation actions could be the answer. Interventions to help people cope with climate change (and, where appropriate, to reduce land-based emissions) will be imperative in FCAC in the years ahead. There is a need for climate change adaptation and mitigation

that learns from and avoids these mistakes, which instead takes into account people's intersecting vulnerabilities and development needs, and is also conflict-sensitive. (See chapters 4 and 6).

The linkages between migration and climate change, natural resources and conflict are as contested and inconclusive as the other research on the climate–natural resources–conflict nexus reviewed here. In the grey literature, media and blogosphere, analysts frequently speculate that there is a causal chain, whereby climatic factors drive natural resource scarcity, which drives in-situ conflict, followed by out-migration or migration from resource-poor conditions, followed by conflict in the migrants' destination. The empirical evidence in the academic literature does not clearly and conclusively support causal chains of this type. Indeed, there is evidence that migration in its many forms (cyclical/seasonal vs permanent, domestic vs international) can be a coping mechanism where climate-related resource scarcity exists. It is valid to ask: does climate-related resource scarcity compel people to migrate and does the migration exacerbate conflict, and if so, where, among whom, and why? But it is also important to ask, as many scholars do: Does climate-related resource scarcity compel people to migrate and is that a form of climate change adaptation? Could it even be a 'release valve' for avoidance of conflict in resource-scarce, climate-affected environments?

5.2 Literature on the interactions among climate change, ecosystems and people's well-being: in more depth

There is a strong interrelationship between climatic factors (extremes and trends influenced by both natural variability and change) and the condition of ecosystems: this is increasingly well understood and well evidenced. However, the impacts of climatic factors on ecosystems can be difficult to separate from other drivers of ecosystem degradation. The IPBES Global Assessment (2019) summarises the contribution of climate change to declines in nature as follows:

> *The direct drivers of change in nature with the largest global impact have been (starting with those with most impact): changes in land and sea use; direct exploitation of organisms; climate change; pollution; and invasion of alien species. Those five direct drivers result from an array of underlying causes – the indirect drivers of change – which are in turn underpinned by societal values and behaviours that include production and consumption patterns, human population dynamics and trends, trade, technological innovations and local through global governance. (IPBES, 2019; see also Figure 6)*

There is strong evidence in the literature for a correlation between ecosystem degradation and decreased human well-being. This is especially the case in already low-income communities that are highly dependent on rainfed agriculture, where climate-related extremes such as drought and flooding, and/or slow-onset events such as salinisation of deltaic agricultural lands and groundwater may decrease agricultural productivity as well as drinking water availability. Such economic systems and related exposure and vulnerability are prevalent in many FCAC.

The Global Environmental Outlook 6 concludes that current rates of environmental degradation are undermining global society's ability to achieve the SDGs (UN Environment, 2019). With regard to biodiversity loss specifically, 'land-use change, habitat fragmentation, overexploitation and illegal wildlife trade, invasive species, pollution and climate change is driving a mass extinction of species, including critical ecosystem service providers, such as pollinators. That mass extinction compromises Earth's ecological integrity and its capacity to meet human needs' (ibid.).

Figure 6   Drivers of global declines of nature
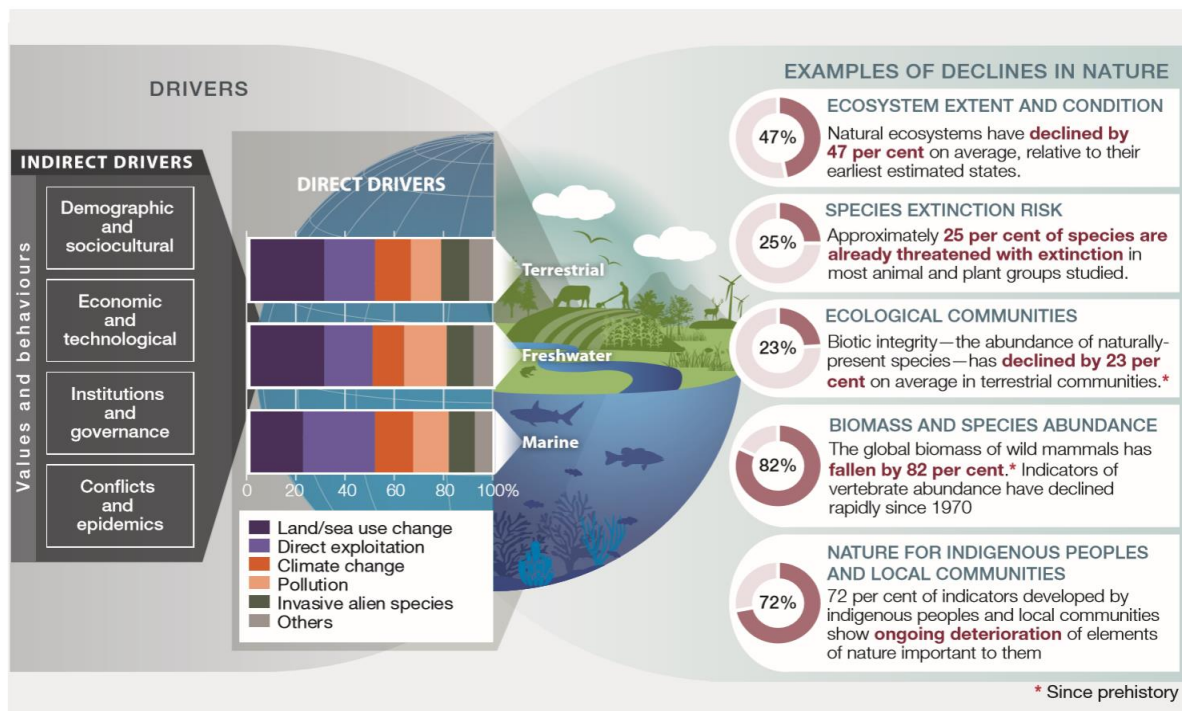
Source: IPBES, 2019.

5.3 Resource scarcity literature: in more depth

The 'roots' of the modern body of literature on resource scarcity and conflict are in Thomas Homer-Dixon's deeply influential research, which framed the narrative for a generation of scholars by linking resource scarcity to violent conflict in the present day (as scholars such as Diamond and Abernethy had done for colonial era history, previously). Homer-Dixon's work (1991; 1994) laid intellectual foundations with empirical research, particularly from Chiapas, Mexico, and in sub-national areas of the Philippines, which charted resource scarcity (also referred to as environmental scarcity) driven by a combination of:

- demographic change (including population growth and/or migration)
- unequal access to resources (including 'resource capture' by elites)
- environmental change.

Homer-Dixon's research project initially incorporated climate change in 'environmental change' but subsequently dropped climate as a focus on the grounds that 'atmospheric changes such as global warming will probably not have a major effect for several decades, and then mainly by interacting with already existing scarcities' (scarcities of cropland, water, forests, and fish caused by over-exploitation and other sources of direct environmental degradation). Homer-Dixon's research went on to describe correlations between resource scarcity and violence, which were by no means inevitable – poverty does not lead to violence – but context-specific:

> *Decreases in the quality and quantity of renewable resources, population growth, and unequal resource access act singly or in various combinations to increase the scarcity, for certain population groups, of cropland, water, forests, and fish. This can reduce economic productivity, both for the local groups experiencing the scarcity and for the larger regional and national economies. The affected people*

may migrate or be expelled to new lands. Migrating groups often trigger ethnic conflicts when they move to new areas, while decreases in wealth can cause deprivation conflicts such as insurgency and rural rebellion. In developing countries, the migrations and productivity losses may eventually weaken the state which in turn decreases central control over ethnic rivalries and increases opportunities for insurgents and elites challenging state authority. (Homer-Dixon, 1994: 31–32)

The research concluded that environmental scarcity as a standalone factor is driving conflict: environmental scarcity can be an 'important force' that nudges powerful actors to concentrate their control over natural resources and increase inequities even more; ecosystem vulnerability – as an independent physical factor – contributes to environmental scarcity in addition to how those resources are governed (the work cites the shallow depth of soils in the upland Philippines and the vulnerability of Israel's aquifers to salt intrusion) and, in many parts of the world, environmental degradation 'has crossed a threshold of irreversibility'. On these grounds, Homer-Dixon concludes that the 'insidious and cumulative social impacts' of environmental scarcity lead to persistent, sub-national violent conflict.

Homer-Dixon's ideas have had a profound influence on natural resource management, disaster and conflict research and discourses over the past few decades. We see these foundational themes and the multiple feedback loops among them interrogated in the academic and grey literature in the decades hence, with increasing effort by researchers to understand the role of climate variability and change – and their impact on the deterioration of ecosystems and their vulnerability – in contributing to natural resource scarcity.

For instance, Theisen et al. (2013) investigate how changing and increasingly severe weather patterns exacerbate the risk of conflict in at least two ways. The first is by interrupting resource supplies and so leading to greater resource scarcity. The second by increasing natural disaster risk and its potential to trigger migration. Contexts with weak institutions, high levels of poverty and agricultural-based economies are particularly vulnerable to these conflict threat multipliers, although Theisen et al. caution against jumping to conclusions about any causal link between climate and conflict. They suggest that economic development could be a mediating factor that reduces the likelihood of climate impacts from contributing to conflict risks, but its role should be further researched.

As literature on this nexus of issues expanded, analysts increasingly pointed to the multiplicity of risk factors that drive conflict in resource-scarce environments, and the difficulty of isolating climatic factors (or indeed, anthropogenic climate change specifically) as a single aggravating cause.

The literature consistently describes climate-related resource scarcity as a *contributor* to the conditions for conflict rather than as a standalone driver of conflict. A preferred term used in the United Nations General Assembly (UNGA) (2009) and in preceding papers by the US military and European Commission termed climate change a 'threat multiplier' (Scheffran and Battaglini, 2011; Peters and Vivekananda, 2014).

Here, climate change is noted as 'exacerbating threats caused by persistent poverty, weak institutions for resource management and conflict resolution, fault lines and a history of mistrust between communities and nations, and inadequate access to information or resources' (UNGA, 2009: 2).

A background paper (Evans, 2010) for the World Bank's *World Development Report 2011: Conflict, security, and development* looked at the historic interlinkages between resource scarcity and conflict/stability and analysed projected trends in resource scarcity and climate change. The analysis emphasised that problems of resource availability:

... may be as much the result of poor governance as physical constraints, and that the risk posed by climate change or resource scarcity depends as much on the vulnerability of populations, ecosystems, economies and institutions as on the magnitude of climate or scarcity impacts themselves. Resource availability must be

seen not as a stand-alone issue, but rather in the context of the overall political economy landscape. (Evans, 2010: 2)

The OECD's *States of fragility 2016* reinforces this message, stating that:

Climate change is an important factor for environmental fragility, however, as it is closely linked with an increased likelihood of natural environmental threats and hazards. Thus climate change should not be seen as a singular driver of conflict but rather a stressor that may lead to heightened risk of violence and conflict in an already fragile setting. The intersection of weak institutions and social fragility with climate change vulnerability is what is referred to as the climate-conflict nexus. (OECD, 2016: 91)

Notwithstanding this wide recognition of complexity and multiple risk factors, Koubi (2018) nonetheless revisits the interweaving influences of resource scarcity, income and economic impacts, demographic and environmental change, and the contribution of climate conditions, poor governance and weak institutions in an effort to find causal chains of events. Koubi suggests that: first, climatic conditions can reduce economic and agricultural income, which can lead to conflict by decreasing the opportunity cost for rebellion; second, climate-driven economic downturns can exacerbate actual or perceived economic and political inequalities in turn, increasing the likelihood of conflict; third, climate-induced migration may lead to conflict in the receiving areas via increased competition over resources, ethnic tensions or distrust. Nevertheless, there is little or ambiguous evidence that climate migration causes conflict; the article points to assumptions that have not been tested and which call for further research. Finally, Koubi highlights the need to further contextualise results, finding it more likely that climatic conditions will increase the risk of violent conflict in agriculture-dependent regions, in combination with other socioeconomic and political factors.

If you ask people in conflict-affected environments what they see as the drivers of conflict, natural resource scarcity is cited as one of several factors in combination (see World Bank, 2011: Overview). Figure 7 summarises the findings of Bøås et al. (2010) from the Democratic Republic of Congo, Côte d'Ivoire, Sierra Leone, Gaza, the West Bank and Colombia.

Figure 7   Citizens' views on how significant resource scarcity is in driving conflict

In surveys conducted in six countries and territories affected by violence, involving a mix of nationally representative samples and subregions, citizens raised issues linked to individual economic welfare (poverty, unemployment) and injustice (including inequality and corruption) as the primary drivers of conflict.
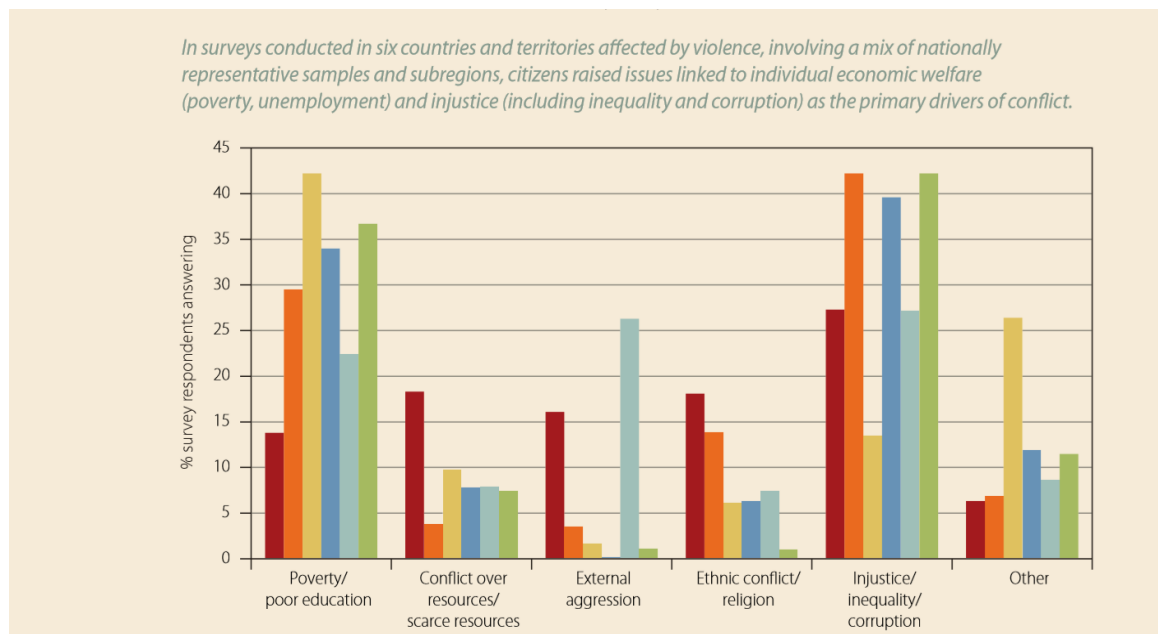
Source: World Bank, 2011.

A 2016 occasional paper from the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) on the climate-conflict nexus identified 20 countries that fall into this gap: Afghanistan, Bangladesh, Burundi, Cambodia, Chad, Democratic People's Republic of Korea, Eritrea, Ethiopia, Haiti, Kenya, Lao People's Democratic Republic, Madagascar, Mauritania, Mozambique, Myanmar, Niger, Pakistan, Somalia, Sudan and Zimbabwe (Bodanac et al., 2016). The paper describes a situation where 'social unrest, intergroup grievances and gender-based violence can increase if a country or Government is unable to provide the resources needed to cope with a changing environment or destruction from extreme weather conditions, or if international climate change adaptation support is insufficient. This, in turn, may contribute to violent conflict' (OECD, 2016: 5). A related body of literature looks particularly at the effect of climate-related factors on resource scarcity – and consequently on income and/or economic growth variables in heavily agricultural, natural resource-based economies, and the correlation with conflict. However, the idea of a causal chain (climate-related factors cause resource scarcity cause economic hardship cause conflict) is weakly evidenced, contested, and in its early days of investigation.

Earlier reviews often attempted to establish direct climate-natural resource-conflict linkages. Satyanath et al. (2004) state that: 'the relationship between rainfall and income growth is strongly positive: current and lagged rainfall growth are both significantly related to income growth at over 95 percent confidence' (735) and 'Using rainfall shocks as instrumental variables for economic growth, we find that growth shocks have a dramatic causal impact on the likelihood of civil war' (ibid: 746). They found that economic conditions are 'the most critical determinants triggering civil conflict in Africa' but also acknowledge well-supported research which identifies low income, weak state military capability to suppress insurgents, and poor road infrastructure as important factors contributing to the rise of inter-group conflict.

The authors conclude, by extension, that it may be possible to reduce the incidence of conflict by designing better income insurance/income support for unemployed young men during hard economic times, making it less attractive to become a rebel or insurgent. One way of doing this could be through public works projects that could be designed in ways that are environmentally friendly and climate resilient, as well as addressing broader socioeconomic vulnerabilities of the local population, such as transporting food, supporting irrigation and other water projects. The study suggests that 'further micro-empirical analysis and careful case studies are urgently needed to illuminate precise causal channels and to design more effective policy responses' (ibid: 747). The World Bank (2011) reached a similar conclusion re the potential of public works programmes to generate meaningful income alternatives and discourage violent conflict.

Boxes 7 and 8 provide specific studies where analysts have warned of the traps of simplistically blaming climate and environment factors for violent conflict, when more complex dynamics have been present.

Box 7   The challenges of linking climate-related factors to conflict in heavily natural resource-dependent settings

Hendrix and Salehyan (2012) go beyond instances of civil war to investigate 'whether deviations from normal rainfall patterns affect the propensity for individuals and groups to engage in disruptive activities such as demonstrations, riots, strikes, communal conflict, and anti-government violence. In contrast to much of the environmental security literature, it uses a much broader definition of conflict that includes, but is not limited to, organized rebellion.' Hendrix and Salehyan draw upon the Social Conflict in Africa Database, listing more than 6,000 instances of social conflict over 20 years. Their results show that rainfall variability has a significant effect on both large-scale and smaller-scale instances of political conflict. Rainfall correlates with civil war and insurgency, although wetter years are more likely to suffer from violent events. Extreme deviations in rainfall – particularly dry and wet years – are associated positively with all types of political conflict, though the relationship is strongest with respect to violent events, which are more responsive to abundant than scarce rainfall.

However, the findings of Hendrix and Salehyan's analysis might not be robust, as they are potentially undermined by the poor quality of their rainfall analysis. Rainfall does not follow a standard Gaussian distribution as used in their analysis, particularly over semi-arid and arid regions. Different statistical distributions, such as Gamma or Weibull, need to be explored to test departures from what is considered 'normal' rainfall in each of the countries they assessed. The standardisation approach the authors used to find 'extreme deviations' – particularly wet and dry years – was not appropriate; extremes rainfall requires special statistical analysis that the authors did not use.

Second, each country has different climates compared to the others and there are often climate variations within-country. For instance, the Kenyan highlands receives far more rainfall than arid Turkana County in northwest Kenya. Grouping all the countries together in a rainfall 'panel' dataset ignores the real spatial and temporal (e.g. wet seasons versus dry seasons) variations in rainfall for each country. Thus, deviations from the norm and the extent of the deviation for a particular zone could be 'averaged-out'.

Because the rainfall analysis was not robust, the study's findings may not be accurate. The study would ideally be repeated both spatially and temporally for each country separately, and appropriate extremes analysis conducted to characterise rainfall departures, such as the Standardised Precipitation Indices (see Guenang and Kamga, 2014, for example).

Source: Authors' analysis.

Box 8   How did climate impacts on natural resources affect the incidence of violent conflict in Darfur, Sudan?

'This particularly violent conflict has a long history and various roots, with the environment likely playing only a secondary role. Traditionally, differences between farmers and herders were resolved in the region by negotiation among tribal leaders, but the government's attempt to establish new administrative structures weakened the established tribal system (International Commission of Inquiry on Darfur 2005). Inter-tribal conflict was further aggravated by access to weapons, partly fuelled by oil revenues. The decision of the government to arm the Janjaweed militia against the rebels has escalated to a full-scale civil war which remained unsolved, despite the 2005 Comprehensive Peace Agreement (ICG 2004). A study by Sandia Research Labs assesses the role of climate factors in this conflict (Boslough et al. 2004). An empirical analysis, based on O'Brien (2002), shows statistical correlations between conflict instability and different indicators, such as income and calories per capita, life expectancy, youth bulge, infant mortality rate, and trade openness, ethnic composition of the population, political freedom and democratic rights. While some of these factors tend to worsen the conflict constellation, a clear overall message was not provided. The Sudan Post-Conflict Environmental Assessment (UNEP 2007), based on an extensive expert assessment, came to the conclusion that critical environmental issues, including land degradation, deforestation and the impacts of climate change, threaten the Sudanese people's prospects for long-term peace, food security and sustainable development. Darfur is considered a ''tragic example of the social breakdown that can result from ecological collapse'' (ibid). After publication of the report, regional experts did not refute the environmental contribution to the conflict but warned of the ''danger of oversimplifying Darfur'' (Butler 2007).'

Source: Scheffran and Battaglini, 2011: S33.

5.4 Impacts of climate factors on agricultural systems and relation to conflict: in more depth

5.4.1 Climate change, agricultural systems more broadly (including crop production), food and livelihood security, and implications for conflict among social groups

The negative impact of climate change on crop productivity and yields – both already being observed and projected – is covered in the IPCC Special Report on Climate Change and Land (IPCC, 2019b). Furthermore, the IPCC reports with high scientific confidence that 'Land degradation and climate change, both individually and in combination, have profound implications for natural resource-based livelihood systems and societal groups' (ibid: 53).

The IPCC finds that land degradation and climate change:

> *… act as threat multipliers for already precarious livelihoods (very high confidence), leaving them highly sensitive to extreme climatic events, with consequences such as poverty and food insecurity (high confidence) and, in some cases, migration, conflict and loss of cultural heritage (low confidence). Changes in vegetation cover and distribution due to climate change increase the risk of land degradation in some areas (medium confidence). Climate change will have detrimental effects on livelihoods, habitats and infrastructure through increased*

rates of land degradation (high confidence) and from new degradation patterns (low evidence, high agreement). (ibid.)

The IPCC (2019b: 275) notes that there is growing evidence that changes in drought can increase the likelihood of sustained conflict for particularly vulnerable nations or groups, owing to the dependence of their livelihood on agriculture, though it acknowledges inconsistent evidence, weak relationships and significant disagreement among scientists. At the same time, it points out that insufficient consideration of the multiple drivers of conflict often leads to inconsistent associations being reported between climate change and conflict (ibid.). The evidence base on increasing desertification and salinisation/saline intrusion of coastal lands, species movement, and disruption to agricultural and aquaculture systems through the combined impacts of human-induced ecosystem degradation, natural resource mismanagement and climate change is particularly germane to FCAC.

5.4.2 Climate change, pastoralist systems, changed transhumance patterns (human and livestock movement), food and livelihood security, and implications for conflict among social groups

The most recent grey literature (including multilateral agency briefings) and academic scholarship – identified via the BRACED Resilience Scans and subsequently – highlights intersections among human movement in pastoralist systems in the Sahel region of Africa, natural resource scarcity and conflict. Peters and Mayhew (2019) cite the following recent, significant studies:

- The early warning action report of the Food and Agricultural Organization of the United Nations (FAO) (2018) ranks the Sahel as a high-risk region, identifying as a prominent cause the increase in migration to forage-rich areas – such as Mauritania, Mali, Senegal and coastal countries – contributing to the deterioration of local agro-pastoral lands. The work highlights that livestock overgrazing has led to increasing tensions between pastoralists and host communities. The impact of climate change on stability within Mali is a cause of concern in a recent UN Security Council (UNSC) resolution on the security situation in the country. UNSC Resolution 2423 calls for the Government of Mali and the UN to recognise the adverse effects of climate change, ecological changes and natural hazard-related disasters on the stability of Mali and to take these into account when preparing country activities, programmes and strategies (UNSC, 2018). Examining these issues in more depth, a report published by the Clingendael Institute (Ursu, 2018) provides a study of Mopti region in Mali's Inner Niger Delta, where in recent years poor resource management has exacerbated conflict over access to natural resources.
- The Food Security Information Network (FSIN) (2018) and FAO (2018) both refer to the high rate of migration by pastoralists towards coastal countries in the Sahel as a result of changing climate conditions (cited in Peters and Mayhew, 2019: 21).
- Mbih et al. (2018) investigate farmer–pastoralist conflicts in the Western Highlands of Cameroon. They find that over three decades, pastoralists have switched from nomadic to a primarily sedentary lifestyles in adaptation to external pressures. This has had both up-sides and down-sides: there are positive relations with farming communities, thanks to improved agro-pastoral production and community development. However, there is also increased competition over land. An increase in climate variability is resulting in 'confusion' (ibid: 791) between farming periods and use of land by pastoralists for their livestock. The authors suggest that efforts to clarify the land tenure system and improve weather forecasting could resolve local tensions (cited in Peters and Mayhew, 2019: 40).

5.4.3 Impacts of climate factors on water scarcity and relation to conflict

A widely quoted 1995 speech by Ismail Serageldin, then Vice President of the World Bank, predicted that while the inter-state wars of the 20th century were fought over oil, the wars of the 21st century would be fought over fresh water, due to its increasing scarcity. In 1995, he cited population pressure, increasing consumption and pollution as the primary drivers for water scarcity; subsequent articles and interviews cited the increasing threat of climate change-related water scarcity (Serageldin 2009a; 2009b).

For some time in the 1990s and 2000s, this warning about 'water wars' was echoed more widely in policy debates. This created a 'securitisation' of climate and water issues – an explicit implication that water scarcity may require military responses. However, scholarly attempts to research whether water scarcity in transboundary river basins led to war between nations demonstrated that, in fact, cooperation was the more likely outcome. River disputes were, in the majority of cases, addressed by cooperative agreements (Swain, 2001) and nations have not gone to war over water until now (Barnaby, 2009) although commentators refused to rule out inter-state wars in their predictions for the future (Serageldin, 2009a; 2009b). If we keep focused on evidence of past and current conflict, the incidence of violence is most evident in cross-border skirmishes among smaller groups, and water scarcity related to climate change is one contributor to violent conflict, among other conflict drivers.

Recent literature on the intersection of water scarcity, food insecurity, displacement and conflict in FCAC reveals a range of findings:

- A recent analysis of links between regional stability and climate factors in Central Asia for UNESCAP refers to the link between climate change and water security. Suleimenova (2018) warns that 'variations in water stocks and flows may intensify competition and tensions over water resources. The study highlights that tensions in the region, such as the unresolved conflict in the Nagorno–Karabakh basin, continue to obstruct collective efforts to address water security' (Peters and Mayhew, 2019: 21).
- Von Lossow (2018) calls for greater attention to political realities and their links with water security challenges in Iraq (Peters and Mayhew, 2019).
- The Planetary Security Initiative (PSI) (2018) explores 'how EU External Action Service policies in Iraq (and Mali) are considering the climate–security nexus. The authors find that the policies on Iraq pay only limited attention to the impacts of climate change on water security and development, and that there is a need to strengthen climate change adaptation measures' (ibid: 20).

Water security is one of the areas in the natural resources scarcity–climate–conflict nexus that is ahead of the others in terms of its maturity as a topic, having attracted a range of leading-edge, transdisciplinary scientific investigation over the past 20 years. It is in the water resources arena that we see teams of climatologists, hydrologists, agronomists, water and sanitation specialists, political scientists and sociologists cooperating to:

- not only analyse historical trends in water availability and use in river basins and territories, but also generate future scenarios for precipitation and flows (including, groundwater recharge) under different climate futures;
- assess current management regimes and their suitability for future 'climate-proofing';
- present future scenarios and incipient trade-offs for the allocation and use of water for the use of different stakeholder groups, some of which arise as 'water-energy-food' (WEF) nexus trade-offs, particularly where agriculture – the world's largest water-user – demands irrigation.

This type of transdisciplinary, directly decision-relevant research comes together in projects such as the Future Climate for Africa's Integrating Hydro-Climate Science into Policy Decisions for Climate-Resilient Infrastructure and Livelihoods in East Africa (HyCRISTAL) (see Box 13). Another example is the detailed future climate and hydrological modelling of the Cumbaza Micro-Basin in Peru by Global Canopy Programme and partners, funded by CDKN and IDRC (see Sabogal et al., 2018), which has fed future climate and water allocation scenarios directly to a multi-stakeholder river basin advisory committee. Initiatives of this type intend to pinpoint the climate- and management-related risks of water scarcity in the future and generate negotiated solutions to head off future conflict.

5.5 Climate change, migration and conflict

5.5.1 Untangling the drivers of migration and role of climate factors

Do climatic factors (whether sudden- or slow-onset events, including those influenced by climate change) cause migration? Even if climatic factors contribute to a decision to migrate, is there necessarily conflict – either conflict driving migration from the point of origin, or conflict at the migrants' destination? Causal chains such as these are frequently cited in the grey literature, policy and national security arenas and the media, often leading to alarmist headlines. However, the empirical evidence points to a complex confluence of factors, and does not support clear causal chains of this type.

It is difficult to attribute human mobility to climatic factors with precision. Opitz-Stapleton et al. (2017: 7) note that 'people move for a wide variety of reasons, and even where [climatic] hazards contribute to this decision, it is the underlying socioeconomic, cultural, political and environmental processes that either enable or constrain people's ability to cope where they are or result in their moving'.

The current literature investigates the degree to which migration is influenced by natural resource scarcity (which may be influenced by one or more climatic factors, sudden- or slow-onset) and its intersection with power, governance and control or access to natural resources (the political, socioeconomic and cultural factors). Such natural resource scarcity may be temporary or longer term, reversible or irreversible – beyond a tipping point. All of these aspects can have a bearing on the type of migration response that individuals and households choose. For instance, where ecosystem services in a given environment are seasonally variable, this can create seasonal or periodic resource poverty and so drive seasonal or cyclical human migration (Adger and Fortnam, 2018).

It is also important to recognise that ecosystem goods and services in any location do not exist in a closed system, but are subject to in-flows and out-flows (not least among them, aid and trade). Pascual et al. refer to 'off-site and out-of-scope issues' that affect these flows. These are 'systemic and affect multiple ecosystem properties beyond the realm of any single resource or sector (e.g. carbon, fisheries); [and are] more difficult to identify … and more uncertain due to diffuse and cumulative cross-scale impacts' (Pascual et al., 2017: 2). This point is immediately relevant to the nexus of natural resource scarcity, migration and conflict, because in-flows and out-flows of natural resources (or 'ecosystem goods and services') can affect people's relative deprivation or well-being where they live, and influence their choice to move as a result.

Meanwhile, socioeconomic and political factors are key determinants of people's vulnerability, which condition their options to respond to climate-related shocks and slower-onset events such as floods, droughts, land degradation, sea level rise and related damages, and their ability to adapt. For example, people's ability to access and use new crop varieties, as well as non-agricultural activities, such as 'consumption smoothing' through access to credit, insurance and social safety nets (Waldinger and Fankhauser, 2015) have a deep bearing on their ability to cope with climate-related scarcity and stresses, particularly where dominant livelihoods depend on natural resources. Gender-related opportunity and discrimination as well as intersecting issues of class, education/literacy, age, ethnicity and other social-political factors influence access to these services (IPCC, 2019c). Studying the causes and consequences of migration for women from the coastal district of Odisha (India), Patel and Giri (2019) observe that the decision to emigrate is determined by a variety of factors, including environmental challenges, and the decision is usually taken by the male head of household. Migration can compromise safety and security due to fear of eviction and prevalence of low-paying unskilled jobs.

Several authors have reviewed existing studies on the effects of climate and socioeconomic and political indicators on migration and conflict, finding that they were either not able to isolate the effect of climate variables from socioeconomic and political ones: Koubi (2018) found this to be the case in agriculture-dependent regions. Owain and Maslin (2018) cannot separate the effect of economic performance, population growth and political stability from climate elements in relation to displacement of people in East Africa. Abel et al. (2019) only find a two-year window, over a 10-year period of bilateral refugee

flows data analysed, where droughts had an effect on forced migration. This window of time coincided with the Arab Spring and conflicts in sub-Saharan Africa, suggesting that other forces may be at play. Riosmena et al. (2018) find socioeconomic conditions to be stronger determinants than climatic conditions in reviewing Mexico outmigration flows to the United States.

The more nuanced role of environmental factors, and specifically climate-related factors, in people's decisions to move is illustrated by key findings from the Deltas, Vulnerability and Climate Change: Migration and Adaptation (DECCMA) project, a research project of the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA), which investigated human mobility dynamics in the Volta Delta of Ghana, the Ganges-Brahmaputra-Meghna Delta of India-Bangladesh, and the Mahanadi Delta of India. In these locations, researchers found that fewer than 3% of respondents singled out an environmental cause as the main reason for migrating. However, one-third of all households with migrants perceived that there was an increased exposure to environmental hazards, and between 40% and 80% of respondents across the deltas associated environmental factors with more insecure livelihoods (DECCMA, 2018). The authors conclude that: 'rather than having a direct effect, climate and environment affect migration because they affect people's ability to earn a living, particularly for slow-onset environmental hazards such as drought and coastal erosion' (DECCMA, 2018: 23). DECCMA research found, for instance, that in the Volta Delta, there is a strong positive association between perceived impact of droughts on economic security of livelihoods, and migration.

A recent (November 2019) endeavour to estimate the proportion of internal and international migration driven by climatic factors is incomplete and relies on figures for involuntary displacement rather than the combined total of voluntary migration (permanent and cyclical) and forced displacement/relocation (McLeman, 2019). McLeman calculates a current global stock of migrants of approximately 760 million internal migrants and 258 million international migrants as conservative estimates, against which the Internal Displacement Monitoring Centre (IDMC) finds the number of people directly and involuntarily displaced by climate-related hazards as approximately 16 million, primarily in Asia, sub-Saharan Africa and the United States (2018): 5.4 million people displaced by floods, 9.3 million displaced by extreme storms, 764,000 displaced by droughts and 424,000 displaced by wildfires.

Ionesco et al. (2017), in their definitive *Atlas of Environmental Migration,* and based on 20 years of data from the International Organization for Migration (IOM), contend that it is 'impossible' to estimate the number of environmental migrants globally as a whole (including climate change-related migrants) given current data deficiencies. They note that the average number of people displaced every year globally due to natural disasters is 24.5 million – one every second. This incorporates people displaced by earthquakes, volcanoes, landslides, tsunamis, etc. as well as those disasters which have a climatic cause (e.g. flooding, drought, wildfire); but the number would need to be augmented with information on those displaced by slow-onset events such as sea level rise. Furthermore, researchers have noted that there is very little tracking by governments or international agencies of how long people are displaced by particular hazards, particularly when displacement turns into longer-term or permanent migration. Trying to estimate the future magnitude of environmental migrants (or specifically, climate migrants) is impossible, and efforts to do so have not been based on any scientifically robust methodology (ibid.).

5.5.2 Migration as an adaptation strategy

While the links between climate change, the natural resource base, and migration remain complex and highly conditioned by social, economic, political and cultural influences, there is accumulating evidence that migration in its many forms can be a coping mechanism where climate-related resource scarcity exists.

In other words, it is valid to ask the question: does climate-related resource scarcity compel people to migrate and does the migration exacerbate conflict, and if so, where, among whom, and why? But it is also important to ask, as many scholars do: does climate-related resource scarcity compel people to migrate and, does that migration (whether cyclical/seasonal or more permanent), actually act as a form of climate change adaptation and 'release valve' for avoidance of conflict in resource-poor, climate-affected environments?

Evidence of migration as an adaptation strategy has become more prominent in the past decade. A significant moment was the inclusion of migration in the Cancun Adaptation Framework of the UNFCCC in 2010, where Parties were invited to enhance action on adaptation by undertaking 'Measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation, where appropriate, at the national, regional and international levels' (UNFCCC, 2010, Article 14, paragraph (f), cited in Ionesco et al., 2017).

Populations with strong adaptive capacity at the household and institutional levels are better able to cope with and adjust to climate hazards with minimal amounts of displacement and migration (McLeman, 2019; UK Government, 2011; Black et al., 2011). The UK government's Foresight report (2011), *Migration and Global Environmental Change* concludes that migration in the face of global environmental change 'may not be just part of the "problem" but can also be part of the solution'. In particular, 'planned and facilitated approaches to human migration can ease people out of situations of vulnerability' and they can address 'trapped' populations in poor and vulnerable circumstances (Black et al., 2011: 449; UK Government, 2011). A review by Adger and Fortnam (2018) concluded that human mobility is a key social response for dealing with spatial and temporal variability in ecosystem services, income and consumption.

CARIAA researchers (2018) assessed and synthesised findings on migration from four research consortia and 15 countries, concluding that migration is used by populations vulnerable to climate change as an adaptation strategy. As to whether migration provides the resilience that migrants seek, the study found that:

> *Migration can increase resilience under certain conditions, mainly when the availability of services in receiving and sending areas allows migrants to profit from their skills, and enables household members left behind to invest remittances productively. In the absence of such support services, migration can lead to the transfer of vulnerability across different groups and communities. (ibid: 1)*

It is often the poorest people who do not have the assets or wherewithal to migrate – temporarily or more permanently – to improve their life chances. It is important to disaggregate to understand the most vulnerable and affected people within households and communities. A key finding from the World Bank (2018), backed by significant multi-country evidence from across the CARIAA research projects, is that vulnerable people 'have the least opportunity to move away from risk' and the most vulnerable lack the resources to move and 'are trapped' (World Bank, 2018b: xxi). Ionesco et al. (2017) distinguish people's 'original vulnerability' as a result of economic, demographic and political stresses, and slow- and/or sudden-onset environmental stress. If people have a desire or need to migrate but are unable to do so as a result of various health, social or economic 'trapping factors' (illness, gender-related factors, deep poverty, etc.), this can lead to 'aggravated vulnerability' for the trapped population (ibid.). See also 'mixed outcomes' reported in the IPCC assessment of out-migration from mountain environments (IPCC, 2019c; and Box 9).

There is contested and contradictory evidence as to whether migration improves environmental conditions (specifically, provision of different types of ecosystem service) in the source and destination areas. The dynamics are very specific to each case. For example, migration may involve rural–rural migration from areas of resource scarcity to areas of resource abundance such as forest frontier areas, where the migrants contribute to heavier resource degradation at their destination (and low levels of conflict); alternatively, migration may be rural–urban and may lead to either environmental regeneration or destitution at the source destination, depending on the capability and labour force roles of the people who stay behind (Adger and Fortnam, 2018).

Box 9   An assessment of climate change as one factor in human displacement and migration: evidence from the IPCC's Special Report on the Ocean and Cryosphere in a Changing Climate (2019c)

Pressures on coastal environments

Marine flooding is already affecting deltas around South Asia and the world and subsequently impacting coastal communities. Marine flooding can come about from a mixture of human factors, climate variability and the effects of climate change, including more frequent extreme weather events. Human activity upstream, such as land-use changes and damming rivers, interferes with natural sediment flows into deltas. This causes subsidence in deltas and relative sea level rise. This is compounded by sea level rise, including storm surges, driven by climate change. Intrusion of sea water into coastal lands can have far-reaching effects. It can affect agriculture, making some crops no longer viable. Farmers have already stopped growing oilseed, sugarcane and jute in coastal Bangladesh, due to high salinity levels. Dry-season crops are predicted to decline over the next 15 to 45 years, especially in the southwest of the country. Meanwhile, drinking water supplies and human health are also at risk. Increased salt levels in water are associated with more abundant, toxic cholera vibrio (vibrio cholerae) as shown by studies in the Ganges Delta. In the coming years, 'significantly higher risks of human displacement' may be expected in low-income, low-lying islands and coasts as a result of multiple environmental changes such as these.

Pressures on mountain environments

Meanwhile, migration from high mountain areas of South Asia, documented in the IPCC Special Report, is associated with changes in the cryosphere environment. One form of seasonal migration ('transhumance pastoralism') is an age-old practice whereby high mountain residents move with their livestock between winter and summer pastures. This practice is now declining for a range of reasons, including the melting of glaciers and snow. Herders say that poor winter snowfall is associated with poor pasture quality in Nepal, and less, lower-quality vegetation in Pakistan and Afghanistan. Meanwhile, water sources along migration routes are depleted in Nepal, and increasingly large glacier lakes on the Tibetan plateau are flooding traditional pasture areas. There are some benefits from warming, namely that seasonal migration to summer pastures now lasts longer in northern Pakistan and Afghanistan. People in the region who migrate to seek wage labour tend to be suffering from livelihood stress at home. Climate change impacts agricultural productivity, which affects livelihoods, which drives people to move for the short-term, the long-term, or permanently, and domestically or even internationally, in search of better lives.

Migrating away can have mixed outcomes: it can both increase and decrease people's vulnerability in different ways, depending on the circumstances. There is often an age element to it: in northern Pakistan, it is the young people who move away from the mountain communities to seek wage labour elsewhere. This has left less labour available to tend the fields, orchards and irrigation infrastructure – and so has reduced farming livelihoods overall.

The IPCC concludes that there is increasing evidence that 'people are rarely moving exclusively due to changes in ocean- and cryosphere-based conditions, and that migration as a result of disasters and increasing hazards strongly interact with other drivers, especially economic and political motivations (high confidence).' However, cases are beginning to emerge of communities in the high mountain regions becoming permanently displaced and resettling completely because of changes in the cryosphere. In Nepal, several villages moved after springs dried up and decreasing snowfall reduced the flows of stream water they relied upon for agriculture and pastoralism.

Source: Dupar, 2019a.

5.5.3 Climate, migration and conflict – how strong are the historic links, and what does the future hold?

Turning now to the relation between climate and migration to conflict, there are two questions that are investigated in the academic literature and carried into the grey literature and policy realm:

- Is natural resource-based conflict (in which climate plays a role) in migrants' original location a driver of migration? That is, can resource scarcity lead to conflict lead to migration?
- Alternatively, is natural resource-driven migration (in which climate plays a role) a driver of conflict once the migrants reach their destination?

Several reviews of existing studies on this causal link have found that it was either not possible to isolate the effect of climate variables from socioeconomic and political factors on migration and conflict, or that contextual factors were stronger determinants of conflict than climate variability and change. Overall, our review concurs with Brzoska and Fröhlich's conclusion (2015: 190) that 'it has become clear that the links between climate change, migration and conflict are complex and defy simple and sensationalist conclusions'.

Reuveny (2007) reviewed 36 cases of environmental migration in developing countries, with a focus on sudden- and slow-onset climate-related or influenced events such as flooding and drought, or water scarcity and land degradation. He found conflict in the migrants' destination in 19 of these cases; and attributed the conflict to: competition for the economic and resource base of the receiving area; ethnic tension; distrust; socioeconomic 'fault lines' among migrant and existing groups; and 'auxiliary conditions' such as political instability and civil strife.

There is evidence that understanding of popular cases of climate-related migration and conflict may not be as complete as previously thought. Ide (2018) reviews the literature on the drought in Syria between 2006 and 2009, which is believed to have led to the civil war. The common understanding is that the climate change-induced drought affected agriculture-based livelihoods, which then led to mass migrations from rural to urban areas, aggravating social services provision and resource availability and leading to conflict. Yet Ide points out that whether or how migrants may have contributed to protests or the civil war is not well understood. Selby et al. (2017) find strongly that 'there is no clear and reliable evidence that drought-related migration was a contributory factor in civil war onset'. Their more robust climate analysis indicated that drought was not universal throughout the country nor unprecedented in the historical record (i.e. within natural variability) and long-term drying trends are also spatially mixed. They further concluded, 'there is no good evidence to conclude that global climate change-related drought in Syria was a contributory causal factor in the country's civil war'. (See also Box 4 in chapter 4 examining climate analysis in various studies attempting to link climate change, disasters and conflict.)

Such unclear and contested incidences should be viewed against the broader context of large-scale human mobility, both within and across national borders, that may have an environmental component – but neither induce conflict at the destination, nor are driven by overt conflict at the source. Burrows and Kinney (2016) cite examples of migration in response to climate-related stresses from the literature that have *not* led to conflict: drought/soil degradation in Kenya in 2004 and 2007, which increased temporary labour migration with decreasing soil quality (Gray, 2011); and heat stress in Pakistan, which increased the long-term migration of men (Mueller et al., 2014).

The Atlas of Environmental Migration provides a more expansive view: based on 20 years of work by the IOM into the environmental causes and consequences of migration (Ionesco et al., 2017), it lays out the great magnitude of human mobility in which environmental factors are thought to play a contributing part (hundreds of millions of people over two decades). The Atlas' data and analysis indicates that in proportion to the scale of human mobility, the incidence of violent conflict involving migrants at either source or destination is very small, as well as difficult to attribute to natural resource scarcity. Claims linking climate change, migration and conflict must be considered with 'caution' the authors say: 'while there is strong evidence linking climate change to resource depletion and disasters, potentially causing

displacement or longer-term migration, it would be incorrect to assume that these phenomena automatically result in insecurity and violence: resource scarcity can be managed peacefully and disasters can incite solidarity' (ibid: 82).

Moving into the policy space, and what should be done to support current and potential migrants, policy prescription has, in some regards, leapt ahead of firm evidence, by creating anticipatory recommendations and frameworks.

A global study by the Center for American Progress (Werz and Conley, 2012), focused explicitly on the historic and future implications of climate change and migration for American national security, acknowledges that there is 'major disagreement among experts about how to identify climate as a causal factor in internal and international migration'. The authors suggest, nonetheless, that given the *future* prospect of increased frequency and intensity of climate-related hazards and their impacts (such as intense storms and flooding), governments must be prepared for the policy impacts of potentially increased human movement. Their synthesis study compiles the findings of country and regional reports from North Africa, India–Bangladesh, the Andean region and China.

It is between such assessments of historic experience of climate-related impacts and vulnerability and their relation to migration, and a future in which climate-related hazards, exposure and vulnerability are projected to increase, where academics and policy-makers have made a leap. They have opted to advocate for a precautionary approach (Reuveny, 2007; Werz and Conley, 2012) where it is assumed that policy-makers must be ready for climate-influenced migration, whereby they must address the needs both of potential migrants in resource-stressed situations, and migrants en route and in host destinations, in order to avert new forms of social, political and environmental pressure and conflict.

The World Bank (2018b) proposes several interventions along the lifetime of climate-related mobility (see Figure 8 and Box 10).

Figure 8   Strategic entry points for action along the life cycle of climate-related mobility

BEFORE MIGRATION

- Invest in better knowledge, anticipation and monitoring
- Foster emissions mitigation and inclusive development
- Embed climate migration in policies and national bodies
- Facilitate adaptation in place
- Enable adaptive mobility

DURING MIGRATION

Support people on the move (holistic approach to all of those migrating, displaced, relocated)

AFTER MIGRATION

Prepare, support, and connect sending and receiving areas and their people—especially in hotspots

Source: Adapted and expanded from Martin (2009).

BEFORE MIGRATION

Holistic approach to all forms of mobility including displaced, relocated, return and temporary migrants

AFTER MIGRATION

DURING MIGRATION

Source: World Bank, 2018b: 187.

Box 10   Anticipating climate-related resource scarcity as a driver of migration and conflict in the future

One of the most significant scenario-based studies in recent years is the World Bank's *Groundswell* report (2018b), which examines internal migration as a result of climate change, and develops three principal scenarios. The work is based on modelling whereby increased 'distress' caused by climate change impacts (crop failure due to drought; flooding and salinisation due to rising sea levels; water scarcity) increases the likelihood of 'migration under distress'. The three scenarios are:

- pessimistic (high levels of emissions, unequal development – the reference scenario)

- inclusive (high level of emissions and with 'improved' development pathways)

- climate-friendly (lower levels of emissions but with unequal development).

The report's key messages are as follows:

- The scale of internal migration will ramp up to 2050 unless concerted action is taken on climate and development.

- By 2050, in the three regions studied of Asia, Africa and Latin America, climate change could cause more than 143 million people to migrate within their countries.

- Countries can expect to see hotspots of climate-induced internal in- and out-migration. This has significant implications for countries and for development planning.

- Migration can be a sensible climate change adaptation strategy if managed carefully and supported by good development policies and targeted investments.

- Internal climate migration 'may be a reality but doesn't have to be a crisis'.

- Policy recommendations include: investment in human capital, better information for potential migrants, supportive policies (e.g. labour market policies for internal migrants), making social protection portable and scalable.

Source: World Bank (2018b).

Arguably the most important contribution to be made by further research – as regards such anticipatory action – is whether such proposed actions are 'no regrets' or whether they have the potential to be ill-designed and accidentally maladaptive, and if so, how to avoid this (see section 5.6).

The Global Compact on Migration (2018) is the culmination of years of intensive negotiations by the international community and prepared under the auspices of the United Nations, to lay the policy framework covering 'all dimensions of international migration in a holistic and comprehensive manner'. The Global Compact was adopted by the UK government under Theresa May's leadership in December 2018 and by numerous other European states such as France and Germany; however, several major refugee- and migrant-receiving nations such as the United States of America and Australia have declined to adopt it to date.

The Global Compact notably includes a section on 'natural disasters, the adverse effects of climate change, and environmental degradation', which recognises the importance of support for potential migrants in their originating location, and once they have moved. The first of the commitments is to

improved data-gathering, analysis and sharing in order 'to better map, understand, predict and address migration movements, such as those that may result from sudden-onset and slow-onset natural disasters, the adverse effects of climate change, environmental degradation, as well as other precarious situations'.

Anticipating the need for integrated policy responses, the Global Compact continues with a call to:

- 'Develop adaptation and resilience strategies to sudden-onset and slow-onset natural disasters, the adverse effects of climate change, and environmental degradation, such as desertification, land degradation, drought and sea level rise, taking into account the potential implications on migration, *while recognizing that adaptation in the country of origin is a priority* [emphasis added].
- Integrate displacement considerations into disaster preparedness strategies and promote cooperation with neighbouring and other relevant countries to prepare for early warning, contingency planning, stockpiling, coordination mechanisms, evacuation planning, reception and assistance arrangements, and public information.
- Harmonize and develop approaches and mechanisms at sub-regional and regional levels to address the vulnerabilities of persons affected by sudden-onset and slow-onset natural disasters, by ensuring they have access to humanitarian assistance that meets their essential needs with full respect for their rights wherever they are, and by promoting sustainable outcomes that increase resilience and self-reliance, taking into account the capacities of all countries involved.
- Develop coherent approaches to address the challenges of migration movements in the context of sudden-onset and slow-onset natural disasters, including by taking into consideration relevant recommendations from State-led consultative processes, such as the Agenda for the Protection of Cross-Border Displaced Persons in the Context of Disasters and Climate Change, and the Platform on Disaster Displacement' (UN, 2018: 9).

The emphasis (which we have added) on investment in adaptation to keep migrants in their country of origin speaks to the Compact's emphasis on international migration and displacement, and perhaps signals the security fears of national governments.

5.6 Filling the evidence gaps: directions for further research at the natural resources–conflict interface

The weakness of the current evidence base on the nexus of climatic factors, resource scarcity, poverty and conflict arises particularly from:

- conceptual laxness or simply lack of investigation of the contribution of anthropogenic climate change to resource scarcity and consequent poverty and vulnerability; and
- lack of consistency and thus comparability in terms of the definitions of conflict and violence used.

It is therefore reasonable to conclude that further research – which would support decision-making and any kind of future insight work – should strive to:

- establish far greater rigour on the contribution of anthropogenic climate change to resource scarcity and poverty
- investigate the contribution of these interrelated phenomena to conflict and violence using consistent, comparable metrics of conflict/violence across cases (as noted also in chapters 3 and 4)
- introduce further comparability between case study sites by undertaking more studies in the same or similar eco-regions or agro-ecological zones so that there is shared learning on comparable, locally appropriate technologies and related institutions, processes, knowledge transfer, and potential for shared and peer-to-peer learning.

Furthermore, previous studies have not sufficiently untangled the climatic drivers from the other drivers of natural resource-based poverty and depressed well-being.

Disentangling the climatic from the other human drivers of resource degradation and scarcity is important for understanding which measures may be available to restore and regenerate the natural environment (and with it people's dependent livelihoods and well-being), and which measures of natural resource management risk becoming redundant or ineffective because of larger (not locally controllable) processes of climate change and its impacts on ecosystems. In other words, the 'limits to adaptation' concerning natural resource management are poorly investigated and understood – in developing country contexts generally and in FCAC in particular.

The IPCC finds that:

> *Even with adequate implementation of measures to avoid, reduce and reverse land degradation, there will be residual degradation in some situations (high confidence). Limits to adaptation are dynamic, site specific and determined through the interaction of biophysical changes with social and institutional conditions. Exceeding the limits of adaptation will trigger escalating losses or result in undesirable changes, such as forced migration, conflicts, or poverty. Examples of potential limits to adaptation due to climate-change-induced land degradation are coastal erosion (where land disappears, collapsing infrastructure and livelihoods due to thawing of permafrost), and extreme forms of soil erosion. (IPCC, 2019b: 348)*

Future research agendas could investigate, broaden stakeholders' understanding and equip stakeholders from local to regional levels with improved conceptual frameworks, data and tools to:

- quantify the potential of, and limits to, climate change adaptation and resilience in natural resource based socio-economic systems and
- investigate and test the contribution of climate change adaptation and mitigation interventions in these settings to peace and stability.

However, given the urgency of climate- and security-related risks and natural resource degradation and scarcity in FCAC, it is important that research should not become bogged down in describing the difficult, interconnected social-political-cultural-environmental-economic systems with such complexity that the policy relevance is lost. Research is desperately needed that underpins a bold aid investment agenda and plan. To advance thinking, it is proposed that DFID's Building Stability Framework (DFID 2016) is explicitly broadened and linked to a series of proactive, policy-relevant research questions concerning the climate–natural resources–conflict nexus as the basis for establishing what is known, and investigating crucial knowledge gaps.

5.6.1 Entry points for policy-orientated research to address the climate–natural resources–conflict nexus

DFID's Building Stability Framework provides a robust and well-evidenced set of entry points for both research commissioning on the climate–natural resources–conflict nexus as well as for programming of aid implementation budgets. It lays out five building blocks to guide DFID as it programmes 50% of the UK's aid budget to FCASs. *'Informed by evidence and experience of what works',* the five building blocks are as follows:

- Fair power structures that broaden inclusion, accountability and transparency over time, while managing tensions to prevent violence in the short term.
- Inclusive economic development which creates widespread benefits, reduces incentives for conflict and curbs illicit economies.
- Conflict resolution mechanisms, both formal and informal, that help manage conflict, help people cope with the legacies of violent conflict and strengthen women's role.
- Effective and legitimate institutions, both state and non-state, that build trust with those they govern, and which grow in effectiveness over time.

- A supportive regional environment that enables communities to be more resilient to transnational stresses and shocks, including organised crime and violent extremist ideologies.

There is a major opportunity to build a stronger and more useful evidence base – partly through primary field-based investigation but also through broader, deeper transdisciplinary synthesis of the material already available – to elucidate how all of the above building blocks apply in FCAC that are highly natural resource-dependent, exposed to climate-related hazards and vulnerable to climatic impacts.

We would therefore suggest that it is instructive to phrase each of the DFID Building Stability Framework's 'building blocks' of conflict avoidance in terms of the climate and natural resource interface, as a way of taking stock and identifying where major evidence gaps and opportunities for policy-relevant research lie, as follows.

Governance structures and effective, legitimate institutions:

- How can power structures for governance and management of natural resources use climate-related information and future scenario analysis to create fair conditions to manage current and incipient resource competition and associated tensions?
- How can effective and legitimate institutions for natural resource management and associated climate risks, both state and non-state, build trust with those they govern and grow in effectiveness over time?

Economic opportunities:

- How can inclusive economic development that is climate-compatible and natural resource-based reduce the incentive for conflict and curb illicit economies?

Conflict resolution mechanisms:

- How can conflict resolution mechanisms help manage conflict over climate-stressed natural resources, helping people cope with the legacies of violent conflict and strengthening women's roles to permit more equal natural resource access and control (with men)?

Supportive regional environments:

- How can supportive regional environments enable communities to be more resilient to transnational stresses and shocks, including organised crime and violent extremist ideologies?

5.7 Stock-take of research needs by entry point

5.7.1 Governance structures and effective, legitimate institutions and processes: overview

There is increasing awareness of the need for integrated climate-fragility risk assessments to guide decision-making and investment strategies.

In Africa, the need for a clearer understanding of the relationship between climate change and conflict, leading to better climate risk assessment and management strategies, was raised at the African Union Peace and Security Council session in May (Amani Africa, 2018). This was also a focus for the president of the UN Office for West Africa statement in June (Vivekananda and Born, 2018). Within UNSC Resolution 2423 on the situation in Mali, the Government of Mali and the UN were called upon to invest in adequate risk assessments and risk management strategies (UNSC, 2018). Within the African region, Nagarajan et al. (2018) provide an example of a risk assessment in practice. As part of a wider climate-fragility risk assessment, the authors highlight that the next step of the process is the collection of further primary data on the links between climate and fragility in Chad, Niger and Nigeria. Similarly, UN Environment's (2018b) outlook for South Sudan aims to gain a comprehensive understanding of the

current state of environmental change, providing benchmarks for assessments, inventories, mapping and valuation of the country's natural resources. UNEP indicates that the information generated will be used for future planning and management of natural resources and environmental protection. (Peters and Mayhew, 2019: 24)

New indices are being developed in the academic literature that could be directly decision-relevant for policy-makers.

> *Liu et al. (2018) construct a new measurement for state fragility – the Fragile States Metric System (FSMS) – which, in addition to traditional indexes used within the Fragile States Index – such as economic, political, social and cohesion – includes an adapted Climate Change Metric System, which incorporates a Climate Change Performance Index. By including climate indexes, the authors argue the FSMS makes it possible to understand the bearing climatic factors have on those indexes traditionally associated with the Fragile States Index. (Peters and Mayhew, 2019: 26)*

> *New theoretical frameworks may also help unpack complex drivers of conflict and interactions with human systems. Navas et al. (2018) examine the diverse drivers of environmental conflicts and consider how multidimensional types of environmental violence – direct, cultural, structural and ecological – overlap across historical, political and economic contexts. This approach allows us not only to see visible forms of violence but also to consider 'slow' violence, which may occur over a longer period of time before the effects are felt. The authors argue that, while slow violence may be less evident, it still poses a threat to both human and natural systems, and livelihoods. (Peters and Mayhew, 2019: 27)*

The BRACED Resilience Scan (Peters and Mayhew, 2019) notes that there is an emerging trend in climate-fragility assessment toward empowering local people in assessments in such environments. Two examples in the literature from 2018 are as follows:

> *Oswald-Spring (2018)'s Human, Gender and Environmental (HUGE) security framework offers a deepened and widened understanding of security. The framework places people in vulnerable situations at the centre of science and policy agendas and emphasises the need for empowerment from below. Through this approach, climate mitigation, adaptation and disaster risk management become methods of tackling threats from patriarchal systems and of enabling resilience-building. (Peters and Mayhew, 2019: 28)*

> *Azpíroz Manero (2018) considers how climate change and security are perceived, interpreted and communicated by social actors, such as indigenous populations, religious organisations, women and youth. Such perspectives may deepen understanding on the risks, needs and expectations of different social actors. (ibid.)*

This accords with a broader trend away from expert-only assessments and mapping exercises toward more co-generated and people-centred approaches to climate risk assessment in all developing countries and including fragile contexts, as described and supported by various case studies in Dupar (2019b) for CDKN. Importantly, people-centred indices of well-being were also tested in several ESPA research projects, which sought to:

- measure links between people's well-being and a shifting natural resource base influenced by a suite of drivers, including management regimes and climate variability and change (e.g. Galafassi et al., 2017);

- or measure changes in people's well-being as a consequence of design and implementation of climate change mitigation strategies such as reducing emissions from deforestation and forest degradation in developing countries (REDD+) (e.g. Rakotonarivo et al., 2017).

Both of these were multidimensional methods for measuring well-being in addition to being 'people-centred'. In addition, the indices were characterised by the participatory way in which they were composed.

The methods and findings of these studies all provide important building blocks for a new generation of research in which such people-centred approaches to climate–natural resources–vulnerability assessments have the potential to be adapted and applied more broadly in fragile contexts:

> *The need for enhanced climate risk information to inform effective and timely responses has been determined as a key area for development, with improvements to primary data collection identified as necessary to provide benchmarks for assessments, inventories, mapping and valuation of countries' natural resources.*
> *(Peters and Mayhew, 2019: 24)*

On policy options assessment, the most up-to-date, authoritative assessment comes in the IPCC's (2019b) Special Report on Climate Change and Land, chapter 6, on 'Interlinkages between desertification, land degradation, food security and greenhouse gas fluxes: synergies, trade-offs and integrated response options' (Smith et al., in IPCC, 2019b).

The above ideas speak to the 'information needs and assessments' piece. A critical, complementary piece is needed around accountability mechanisms of government and other decision-making authorities. Here, it can be helpful to look at some of the insights by sector as well as at the landscape level.

5.7.2 How effective forest governance and institutions can contribute to climate change adaptation, mitigation, inclusive and just human development, and peace and stability

Decades of research and practice on halting deforestation, strengthening and enforcing forest-related rights and laws, and investigating the justice and livelihood implications have yielded strongly evidenced strategies on 'what works' in forest conservation and restoration and what the major obstacles to such strategies are. This evidence base is directly relevant to the nexus of natural resource management-conflict (and peacebuilding) and climate adaptation and mitigation. However, it still remains the case that the most robust evidence comes from stable, secure contexts (countries such as Sweden and Costa Rica) and not the most fragile contexts (countries such as Sierra Leone and the Democratic Republic of Congo (DRC)). There is, however, a major opportunity to fund applied research in fragile contexts, perhaps related to the new generation of donor-funded initiatives (e.g. FAO, European Union (EU)) in such contexts and including for investments that are 'pre-REDD+ ready' in their maturity, due to the lack of domestic institutions and processes to support REDD+ readiness.

The Food and Land Use Coalition's work, including its flagship *Growing Better* report and contributing working papers (such as *Public Sector Measures to Conserve and Restore Forests* by Chaturvedi et al., 2019), synthesises important country and sub-national case study findings on how to develop effective, legitimate institutions and processes to overcome natural resource-related conflicts and progress climate change mitigation and adaptation in natural resource sectors (see Figure 9 and Box 11).

Literature on the 'resource curse' is helpful in illuminating measures to curb elite capture, ecosystem degradation, and further poverty and inequality. Of major relevance to climate adaptation and mitigation is the literature around illegal logging, which is 'captured' and driven by political and social elites, and subsequently undermines carbon stocks and livelihood potential for the poorest people. However, such studies – many of which are NGO reports in the grey literature – also demonstrate the severe

methodological difficulties of gathering information and the risks to researchers of doing so. There are decades of investigative work of this type in FCAC by NGOs such as Global Witness – too extensive to cite here. An impressive recent investigative report by the Center for International Environmental Law (CIEL, 2019) tracks illegal timber flows and attributes them to specific offices and high-level personnel in Peru. The geographic focus of the research is Peru's Amazon region, and it relies on scrutiny of timber permits, which is possible in this territory despite fragility and elements of lawlessness; however, such methods are unlikely to be feasible in many other FCAC described in this literature review.

Figure 9: Strategies for overcoming fragile forest governance and supporting climate-smart, pro-poor outcomes

1 Patronage and power	2 Worth more dead than alive	3 Where's the money?	4 Who's the owner?	5 Working at cross purposes	6 Laws on the books but not in practice
Forge political coalitions that challenge the status quo	Identify and communicate a compelling economic narrative	Find new public money for public goods	Make the business case for secure tenure	Improve land-use planning or zoning	Use ICT to safely expose corruption
Build voter demand	Create new business models	Reform subsidies	Support cadaster processes	Strengthen national interagency governance	Sustain democratized forest monitoring
Leverage right to information laws to increase decision-making transparency	Leverage crisis events	Embrace REDD+	Map boundaries of indigenous and community lands	Strengthen national/subnational interagency governance	Implement policies in consumer countries that encourage law enforcement in forest producer countries
	Leverage trade agreements	Introduce fiscal transfers	Invest in institutions and processes for conflict resolution	Introduce jurisdictional approaches	
		Create new business models to crowd in private money			
		Incorporate the value of forests into public accounts			

Tap into leaders' desire to
Stay in power
Achieve status relative to peers
Forge a legacy

Source: Chaturvedi et al., 2019.

A sub-set of the literature on legitimate, effective governance and institutions for forest conservation concerns REDD+ specifically, as a potential carbon-linked mechanism for unlocking international finance streams to developing countries. A critical mass of literature has built up on the institutional, procedural, political and social conditions for 'REDD+ ready' or REDD-type projects and programmes to build trust, grow in effectiveness and thus contribute simultaneously to local security and stability, well-distributed development benefits and well-being, and regional and global climate outcomes. Explicit links with conflict and fragility, however, remain the least-explored vein of this literature.

CIFOR (the Center for International Forestry Research, which, since January 2019, has been merged with the World Agroforestry Centre) has been an international leader in evaluating countries' REDD+ readiness during the 2010s. This has been an important exercise in laying the knowledge basis for development of a fully fledged REDD+ mechanism via the UNFCCC, even though such a mechanism – like negotiations around operationalising carbon markets under the Paris Agreement – remains hamstrung at present.

Box 11 Case study: Strategies for overcoming fragile forest governance and supporting climate-smart, pro-poor outcomes

Chaturvedi et al. (2019) describe the key strategies for conserving and restoring forests as:

'**Reduce supply of land available for deforestation**: 1. Do not make public land available for conversions; 2. Place moratoria on forest conversion; 3. Establish protected areas; 4. Secure tenure and protect indigenous territories; 5. Build climate-smart roads. **Increase risk associated with deforestation:** 6. Enforce the law; 7. Develop conversion-free supply chains; 8. Improve transparency. **Reduce demand for alternative use of (once) forested land:** 9. Sustainably intensify agricultural production; 10. Decrease agricultural commodity demand; 11. Increase relative financial attractiveness of trees vs no trees; 12. Strengthen decentralised resource management.

The six barriers to implementing these good practices are:

1) Patronage and power. Forests are often treated as a source of political patronage to be used to get and keep political power and support. An extreme example took place two decades ago, when then-Liberian President Charles Taylor routinely rewarded political loyalists with lucrative logging concessions.

2) Worth more dead than alive. Trees are often seen as obstacles to economic growth, while so-called development is seen as first extracting value from standing forests in the form of timber or biomass energy and then offering supposedly longer-term value of the land under the trees, either for grazing cattle, raising agricultural crops, extracting minerals or speculating on the value of a future sale.

3) Where's the money? Financing forest conservation and restoration has proved difficult because many forest benefits are not monetised. And financial incentives supporting activities that drive deforestation or keep trees from coming back often outweigh the incentives for conservation and restoration.

4) Who's the owner? Communities living in and around forest areas can play a vital role in successful conservation and restoration but are too often excluded from decision-making about forest policy in part because of unclear and contested land tenure.

5) Working at cross purposes. In some cases, governance over land that affects forests is not aligned, leading to policy paralysis, incoherence or even conflict. The governance of forests is often influenced by multiple agencies, operating at different levels, leading to fragmentation of interests, priorities and actions along horizontal (e.g., agriculture vs. environment ministries) and vertical (e.g., national vs. local government) lines.

6) **Laws on the books but not in practice**. Systemic corruption and low levels of law enforcement often exacerbate these barriers. Although progressive laws may be on the books to support forest conservation and restoration, there is little follow-through and illegalities continue to occur.

Source: Chaturvedi et al. (2019)

CIFOR's multi-country study, the Global Comparative Study (GCS) of REDD+, has published dozens of case studies on the readiness of different countries for verifiable land-based greenhouse gas reporting and REDD+ funding, as well as multiple synthesis reports and academic papers. The Global

Comparative Study on REDD began in 2009 and has included 'comparative studies of international, national and sub-national REDD+ experiences in 15 tropical forest countries, and the production of knowledge products to inform effective, efficient and equitable REDD+ policies and projects' (Young and Bird, 2015: 7). The GCS includes research in FCAC such as DRC; this knowledge base also opens the opportunity for follow-up research on the requisite conditions and potential for step-wise progress toward REDD+ and attainment of important intermediate benefits (see Box 12).

Based on nine case studies across four countries in Southeast Asia, Kane et al. show that, although REDD+ does carry conflict risks, it also contains 'transformative potential' (Kane et al. 2018: 1) in terms of conflict resolution: REDD+ has the potential to empower marginalised groups and strengthen tenure security. Kane et al. highlight that the evidence from their own study but also other research supports 'the importance of clarifying tenure and rights' (ibid: 14). In efforts to achieve this, they recommend the following 'governance initiatives': Free, Prior and Informed Consent (FPIC), Forest Law Enforcement, Governance and Trade –Voluntary Participation Agreements (FLEGT-VPA) and the UN Voluntary Guidelines on the Governance of Tenure (VGGT). Sunderlin et al. (2018) also explore land tenure in relation to REDD+. They argue that, although REDD+ often prioritises land tenure security, this is 'the single most difficult challenge' (ibid: 377) in its implementation. They identify socioeconomic and political conditions, conflict and divergent interests and goals – or 'business as usual interests' (ibid: 376) – as major obstacles. In addition, national governments often lack interest in addressing tenure security, often granting 'privileged access to economically and politically powerful actors' (ibid: 377).

Drawing on evidence from Brazil, Cameroon, Indonesia, Peru and Tanzania, Sunderlin et al. find that, while in some areas there are signs of improved land tenure security attributable to REDD+, overall there is little evidence in this regard. Given the contextual factors listed, the authors argue that REDD+ initiatives are often trying to resolve issues 'whose origin and scope are far beyond the borders of their own site' (ibid: 378). Hein et al. (2018) also explore difficulties addressing land tenure and impacts on implementing REDD+. In an analysis of 162 Intended Nationally Determined Contributions (INDCs), they highlight that of those that reference REDD+, only 18% reference land and forest governance issues, including tenure and indigenous people's rights, which can be the source of violent confrontation. Only 7% of INDCs refer to social and environmental safeguards put in place to 'ensure that indigenous and other local communities fully understand, and agree, with the terms of their involvement in REDD+ projects' (ibid: 9).

Recent events – and scholarship – have also revealed the implications of democratised access to satellite imagery for activism and accountability on forest status and governance, and hence implications for the attainment of climate goals. Rothe and Shim (2018) consider how NGOs use satellite-based imagery to exercise transparency in environmental governance, through the 'detection and monitoring of large-scale environmental changes that would otherwise remain hidden' (ibid: 417). Through the Global Forest Watch project, the World Resources Institute has utilised satellite imagery to shed light on illegal deforestation. While Rothe and Shim note that much has been made of the power this hands to NGOs in terms of challenging state power, they highlight that certain restrictions – security access, high costs, expertise – mean that the power of such tools is concentrated. In particular, non-state actors can fall victim to 'reproduc[ing] a dominant, state driven satellite gaze' (ibid: 436). However, the authors argue that further 'democratisation of satellite technology' – such as 'commercial micro satellites' (ibid.) – may provide more NGOs and civil society organisations (CSOs) with the means to challenge this position.

Many of the social, political and economic *barriers* to protecting and restoring forests, as assessed by the Food and Land Use Coalition (FOLU), such as elite capture and corruption, are endemic in FCAC. Some of the authors' propositions for overcoming barriers are not immediately feasible or relevant in certain conflict situations (e.g. 'applying voter pressure' where the state is failed and democratic institutions and processes are not functioning). However, other strategies and tactics for unblocking hurdles to forest protection are feasible. Further research is needed to build on the important body of work most recently summarised and systematised by FOLU, and test which strategies for overcoming

forest protection and restoration barriers are applicable during times of violent conflict and in immediate post-conflict reconstruction periods.

Box 12   Insight on forest governance and REDD+ readiness and future prospects in the Democratic Republic of Congo

Have efforts to institutionalise REDD+ ready projects and programmes in DRC moved too far, too fast, given the high levels of technical accounting (for forest- and land use-related emissions) required for REDD+ financing? Has this placed too great a burden on institutions from national to local level – and increased the potential for corruption, i.e. capture of climate finance, by intermediary institutions? There is an urgent need for independent research to further assess – based on the experiences of countries such as DRC – what minimum enabling conditions may be needed in a country's institutions and what elements of social stability must be in place (and how these could be measured) as minimum requirements for establishing REDD+ programmes. This work could be both integrative of existing knowledge already compiled by CIFOR, UN-REDD and others, and also additive: bringing in new insight from recent developments in DRC and other FCAC. One of the enquiry questions must also be: how can Payments for Ecosystem Services (PES) of diverse types contribute to (and make sure not to undermine) progress toward peaceful, stable, inclusive and equitable forest-based economies – i.e. programmes that share the climate mitigation goals of REDD+ but require less stringent levels of technical accounting? The CIFOR Global Assessment of REDD+ evaluated the suitability of a range of countries for REDD+ development based on the '3 E' criteria: effectiveness, efficiency, equity. In 2013, its published study for DRC concluded that:

> *'The REDD+ profile in DRC is marred by several shortcomings, and the State institutions have some pronounced structural weaknesses: poor governance; almost total lack of government authority in certain regions of the country; insufficient national capacity to launch sectoral policy reforms compliant with REDD+ requirements; and a shortage of autonomous human, material and financial resources. Certain members of the international donor community share this opinion. The assessment concluded that because of the country's precarious socio-political environment, it would be difficult, almost impossible to implement REDD+ or meet the 3E criteria (effectiveness, efficiency, equity of the REDD+ mechanism).' (Mpoyi et al., 2013: 55)*

Notwithstanding this assessment at the end of the DRC's REDD-readiness phase, REDD+ projects and programmes have proceeded regardless; these are summarised in brief (see Yale Global Forest Atlas, 2020). Several of these have subsequently been criticised for their blindness to conflict and even their harm to local populations.

Brown (2017) analysed 102 documents from four major REDD+ initiatives in DRC and concluded that 'Concrete approaches to address the reality of civil conflict were not evident', although governance reform figured in REDD+ programmes in the country. Brown argues that it is important for external funding institutions to establish how they can be more intentional in harmonising approaches to peace-building, climate change mitigation (and adaptation) and development in conflict-affected, forest-rich countries like DRC.

Box 12 (cont.)   Insight on forest governance and REDD+ readiness and future prospects in the Democratic Republic of Congo

A report by the NGO Rights and Resources, entitled Mai-Ndombe: Will REDD+ laboratory benefit Indigenous People or Local Communities? (Gauthier, 2018) instigated an important and public exchange between the authoring institution and the World Wide Fund for Nature – Democratic Republic of Congo (WWF-DRC), which leads implementation of the substantial REDD+ project in the Mai-Ndombe region (WWF, 2018). Collectively, these texts signal the need for rigorous, independent academic analysis to identify the relationship among international and local power structures, resource flows, resource rights and socio-ecological dynamics, and how these affect the accrual of benefits to local people and the environment, and incidence of conflict.

Furthermore, while we emphasise elsewhere in this section the need for future research to interrogate the adequacy and application of social safeguards in REDD+ as developed by international public funding agencies (UN-REDD partners, the World Bank, FAO, etc.), the DRC experience also illuminates the need for research into the adequacy and practical application of voluntary REDD+ principles that have been developed by large international NGOs, such as the five guiding REDD+ principles of WWF, CARE and Greenpeace:

- Climate: REDD+ demonstrably contributes to greenhouse gas emission reductions with national goals working toward a global objective;

- Biodiversity: REDD+ maintains and/or enhances forest biodiversity and ecosystem services;

- Livelihoods: REDD+ contributes to sustainable and equitable development by strengthening the livelihoods of forest-dependent communities;

- Rights: REDD+ recognises and respects the rights of indigenous peoples and local communities;

- Fair and Effective Funding: REDD+ mobilises immediate, adequate and predictable resources for action in priority forest areas in an equitable, transparent, participatory and coordinated manner.

Meanwhile, strides have been made in DRC's legislative framework since the CIFOR REDD+ readiness assessments were first made, and the first tranche of REDD+ projects is now underway. The government is seeking to reform the country's land tenure system, including clarifying community land rights. Land rights have, since colonial times, been ill-defined; as such, the lack of clarity and existence of land 'grabbing' by elites have contributed to local conflicts. As legislation advances, in parallel, a DFID-led land governance initiative, with UN Habitat, seeks 'to promote the concept of integrated land use planning at community scale to mitigate the risk of land disputes while unlocking the potential for increased socioeconomic development' (UN-Habitat, 2016).

Stakeholders have highlighted the potential for complementary (legislative, operational) initiatives to clarify land and natural resource-based rights, enforce indigenous rights and the application of Free, Prior and Informed Consent in order to strengthen the foundations for more robust and resilient REDD+ schemes (IUCN, 2016). There is a significant opportunity for relevant, applied research that could inform programming.

An example of a leading edge, action-research project of this type is the IDRC-sponsored 'Legal empowerment for accountable, just and equitable governance of land and investment in Cameroon' (IDRC, n.d.). In Cameroon, as in DRC (see Box 12), the government has launched a land reform process to address the multiplicity of overlapping and conflicting types of land tenure and control, including logging and agribusiness concessions – the existence of which deeply affect local people's livelihood opportunities and climate resilience, as well as the country's land-based greenhouse gas emissions. The project will test two sets of interventions: a local-level community-investor dialogue process, supported by junior lawyers and local support staff; and a national-level process to facilitate effective public participation in land policy and reform debates. More action research of this type is urgently needed across FCAC more generally.

Research questions include the following:

- What are some of the minimum required conditions for supporting both forest conservation for climate goals and local people's well-being in FCAC?
- What important, intermediate benefits for livelihoods, personal and societal security, climate and environmental sustainability can early interventions make, and how can they lay the ground for longer-term, more mature forms of financing and international cooperation such as REDD+?
- What other mechanisms involving external support (such as differing forms of Payment for Environmental/Ecosystem Services) may be more effective than REDD+ in achieving multiple climate adaptation, mitigation, peace-building and human development outcomes, particularly in FCAC?

5.7.3 How effective water governance and institutions can contribute to climate change adaptation/resilience, inclusive and just human development, and peace and stability

As indicated above, some of the most robust research to date at the interface of climate adaptation, development, peace and stability has had water at its heart and has been a transdisciplinary endeavour involving physical, biological and social scientists, who are well linked to real-life decision processes. In this regard, the Future Climate for Africa programme, and particularly its HyCRISTAL and Future Resilience for African Cities and Lands (FRACTAL) projects which inform water resources planning and future climate-proofing from city to river basin scale, are good practice examples – although still emergent in terms of being able to measure the true impact of the research (see Box 13).

5.7.4 How effective integrated landscape/ecosystem governance and institutions can contribute to climate change adaptation, mitigation, inclusive and just human development, and peace and stability

A significant volume of research has been undertaken in one FCAC, Bangladesh, on the complex interlinkages among climate change, ecosystems, natural resource management systems and human well-being at landscape scale. Here, broad and deep work in the Ganges-Brahmaputra-Meghna Delta, involving field studies and modelling linked to policy processes, has evaluated the potential impacts of sea-level rise on people and livelihood systems and potential interventions 'with an explicit aim of generating findings relevant for long-term planning and policy processes in the delta' (Nicholls et al., 2018: 79). An iterative learning loop process was deployed, which allowed for external expert analysis of projected climate impacts and feedback loops on the delta's socio-ecological systems under a range of possible climate futures, integrated with extensive socioeconomic/livelihood options assessment and scenario development involving sub-national and national stakeholders (see Box 14).

Box 13 Case study: Integrating hydro-climate science into policy decisions for climate resilient infrastructure and livelihoods in East Africa

'Driven by East African priorities, the overarching goal of HyCRISTAL is to develop a new understanding of East African climate variability and change, their impacts, and to work with regional decision-makers to support effective long-term (5–40 years) decision-making in the face of a changing climate. In particular, it is designed to understand, quantify and reduce the uncertainty in the regional climate projections, and, in collaboration with a range of stakeholders, co-develop climate change coping options that meet the region's needs in both urban and rural areas through a series of pilot demonstration projects, covering urban water, sanitation and hygiene (WASH), rural livelihoods, water management, tea production, transport and lake levels … HyCRISTAL's overarching goal will be achieved through the following specific objectives:

1. Quantify the projections of decision-relevant quantities from state-of-the-art climate models, and their uncertainties due to model formulation and due to unknown aerosol-emission and land-use scenarios.

2. Determine the processes most relevant to 5-40 year East African predictions, including the effects of convection-dynamics coupling missing in all Coupled Model Intercomparison Project (CMIP) models, and evaluate their role in models, to quantify the trustworthiness of their projections.

3. Generate cross-level interactions to foster engagement of key stakeholders/decision-makers throughout the research process, to enable appropriate use of water, sanitation and livelihoods planning tools.

4. Improve critical knowledge of water availability as well as current and future risks from high-impact hydrological events based on the new understanding of future climate.

5. Translate scientific understanding into appropriate water management and livelihood planning tools to enable decision-makers to assess the risk to infrastructure and livelihoods from climate change and to support the development of adaptation strategies.

6. Evaluate new tools and integrated governance mechanisms in pilots, developing livelihood benefits within targeted urban and rural communities.

7. Deliver a comprehensive dissemination and knowledge-sharing campaign to share evidence and tools with local decision-makers through to national and regional policy-makers.'

Source: Future Climate for Africa (n.d.)

A multidisciplinary, multi-scale/multi-level analysis of socioeconomic and ecological systems and development options under a range of future climate scenarios and hitched to concrete government planning and investment processes, of the type undertaken in the Ganges-Brahmaputra-Meghna Delta, raises key questions about further research of this type. Questions include:

- How can the considerable sunk costs of model development be leveraged to update the findings and stakeholder understanding and responses over time?
- To what degree are the stakeholder partnerships and networks and human capacities now in place and able to be sustained in order to coalesce further collective understanding, negotiation of and

diffusion of conflicts and action toward negotiated solutions for stable, adaptive, natural resource-based economies, over the longer term?

- Notwithstanding the considerable efforts made to garner government and local authority support from national to union (local) levels in this initiative, what further insights could be brought to this type of future landscape-level work with an 'intersectionality' lens, as described earlier in this review?

- How can inclusive economic development that is climate-compatible and natural resource-based reduce the incentive for conflict and curb illicit economies? (Or, where conventional natural resource-based livelihoods fail as a result of limits to adaptation, what kinds of alternatives exist across the urban–rural spectrum to provide income and livelihood security and contribute to stability?)

Box 14   Case study: Analysing the future of ecosystem services and human livelihoods in coastal Bangladesh

'Explaining social outcomes of ecosystem service use within the Ganges-Brahmaputra-Meghna delta requires consideration of (i) the magnitude and mobility of ecosystem services and associated populations, (ii) seasonality and other short-term temporal dynamics of ecosystems, (iii) social structures such as the debt economy, (iv) capital accumulation and reciprocity in economic relations and (v) the distribution issues associated with ownership and access to land and resources such as fisheries. These mechanisms are persistent and engrained in social-ecological systems and their governance. They have been used to explain the continued presence of poverty, social exclusion and patterns of uneven development in many contexts … The social mechanisms are manifest in measurable outcomes: notably the material well-being and incomes of populations, their nutritional status and health outcomes and, in so-called subjective well-being, how people perceive their present and futures' (Nicholls et al., 2018: 78).

'This scientific body of evidence further shows that the well-being and health status of populations coming from ecosystem services do not depend on individual elements of ecosystems, but rather on bundles of ecosystems that collectively produce desirable and socially useful outcomes. The people, ecosystems, services and mechanisms used to access these services together combine to create distinct social-ecological systems, unique to each bundle of services' (ibid.).

Governing and managing ecosystem services at the landscape scale requires significant trade-offs: in the GBM Delta, for example, land use intensification over the past 50 years has significantly increased provisioning ecosystem services per capita (e.g. shrimp, rice production), but with a concurrent decline in natural habitats and regulating services (e.g. sediment, nutrient flows). Salinisation of agricultural lands and the water table poses differing threat levels under differing climate change and sea-level rise scenarios to 2100.

In this instance, and thanks to a multi-million pound UK government investment, analysis of differing future climate scenarios with socioeconomic and other environmental flows and management regimes was integrated in a multi-stakeholder research and deliberative process.

5.7.5 Economic development opportunities: how could inclusive economic development that is climate-compatible and natural resource-based reduce the incentive for conflict and curb illicit economies?

There is relatively little documentation of applied conflict-sensitive approaches in 'climate-compatible development' including climate change adaptation and mitigation policies and programming (as detailed in chapter 6, and below).

However, significant trends in the literature and areas for future exploration involve the interface of rights-based approaches to natural resource management and its economic gains. This includes an increasing body of literature in the grey as well as academic realm that evaluates the adequacy of social safeguard processes in the design, implementation and monitoring of climate-compatible, natural resource-based climate policies and programmes. The key messages emerging from this literature are:

- Although the requirements of international public funding bodies for implementation of rigorous social safeguard procedures for natural resource-based climate projects are deemed to be significant and difficult for project developers to comply with, the safeguards nonetheless do not guarantee inclusive and equitable outcomes. This includes the meaningful attainment of free, prior and informed consent by indigenous peoples to use of their land and water resources for climate-related programmes.
- Similarly, the inclusion of indigenous peoples and other minority rights in a country's constitution and laws does not guarantee that the design and implementation of domestic climate policies will be undertaken in ways that cultivate peace, shore up social harmony and decrease conflict.
- Emergent thinking on realising inclusive and conflict-free economic development through climate-compatible, natural resource-based programmes is foregrounding the importance of:
  - explicitly supporting human rights-based approaches in the context of climate-compatible development (CIEL, 2019), which arguably is a successor to the rights-based livelihoods and development approaches of the 1980s to 1990s;
  - recognising that social safeguards mandated by international schemes are too often 'tick-box' exercises at proposal stage that are not followed through fully to implementation;
  - stakeholder mapping and intentional efforts to improve the workings of 'multi-level governance' that supports coordination of natural resource allocation, management and use across and between both ecosystem units (such as river basins or gazetted forest regions) and also administrative territories (such as districts, provinces, traditional authorities' lands) (Muller et al., 2017).

Furthermore, there is increased understanding of the role of indigenous and local knowledge in FCAC in enabling people's climate resilience. Just as there is increasing evidence of the lack of viability of complex mechanisms such as REDD+ in conflict and fragile conditions, there is also growing recognition of how simple farmer-to-farmer methods of adapting to and mitigating climate change can reach tens or hundreds of thousands of practitioners with far simpler forms of external support. Farmer-managed natural regeneration in the Sahel is an emblematic example of this (Cameron for CDKN, 2011), as are a range of adapted traditional water-saving methods that are starting to be widely replicated in Africa to underpin agricultural systems in drylands (as described in IPCC, 2019b).

Some of the most interesting material is emerging from Latin America, and here, REDD+ again provides another illustration: Wallbott and Florian Rivero (2018), cited in Peters and Mayhew (2019: 47), find that REDD+ schemes in Costa Rica are vulnerable to land grabs, exclusion and conflict escalation. The authors posit that REDD+ safeguards are developed internationally and so 'attention needs to be given to how these are realised domestically'. In this case, which may provide inspiration for other conflict-vulnerable contexts and for follow-up research, a dialogue platform was created to facilitate discussions between indigenous communities and the state.

Similarly, at present in Peru (Huertes Campoverde, 2020), a detailed planning process for implementing the country's Nationally Determined Contribution is explicitly creating new forums for foregrounding

of indigenous peoples' and women's concerns and aspirations as regards climate adaptation and mitigation activities, with the goal of decreasing conflict potential and realising widespread benefits.

New research is needed at the applied, decision-scale level in numerous further cases, as detailed in the 'emerging areas' above on how the implementation of safeguards in adaptation and mitigation programming can be achieved for fair, inclusive outcomes that reduce conflict. It is also necessary to investigate 'beyond safeguards' and interrogate more fully the role of more external modes of support in strengthening (domestic) institutions, networks and human capacities for climate-compatible development. Research is also needed on how modes of multi-level governance can support forms of climate-compatible development that are construed as equitable and fair, including providing enabling environments for communities' peer-to-peer climate resilience efforts even in the absence of well-functioning state institutions.

The discussion in chapter 6 on partnerships, community and stakeholder engagement strategies (mapping, engagement) and inequality and social justice (power dynamics, inclusivity and intersectionality, structural violence and gender) are all relevant and carry over into the natural resources domain as areas which merit considerable further research, within and across administrative and ecosystem boundaries. These stakeholder and power relationships, including around ethnicity and gender, are critical elements of the enabling environments that nurture either peace and stability or increased conflict over natural resources where multiple stressors (including climate change) come to bear.

5.7.6 Conflict resolution mechanisms: how can conflict resolution mechanisms help manage conflict over climate-stressed natural resources, helping people cope with the legacies of violent conflict and strengthening women's roles?

Strong evidence exists in the academic and grey literature and in policy and practice on the pillars of just, legitimate conflict resolution mechanisms over natural resources (which apply whether those resources are explicitly climate-stressed or not).

The foundational components of people's environmental rights, particularly their rights to the natural resources on which they depend, are:

- access to environmental information;
- access to public participation in environmental decision-making;
- access to environmental justice.

These rights are embodied in Principle 10 of the Rio Declaration (1992). The third of these, concerning adjudication and access to meaningful recourse for justice and conflict resolution over natural resources and other aspects of environmental quality, links directly to the typology of conflict-sensitive building blocks in the DFID Building Stability Framework, explored earlier.

Fifteen years ago, governments' unwillingness to apply Principle 10 in practice led to the formation of the Access Initiative, an international network of some 150 civil society organisations, to demand these rights. Since then, as described on the Access Initiative website (www.accessinitiative.org) and in a rich and extensive academic and grey literature, there has been a persistent worldwide movement to demand improvement in access to these rights. Tools and frameworks for demanding and applying these rights in specific natural resource management contexts are too broad to review here. However, an indicative example is provided from the ESPA research programme (see Box 15).

Noting that the construction of large dams for irrigation, flood control, hydropower production and multiple uses has created particular flashpoints for overt violent conflict, forced migration and displacement in the past decades, the World Commission on Dams (WCD) worked in 1999–2000 to create consensus on principles and procedures for decision-making in the design and management of large dams (WCD, 2000; Dubash et al., 2001).

Box 15   Applied framework for reducing natural resource-related conflicts – insights from ESPA

The DFID-supported Ecosystem Services for Poverty Alleviation (ESPA) programme funded several projects that looked at the required conditions for just, fair, credible, legitimate natural resource management in fragile and conflict-affected contexts and brought these together in a cross-cutting synthesis project.

The ESPA researchers posited that protected areas are at the core of efforts to conserve biodiversity and ecosystem services. It is recognised that environmental conservation has costs as well as benefits, and that these costs are often shouldered by the poorest local communities. In view of this, Aichi Target 11 of the Convention on Biological Diversity calls for PAs to be 'effectively and equitably managed'. Yet understanding of 'equitable management' – and how to achieve it in practice – remains elusive. Several ESPA projects worked together to develop a framework to support fair, equitable management of PAs. The team responded to a clear policy need, and fed into Convention on Biological Diversity policy processes (including being directly cited in a Convention on Biological Diversity document), as well as the revision of the International Union for Conservation of Nature (IUCN) Green List standards. These culminated in the project 'Developing a framework and tools for enhancing equity and justice in protected area management', led by Kate Schreckenberg in 2015–2016.

The framework emphasised the need to create and strengthen the following institutions and processes for natural resource management:

- Recognition of rights: recognition is about acknowledging and respecting rights, and the diversity of identities, knowledge systems, values and institutions of different actors.

- Procedural rights: procedure is about participation of actors in decision-making, transparency, accountability and processes for dispute resolution.

- Distributional rights: distribution is about the allocation of benefits across the set of actors, and how the costs/burdens experienced by some actors are mitigated.

Sources: ESPA Directorate, 2018; Schreckenberg et al., 2018; Sikor and Cầm, 2016.

At the time of the WCD's final report published in 2000, there were roughly 45,000 large dams worldwide defined as over 15 metres high or with a reservoir capacity of more than 3 million m^3, and a displaced population of between 40 million and 80 million people globally. The WCD's report presents three grounding global norms, five core values, five key decision points, seven strategic priorities, 33 associated policy principles, and 26 guidelines intended to protect populations whose rights and interests have historically been marginalised during large water infrastructure development (and indeed, the rights of nature and non-human species), while also delivering widespread and inclusive development benefits and diffusing actual or potential for conflict. In reappraising the application of the WCD framework 10 years on, Moore et al. (2010) edited a special issue of the journal *Water Alternatives*. Its cross-cutting thematic findings included the following: (a) water and energy demands continue to rise and drive dam development; (b) climate change is now a greater driver of dam construction (based on aspirations for hydropower to provide a low-carbon energy source); and (c) new financiers are changing the loci and framework for decision-making processes. In the wake of the WCD report, water industry stakeholders forged ahead in developing operational tools for evaluating options for water resources infrastructure (including in integrating climate risk), managing and building dams. These include

protocols from the Hydropower Sustainability Assessment Forum (HSAF), the Interdisciplinary Dam Assessment Model (IDAM) and others.

While these technical approaches have gained traction and been widely explored by international funding agencies and major corporates, countervailing academic work and NGO investigation emphasises the urgent need to keep advancing participation of affected communities in decision-making and management processes around water infrastructure, compliance, accountability and performance (Moore et al., 2010). Analysts have stressed the need for mechanisms to not only support procedural justice but also distributional justice – a theme which is also echoed in the parallel but separate literature around application of the Rio Principle 10 discussed earlier. The *Water Alternatives* special edition points to multi-stakeholder platforms as a continued mechanism that shows promise 'for informing and shaping negotiated agreements that result in better sharing of the resources, benefits, and costs associated with dams' (ibid.).

Indications are that there has been a lack of integrated thinking – and a possible new area of synergy and linkage to explore – on how local and national approaches to seeking and applying the 'access principles' to justice in environmental matters could be applied more consistently to the 'climate solutions and conflict' arena described in this review paper (see Box 12).

In the water resources arena specifically, key research questions are:

- How to move beyond purely 'minimum standards' and technical tools in large water infrastructure development such as HSAF, IDAM, benefit-cost analyses, etc. – even when these are adequately accounting for future climate risk – and integrate these with political ecology analysis which explores the social and power relationships between actors and supports negotiated access and use solutions? (e.g. through multi-stakeholder platforms)
- What are the fundamental characteristics of such institutions and processes that can be cultivated in particularly fragile and conflict-affected contexts and what are the appropriate nested geographic scales in which to do so?

5.7.7 Regional environments and transboundary management: how to create supportive regional environments that enable communities to be more resilient to transnational stresses and shocks, including organised crime and violent extremist ideologies

The African Union (AU) has recognised the need for regional attention to peace-building agendas that explicitly address climate change and natural resource conflict. This nexus came to the fore at the AU Peace and Security Council meeting in May 2018. A press statement of the event issued by Amani Africa (2018) draws attention to the Council's concern around the lack of or weakness of shared institutions and mechanisms of conflict resolution and management among different national and regional groups. Meanwhile, the AU (2018) press statement confirmed the Council's emphasis on the importance of mainstreaming climate change into all activities by the AU Commission, particularly in early warning and prevention of climate change-related conflicts.

At the same time, there remains weak understanding of the degree to which climate-related factors contribute to the escalation of violent conflict in border areas – as compared to other risk factors. For instance, a recent investigation by McCullough et al. (2019) interviewed people-smugglers, gold-smugglers and drug-smugglers in the lawless northern Niger border area, to explore the degree to which recurring droughts had driven young men out of pastoralist livelihoods and into higher-risk and more violent smuggling operations. The authors conclude:

> *Our study shows how, rather than climate change being a dominant driving factor behind the proliferation of armed networks in one region, global politics interact with trading practices and corruptible state officials in northern Niger to produce a political economy that incentivises young people to become smugglers. In the near future, threats such as global financial instability, market volatility, increasing support for protectionism and rising nationalism are likely to have a much greater*

impact on the proliferation of armed groups in northern Niger than climate variability and change. A strategic intervention to address insecurity in northern Niger would account for global political and economic threats, and identify ways in which those threats can be managed to promote sustainable livelihoods that don't need to be armed protection: global financial stability, market volatility and climate change intersect and need to be treated as part of a complex system. (ibid: 7)

Indeed, the research found that over-attention to climate-related factors, including climate change as a threat multiplier, shifts focus (and action on accountability) from international criminal gangs and Nigerien officials complicit in illegal and dangerous trade. Furthermore, such a misplaced focus may divert military security interventions in areas that hamper rather than facilitate local people's ability to pursue climate-resilient development. Taking a broader, risk-informed development approach in internal and transboundary contexts is more useful in steering external investment and support (Opitz-Stapleton et al., 2017).

Box 16   The need to create and test mechanisms to avert conflict in the face of rapidly changing coastal-marine and cryosphere risks

In coastal areas, choosing and putting in place measures to respond to sea-level rise presents tough governance challenges and potentially difficult social choices. There are uncertainties about the degree and impact of sea-level rise beyond 2050, and the impacts could fall unequally on different social groups. For example, the economics may favour investing in coastal defences to protect densely populated urban centres with concentrated wealth as opposed to less densely populated rural areas with more marginalised populations. Investment choices will be highly political and will need to be navigated carefully.

In spite of this, there are methods for developing and analysing options that are designed to deal with future uncertainty. These methods emphasise:

- keeping the ability to be flexible over time

- using criteria to gauge robustness and to establish the usefulness of investments across a range of circumstances

- adjusting decisions periodically as consequences become known

- considering social vulnerability and equity

- creating safe community spaces for public deliberation of options and conflict resolution (IPCC, 2019c: chapter 4).

Participatory scenario-building processes, collaborative landscape planning and co-design of ecosystem-based management are all promising, emerging approaches for engaging people on low-lying islands and coasts, enabling them to work together to develop future adaptation scenarios and climate resilience (ibid.).

With reference both to climate change-related risks in both coastal-marine environments and the cryosphere (frozen ecological systems) the IPCC's *Special Report on the Ocean and Cryosphere in a Changing Climate* finds with high confidence that: 'the capacity of governance systems to respond to climate change impacts has strengthened recently but this development is not sufficiently rapid or robust to adequately address the scale of increasing, projected risks' (IPCC, 2019c).

It is evident that significant climate–natural resource–conflict links (and their multiple feedback loops) are of a regional nature: not state-on-state but affecting border areas and competition for scarce resources or displacement of peoples on the basis of degraded resources, in sub-national areas between states. The potential benefits for improved regional understanding and action are increasingly openly recognised by political leaders: particularly in Sahelian Africa, and Central and South Asia. However, much of the literature until recently has been based on single-country studies in FCAC. There is a strong need for more evidence that investigates regional dynamics (see Box 17).

Box 17   Emergent good practices in transboundary climate risk management

'Climate change requires action across national boundaries. Climate risks—both slow-onset and more extreme events—are already displacing people both within countries and across borders, and require planned relocation efforts. Other transboundary climate issues relate to natural resource use, such as watersheds, and trade. Institutional models exist to improve planning, reduce tensions, learn from others, and use science and technology in finding solutions. A few examples are:

(a) the West Africa Coastal Areas Management Program (WACA), a World Bank-financed multicountry program that addresses problems with cross-border climate impacts;

(b) the Seeds without Borders initiative, which supports how neighbouring countries improve agricultural productivity and resilience in the face of increasing natural disasters.'

Source: Global Commission on Adaptation, 2019: 25.

5.7.8 Recommendations for new research on migration

This chapter has included a dedicated, rapid review of migration issues and suggestions for further research as a cross-cutting issue in the natural resources–climate–conflict–fragility space, in response to DFID and IDRC's request.

How do we progress a research agenda, in light of the contested and unclear evidence base and multiple policy agendas concerning climate change and migration? Our review suggests that research agendas and research-into-policy and practice could most productively focus on accumulating and testing the empirical evidence for adaptation in situ (for potential migrants) and support to migrants in their eventual destinations that is appropriate, sustainable (which inherently assumes flexibility) and avoids maladaptation. Policy pointers by Waldinger and Fankhauser (2015), for example, provide a springboard for further empirical investigation.

Noting that 'planned, proactive migration may be a necessary and effective response to climate risks' and that 'uncoordinated distress migration is a sign of adaptation failure', policy measures to support effective in situ adaptation or out-migration, and which could be tested for their effectiveness over time and avoidance of maladaptation include the following (adapted from Waldinger and Fankhauser, 2015: 7; our further caveats and emphases in italics):

- Providing sufficient information about the costs and benefits of migrating, including psychological and social, along with more clarity about alternative adaptation options.
- Releasing credit constraints, to offset the up-front costs incurred by potential migrants, particularly high in areas with poor transportation infrastructure *(and scrutinising and addressing gender- and other socially related discriminatory hurdles to overcome).*

- Improving institutional quality to ensure the incentives to migrate are not reduced, in particular in the context of land tenure security when people are not able to sell their land or are not confident of reclaiming it upon return.
- Putting in place safeguards against distress migration – for example, in the event of conflict, which can force people to choose sub-optimal migration strategies, leading to maladaptation.
- Supporting the areas affected by outward migration by promoting links between migrants and their region of origin; 'managed retreat' from severely affected regions may be a last resort if they become inhospitable.
- Supporting the absorptive capacity of the receiving jurisdictions, in particular urban labour markets and public services, to manage the socioeconomic implications of the arrival of migrants in a new destination.
- Directing migrants away from environmentally vulnerable areas where they move to for different reasons, as is the case in Senegal where more than 40% of new migrant populations are located in high-risk flood zones.

Future policy and practice would be productively informed by action research agendas to illuminate how such policies and forms of external support (and internal self-help) are working now. Further, transdisciplinary research focused on emergent policy and programme interventions would be helpful, even without the need to forensically define the contribution of climate variability or change as a standalone factor in migration, but recognising that climate factors, together with resource scarcity or abundance, contribute both risks and assets, alongside people's other risks. Such research could also investigate the relevance of gender, age, physical (dis)ability, economic capital, education/literacy and skill levels, social networks and relationships to the reasons for people's mobility or decision to stay in place and what happens when they make that decision.

6 Impacts of climate change adaptation and mitigation programmes on conflict

This chapter reviews and summarises the available information, evidence and gaps on the impact of climate change adaptation and mitigation policies and programmes on conflict, exploring:

- how these programmes and policies can exacerbate conflict
- how they can be designed to enhance cooperation and collaboration
- what tools and guidelines (conflict-sensitive and 'do no harm' approaches) have been developed to assist programme implementers, policy-makers, governments and other decision-makers to make appropriate and informed decisions.

6.1 State of the evidence and trends

Over the past 20 years, there have been several parallel discourses related to climate change, adaptation, and mitigation in FCAC. In the past 10 years, these have converged around the nexus of climate change adaptation and mitigation (CCAM) in FCAC. Before 2008, the main body of literature was largely separated by sector, with overlaps and synergies beginning to emerge across the sectors in the discourse from 2014 onwards.

In the late 1990s and early 2000s, there was a growing acknowledgement that policies and programmes in FCAC can exacerbate conflict, particularly around humanitarian and development interventions (Africa Peace Forum et al., 2004). The do no harm approach was adapted and developed for humanitarian action by Mary Anderson in the 1990s as an approach to working effectively in conflict-affected situations (Anderson, 1999). It was then extended into development and other sectors and evolved into the concept of 'conflict sensitivity' (Africa Peace Forum et al., 2004). At this stage, most conflict-sensitive literature was related to humanitarian, development and livelihood programming (Garred, 2007; Haider, 2014).

Early IPCC reports noted that conflict stresses can increase vulnerability to climate change by reducing resilience, as well as reducing adaptive capacity because of resource deployment to competing needs (see chapter 5). However, they could not consider how adaptation or mitigation – whether spontaneous and taken on an individual level or planned interventions deployed by governments or NGOs – could exacerbate conflict, given the limited evidence, or that approaches need to be conflict-sensitive in fragile contexts, until the more recent assessments (IPCC, 2007; 2014); the IPCC special report on climate change and land (2019b) acknowledges the literature on how ill-conceived and implemented land-based mitigation policies can exacerbate conflict (see chapter 5 for more details).

Since 2010 there has been a growth in awareness that CCAM programming and policies have exacerbated (or could) exacerbate conflict if not adapted appropriately (Smith and Vivekananda, 2009; Hunsberger and Ponte, 2014; Rüttinger et al., 2015; Woods, 2015; Zhang, 2015; IPCC, 2019b). There

has been a growing body of anecdotal evidence and case study examples of where CCAM policies and programming have exacerbated conflict (Huesca-Pérez et al., 2018; Schilling et al., 2018a; Wallbott and Florian-Rivero, 2018). However, there is also a growing body of evidence of where actors have adapted CCAM policies and programmes to be conflict sensitive, ensuring that their work does not exacerbate conflict (Smith and Vivekananda, 2015; Peters and Vivekananda, 2014; Cordaid and IIRR, 2011; Twining-Ward et al., 2018; Nagarajan et al., 2018).

Specific guidance for adapting and implementing CCAM policies and programmes in FCAC is limited (Smith and Vivekananda, 2015; Peters and Vivekananda, 2014). However, actors working on CCAM in FCAC have been able to draw from existing good practices on conflict sensitivity and working in FCAC (Peters and Vivekananda, 2014; Nordqvist and Krampe, 2018). Some have drawn on institutional approaches to applying conflict sensitivity across diverse sectors – for example, DFID's Conflict Sensitivity Consortium, which brought together 36 humanitarian, development and peace-building agencies to apply conflict sensitivity across all sectors of their work (CSC, 2012).

6.2 Evidence of DRR, climate change adaptation and mitigation programming and policies exacerbating conflict

This section synthesises selected literature on how CCAM programming has exacerbated conflict (see Box 18). Literature related to land use, irrigation, agriculture and other forms of natural resource management, including aspects of mitigation (biofuels, forestry) was discussed in chapter 5.

DRR and linked climate change adaptation strategies and national plans are considered the foundation stone of formal governance mechanisms for national government agencies – setting out a plan of action and the means through which to achieve it, to protect citizens against current and future disaster risk. Such plans also 'act as an instrument for holding governments to account for their actions (or inactions)' (Peters, 2019a: 21). Despite gaps in the data – suggesting that more investment is required for monitoring the current status and effectiveness of disaster-related policies, strategies and legislative frameworks in conflict contexts – it is well recognised that conflict and post-conflict contexts are least likely to have updated DRR strategies in place, and where they do exist, 'there is a disconnect between people's lived experiences of intersecting disaster and conflict risk and recognition of the dynamic conditions of conflict in policy documents' (Peters, 2019a: 21). Thus, what has not yet been explored are the ways in which conditions of violence, conflict and fragility (such as those described previously) shape changing patterns of vulnerability and exposure, and can or should be integrated into the design of DRR or linked climate change adaptation – strategies.

A conflict sensitivity-focused review conducted for USAID found 'a very limited number of useful and reasonably recent case studies that document use, application, and uptake of conflict-sensitivity among donors and implementing agencies' (Goldwyn, 2016: 4). Case study evidence specifically focusing on the impact of Climate Change Adaptation programming on conflict is even more limited. Nevertheless, there is consensus across the wider literature that all work in FCAC has potential to cause conflict, and this will include CCAM programming (Rüttinger et al., 2015; IPCC, 2014; Gilley and Kinsella, 2015). Case studies and lessons can be drawn from a wider range of areas of programming where there is more literature – for example, livelihoods, humanitarian aid (Zicherman et al., 2011), or on the impact of businesses on conflict, particularly in extractives or agri-business (Orsini and Cleland, 2018).

From a programming perspective, the evidence base on the intersection between CCAM and conflict is relatively thin. One exception is a BRACED review (Neaverson et al., 2019), which argues that BRACED projects faced the 'double vulnerability' of working in countries susceptible to both climate-related disasters and political instability and violent conflict. The review notes that it is not only a case of climate factors amplifying existing vulnerabilities and insecurities; there may also be 'negative feedback loops, whereby violent conflict and fragility amplify the impacts of climate-related shocks and

stresses due to an increased vulnerability and reduced capacity of both communities and the state to effectively deal with climate change' (Crawford et al., 2015: 5).

The BRACED review found that projects' operational realities meant that space for resilience-building activities in times of crisis was often reduced, which meant that humanitarian activities had to take precedence over longer-term, climate-resilient development activities. In 2016, such conflict over natural resources between pastoralists and farmers led to the BRACED Livestock Mobility project suspending routine resilience-building activities in one operating area in Burkina Faso, switching instead to providing humanitarian assistance to refugees (Neaverson et al., 2019: 19–20).

Box 18   Summary of evidence on climate change adaptation and mitigation that exacerbates conflict

There are several discourses in the climate change adaptation and mitigation (CCAM) literature on how CCAM can exacerbate conflict:

- Distribution of resources can change power dynamics in highly political contexts. This can reinforce patterns of control and exclusion, worsening inequalities, and can have significant impacts on the least visible groups in society.

- CCAM strategies focusing on natural resource management can lead to increased insecurity of land tenure, marginalisation of minority groups, increased environmental degradation and loss of biodiversity, and accelerated climate change. These are all underlying points of tension that can exacerbate conflict (see chapter 5 on natural resource management and conflict).

- There is a risk that CCAM funding and policies can be exploited or biased by elite groups and those in power.

- Adaptation measures can have transboundary implications that can increase potential for conflict over shared resources (see chapter 5).

Specific studies evidencing CCAM impacts in FCAC include the following:

- Zhang (2015) found that climate change adaptation strategies favoured the politically dominant members of society, increasing inequalities in some Asia-Pacific urban environments.

- In Aceh, Indonesia, a CCAM REDD initiative inadvertently exacerbated recent and historical political tensions (Levine et al., 2014).

- Rüttinger et al. (2015) and Levine et al. (2014) reviewed Uganda and Ethiopia's CCAM policies and found that they would likely increase marginalisation because policies were politically driven by those in power. Both policies would have 'significant consequences for people's ability (or right) to continue current rangeland management strategies, with further implications for land rights, cultural identity and relations between citizens and the state' (Levine et al., 2014: 10).

- Woods (2015) found that CCAM projects and large-scale land deals exacerbated and instigated conflicts over land and resources in Myanmar.

The non-BRACED project, Linking Preparedness, Response and Resilience in Emergency Contexts, led by Christian Aid, suspended its natural resource management activities in Kenya during the 2016 drought. Meanwhile, changing rainfall patterns, increasing drought, and resource scarcity, coupled with impacts such as migration, food insecurity and market disruption, are thought to have contributed to violent conflict involving pastoralists and farmers (Mobjörk et al., 2016: 8).

CCAM interventions can exacerbate conflict or fragility in various ways. Any assistance distributes resources (tangible and intangible) and changes power dynamics (intentionally and unintentionally) and as such can never be neutral (UNDP, 2017). By operating in FCAC, 'donors and investors become inherently part of the political marketplace' (Grawert, 2018: 3; Hoffman, 2014); assumptions that businesses can operate as non-political agents in highly political contexts have been proven wrong (Ganson and Wennmann, 2015). In developing contexts, interventions may mean that inequalities can be worsened or improved; in FCAC, where governance structures and institutions are often weak, interventions can worsen conflict or support peace (Sieghart et al., 2018). Stakeholders who are likely to experience significant impacts can be the least visible (International Alert, 2019). If development assistance is not conflict sensitive, it can reinforce patterns of control and exclusion (UNDP, 2017). There is acknowledgement that 'As climate adaptation and mitigation policies are more broadly implemented, the risks of unintended negative effects – particularly in fragile contexts – will also increase' (Rüttinger et al., 2015: 10).

Unintended consequences of CCAM can include:

> *... increased insecurity of land tenure, marginalization of minority groups, increased environmental degradation and loss of biodiversity, and accelerated climate change. These unforeseen effects often arise due to the lack of cross-sectoral coordination and, in the case of fragile and conflict-affected situations, the lack of conflict-sensitive implementation of policies and programs. (Rüttinger et al., 2015)*

There are multiple instances in the literature where work that is not inclusive has led to exacerbated conflict (UNDP, 2017).

UNESCAP (2018a) highlights a gap in developing transboundary early warning systems that are conflict sensitive. Currently, early warning systems often fail to address conflict and fragility, especially in cross-border displacement cases where the systems do not include cross-border migrants.

A lack of conflict-sensitive approaches is also a problem in post-disaster contexts. Analysing the impact of the 2004 Indian Ocean tsunami on Sri Lanka, Kikuta (2019) finds that it was not the destruction of houses by the tsunami, but the infusion of post-disaster housing reconstruction and emergency aid that have increased conflict. The author suggests that parties may have resorted to violence to either shift those funds to accumulate power, or to prevent shifts in existing balances of power from occurring.

Several studies point to the potential of climate mitigation approaches and new technologies to lead to conflict. Analysing deployment of 'conventional' renewable energy, Huesca-Pérez et al. (2018) point to opposition from communities in Oaxaca, Mexico, for the deployment of wind energy in a perceived top-down fashion with little consultation. Similarly, Schilling et al. (2018a) point to tensions between communities and wind farm companies and a general lack of wind park development in Africa. Both studies highlight the disillusionment of local populations over employment opportunities as the main driver of conflict.

Hunsberger et al. (2018) have explored the dynamics of resource conflicts related to biofuel production and water irrigation projects centred on mitigation and adaptation measures in Cambodia. They conclude that 'climate change strategies are now deeply entangled with resource conflicts in the greater Aural region' (ibid: 309).

Commenting on the promise of solar radiation management technologies to mitigate climate change, Mayer (2018) posits that future applications risk mirroring current power dynamics in climate discussions, where those with limited voice have less of a say, whereas the greatest polluters will wield

more political power. Halstead (2018) points out that the governance of such technology is inadequate in the current international system, and highlights a gap in geoengineering research that focuses on security rather than environmental aspects, to better understand the risks of tensions between states in the use of such technology.

Analysing REDD+ forestry conservation initiatives for climate mitigation, Duker et al. (2019), Sunderlin et al. (2018), Hein et al. (2018), and Froese and Schilling (2019) find that REDD+ has not addressed land tenure and indigenous rights adequately if at all, nor have countries done so in their INDCs. This has led to conflictual situations and maladaptation, which has impacted already marginalised groups in particular (see chapter 5).

Although there is limited evidence of negative impacts of *lack of inclusivity* specifically for climate change programming, similar evidence is available from livelihood programming. In some Asia-Pacific urban environments, climate adaptation strategies related to employment and housing were found to favour the politically dominant members of society as they require technical or scientific knowledge, thus disadvantaging poorer members of society and further increasing inequalities (Zhang, 2015).

In Nepal, work supposedly contributing to peace through inclusive livelihoods prioritised vertical inclusion (inclusion of the poorest households) and inclusion in terms of gender. However, other horizontal areas of inequality or exclusion (ethnicity, religion, caste) were not considered, despite the well-known importance of horizontal inequality in driving Nepal's conflicts:

> *Many livelihoods groups were formed by NGOs in ways that actually excluded poorer or marginalised community members, or those unable to absorb the opportunity costs of taking part, such as mothers of young children. Better-off women and members of marginalised groups were more easily able to participate, while poorer – i.e. more marginalised – people from the same groups were not. Local power hierarchies in communities affected community projects, meaning people already marginalised in their communities were less able to participate or benefit. In some cases, political interference directed livelihood project opportunities towards political allies. (International Alert, 2019: 5)*

This led to increased frustration on the part of community stakeholders, undermining their optimism about the future, and reinforcing their sense of grievance.

In Myanmar, humanitarian assistance was provided overwhelmingly to Muslims in camps for internally displaced persons (IDPs) following the violence between Muslim and ethnic Rakhine communities in 2012; this sparked a backlash against international agencies as the dispersal of aid was perceived as unjust and biased by the ethnic Rakhine communities, given their own long-standing poverty (UNDP, 2017).

Programming can exacerbate fragility and conflict when there is a *lack of consultation*. A review of livelihood programming in Nepal found that a lack of public consultation and perceived political interference and corruption bred resentment, undermining intended impacts 'by damaging public confidence that governance arrangements were working in their interests' (International Alert, 2019: 5).

Interventions that oversimplify conflict context and fail to account for both temporal and spatial variations, complexity, and changes in conflict and fragility contexts can often result in insensitive approaches that can exacerbate conflict.

Work that *does not consider the history of conflict*, including changes over time and underlying tensions, can exacerbate tensions (CSC, 2012). In Aceh, Indonesia, a 'failure to understand post-conflict political dynamics undermined a climate related initiative and may have inadvertently exacerbated underlying political tensions' (Levine et al., 2014: 5). Disagreements over decision-making, over legal rights and over control of finances led to withdrawal of investment and exacerbated tension between different government actors, which led to a breakdown in relations between these actors, which became a focal issue during elections (Levine et al., 2014).

A lack of understanding of the *spatial differences in conflict situations*, including sub-national or local variations and transboundary impacts, can oversimplify understanding of the context (CSC, 2012). Rüttinger et al. (2015) studied the national climate change adaptation policies in Uganda and Ethiopia, noting how political interests can drive particular adaptation policies that can have differential benefits on groups who are already politically marginalised. A lack of explicit consideration of the overlap between adaptation policies and existing low-level conflict can increase tension and insecurity (ibid.). This emphasises the importance of including political interests at the centre of analysis, otherwise a climate change adaptation agenda can contribute to conflict.

Similarly, *transboundary impacts on conflict dynamics* need to be considered – for example, impacts related to transboundary water resource management (see chapter 5):

> *Adaptation measures of an up-river community could result in water scarcity in the down-river community, increasing chances for conflict over the shared resource. Also, interventions to rehabilitate rangeland to adapt to climate change could potentially contribute to conflict if there isn't clarity and buy-in from communities and adherence to local laws, customs and social arrangements, about who is able to use and benefit from the land. (Sieghart et al., 2018: 4)*

There is some literature that considers how timing, and rushed investment (*not allowing enough time for careful analysis*), can exacerbate conflict. In Myanmar:

> *many interviewees shared examples where they felt international donors had interpreted Myanmar's democratic transition or peace process too positively and initiated investments and development projects in conflict-affected areas too quickly. They found that these efforts were not mindful of the fragility of the transition and peace processes, and risked marginalizing local stakeholders and communities, and triggering new or increased conflicts, for example over natural resources and land. (UNDP, 2017: 21)*

The literature has numerous examples of programming that is *peace insensitive*, meaning that they were missing opportunities to consolidate peace. Conflict-unaware programming often has insufficient analysis of or monitoring of conflict to track any of its own negative impacts on conflict. Analysis of livelihood programming in Nepal concluded that most was 'neither explicitly designed to improve stability and consolidate peace, nor based on a thorough analysis of contextual power and conflict dynamics. As "peace insensitive" initiatives, therefore, they risked having a negative impact on stability' (International Alert, 2019: 5).

6.3 Climate finance for adaptation in fragile and conflict-affected contexts

Our review did not find significant evidence on the amount, modalities and outcomes of climate adaptation finance targeting FCAC. This is likely a reflection of the status of development of climate security as a field of study and in international fora. Interviews with experts have highlighted two ongoing studies analysing this issue that will be published in early 2020 (see Box 19). Both studies are initial contributions to understanding how to improve financial flows to address the challenges at the climate–conflict–fragility nexus, but more analysis is required overall.

Box 19   Climate adaptation financing in fragile and conflict-affected contexts

The Environmental Law Institute is analysing investments in the Global Environment Fund (GEF), inquiring whether these have included conflict-sensitive design and implementation and looking at correlations with project and programme outcomes. The analysis is carried out at the GEF global portfolio level, which includes both climate and other environmental projects. Seven projects affected by conflicts are selected for further deep dive analysis, including those in Colombia, Lebanon, Cambodia, Afghanistan, Mali and two transboundary situations – East Africa and the Balkans. The study analyses the barriers and seeks to understand how conflict-sensitive considerations can be better incorporated in GEF projects.

Early findings identified four categories of projects based on their level of conflict sensitivity: (1) projects that are aware of the conflict context but do not incorporate it in design; (2) those avoiding the conflict (for instance, by programming in a different part of the country); (3) those actively managing conflict risks through local ownership; and (4) those that provide opportunities to bring different actors for risk management together (for instance, for conflict involving water or livelihoods).

Mercy Corps is analysing OECD DAC bilateral and multilateral (climate funds and development banks) official development assistance (ODA) flows for climate adaptation purposes to countries that are highly fragile and exposed to climate hazards as per USAID's definition (see Moran et al., 2018). Some of the themes the research is seeking to explore includes:

- understanding how much climate adaptation funding is reaching the most fragile and climate-exposed countries

- the pace of commitment and disbursement

- whether the amount of finance is adequate to meet countries' needs

- whether these financial flows are going into risky projects and areas, or if they are just targeting 'low-hanging fruits'

- the barriers to access these funds.

Source: Interviews with Mercy Corps and Environmental Law Institute.

6.4 Finance for disaster risk reduction in fragile and conflict-affected contexts

Despite current and future trends in hazard-related disaster impacts, financing for DRR is notoriously low, and has been for decades – as revealed by a 20-year review of disaster finance (Kellett and Caravani, 2013). DRR as part of development assistance has been moderate (Watson et al., 2015). This is despite the reality of increasing direct and indirect losses due to disasters, disaster mortality being increasingly concentrated in developing countries, and increased frequency of disaster events – a trend that is likely to continue (IPCC, 2012). Available funding is just a fraction of overall aid finance and largely ex-post, undermining the preventive ambition of risk reduction work (Watson et al., 2015). Numerous cost-benefit analyses have been conducted with varying findings, but all showing substantial benefits in ex-ante vs ex-post spending. The 2014 *World Development Report* suggests the benefit is

between 4 and 36 times greater than the cost for early warning systems alone (World Bank, 2014). ODI conducted a number of quantitative analyses on DRR financing in the early 2010s but this data and analysis requires updating.

Furthermore, sources of DRR finance are varied, which adds further complexity, as international aid finance can be channelled through a range of sectors or parts of the risk management cycle, as can domestic and private finance. Of the data that exists on international aid finance, we know that 'more is done to support preparedness and recovery than to understand the underlying vulnerabilities that lead to disasters' (Watson et al., 2015: 3). This may partly explain why evidence on the role of climate and conflict in disaster vulnerability and exposure has been lacking, and requires substantive further research.

More recent analysis finds that 58% of disaster deaths took place in the world's 30 most fragile states between 2004 and 2014, and figures of people affected are often unreported or vastly under-reported, suggesting that the real impacts are much greater (Peters and Budimir, 2016: 5). In a quantitative study at the global level, Marktanner et al. (2015) found disaster deaths to be 40% higher in locations with a history of armed conflict, compared to locations without. The reasons are varied, relating to conflict conditions increasing exposure and vulnerability to natural hazards – including displacement, reducing coping capacity, disrupted social networks, and insufficient state disaster risk management capacities – owing in part to limited financial and technical resources. It has been well documented that high-impact disaster events are devastating for those affected and costly for the international community – between 2005 and 2010, for every $100 spent on humanitarian response in fragile states, only $1.30 was spent on DRR (Peters and Budimir, 2016: 12). Analysis of climate-related disasters shows a similar story, with 55% of climate-related disaster deaths in Asia between 1997 and 2016 occurring in the region's four most fragile countries (Afghanistan, Pakistan, Myanmar and Bangladesh) (Peters, 2018: 7).

Much of the literature on DRR finance around the beginning of the 2010s calls for or anticipates that climate adaptation funds will help address the shortfall. Given the similarities between some aspects of climate change adaptation and DRR, this is common sense. Indeed, in 2014, 42% of adaptation funding was found to include a DRR component (Nakhooda et al., 2014, in Watson et al., 2015: 8). However, the eligibility criteria of some climate funds are dissuading access and use by governments in contexts affected by fragility and conflict; 'An added challenge is that many countries do not have the systems set up to absorb and effectively utilise climate finance; as the GAIN [Global Adaptation Initiative] Readiness index shows, those countries are largely fragile and conflict affected' (Peters and Budimir, 2016: 14). Though somewhat dated, figures suggest that 28% of adaptation finance is allocated to FCAC (when tracked multilateral adaptation finance totalled $751 million), a proportion of which is likely to be spent on DRR-related activities (ibid.). More detailed and up-to-date analysis is required of the figures, and impact.

Perception of *inappropriate use of funding* can drive conflict, either linked to inequality in targeting or to exploitation by elite groups (Levine et al., 2014). There are also risks that climate change funds may encourage elite groups to exploit funding for their own benefit (Peters and Vivekananda, 2014). For example, in Mali, there are reports of embezzlement of drought relief funds by some government officials, contributing to grievances between the central government and the Tuareg community (Benjaminsen, 2008).

It must be noted that reviewed data are limited in their capacity to provide information for climate security analysis in their present form. Apart from ongoing challenges of quality and consistency between these sources, no internationally agreed methodology exists to define, track and report 'climate security activities' akin to the Rio Markers developed by the OECD DAC to 'tag' mitigation and adaptation activities in climate finance flows. This means that the data reporting systems of institutions providing climate finance data are not designed to track and report this information (either at all or in a consistent manner), which is therefore not reported by aggregators and publishers.

There is also a wider, ongoing discussion as to what climate security finance is. As noted by Born et al. (2019: 4):

> *The systemic nature of climate-related security risks makes financing challenging. Funding is often siloed, which hinders integrated responses. 'Climate security' is not a budget line item and responses take other, often multiple, labels such as resilience, climate change adaptation, disaster risk reduction, peacebuilding and development.*

Speaking of the multilateral climate funds, an interviewed expert noted that their funding flows (around $2 billion per year) are insufficient to address climate issues, let alone conflict, and therefore caution is needed when stressing the importance of these financial flows to address conflict. Three interviewees agreed that developing dedicated climate security finance streams would not be helpful, as 'proper development work' would address the root causes of conflict in development, suggesting mainstreaming conflict sensitivity and climate security in existing funding mechanisms from the climate, humanitarian, DRR, peace-building, trade and investment, and development sectors.

6.5 Gaps in the climate change adaptation and mitigation evidence base and priority research questions

Overall, the literature emphasises the shortage of case studies or evidence on CCAM being applied with conflict sensitivity in FCAC as there are only a small number of publications in the literature specifically on CCAM in FCAC (Peters and Vivekananda, 2014; Zhang, 2015; UNDP, 2017).

The majority of CCAM case studies in FCAC are in East Asia and Africa, with a few summary publications in MENA and the Arab states. *More research is needed to widen both the geographical scope and the depth of evidence for applied conflict-sensitive approaches to CCAM in FCAC.*

Key priorities to address include: improved consideration of conflict dynamics within CCAM programmes; improved familiarity with conflict-sensitivity concepts and tools by DRR and climate change adaptation actors; donor leadership in mandating and enabling conflict sensitivity in programmes and institutions (Peters and Vivekananda, 2015); and increased recording of evidence of instances where conflict-insensitive programming has negative outcomes (Zhang, 2015).

Given existing consensus on the importance of conflict sensitivity across all actions in FCAC, more emphasis can be placed on evidence of CCAM programmes applying conflict sensitivity, flashpoints where conflict and CCAM are most likely to overlap, and *case studies of programme adaptations based on conflict sensitivity*. This process can learn from case studies of programme adaptations (CSC, n.d.) as well as from efforts to monitor and evaluate conflict sensitivity (Goldwyn and Chigas, 2013). Focused CCAM conflict-sensitivity case studies can provide detail and nuance in understanding the climate–conflict relationship in specific countries or regions, as well as helping donors and practitioners better understand where CCAM programmes need to give particular attention to conflict. Research can also *assess the integration of conflict-sensitive thinking and practice within organisations*, identifying how best this can be strengthened at an institutional level (UNDP, 2017) in organisations focusing on CCAM programming.

Research gap: gender, inequality and structural violence impacts on climate change adaptation and mitigation

The literature recognises the need to *better understand gender, structural violence and marginalisation when applying conflict sensitivity to CCAM projects*. This would be a valuable lesson to take into future research and implementation work for CCAM in FCAC. Priority areas for gathering evidence include: the drivers of sub-national conflict and marginalisation in new and evolving contexts; the ways in which conflict changes gender roles domestically, economically, socially and politically over time; and how

to design gender-sensitive peace-building interventions that address the specific needs of women. There is also a need to enhance the understanding of gender to be more nuanced, and to consider gendered perspectives on the experiences of men and boys in conflict (International Alert et al., 2019; Saferworld, 2019; Seng Lawn and Naujaks, 2018).

Research can also analyse the ways in which *policy options – for example, relating to natural resource management, impacts on CCAM and peace-building* – need further analysis (Peters and Vivekananda, 2014). Additional research is also needed to improve the understanding of the complex interaction of social and ecological domains and the spill-over effects caused by land-based climate change adaptation projects, such as biofuel production, forest conservation, or hydroelectric projects, and their potential implications for increasing conflict susceptibility (Hunsberger and Ponte, 2015) as well as further research on the *adequacy of existing social and environmental safeguarding systems* in internationally, publicly funded projects (see chapter 5 for more detail).

Peters and Vivekananda (2014: 25) also suggest a need for further research to delineate '*main areas and investments that can mitigate conflict linked to climate change*, such as:

- **Institutions and natural resource management governance:** clarification of land rights and tenure, dispute resolution processes and harmonization of laws;
- **Sustainable livelihoods:** diversification, insurance, support for mitigation and mobility, early warning;
- **Rehabilitation of degraded ecosystems and improved management:** to improve/increase the supply of natural resources through management, more efficient use of natural resources and rehabilitation of degraded areas.'

6.6 Priority questions around financing climate change adaptation and mitigation and climate security in fragile and conflict-affected contexts

Synthesising our findings on the current evidence on climate security finance has led to some critical questions that need to be addressed.

How do we define climate security finance?

- How do we assess if a project or programme activity addresses climate security?
- What challenges would institutions face to track this information, and how can we overcome those challenges?

What are the volumes and dynamics of current financial flows addressing climate security in fragile and conflict-affected contexts?

- How much climate adaptation finance is reaching the most fragile and climate-exposed countries?
- How much of the other financial flows (i.e. humanitarian, DRR, peace-building, trade and investment, development) is reaching the most fragile and climate-exposed countries?
- Which countries are actively targeting the most fragile and conflict-affected countries? How?
- What is the pace of commitment and disbursement of this funding?
- Are the flows adequate to the needs of targeted countries?
- Are these financing flows consistent over time, predictable and reliable? (How can we make humanitarian finance address longer time frames than is usual?)
- What kind of assistance or activities (e.g. capacity-building, readiness support, infrastructure) is this funding supporting in FCAC? How does it compare to other developing countries?

What are the barriers to increasing climate security financing targeting fragile and conflict-affected countries?

- What are the barriers that fragile and conflict-affected countries face in accessing these financing mechanisms? (e.g. Are fiduciary requirements too high for governments?)
- Which and how many entities from fragile and conflict-affected countries are accredited to access these funding mechanisms? Is there a trend?
- How should lending instruments (e.g. debt vs grants) be deployed based on the level of country risk and project risk?
- How do we increase the risk appetite of existing funding mechanisms to target more fragile and conflict-affected countries? Do internal mechanisms exist in these institutions to channel funding to those countries?

What are the outcomes and effectiveness of this funding?

- Are these financial flows targeting risky projects and areas?
- Is this funding reaching individuals and institutions at the local level?

6.7 Recommendations for climate change adaptation and mitigation in fragile and conflict-affected contexts

Climate change adaptation interventions ideally should be *conflict sensitive*, ensuring that they do no harm and where, appropriate, positively contribute to peace (see Box 20). However, as discussed earlier, the capacities, resources and objectives of implementing groups influence the conflict sensitivity and peace-building potential of various programmes.

Box 20   Case study: Integrating conflict sensitivity into adaptation in Africa

A workshop on integrating conflict sensitivity into adaptation programming in Africa provided the following recommendations:

- 'Countries should consider conducting a full conflict assessment that explicitly examines conflict dynamics around natural resources, the environment and climate change. The principles underlying the DNH framework should be incorporated in those analyses, including NAP processes. The analysis should be cross-sectoral.

- Conflict analysis should take account of how climate change might influence three factors: the context, institutional performance, and key actors' interests, resources, and strategies.'

Source: Tadesse and Lyons, 2013: 12.

There is *limited guidance on how to conflict-proof climate adaptation programmes* (see Boxes 21 and 22) (Rüttinger et al., 2015). However, Peters and Vivekananda (2014) argue that a new toolkit for conflict sensitivity CCAM is not needed: instead, donors, policy-makers and practitioners need to *commit to applying existing political economy and conflict-sensitive approaches*. CCAM programmes

need to *build on lessons learned from other sectors* such as livelihood programming and development practices in FCAC and adopt an *integrated, holistic approach* across sectors.

Box 21   Summary of conflict-sensitive climate change adaptation and mitigation

Zhang (2015) emphasises that conflict-sensitive adaptation and mitigation programming needs to consider:

- horizontal coordination between various government departments

- vertical coordination among different levels of government

- collaboration with non-state actors

- inclusivity of the needs of the poor.

Case studies where CCAM projects have taken a conflict-sensitive approach include the following:

- 'Both the Climate Fragility Risk Assessment of Lake Chad (Nagarajan et al., 2018) and the Expert Working Group on Climate-Related Security Risk's Climate-related Security Risk Assessment (Vivekananda and Born, 2018)...publications aim to support practitioners working in Lake Chad to understand the interplay between climate and security risks and to plan, design, implement and evaluate programmes to respond positively to these' (Peters and Mayhew, 2018) (see Box 3 in chapter 4).

- Conflict-sensitive CCAM sub-projects in Iraq (see Box 22, a case study of conflict-sensitive CCAM in Iraq) (Sieghart et al., 2018).

- 'The Multi-Hazard Disaster Risk Assessment (MHDRA) conducted by DFID Tanzania in March 2014 provides an example of an assessment which takes a holistic approach to risk and vulnerability. The MHDRA actively encompasses a wide range of issues, including conflict and security, climate change and environmental change' (Peters and Vivekananda, 2014).

Bringing conflict sensitivity into programming and other interventions requires the following:

- **Good practice** conflict-sensitive concepts to be applied across all stages of the intervention, from stakeholder engagement, analysis, and intervention design to implementation and monitoring. These good practice concepts require that conflict–climate-sensitive interventions be treated as processes that: are consultative and build trust; enhance and capitalise on existing relationships; build in monitoring for continuous learning and adaptive iteration; and are sensitive to context, including intersectional vulnerabilities, exposures and structural inequalities**.**

- **Tools** to facilitate the integration and application of conflict-sensitive concepts in intervention stages, such as conflict analysis, conflict trees, 'positions, interests and needs' analysis, intersectional analysis, and M&E systems.

- **Support, capacity-building and resources** within implementing institutions to ensure commitment and ability to follow through on conflict sensitivity in interventions.

Box 22   Case study: Conflict-sensitive climate change adaptation and mitigation in Iraq

'The Iraq Social Fund for Development, approved in February 2018, will finance community level subprojects which incorporate climate adaptation into their design, including the rehabilitation and maintenance of irrigation canals, drainage structures and roads, and the construction of small scale water supply and reservoirs. These subprojects are expected to contribute to increased agricultural productivity, enhanced infrastructure resilience to extreme weather events such as more intense and frequent storms and increase the quality and quantity of water resources. Overall, the $300 million project expects to benefit 1.5 million households and create over 10 million employment days, leading to improved, sustainable access to basic services and increased social cohesion.

Inclusive community engagement is a crucial element to prioritizing and then implementing sub-projects in an effective, and conflict-sensitive manner. Local representatives, with a strong showing from women, have already participated in planning and decision-making discussions.'

Source: Sieghart et al., 2018: 2.

6.8 Approaches to ensuring that programming and policies in fragile and conflict-affected contexts do not exacerbate conflict

Conflict sensitivity

Any person, entity or intervention operating in a conflict-affected context will inevitably impact on conflict and peace, and may cause harm (Orsini and Cleland, 2018; HMG Stabilisation Unit, 2016). Interventions in FCAC need to be designed, managed, implemented and monitored in a conflict-sensitive manner (UNDP, 2017).

The three key tenets of conflict sensitivity are: to understand the context in which you operate; to understand the interaction between your intervention and the context; and to act on this understanding, in order to avoid negative impacts and maximise positive impacts (Africa Peace Forum et al., 2004).

The work of the Conflict Sensitivity Consortium revised the final tenet to add 'within an organisation's given priorities/objectives (mandate)' (Brown et al., 2009). This recognised a consensus within the consortium that an organisation's mandate and objectives will shape how it engages in and on conflict. Organisations need to consider their skill set, priorities and mandate, recognising that not all organisations need to include (or are effective at including) peace-building as a key objective (which requires a substantial understanding of, skills in and commitment to addressing conflict), but all organisations can and should have a positive impact on peace within their existing objectives or mandate (CSC, 2012).

UNDP notes that:

> *... while there is potential for local and community development programming to be*
> *peace supportive by tackling conflict causes and drivers and contribute to peace, it*
> *is important to note that not all programmes are mandated or equipped to do so.*
> *The potential to move (towards peacebuilding) must be carefully assessed against*

the context, organizational mandates, stakeholder views, planning and implementation timeframes and capacities. (UNDP, 2017: 31)

It is important to be realistic about what CCAM programmes can achieve within their immediate operating environments and those dynamics that are beyond their control (Wallis and Buckle, 2016; CSC, 2012).

It is also, however, noted that 'the enhanced understanding of conflict that stems from conflict sensitivity may lead some agencies to explicitly adopt peacebuilding priorities or activities. This may be considered a peacebuilding side-effect of adopting a conflict sensitive approach' (Brown et al., 2009).

Conflict sensitivity:

1. **'Applies to all contexts,** regardless of the severity or frequency of violence, even in situations where underlying tensions have not recently resulted in violence.
2. **Applies across and throughout all areas of our work** and should be applied as an institutional approach (beyond tools).
3. **Applies to all types of work**, to encompass humanitarian, development and peacebuilding, also including, where appropriate, work conducted by local civil society, government or private sector partners.
4. **Does not require changing mandates/priorities/objectives**, and does not entail an explicit commitment to peacebuilding as a priority (can be mainstreamed across any priority / mandate)' (ibid.: 19).

Conflict sensitivity does not require changing mandates/priorities/objectives as it does not entail an explicit commitment to peacebuilding as a priority – it can be mainstreamed across any priority/mandate.

The literature emphasises the importance of a multidimensional understanding of peace and conflict; 'where development actors make efforts to be more conflict sensitive, they tend to focus solely on ethnic conflicts or on their work in conflict-affected areas, as if conflict is not a problem elsewhere' (UNDP, 2017: 21). Conflict sensitivity cannot be limited to 'conflict areas' as this risks missing the interactions between development activities and the different layers and levels of conflict that exist throughout a country or region, including multiple fault-lines around ethnicity, religion, language, class and poverty, gender, and age (UNDP, 2017).

It is also important to note that being conflict sensitive does not mean avoiding conflict, particularly where conflict is inherent in social change and redressing structural injustice. When desired changes are likely to lead to resistance or conflict (e.g. incorporating gender equality), more careful planning is required to understand the context and to minimise undesirable repercussions. A project in Afghanistan led to a situation where a local religious leader became agitated about the project's impact on gender norms and gender equality – in this case, conflict sensitivity did not mean avoiding this potential conflict, but identifying it, understanding it, and taking action to reduce risk through dialogue (International Alert, 2019).

The Conflict Sensitive Approaches to Development, Humanitarian Assistance and Peacebuilding Resource Pack (Africa Peace Forum et al., 2004) provides the following guiding principles for implementing a conflict-sensitive approach: participatory processes; inclusiveness of actors, issues and perceptions; impartiality in relation to actors and issues; transparency; respect for people's ownership of the conflict and their suffering; accountability for one's own actions; partnership and coordination; complementarity and coherence; and timeliness. The Commission for Research Partnerships with Developing Countries is developing guidelines for conflict-sensitive research (see Box 23). These issues and themes are elaborated and discussed in the following sections.

> **Box 23   Conflict-sensitive approach to research**
>
> The Commission for Research Partnerships with Developing Countries (KFPE) is developing guidelines on conflict-sensitive research, based on a recent publication, which summarised the following issues.
>
> **Conflict sensitivity:** Conflict sensitivity is both about what we do and how we do it. For researchers this means it is both about the content of research and about the way research is being conceived and implemented (theory and methodology).
>
> **Research and local context:** The researcher and his / her research are always part of the local context, regardless of subject and methodology of the research.
>
> **Security:** A conflict sensitive approach is relevant both for the impact of the research on the context and for the security of the persons involved in the research.
>
> **Communication of results:** The perception of research results as "critical" is not only dependent on their content but mainly on the way these results are being communicated and on their addressees.
>
> **Flexibility:** A conflict sensitive approach draws heavily on the capacity of researchers to adapt their behaviour, their activities and their communication about what they are doing to changing research environments.
>
> **Political sensitivity:** Conflict sensitivity makes researchers aware of their political position within the context of their research. This context includes both the "North" and the "South".
>
> **Trade-offs:** Being aware of and adapting to a particular (conflict) context entails contingencies and limitations for research. Researchers must decide what kinds of concessions or trade-offs they want to make.
>
> The guidelines will be designed for researchers who work on and in conflict and will be of use to a variety of disciplines. The guidelines will be informed by researchers of different disciplines, experiences from field research, funding institutions, etc.
>
> *Source: Swiss Academies of Arts and Sciences, 2017.*

6.9 Recommendations for applying conflict sensitivity

This section draws on lessons from wider programming, providing recommendations on applying conflict sensitivity to CCAM and DRR programming.

Take a holistic, integrated approach

Alongside conflict sensitivity, many authors recommend taking a holistic and integrated approach across sectors and institutions to tackle complex interconnected challenges like climate change and disasters in FCAC (Wolfmeier et al., 2019; Peters and Vivekananda, 2014; International Alert, 2019; Goddard and Annaraj, 2017). Divisions between sectors limit the possibilities for proactive, coordinated

co-benefits, and create false compartmentalisation between issues, which can result in action taken to advance one cause at the expense of another (Peters and Vivekananda, 2014).

Smith and Vivekananda (2009 emphasise the importance of coordinated, complementary and coherent efforts – connecting up development sectors with environment, trade, peace-building and post-conflict sectors. They highlight that DRR and climate change adaptation are expanding to look at a range of risks – i.e. disaster and climate-related, but rarely expand to include conflict. They emphasise that a shift in policy and practice is needed to move to integrated approaches. For example, climate change risk assessments can be expanded to consider the interactions between policies, actions and the ethical implications of interventions (Mayhew et al., 2019; Peters et al., 2019b). Coordination across sectors also can result in win-win opportunities for enhancing resilience and reducing fragility (Moran et al., 2018).

Evidence from existing programming and research suggests the following general entry points for integrating peace-building and climate resilience programming: strengthening social cohesion within and between groups; supporting sustainable livelihoods and an enabling environment; working on multiple governance levels; and addressing exclusion and marginalisation (Vivekananda et al.,2014).

Conflict sensitivity can also be combined with other approaches. International Alert's Conflict Sensitive Business Practices guidance (Orsini and Cleland, 2018) combines conflict sensitivity with a human rights approach. This includes a commitment to redressing power imbalances in favour of risk governance approaches centred on poor people (Mayhew et al., 2019).

Some agencies have integrated conflict sensitivity with disaster or climate risk management (see Boxes 24 and 25). However, a review for USAID found that this can 'undermine conflict sensitivity if there is confusion about the particularities and differences between risk management and conflict sensitivity' (Goldwyn, 2016: 4).

Box 24   United Nations Environment Programme Post-Conflict and Disaster Management Branch (PCDMB)

Natural hazards, land degradation, and damage and destruction to natural resources are only some examples of the many environmental challenges facing fragile and conflict-affected states, which not only pose a threat to human security and peace-building, health and livelihoods, but also hamper long-term development. To better understand and address this challenge, UNEP linked its branches on post-conflict work and disaster management to form a Post-Conflict and Disaster Management Branch (PCDMB). Since 1999, it has responded to 40 crises in countries including Afghanistan, Côte d'Ivoire, Democratic Republic of Congo, Haiti, Nigeria, Sierra Leone, South Sudan and Sudan. Alongside technical support to the countries in their peace-building and peacekeeping efforts, the PCDMB fosters collaboration between organisations working on DRR, climate change adaptation and the environment. The PCDMB has successfully managed to increase awareness about the link between conflict, natural resources and disasters through strong and wide-reaching partnerships and advocacy.

Source: UNEP, 2010.

Conduct conflict analysis

Conducting a structured conflict analysis, and regularly updating it throughout all stages of the project cycle to inform how interventions are designed, implemented and monitored, is the cornerstone of conflict sensitivity (UNDP, 2017). Conflict analysis needs to consider different categories of conflict (armed conflict, armed violence, post-conflict and social unrest), recognising that in many FCAC, an absence of armed conflict is only an illusion of peace. 'Under the surface, less visible social, political and economic tensions manifest in social unrest or cycles of violence that can destabilise development' (Orsini and Cleland, 2018: 10).

Aid should not be spent in FCAC without first doing a thorough conflict analysis (Peters and Levine, 2014). This will help to identify areas of a proposed intervention that may overlap with, and interact with, conflict issues (Melander et al., 2004). Such an analysis will increase the implementing agency's understanding of the drivers, causes and consequences of conflict, and help to identify most of the relevant stakeholders involved, their perspectives, and how they relate to each other. It will also increase understanding of levers that could help in managing or preventing conflict, and resilience factors – i.e. factors that can help communities prevent or manage conflicts in a peaceful manner, or can help those affected to better withstand the effects of the identified grievances (CSC, 2012).

Conflict analysis needs to be consultative, iterative, sensitive, monitored, and continuous throughout and beyond project implementation (see Box 26). It should be referred to as 'context analysis' where the sensitivity of a situation makes this more appropriate (UNDP, 2017).

Use other analysis tools

International Alert emphasises that 'special attention must be paid to flashpoints that are likely to drive conflict, such as access to land, distribution of benefits, employment opportunities or security arrangements' (Orsini and Cleland, 2018: 4). Tools can also look at grievances and resilience factors (as used in USAID's Conflict Assessment), and dividers (such as inequality in access to resources or power), or linguistic and cultural barriers, and connectors (such as shared harvest or memories of peaceful coexistence) (Orsini and Cleland, 2018).

One such tool is 'positions, interests, needs', which can be used to unpack people's positions (what people say they want), interests (what people want to have), and needs (basic elements that are usually

non-negotiable). This information can shed light on the difference between root causes of conflict, and proximate ones (those that feed or perpetuate conflict rather than create it) (CDA, 2016a; 2016b). Other tools include conflict trees to enable consideration of root causes of conflict, problems (e.g. tensions) emerging from this, and manifestations/effects of the problems. This acknowledges that action focusing only on manifestations, leaving root causes unaddressed, is unlikely to be successful (Orsini and Cleland, 2018; CDA, 2016a; 2016b).

Box 26   Conflict-sensitive approaches to multi-sectoral programming in Burkina Faso

'… a conflict-sensitive approach requires that agencies re-assess their work on a constant basis, draw lessons from these assessments, and act upon them ... The situation in the country is very fluid, as is always the case in a situation of conflict. In order to ensure that conflict dynamics are taken into account in their operations, both peacebuilding and humanitarian agencies need to put enough human and financial resources into conflict monitoring. For example, a theory of change could be valid at the beginning of an intervention, and then could lose its value six months later. Aid agencies should constantly monitor conflict dynamics and adapt their interventions accordingly, to ensure that they be conflict sensitive.'

Source: Excerpt from Totoro, 2019: para 6.

Adapt

It is important not only to identify and understand impacts through regular assessment, but also to be prepared to act on them (Orsini and Cleland, 2018). Ensuring that programmes have the scope to adapt and respond to context and decentralising project decision-making to enable this agility is integral to conflict sensitivity (UNDP, 2017). Robust, accessible, and confidential beneficiary feedback mechanisms should be set up to alert organisations to any harm or emerging risks (ibid.). Donors can support this (see section 6.12), enabling flexibility to changes in project strategies and implementation (and related project extensions and budget revisions) where overlaps with conflict are found, or where additional conflict analysis or stakeholder engagement is required.

Take an institutional approach

Conflict sensitivity needs to be approached at an institutional and strategic rather than project level (CSC, 2012; Woodrow and Jean, 2019). Organisations working in FCAC need to ensure they adopt a conflict-sensitive approach. It is ineffective to aim for conflict sensitivity at project level without a wider organisational framework and institutional culture that is conflict sensitive. Conflict sensitivity must influence 'how development organizations design their country programme frameworks, how they prioritize and sequence their interventions, how they put in place operational policies and procedures, and how they invest in strengthening an organizational culture for conflict sensitivity' (UNDP, 2017: 10).

In a review of local and community development practices in Myanmar, institutional set-up was recognised as key for effective conflict sensitivity; however, there are challenges related to a lack of internal conflict capacity in governance. Conflict sensitivity is found to be the responsibility of designated staff members who 'must invest considerable energy to advocate for it with managers and other staff', and must often 'swim against the tide of institutional culture and time pressure' (UNDP, 2017: 33).

Address technical capacity

The availability of technical expertise on conflict is a critical factor in FCAC. Implementation of programmes should be supported by a Do No Harm advisor or officer; promising staffing models include the placement of part-time Do No Harm focal points in each geographic zone, supported by full-time conflict sensitivity advisors (Garred, 2007). Idris et al. (2013) advise partnering with a specialist peace-building agency or ensuring that specialist peace-building/conflict transformation technical assistance is embedded in programming for FCAC.

A review for USAID found that 'Several donors and implementing agencies assert that staff know Do No Harm or that a "do no harm principle" influences everything they do, but do not back this up with guidance, training or assessments to determine actual staff capacity' (Goldwyn, 2016: 4) (see also Box 27). The same review recommended the value of specialist roles supporting countries in applying conflict sensitivity, as well as the use of dedicated helpdesks.

Box 27   Conflict capacity challenges in Myanmar

'Government departments consulted do not have dedicated internal conflict advisory capacity. Many of the bigger international development organizations interviewed do tend to have conflict advisors, though some noted the challenges associated with the project-based, short-term or advisory nature of their work means that their sphere of influence, especially at the strategic and organizational level, is limited. The scoping did not identify any conflict advisors based in the field full-time. Several people noted the tendency to recruit conflict advisors to projects after they have been designed, greatly limiting the scope for these individuals to influence the project. In interviews with these advisors, they shared that they were spread very thin across several projects. Though rare in practice, ideally each project needs a dedicated conflict advisor to fully integrate conflict sensitivity, including training, mentoring and advising other staff and partners.'

Source: UNDP, 2017: 33.

The skills and experience within a team carrying out research or implementing projects on CCAM within FCAC need to be interdisciplinary, ensuring coverage across themes, sectors and institution types (see also Box 28). At least one conflict advisor and a gender and marginalisation expert should be integrated within the team (UNDP, 2017).

Box 28   Myanmar conflict expertise

'The Livelihoods and Food Security Trust Fund and the Millennium Development Goals health facility, established in 2009 and 2012 respectively, have increasingly systemized conflict sensitivity into their project management cycles and have also drawn on dedicated conflict experts and expertise. Two more recent multi-donor mechanisms, the Peace Support Fund and the Joint Peace Fund, also have a strong focus on conflict sensitivity, which is an explicit criterion for assessing potential projects and partners.'

Source: UNDP, 2017: 21.

Where programming teams are inexperienced in conflict sensitivity (which is likely to be the case in CCAM programming – an area with limited emphasis on conflict sensitivity previously), collective efforts can enable joint analysis, peer review of project plans from a conflict sensitivity angle, and capacity-building. Lessons can be learnt from areas where a collective approach to improving conflict sensitivity has been applied (see Box 29).

Box 29 Conflict-sensitive assistance to Libya Forum

'In Libya a Conflict-Sensitive Assistance to Libya (CSA) Forum facilitates collective conflict analysis, regularly updated, with consideration and discussion on conflict sensitivity consideration of varying topics/interventions/themes. A process to increase the conflict sensitivity of international assistance to Libya started in 2012, with two formal mechanisms to promote conflict sensitivity: Participatory Conflict Analysis Forum; and Voluntary Peer Reviews.

These enable collective (regularly updated) conflict analysis, alongside opportunities for organisations to gain peer support in assessing and understanding the potential conflict issues of a particular programme or sector, providing recommendations on adaptations for conflict sensitivity.'

Source: Peaceful Change Initiative, n.d.

Be inclusive and local

In fragile situations, a community and locally based approach may be preferred over 'outsider' help, which may have negative effects on development and aid equity between people affected by natural hazard-related disasters and conflicts (Zeccola, 2011). International humanitarian action should be driven by the concept of subsidiarity, by supporting local systems and decisions, rather than supplanting them (World Humanitarian Summit, 2015). Continuous and sustainable measures for strengthening the capacities of staff and partners for learning and sharing experiences should be integrated into programming (UNDP, 2017).

6.10 Recommendations for partnerships, community and stakeholder engagement strategies

Alongside and as part of conflict analysis, conflict-sensitive programmes need to develop a thorough analysis of the power relationships in communities, to enable conflict-sensitive programme design and implementation (International Alert, 2019) (see also Box 30).

Conduct stakeholder mapping

Another theme highlighted in the literature is the importance of paying particular attention to the politics of who is involved, when and how (UNDP, 2017; Zicherman et al., 2011). Meaningful stakeholder consultations should be informed by an understanding of conflict dynamics and actors (UNDP, 2017). Stakeholder mapping needs to be effective and focus on: (1) who has power or who is affected from a conflict perspective (see chapter 3 for more details); (2) how actors related to the conflict (ex-combatants, victims, refugees, human rights defenders, illegal armed groups) can/should be involved; (3) identifying which stakeholders are not formally organised, including those excluded from political, social or economic life, those discriminated against, those likely to be scared to speak up, and those not

represented (International Alert, 2019; Zicherman et al., 2011). Programming needs to enhance understanding of intra- and inter-community conflict (Orsini and Cleland, 2018).

> *Accountability, transparency, and responsibility of government officials at all levels are needed in the development and implementation of adaptation actions. Points of unity and divisiveness among stakeholders potentially affected by adaptation need to be identified to strengthen the effectiveness of adaptation actions. (Tadesse and Lyons, 2013: 12)*

Box 30   A conflict sensitivity review of World Vision's programming across 12 countries

'There were two types of programmatic decisions that emerged as important in examining the conflict sensitivity impacts of World Vision's programs: how goods, services, time, attention, jobs and other WV benefits were distributed, and which key actors WV engaged. Who receives benefits from a program or project is determined by criteria, most often not set at the field level. These criteria are meant to ensure that the resources brought into a community generate the maximum programmatic impact, by addressing the greatest need and directing aid toward the most vulnerable or poorest. However, when selection, hiring, or program participation criteria run parallel to lines of conflict in a context, it can deepen existing lines of division and contribute to tension. In WV programs, the effect of how resources were distributed led to increased tensions, perverse incentives, and negative perceptions of WV and its staff.'

Source: Excerpt from Goddard and Annaraj, 2017: 1.

Practice stakeholder engagement

Effective community engagement and collaboration strategies are critical when working in FCAC (International Alert, 2019). It is good practice to consult widely, including asking existing stakeholders who else you need to consider. Consultations should consider vulnerable groups in the area (indigenous peoples, women and children, victims of conflict, ex-combatants, sexual minorities, human rights defenders, refugees or internally displaced people) who could be affected by a project, even when they are not the intended project participants (Orsini and Cleland, 2018).

It is important to understand the barriers to stakeholder engagement in FCAC, where vulnerable groups may not be visible or may be afraid to speak out – for example, women and girls who have experienced sexual violence by armed or criminal groups (ibid.). Additional consideration, careful analysis and clear stakeholder engagement strategies are needed to ascertain how to engage (or not engage) with (for example) illegal armed groups present in operational areas.

Trust borne out of constant communication and transparency is emphasised (Zicherman et al., 2011). Building trust takes significant time (UNDP, 2017), which can be a challenge for traditional project structures, with relatively short-term, time-bound, pre-designed and rigid initiatives. It takes considerable time to build relationships with and consult stakeholders (ibid.).

Where desired project outcomes are in tension with local context, some projects have advised against highlighting the boldest changes first or adopting adversarial stances that can result in increased conflict (including increased risk to those a project is supposed to benefit).

Targeting strategies are highlighted in the literature on conflict sensitivity (Zicherman et al., 2011). UNDP (2017) emphasises dilemmas that can occur when vulnerability-based targeting may clash (in reality or perception) with considerations of equity or fairness, especially when this runs along the lines of conflict. Targeting should emphasise equity rather than rigid formulas, and be transparent and well-communicated, incorporating feedback to avoid issues of perceived bias or unfairness (UNDP, 2017) (see also Box 31).

Box 31   Conflict -sensitivity analysis in Myanmar

'This initiative has involved strengthening the capacities and confidence of civil society and community-based organisations (CBOs) to undertake their own conflict sensitivity analysis and to engage in dialogue with international actors. Strategies were developed by civil society following a process of conflict sensitivity assessment and advocacy ... This entailed developing systematic analyses of how international interventions interact with the issues and dynamics that affect local peace and security. Dialogues were then organised that enabled local civil society actors to engage with international actors about the impacts of their interventions, and how to mitigate the conflict risks identified.'

Source: Campbell, 2016: 3.

Teams should *collaborate with in-country experts and trusted, appropriate stakeholders* within the project area as equal project partners to build on existing expertise within the region, inform approaches, research questions and ensure conflict sensitivity in project scope and design. In FCAC, it is likely that progress in research and projects will not be as straightforward or as fast as non-FCAC projects; it is therefore important to re-orient the perception of a 'successful' project in these cases. The value of building understanding and relationships in FCAC through projects and research should be recognised and celebrated as a success.

There is a body of literature on conflict-sensitive employment (and procurement) policies, addressing how it can reduce local tensions and armed conflict (Grawert et al., 2017; Grawert, 2018; UNDP, 2017). This also extends to consideration of risks across a project's supply chain (e.g. whether workers in the supply chain are exposed to conflict risks such as extortion and kidnapping in contexts with illegal armed or criminal groups, threats).

Address inequality and social justice

It should not be assumed that any development interventions will help the poorest people without a concerted effort to ensure that outcome (Peters and Levine, 2014). Targeted stakeholders should be approached in a way which is intersectional, inclusive, and ensures that all voices are heard, so that analysis is thorough and representative, and can support peace-sensitive programme design and implementation (Seng Lawn and Naujoks, 2018; International Alert, 2019).

Horizontal inequality and exclusion (i.e. exclusion linked to ethnic, religious, caste and gender identity) are at the heart of conflict, with income inequality widening during years of conflict and unrest (International Alert, 2019). When working in FCAC, existing inequalities and power relations must be thoroughly considered in programme and research design to avoid interventions causing unequal or unintended impacts (International Alert, 2019; International Alert et al., 2019). Any intervention, project or strategy must be shaped not just by the understanding of the specific system being addressed (e.g. climate change), but also by systems of power and equity. Without bearing these implications in mind,

a scheme could, depending on its details, exacerbate conflict in a fragile state (Smith and Vivekananda, 2015).

Understand power dynamics

While conducting an iterative and thorough analysis of the context and adapting activities in response to findings, it is important to understand complex localised and sub-national drivers of conflict, and their link to experiences of marginalisation (International Alert et al., 2019).

Building an inclusive, sustainable, positive peace in societies affected by violent conflict requires analysing and addressing gendered power dynamics as well as gender roles and expectations (Myrtinnen, 2018). Preventing violence requires considering structural privileges, ensuring that actions are accountable to women, girls and minorities, and also do not lead to a stabilisation or strengthening of patriarchal power (ibid.). Programmes should be monitored and adjusted, using gender-sensitive indicators (International Alert, 2019).

Adopt an inclusive and intersectional approach

There is increasing awareness that gender is important in governance, in understanding conflict and building peace. Since women are often missing in formal settings, programming on 'gender' has frequently translated into a focus on 'women and girls', usually as victims contrasted with men as perpetrators of violence (Orsini and Cleland, 2018). Being inclusive should go beyond focusing on 'women and girls' to actively include experiences of marginalised groups, including (for example) people with disabilities, ethnic minorities, people of different religious affiliations, different castes, LGBTQI communities, men and boys, to ensure that their voices are heard.

Programmes should adopt an intersectional approach to targeting to ensure that all voices are heard, taking account of gender and other forms of horizontal exclusion, and of people in extreme poverty (International Alert et al., 2019; Saferworld, 2019). International Alert (Orsini and Cleland, 2018) adopts a 'gender-relational approach'. This means understanding how gender roles are constructed through societal relations between and among men and women in any given conflict context, and how those roles relate to other factors such as age, social class, ethnicity, sexual orientation and geography. This also allows for an improved understanding of gender roles in conflict, beyond simplistic understandings such as those of men as perpetrators and women as victims.

6.11 General recommendations

Climate resilience-building (including both adaptation and mitigation interventions) and DRR in FCAC needs to be treated as a process, rather than an end point. As a process, it should ideally adhere to a number of good practice principles that research and practice from climate change adaptation, disaster risk management and other areas of practice have learned through experience:

Inclusive and transparent – Grounded in participation and co-learning with a variety of stakeholders, including vulnerable groups, government at a variety of administrative scales, NGOs and donors in order to deliver on intervention Theory of Change or objectives at short-, medium- and long-term timescales. The research questions and tools for analysis risks, including conflict risks and the appropriateness of climate interventions in FCAC, must be answered in an integrated, multidisciplinary manner that is conflict sensitive.

Stepped and iterative – Developing conflict-sensitive climate resilience interventions in FCAC might better be done through a stepped and iterative manner, in which outcomes and lessons from one step support the subsequent steps. New knowledge at a later step, such as that arising from the co-development of an intervention with a wide range of stakeholders, might require revisiting prior steps (e.g. the conflict-sensitive risk assessment) and updating them.

Flexible and adaptable – Teams have to modify their approach and research questions, and adopt methodologies in a manner that is responsive to the different development contexts in each of the case study countries, and that reflect the dynamic priorities and concerns of a diverse array of stakeholders and actors. Multidisciplinary intervention teams should ideally reflect on and review information emerging from each step, in order to adjust the research questions, methods, participation and engagement, and team collaboration mechanisms.

Continuous learning and evaluation – The learning and interventions must constantly evolve because development conditions, risk priorities and preferences, and threats are constantly changing. Intervention programmes must implement M&E systems from project outset, which can continue after the project's end, in order to learn from past programmes about what worked and is still working – and where the gaps and challenges lie – in order to avoid repeating the same mistakes.

All chapters discuss the need for a greater evidence base. Generating this evidence base requires a multi-pronged approach, as follows:

- Capacity and training of intervention implementors to:

    - understand risk and conflict–climate–natural resource management risks, intersectional vulnerability, exposure and capacity drivers of risk and how these vary and evolve in FCAC;

    - appropriately use various risk assessment and risk perceptions tools, including ensuring that conflict-sensitive and intersectional considerations are included in analysis of the context, scenarios of how conflict risks might evolve in the future under various climate, governance and demographics scenarios, and of the potential of various interventions to reduce conflict risk, build climate resilience and exacerbate tensions among particular groups. There are always trade-offs and these need to be acknowledged and understood; people-centred risk assessments and co-developed interventions might be better placed to address some of these challenges than traditional 'expert-driven' assessments.

- Ensuring that a dedicated conflict expert is included in the interventions.

- Ensuring institutional support for such interventions.

- Consistent definitions and concept framing adopted among intervention participants in order to facilitate assessments, pick appropriate tools and guide interventions.

- Providing appropriate resources for M&E from project inception until a few years after a project has ended. Results and outcomes (good, bad and mixed) are often not apparent until some time after a project has ended and unintended consequences that arise as contexts change will also only become apparent with time. Such evidence is needed to help address current knowledge gaps and feed into subsequent interventions.

- Evolve existing tools and frameworks and develop new ones to account for the different realities in FCAC. In particular, priorities, perceptions and power dynamics need to be accounted for more strongly and evidence gaps around how these shape structural inequalities and conflict–climate risks and options for managing these are needed.

- On-the-ground evidence collected through individual intervention research and M&E and databases allowing for cross-intervention data-sharing is needed to avoid replication, close gaps, and allow for longitudinal and multi-geographic scale research and intervention design and implementation.

6.12 Recommendations for the funding, design and delivery of programmes

Funding for CCAM in FCAC needs to be designed by donors to require and support programming that is conflict sensitive, longer term, with a built-in inception phase, allowing lead-time for conflict analysis and consultative project adaptation (Midgley et al., 2012; UNDP, 2017).

Programming for uncertainty (in relation to both conflict dynamics and climate change) should be built into the funding set-up, allowing for adaptability and flexibility in response to change (Peters and Vivekananda, 2014; UNDP, 2017) This requires a move away from inflexible structures grounded in sectoral silos, counterproductive incentive systems that advance large-scale fund disbursements, patchy knowledge bases, and inadequate consideration of governance in any meaningful sense (Bell, 2008). Climate financing must also be adapted to ensure that it does not contribute to the disconnect between institutional plans and local peace and development priorities (Levine et al., 2014).

Donors can also explore innovative approaches to funding that provide non-project-based funds for technical advice on conflict sensitivity and space for cross-project and cross-organisational learning that is non-project-based (UNDP, 2017).

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Annex 1   Mapping institutions, models and financing for disasters, climate change adaptation and mitigation

We reviewed the following types of DRR and CCAM research and funding initiatives in support of the evidence bases provided in the report chapters. In particular, we examined the following:

- the volume of funds currently being spent on climate change adaptation in FCAC

- which multilateral and bilateral agencies, research institutions, think tanks, foundations and NGOs are currently developing support for research on conflict and climate change, including details on the form and focus of current and planned work

- the current state of development and use of predictive and decision support models for climate change and conflict, including a review of current technologies, methods and innovation.

Introduction

This annex reviews the state of evidence, debates and trends in three areas of knowledge at the intersection of climate change and conflict: (1) the institutions supporting research, policy and programming for climate security; (2) existing predictive and decision support models for climate security, and any gaps; and (3) evidence on climate adaptation finance tackling climate security challenges in FCAC. It is intended as a mapping of the evidence and, therefore, does not produce primary research or analysis on these issues.

This mapping draws principally from ODI's series of climate change, conflict and security scans published in 2018 and 2019 (Peters and Mayhew, 2019; Mayhew et al., 2019; Peters et al., 2020), which provide an extensive review of the latest academic, grey and policy literature on climate and conflict. As such, we consider this a non-exhaustive, but up-to-date mapping of knowledge and trends in the three areas of climate security mentioned above. Additionally, we have complemented this information with ad hoc online searches and by interviewing climate finance and security experts.

Support for research on conflict and climate change

Multilateral and bilateral agencies, research institutions, think tanks, foundations and NGOs are currently developing and supporting work on research, policy and programming for climate security. This section provides an overview of what each category of actors is focusing on, and their plans for future work on this topic. We identified relevant organisations and have grouped the reviewed institutions into: (1) international initiatives; (2) national agencies, (3) multilateral organisations; (4) research institutes and think tanks; and (5) civil society.

(1) International initiatives

There is an ongoing debate on the merits of including climate security issues in the United Nations Security Council (UNSC) and what role the latter should and could play in tackling climate security issues. Those against inclusion have argued that the UNSC's principal task is to react rapidly to menaces to international peace and security, and that the inclusion of climate change would be counterproductive (France 24, 2019). Arguments have also considered the interference that the inclusion would have with other areas of the UN system and UNSC's ability to respond to issues requiring a 'system-wide response', though others have contended that its function would be complementary and would not encroach on the mandate of other UN agencies. Nevertheless, issues remain regarding the current state of research focused on the role that climate change plays in relation to conflict (see chapter 4).

Despite these ongoing discussions, progress has been made in terms of policy and practice. There are increasing international initiatives set up to address climate security and elevate it onto the international and UN political agendas, as follows:

- **The Group of Friends on Climate Security** was set up in summer 2018 by Germany and the Pacific state of Nauru. It includes more than 40 member states with the aim of cooperating to develop solutions for the impact of climate change on security policy, to raise public awareness and boost the involvement of the UN (Federal Foreign Office, 2018).

- **The Planetary Security Initiative** launched in 2015 by the Netherlands Ministry of Foreign Affairs held four Planetary Security conferences to advance the state of knowledge and practice on climate security. This culminated in the Hague Declaration of Action on Climate Security in 2017, which sets out a six-point action plan to concretely deal with climate security.

- **The Stockholm Climate Security Hub** is an initiative of the Swedish Ministry for Foreign Affairs launched in 2018 that builds on cooperation between four Stockholm-based think tanks. The Hub is focused on research and analysis on climate security and promoting policy dialogue with policy-makers.

- **The Expert Working Group on Climate-Related Security Risks** initiated during Sweden's membership of the UN Security Council (2017–18), which is focusing on climate security risks and has performed risk assessments in four regions: Lake Chad, Iraq, Mali and Somalia (SIPRI, n.d.).

These initiatives have been met by a shift within the UNSC, where discussions are starting to move away from generalised statements to include discussions of 'tangible assessments 'in both conflict and post-conflict environments. The creation of the Climate Security Mechanism by UNDP, UNEP and the UN Secretariat's Department of Political and Peacebuilding Affairs (DPPA) to strengthen the evidence base and guide the design of risk assessments and risk prevention and management strategies is another sign of this shift. In addition, there have been calls from different quarters for 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 (Conca, 2019).

(2) National agencies

This section reviews how climate change fits within national security strategies and how national agencies are working towards the inclusion of climate security in the international security agenda.

- **Australia**: The military is increasingly accepting that it will need to include climate change within its planning, though it has been reluctant to openly discuss this until recently due to government opposition and the political climate (McDonald, 2018b). In May 2018, the Australian Senate Committee held an inquiry at which climate change was presented as a threat not only to national security but also to wider stability within the Asia-Pacific region. Its recommendations included: calls for increased foreign aid targeting CCAM within the region; a White Paper on climate security to guide a coordinated government-wide response to climate change risks; emissions targets for the Department of Defence; and a post dedicated to climate security within the Department of Home

Affairs (Doherty, 2018). Inclusion of climate change both within 'defence and security' planning and also in wider 'public debate and climate policy orientations' provides an opportunity for change (McDonald, 2018b).

- **Caribbean Disaster Emergency Management Agency (CDEMA):** A document produced by CDEMA (2018) summarising the outcomes of a consultation on climate and security in the Caribbean shows that stakeholders agreed on: 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.

- **Germany:** Besides launching the Group of Friends on Climate and Security, Germany is making climate security a priority during its time as a non-permanent member of the UNSC in 2019–2020 (UN News, 2018c).

- **Netherlands:** The Ministry of Foreign Affairs has created an Integrated International Security Strategy 2018–2022, which aims to put in place a long-term, preventive approach. It looks at the root causes of terrorism – including climate change and poverty – while making clear links to the ambition to achieve the SDGs.

- **New Zealand:** Recognises climate change as one of the 'greatest security challenges for New Zealand defence in the coming decades' (Ministry of Defence, 2018: 3) by heightening security challenges across the wider Pacific region and testing communities' resilience. The reports finds that more humanitarian assistance, disaster relief and stability operations will be required in future, which will create more frequent and concurrent operational commitments for the New Zealand Defence Force, testing its capacity to respond.

- **UK:** The government has recently announced £60 million worth of financial aid to assist Somalia in supporting those affected by both conflict and climate change, hoping to ease tensions over access to natural resources and contributing to stability in the longer term (Africa News, 2018). The Office of the Independent Anti-Slavery Commissioner has also undertaken a broad assessment of the nexus between modern slavery, environmental destruction and climate change (Boyd et al., 2018).

- **US:** The US Department of Defense (2019) released the *Report on effects of a changing climate to the Department of Defense*, which highlights the high vulnerability of US military installations within the US to the impacts of climate change. It acknowledges that 'the effects of a changing climate are a national security issue with potential impacts to Department of Defense … missions, operational plans, and installations' (ibid: 2). Despite reservations from the Trump administration, the John McCain National Defense Authorization Act was passed in 2018 showing the serious commitment of the US military to tackling climate risks. The new legislation requires all military bases to include a master plan examination of energy security and resilience to future risks, such as tidal floods (Schewe, 2018). In 2019, the US Senate also published the Climate Security Act, which establishes new climate-security related posts within US executive branches and responsibilities: (1) a Climate Security Envoy within the State Department that will oversee the development of a climate-security policy; (2) the President will periodically conduct evaluations of disruptions to the global climate system and make them available to public; and (3) creation of a Special Representative for the Arctic designated by the Secretary of State to formulate the US response to international conflicts in the Arctic.

The United States is the country with perhaps the greatest debate and discord between different parts of the government over climate change and security. There does seem consensus as to the purpose of the now cancelled Presidential Committee on Climate Security, which was set up to provide 'adversarial' scientific peer review to the national security implications of climate change. Melton (2019) and Revkin (2019) agree that the purpose was to undermine the US military's position on climate change, as adversarial review seeks to primarily undermine arguments and not uncover truths.

Besides the military and the Department of State, other US agencies are also engaged with climate security to a different extent. Reviewing the work of how three federal agencies engage with climate

change as a potential driver of global migration, the US Government Accountability Office (GAO) (2019) argued 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. In response, the Department of State is now allowing country missions to report such data on a voluntary basis.

The Fourth National Climate Assessment Report, authored by the US Global Change Research Programme involving 13 federal agencies, finds that US interests in trade, international development, humanitarian assistance, national security and transboundary resources will be affected by climate change and may lead to large-scale alterations in the global availability and prices of a wide range of goods (Smith et al., 2018). Lastly, USAID is funding the PEACE III Cooperative Agreement programme, designed to address challenges arising in areas along the borders between Kenya and its neighbours that are affected by conflict between pastoralist and agro-pastoralist communities (Stark et al., 2018).

- **Vanuatu**: The Vanuatu National Disaster Management Office's (2018) National Policy on Climate Change and Disaster-Induced Displacement is mainstreaming displacement, mobility and conflict considerations into key areas of the government.

(3) Multilateral organisations

Multilateral organisations are often at the forefront of work at the climate change–conflict nexus, implementing programmes and projects on the ground. This section summarises current and future programming, as well as lessons learnt from past programmes, of multilateral organisations operating within the climate security space.

- **Asian Development Bank (ADB):** The ADB considers FCAC and Small Island Developing States (SIDS) as priorities in its activities. It will design interventions to be context-specific and ensures they are fragility and conflict-sensitive (Ravelo, 2018).
- **African Union (AU):** The AU emphasises the importance of mainstreaming climate change into all activities by the AU Commission, particularly in early warning and prevention of climate change-related conflicts (AU Commission, 2018).
- **Caribbean Development Bank:** The bank considers DRR as a critical priority and has contributed $3 million to Haiti's parametric insurance coverage. This insurance can provide financial support for humanitarian relief.
- **European Union (EU):** The EU has been leading work on climate diplomacy, culminating in the 2018 EU Foreign Affairs Council's adoption of its latest conclusions on climate diplomacy, including: (1) further mainstreaming of the climate change–security nexus in policy dialogue; (2) conflict prevention; (3) development and humanitarian action; and (4) disaster risk strategies. In 2015, it launched the Climate Change and Security initiative jointly with UNEP, financed by the European External Action's Instrument contributing to Stability and Peace to address global and trans-regional effects of climate change that have a potentially destabilising effect on fragile states (EU, 2015).

Externally, it has pledged ongoing support to G5 Sahel countries' stabilisation of the food and nutrition crisis, caused by environmental degradation and continued dry weather conditions (EU, 2018). It has also committed to addressing vulnerability and fragility risks in the East African region.

- **Food and Agriculture Organization of the United Nations (FAO):** The FAO has done considerable work in the area of food and water security, often in conjunction with other multilaterals. It ranks the Sahel as a high-risk region due to the high climate-induced migration of pastoralists towards forage-rich areas in coastal countries, which contributes to livestock overgrazing and has increased tensions between pastoralists and host communities (FAO, 2018). It has also looked at the drivers of food insecurity in the Lake Chad Basin countries, finding that climate hazards and conflict are driving displacement and food insecurity (in Cameroon and

Somalia). The FAO and World Food Programme (WFP) (2018) have also looked more specifically at the interaction between climate and water security and their negative effects on food security.

- **OECD**: The OECD is now including environmental factors in its measurement of fragility.

- **UNDP:** UNDP has published lessons learnt from its adaptation work addressing the compound challenges of rising levels of conflict, displacement, water scarcity and food insecurity in Mashreq, Maghreb, the Arab Gulf and the Horn of Africa (Twining-Ward et al., 2018).

- **UN Environment:** In partnership with the EU and think tank adelphi, has launched a four-year programme to translate the theory on climate change and security into practice. 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.

- **UNESCAP:** UNESCAP has looked into conflicts over climate-impacted water resources in Central Asia, such as in the Nagorno-Karabakh basin (Suleimenova, 2018).

- **UN Secretary-General:** Authored the UN Framework for Action in 2019 to identify entry points to integrate land in conflict analysis, planning and processes. The framework recognises that land is relevant across the three pillars of the UN (UNSG, 2019):
  - 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 preventive measure for conflict relapse.

- **World Bank:** The Bank has planned to double its financing for fragile and conflict-affected countries, from $7 billion to $14 billion over the next three years. It has carried out conflict-sensitive initiatives on climate change in the MENA region (Lia Carol et al., 2018). And it will focus on culture in city reconstruction and recovery through the use of the CURE framework, which it plans to use in the reconstruction of Mosul, Iraq (World Bank, 2018a).

(4) Research institutes and think tanks

As already illustrated, research institutes and think tanks have been part of many international initiatives to promote climate security on the international agenda. Below we list the most prolific and active think tanks in terms of producing climate security research and fostering policy dialogues and actions, as per our mapping of the literature.

- **Overseas Development Institute**: ODI has led knowledge, learning and evidence-gathering exercises on climate change adaptation and resilience in FCAC as part of the BRACED programme, and led the development of policy-oriented research on climate-related disasters in FCAC through its When disasters and conflict collide initiative. Furthermore, ODI established the climate, conflict and security scans – a four-monthly review of evidence on the intersection of climate change, conflict and security issues. Together with the ICRC and IFRC, ODI convened a series of global policy-making roundtables on climate change and conflict, and their humanitarian implications, throughout 2018, with roundtables hosted in every region of the world. Finally, ODI has undertaken original research on climate variability and change and armed groups and insecurity in Niger.

- **Adelphi:** This think tank has focused on developing solutions to support practitioners in understanding the interplay between climate and security risks, and how to plan, design, implement and evaluate programmes to respond to these. It has carried out climate security risk assessments of the Lake Chad region (Nagarajan et al., 2018; Vivekananda and Born, 2018), and will be partnering with UNEP to pilot climate security interventions in Sudan and Nepal over the next four years.

- **Centre for Climate and Security:** The Centre has analysed climate change and security risks of SIDS in the Caribbean, identifying pathways through which climate change acts as a threat multiplier for security risks. Some of its researchers advocate for integration of climate security into existing efforts instead of creating dedicated institutions to address the risk nexus (Fetzek and Barrett, 2019). To do this across EU foreign policy and security institutions, Fetzek and van Schaik (2018) argue there is a need to develop and strengthen climate information, and the institutions that

produce this data, and climate security early warning systems must include clear 'triggers' for emergency action that can be acted on with the appropriate levels of urgency.

- **Clingendael Institute:** The Institute has studied the dynamics between climate change, water security and development in Iraq (von Lossow, 2018), and has focused on researching the nexus of climate and conflict in cities. Rademaker et al. (2018) analysed the efforts of three cities – Bamako (Mali), Maiduguri (Nigeria, Lake Chad Region) and Baghdad (Iraq) – to build resilience, concluding that: (1) conflicts significantly lower urban resilience to climate-related impacts; (2) very dense urban areas are particularly vulnerable to climate disasters; and (3) large sprawling cities have poor capacity to maintain resilience.

- **E3G:** This is part of the steering group for the Expert Working Group on Climate-Related Security Risks and has worked to put the climate security issue onto the UNSC agenda through climate diplomacy. It has also participated in the four risk assessments produced for Lake Chad, Iraq, Somalia and Central Asia.

- **Stockholm International Peace Research Institute:** SIPRI hosts the Expert Working Group on Climate-Related Security Risks. It has analysed regional climate security risks in Asia and Africa to understand how regional intergovernmental organisations are developing capacities to deal with them. Specifically, it has looked at the Association of Southeast Asian Nations, the South Asian Association for Regional Cooperation, the Economic Community of West African States and the Intergovernmental Authority on Development (Krampe et al., 2018).

- **Toda Peace Institute:** The Institute is responding to the perception that approaches to climate security are currently dominated by a western-based, state-centric approach. It has led the creation of an agenda for research focused on Asia-Pacific, which aims to: address climate change in a conflict-sensitive manner; coordinate activities at church, civil society and community levels with policy-makers through climate change action that is both bottom-up and top-down; integrate indigenous and traditional knowledge with western and scientific knowledge; and decolonise climate change language (Toda Peace Institute, 2018). It has studied the climate security challenges of the Solomon Islands, stressing its acute vulnerability to the impacts of climate change as it is both a SIDS and a post-conflict state (Higgins and Maesua, 2019), as well as those of Vanuatu, which has a growing population and is already faced with relocation challenges (Davies, 2019).

(5) Civil society

Among CSOs, a few NGOs have delivered projects seeking to address challenges at the climate change–security nexus. Here we report on a few found in the literature.

- **Amnesty International:** Amnesty International (2018) has looked at tactics of the Islamic State in rural Iraq to win support by destroying means of rural livelihoods, such as irrigation wells, orchards and electricity lines. This has created joblessness and insecurity that will be exacerbated by extreme weather events and slow-onset climate stresses, which the country is highly exposed to. These will be key priorities to be addressed during reconstruction.

- **Asian NGO Coalition (ANGOC) for Agrarian Reform and Rural Development:** This organisation has monitored land conflicts in six Asian countries (Indonesia, India, Nepal, the Philippines, Bangladesh and Cambodia), recognising that climate change adds pressure on inadequate land tenure systems in these countries, and generates resource conflicts (ANGOC, 2019)

- **Displacement Solutions**: Displacement Solutions (2018) has looked at the climate displacement potential in Ayeyarwady and Mon states in Myanmar, and how the Myanmar National Climate Land Bank is identifying land plots for relocation of coastal communities that have agreed to be relocated.

- **Mercy Corps:** Mercy Corps (2018b) has supported natural resource-sharing initiatives and shock-absorbing activities such as agriculture practices change and banking services access, between communities in the Kenya-Uganda border region of Karamoja, where changing precipitation patterns are feeding ethnic tensions.

- **Wetlands International:** This organisation has analysed increasing water conflicts within Indian cities driven by degradation of wetlands, and has argued for more attention to them within a context of climate change (Kaul and Kumar, 2018)

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