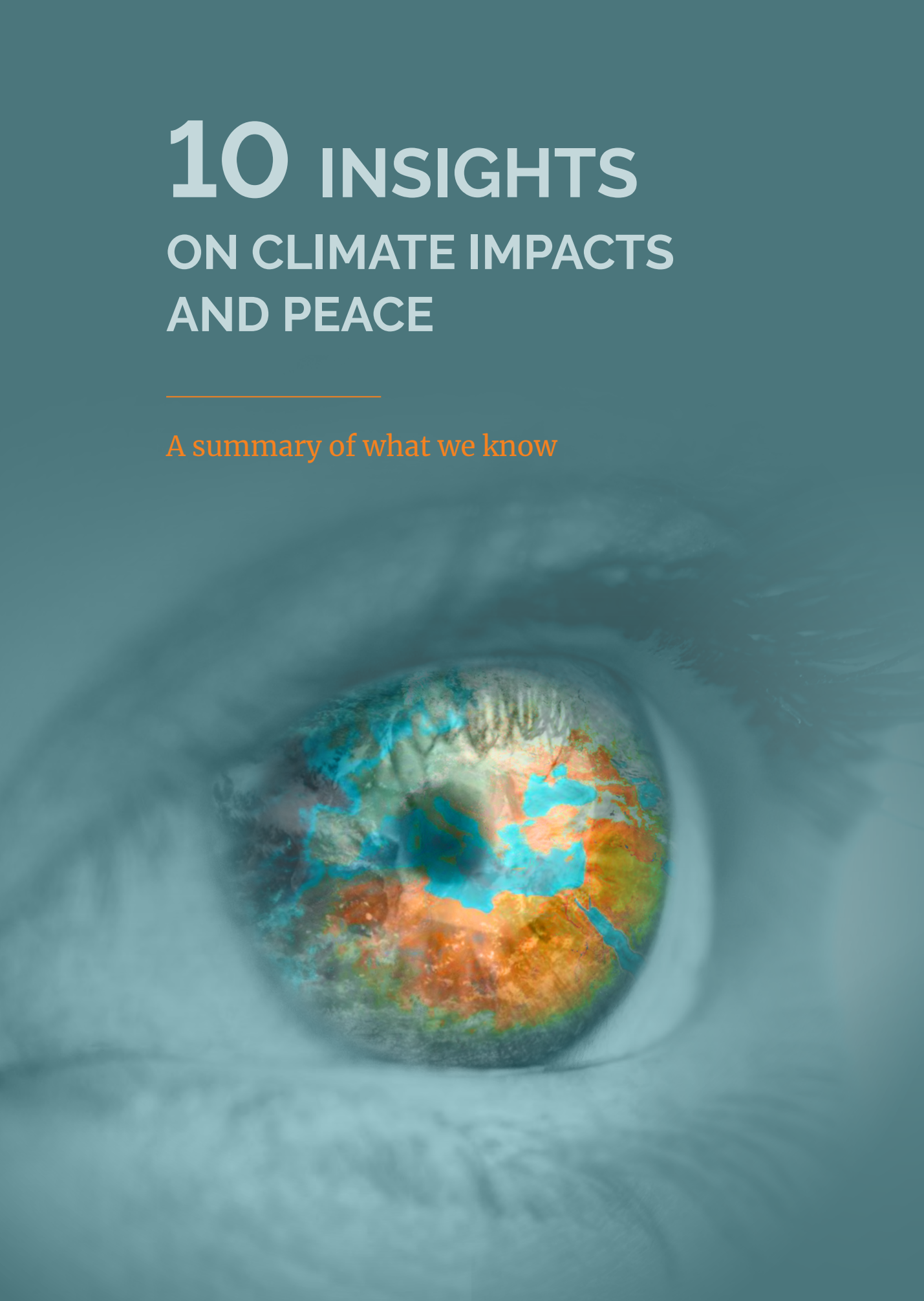
10 INSIGHTS ON CLIMATE IMPACTS AND PEACE

A summary of what we know



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adelphi is a leading Berlin-based think tank for applied research, policy analysis and consultancy on global change issues.

The Potsdam Institute for Climate Impact Research combines natural and social sciences to generate key scientific insights in climate risks and solutions.

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10 INSIGHTS ON CLIMATE IMPACTS AND PEACE

Executive Summary

Climate change is one of the most pressing political issues of our time. Science is uncovering the unprecedented nature and scale of its impacts on people, economies and ecosystems worldwide. One critical dimension of these impacts is their effect on international peace and security.

This report summarises the state of knowledge regarding security risks related to climate change. To this end, it synthesises and contextualises the existing scientific evidence. It does not reflect all aspects of the debate that have emerged across social science but focuses on those that are particularly relevant at the political level.

Climate change itself is rarely a direct cause of conflict. Yet, there is ample evidence that its effects exacerbate important drivers and contextual factors of conflict and fragility, thereby challenging the stability of states and societies.

Ten insights stand out:

1. The risks that climate change impacts pose to international peace and security are real and present.
2. Climate change impacts affect competition and conflict over natural resources such as land and water.
3. Climate change impacts undermine livelihoods, affect human mobility, and push people into illegal coping mechanisms.

4. Climate change impacts contribute to extreme food price spikes and food insecurity.
5. Extreme weather events challenge government effectiveness and legitimacy.
6. The unintended consequences of poorly designed climate and security policies carry their own risks.
7. Climate-related security risks are particularly significant where governance mechanisms are weak or failing.
8. We are very likely underestimating the scale and scope of climate-related security risks.
9. Climate-related security risks will increase and multiply in the future.
10. Our capacities to assess and manage climate-related security risks lag behind the changing risk landscape.

The implication of these insights is that, without appropriate action, climate change will mean more fragility, less peace and less security. The ways in which climate change threatens international peace and security need to be addressed across the entire impact chain: we must work to mitigate climate change; attenuate its consequences on ecosystems; adapt our socio-economic systems; better manage the heightened resource competition that climate change will bring about; and strengthen governance and conflict management institutions. Managing these security risks requires action far beyond the peacebuilding community, yet every dimension of the response must be conflict-sensitive. At the same time, the tools of peacebuilding – from early warning and responses to mediation and peacekeeping – need to reflect the ability to anticipate and address climate risks to security. In short, conflict prevention and peacebuilding need to become climate-sensitive.

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Introduction

Climate change is one of the most pressing political, economic and environmental issues of our time. Not only has our understanding of climate change and its direct impacts advanced significantly over the past decade, but so too has our knowledge of the relationships between climate change, security and peace.

This synthesis for policymakers provides an overview of the growing research on the links between climate change, security and peace. In particular, it answers the following questions:

- *When and how can climate change contribute to more conflict and fragility?*
- *On which points do scholars disagree and why?*
- *Why is existing research likely underestimating climate-related security risks?*
- *How can we expect climate-related security risks to develop in the years ahead?*
- *What are critical gaps in our knowledge of climate-related security risks?*

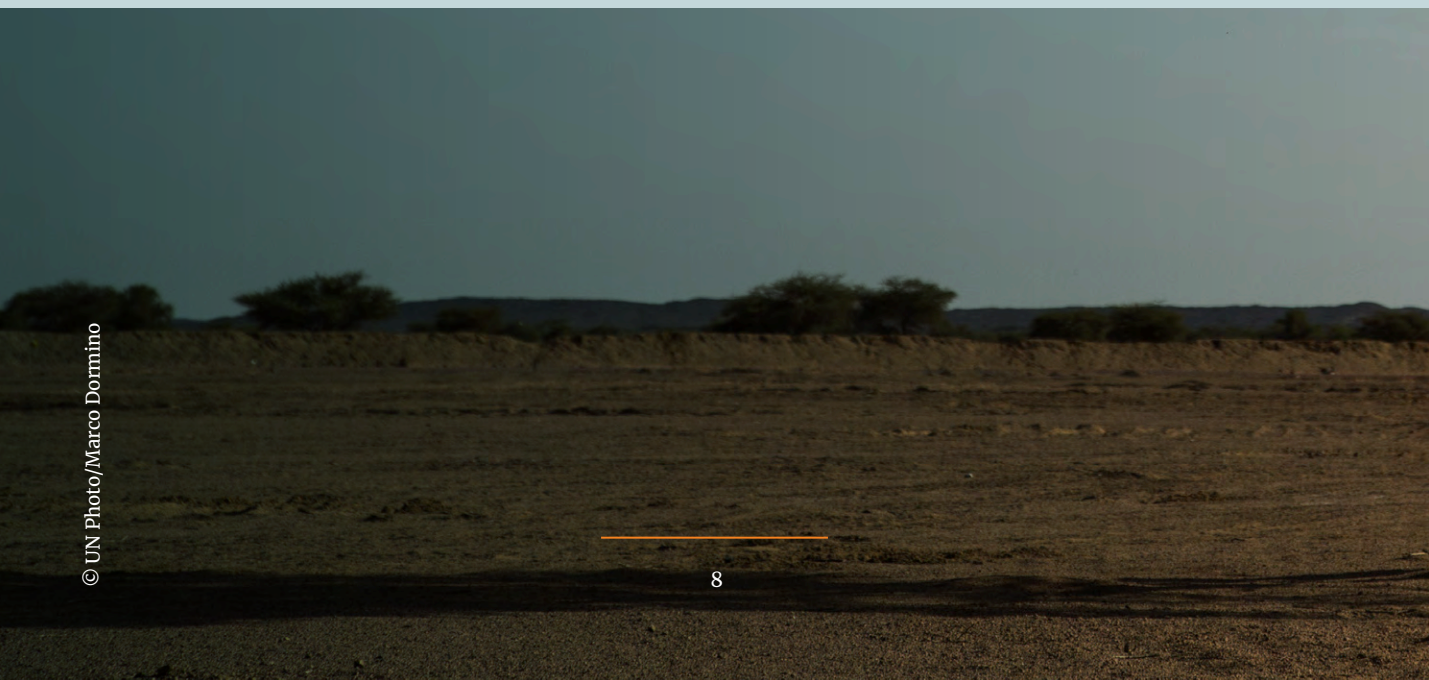
In 10 Insights, we set out our current understanding of the links between climate change, fragility and conflict. There is little doubt that climate change impacts can undermine human security.[1]

1 See the 12th chapter of the Fifth Assessment Report (Adger et al., 2014). The Intergovernmental Panel on Climate Change defines human security in the context of climate change as "a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity."

There is also broad agreement that greater human insecurity increases the risk of violent conflict, and thus threatens international peace and security in the form of violent conflict. The relative significance of and conditions under which these risks manifest remain vigorously debated. However, the complexity of the situation should not obscure the scale of the risk. Experts will continue to debate the relative significance of different pathways, as they should. However, the critical shortfall lies not in our knowledge, but rather in our actions to address this known security challenge.

The ten insights cluster around five compound climate-related security risks that describe the complex interactions between climate change and important social, political, economic, and environmental drivers of conflict and fragility (Insights 2-6). These are not simply future security risks; they are already visible today, and projected to increase. Scientists predict the impacts of climate change will grow significantly in the future. Thus, we expect that climate-related implications for international peace and security will increase considerably as well.

Our capacities to assess and address climate-related security risks are not keeping pace with the speed with which the 'risk landscape' is changing. The current COVID-19 crisis provides a vivid example of how global connectivity transmits cascading risks. Even though the risks of global pandemics were well-known, the scale and scope of their consequences have surprised policymakers. Climate change



is similar in that expert communities have long been sounding the alarm, but have found it difficult to mobilise societies against a threat whose costly consequences may not be felt until it is too late to prevent them.

Even though there has been significant research into the impacts of climate change, we may be underestimating the risks it raises for peace. Thus far, researchers have primarily focused on assessing relatively direct effects on conflict; they have so far been unable to fully account for all the impact pathways and cascading risks that those direct effects may trigger. Even more critically, there are thus far no adequate governance mechanisms for responding to these risks. To reduce negative impacts along the entire impact chain and to help find equitable and sustainable approaches to manage competing needs and claims, societies require institutions that are able to identify and manage these risks.

Insight 1

1. The risks that climate change impacts pose to international peace and security are real and present

Key facts

- Climate change impacts inhibit peace by undermining human security and increasing the impact of other drivers of conflict and fragility.
- Current academic debates focus on the conditions under which specific climate change impacts contribute to causing, intensifying or prolonging conflict.

Most security experts understand climate change as a risk multiplier. The impacts of climate change exacerbate challenges such as rapid population growth and urbanisation, increase resource demands, environmental degradation and uneven development, and exacerbate existing fragility and conflict risks (Rüttinger et al., 2015; International Military Council on Climate and Security Expert Group, 2020).

Early academic discussions on the impacts of climate change on peace and security largely concentrated on the question of whether there was a link. Research has since moved beyond this debate to a more complex and systemic understanding of climate-related security risks. Researchers have studied the conditions under which rising temperatures and extreme weather events affect the livelihoods of vulnerable communities, change migratory patterns and challenge the cohesiveness and capacities of societies. They have also examined

how climate change might exacerbate underlying drivers of fragility and conflict, such as marginalisation and the erosion of social relations and institutions (Salehyan, 2014; Mach et al., 2019; Scheffran, Link & Schilling, 2019). The focus of debate has thus shifted towards the questions of when and how those pressures contribute to conflict. Yet, given the absence of counterfactuals, researchers will never be able to say with perfect certainty that a given conflict would not have occurred or would have been less intense in the absence of climate change (see Selby et al., 2017; Gleick, 2017; Kelly et al., 2017; Hendrix, 2017a). It is therefore best to consider climate-related security risks in probabilistic terms.

Although most researchers agree that climate change impacts constitute risks for international security, debate has been vigorous. Three areas of contention stand out:

i) methodological issues and modelling assumptions (e.g. Burke et al., 2009, 2010; Buhaug, 2010a, 2010b; Solow, 2013; Hsiang, Burke & Miguel, 2013; Hsiang & Burke, 2014; Buhaug et al., 2014);

ii) the relative importance of climatic, as opposed to non-climatic, drivers of conflict (e.g. Selby et al., 2017; Gleick, 2017; Kelly et al., 2017; Hendrix, 2017a);

iii) the ethical implications of conducting research that informs public discourses on climate action, sustainable development, and international security more broadly (e.g. Selby, 2014; Selby & Hoffman, 2014; Verhoeven, 2014).

However, there is significant common ground. Most scholars agree that the relationship between climate change and conflict is, as with other potential drivers of conflict, multifaceted and context dependent. There is no deterministic thread that automatically links climate change to increased conflict and fragility. Rather, climatic impacts have an effect on security when they interact with a larger web of existing socio-political and economic grievances that affect means and motivations for violence (see Buhaug, 2016; Gilmore, 2017; Mach et al., 2019; Scheffran, Link & Schilling, 2019).

In essence: context matters. Climate change impacts deliver diverse challenges for different livelihoods under different conditions. Neither individuals nor societies respond mechanistically to changes in the environment and the grievances they may trigger or aggravate. Different types of conflict – whether inter-community tensions, urban unrest, or civil wars – feature different drivers. This diversity has resulted in researchers moving away from attempts to prove a singular link between climate and conflict to examining the diverse set of possible risks and complex interactions of climate and security challenges (see also Salehyan, 2014; Buhaug, 2015a; Detges, 2017a; Theisen, 2017).

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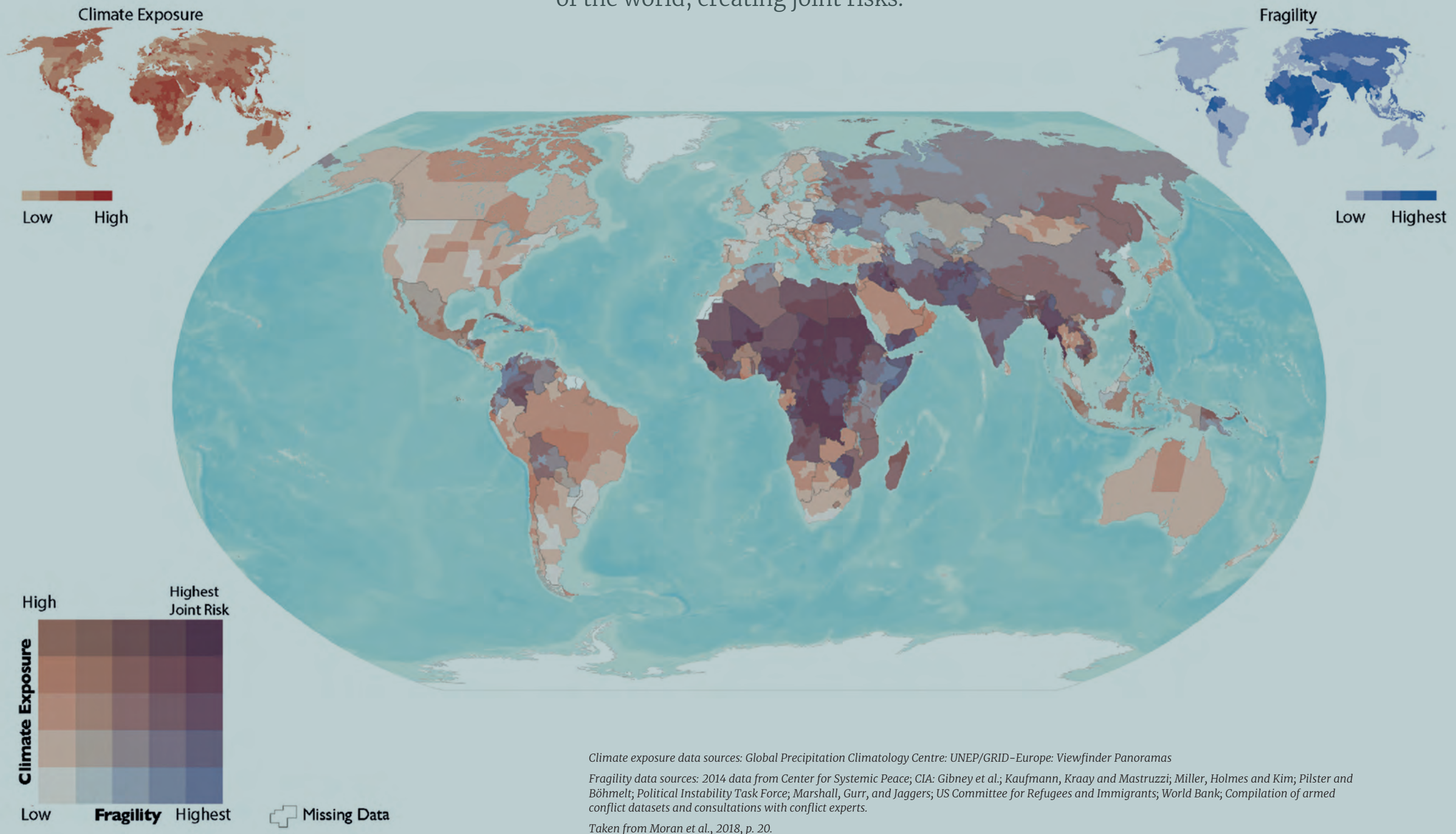
Climatic exposure and fragility overlap in many parts of the world, creating joint risks.



Climate exposure data sources: Global Precipitation Climatology Centre: UNEP/GRID-Europe: Viewfinder Panoramas

Fragility data sources: 2014 data from Center for Systemic Peace; CIA: Gibney et al.; Kaufmann, Kraay and Mastruzzi; Miller, Holmes and Kim; Pilster and Böhmelt; Political Instability Task Force; Marshall, Gurr, and Jaggers; US Committee for Refugees and Immigrants; World Bank; Compilation of armed conflict datasets and consultations with conflict experts.

Taken from Moran et al., 2018, p. 20.

Insight 2

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2. Climate change impacts affect competition and conflict over natural resources such as land and water

Key facts

- Climate change impacts can create new disputes over natural resources, especially in areas where conflict management mechanisms are weak and where certain groups face political exclusion.
- Infrastructure development and increasing water withdrawal could harm downstream countries and spur diplomatic tensions. This necessitates closer cooperation across transboundary river basins.

Climate change affects access to and availability of natural resources, such as land, water, timber and extractive resources in many regions around the world (IPCC, 2014). At the same time, resource demand and environmental degradation continue to increase. Combined, these trends will exacerbate local competition over natural resources, which can escalate into violence. This risk is particularly salient where climate-induced changes in access to or availability of resources occur in a fragile social and institutional environment, making it difficult to manage or resolve competition and disputes peacefully.

In many regions, climate change-induced impacts on natural resources and increasing resource competition are happening against a backdrop of a history of social, economic and political exclusion

and marginalisation. A frequently cited example of this are farmer-herder conflicts in the Sahel and East Africa (Mwiturubani & Van Wyk, 2010; Seter, Theisen & Schilling, 2018; USAID, 2018; Scheffran, Link & Schilling, 2019; Vivekananda et al., 2019).

Rainfall conditions become less predictable as a result of climate change. This uncertainty makes it harder to maintain and plan grazing routes, requiring herders and farmers to reach new agreements (Vivekananda et al., 2019). Many pastoralist communities have been facing restrictions in mobility, resource access, land rights and access to public services since the end of colonialism. This exclusion is exacerbated by the fact that remote and cross-border pastoralist groups often lack representation and influence in national political debates (Doti, 2010; Schilling, Scheffran & Link, 2010).

At the same time, protracted conflicts can disempower the dispute resolution mechanisms that people traditionally use to resolve tensions over natural resource management (Vivekananda et al., 2019). In such situations, increasing competition is more likely to escalate to violence. Politically excluded groups in Sub-Saharan Africa are hence disproportionally affected by conflicts related to environmental pressures (Raleigh, 2010; Fjelde & von Uexkull, 2012). It is important to stress that tensions are not necessarily a function of scarcity: A recent report by the International Crisis Group on climate change and conflict in the Sahel found that the increasing availability of resources from development efforts had in some cases sharpened tensions over resources (ICG, 2020).

Climate change also affects shared, transboundary natural resources. In particular, it is likely to challenge cooperation in a number of transboundary river basins. Together with economic development and population growth, climate change impacts are increasing pressure on these basins and the potential for diplomatic tensions and conflict (Böhmelt et al., 2014). Demand for irrigation and hydro-energy encourage dams and other infrastructure developments on many international rivers such as the Mekong, Indus and Nile. These developments may be flashpoints for tensions, especially when planning authorities ignore a project's possible negative effects on downstream ecosystems and economies. These risks are particularly

pronounced in the many basins that lack management institutions to address real or perceived negative impacts (see Dinar et al. 2015). Yet even where institutions exist, they are not always effective.

Studies relying on past data point out that there are practically no examples of inter-state wars over shared water resources (Tir & Stinnet, 2012; Dinar et al., 2015; Link, Scheffran & Ide, 2016). This is a hopeful finding, though there is no guarantee that it will continue under conditions of ever-greater demand for water. In the past century, water use increased by a factor of six (UNESCO & UN Water, 2020). Facing less predictable conditions and fearing water shortages, riparians may take unilateral actions, potentially at the expense of their neighbours. An upstream country might anticipate more droughts and build water storage capacities, potentially depriving a downstream country of water (Link et al., 2012). Past and ongoing political conflicts over dams – on the Blue Nile, the Euphrates, the Indus or the Amu-Darya – highlight these dynamics and the need to counterbalance climate-related challenges with appropriate management mechanisms (Tir & Stinnett, 2012).

Whether increased competition over natural resources escalates into conflict depends on a number of risk factors.

A history of conflict & fragility

Civil war, ethnic rivalries, and interstate conflict often establish a culture of violence, weaken cooperative mechanisms, and make arms easily available.

High dependence

Groups that are highly dependent on specific supplies of natural resources and lack alternatives may be more likely to pursue coping strategies that could spur conflict.

Inequality & Marginalisation

Imbalances in power and rights can lead to differences in access to resources, which can entrench poverty and inequality. Inequality, or the perception of it, can spur conflict between 'haves' and the 'have-nots'. Marginalised groups are often excluded from formal methods of resolving resource conflicts.

Insight 3

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3. Climate change impacts undermine livelihoods, affect human mobility, and push people into illegal coping mechanisms

Key facts

- Where livelihoods are lost due to climate change, people may turn to illegal coping strategies and non-state armed groups.
- Partly in response to climate change impacts, internal migration is likely to grow in the future. While this can be an important economic driver and coping strategy, it can also create tensions with underserved host communities and stretch capacities in rapidly growing urban areas.

Farming, livestock herding and fishing depend on natural resources. In many places these livelihoods may become less reliable or impossible due to changing climatic conditions. Areas that already face land and resource degradation are especially likely to be negatively affected by rising temperatures, changing rainfall patterns or salinisation (IPCC, 2014). The degradation of climate-sensitive livelihoods can affect people's ability to move and can push individuals to turn to illegal or unsustainable activities.

In many vulnerable areas, the number of accessible livelihoods is limited (Berchoux et al., 2019). This can push people to turn to illicit activities to make a living. For instance, Blakeslee and Fishman (2018) show that in India, drought and heat leading to decreased agricultural

incomes is an important factor in increases in almost all types of crime. In Afghanistan, there are examples of farmers turning to illicit and lucrative opium cultivation, in part because climate change undermines traditional crop cultivation (Brown, 2019).

As climate change reduces legal opportunities to make a living, particularly for young people, the recruitment efforts of non-state armed groups can fall on fertile ground (Nillesen & Verwimp, 2009; Mercy Corps, 2016; Nett & Rüttinger, 2016). Beyond offering payment, groups can exploit existing grievances with governments, sometimes capitalising on a lack of state support to promote services they offer to supporters, for example education, healthcare, and food provision. In underserved areas, this can be a highly effective incentive (ICG, 2016; Mercy Corps, 2016; Vivekananda et al., 2019). Secondly, lack of social cohesion can facilitate recruitment as armed groups might offer a sense of community and draw on existing divisions in creating narratives of conflict that supposedly legitimise their existence (Nett & Rüttinger, 2016; ICG, 2017; Vivekananda et al., 2019; Nagarajan, 2020).

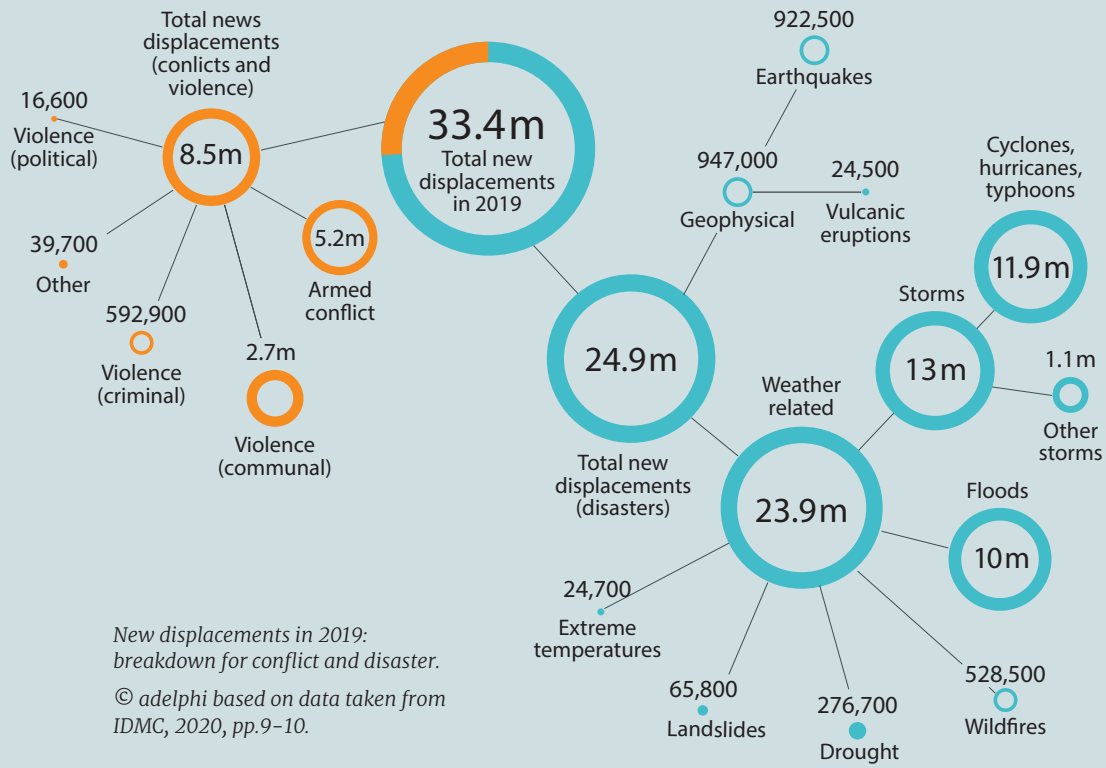
Individuals might choose or be pushed to move, either in direct response to climatic impacts (Ginnetti et al., 2019) or in search of alternative livelihoods (Rigaud et al., 2018). Climate change will most likely amplify existing migration patterns, but is unlikely to lead to international mass migration (Millock, 2015). Movements from rural to urban areas are expected to increase (Henderson, Storeygard & Deichmann, 2017; Nawrotzki et al., 2017; Sedova & Kalkuhl, 2020). However, climate change may also trap populations without sufficient resources to migrate (Cattaneo et al., 2019).

Migration itself is not inherently a risk, and often serves as a coping strategy and important driver of economic development. Migration offers a viable opportunity to attain incomes, to reduce climatic vulnerability, and to reduce tensions in the sending communities (Bosetti, Cattaneo & Peri, 2018). However, it can create new challenges in receiving areas. Already-overstretched city planning, infrastructure and services might not be able to keep pace with growth, especially in informal settlements. This can lead to underserved communities and socio-economic marginalisation, creating potential sources of tensions and violence (Buhaug & Urdal, 2013; Ostby, 2015). Breckner and Sunde (2019) find that on the African continent, temperature

extremes are more likely to lead to conflict in areas that experience immigration and/or are densely populated. While not explicitly addressing urbanisation, this indicates that migration is an important mechanism aggravating urban conflict risk in a changing climate.

Moreover, grievances with governments might emerge. For instance, Ash and Obradovich (2019) show that drought depressed agricultural outcomes and induced out-migration, contributing to a greater risk of protests in parts of Syria in 2011. Additionally, the economic hopes of migrants will not always be fulfilled, leading to a lack of livelihoods and associated potential conflict. These factors already combine in some places, and youth street gangs and violence have grown in rapidly urbanising areas, for example in Guatemala (Kunkeler and Peters, 2011; FLACSO, 2014; Dudouet, 2015).

Natural disasters and conflict newly displaced more than 30 million people last year.



New displacements in 2019: breakdown for conflict and disaster.

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Insight 4

4. Climate change impacts contribute to extreme food price spikes and food insecurity

Key facts

- Rising food prices and price shocks have already contributed to protests and conflict around the world.
- Climate science shows that production-related risks to agriculture and food prices are likely to rise significantly.

Volatile food prices and associated food insecurity are a critical risk to social stability. Global crop production is strongly concentrated in a few regions, making supply chains, markets, and prices vulnerable to extreme events in major producing countries such as Russia, China, Canada, and the US (Bren d'Amour et al., 2016; FAO, 2020). For countries importing a large part of their food, this can have dramatic economic and political consequences (Benzie et al., 2016, Bren d'Amour et al., 2016; Ceballos et al., 2016).

Quickly rising food prices are associated with higher levels of social unrest and conflict (Bellemare, 2015). This became visible to the world during the global food price crises in 2007/08 and 2010/11, when staple food prices skyrocketed in a matter of months, driven, among other factors, by droughts and bad harvests in the main producing countries. These price spikes put strong pressure on many Middle Eastern and African governments to provide affordable food for their populations. Many such countries are highly dependent on cereal imports and often provide subsidies to keep food prices low; many of

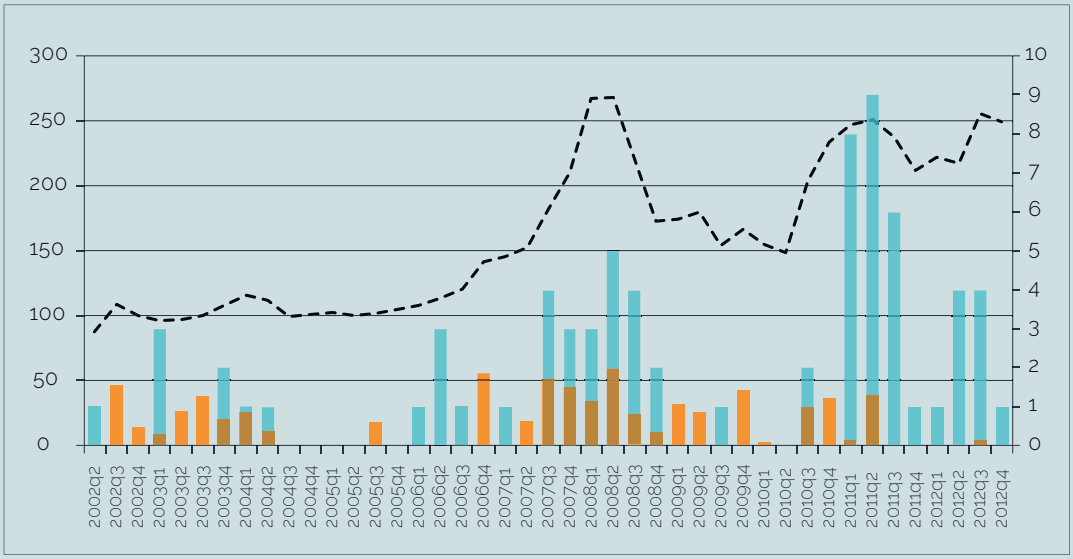
them also struggle to maintain adequate food stocks. Thus, in such places, rising food prices can combine with other political pressures and grievances to create an explosive situation. Indeed, there is strong evidence that food prices have acted as catalysts for protests and political unrest, which has often escalated into violence (Lagi, Bertrand & Bar-Yam, 2011; Sternberg, 2012; World Bank, 2014). Beyond these global events, food prices on local markets can fluctuate even when global and national prices are stable, and can interact with violent conflict to form a vicious circle where conflict gives rise to rising food prices and vice versa (Raleigh, Choi & Kniveton, 2015).

While food prices are shaped by many factors, climate is a major driver of variations in agricultural production and thus food prices (Lesk, Rowhani & Ramankutty, 2016; Schewe, Otto & Frieler, 2017). Anthropogenic climate change is already causing noticeable increases in drought intensity, water scarcity and extreme air temperatures, all of which put pressure on crops and livestock (Lobell, Schlenker & Costa-Roberts, 2011). Global warming is also expected to increase the frequency and intensity of severe water scarcity events. A recent study calculated that the likelihood of simultaneous severe droughts across the world's major wheat-growing areas would double between 2041 and 2070 compared to current conditions even under strong mitigation scenarios (Trnka et al., 2019).

Therefore, it is plausible that recent climate change has already contributed to increases in violent conflict via its effect on food prices, even though this link still needs to be consolidated with attribution studies. Food price-related violent unrest in urban settings is emerging more often in democratic countries than in autocratic countries (Hendrix & Haggard, 2015), suggesting that discontent over food prices may be even more widespread than observed. Authoritarian regimes may invest more into deflecting or suppressing such unrest – but at the price of risking full-scale revolution at some point, such as during the Arab spring or from 2018-2019 in Sudan (Al-Shammari & Willoughby, 2019; Hassan & Kodouda, 2019; Berridge, 2020).[2]

2 Thus far, most studies supporting the link between food prices and conflict focus on Sub-Saharan African countries. This should, however, not be taken to mean that such links do not exist in other parts of the developing world.

Food production challenges will increase significantly due to climate change.



Food prices, excessive volatility and social unrests. Note: Average share of days with excessive price spikes for maize, wheat and rice futures returns as reported by IFPRI's NEXQ model (see explanation below in the text). All values per quarter. Source. Own illustration based on data from foodsecurityportal.org (excessive volatility), Social conflict in Africa Database (SCAD) and FAO. Taken from: Kalkuhl, von Braun and Torero, 2016, p. 5.

Insight 5

5. Extreme weather events challenge government effectiveness and legitimacy

Key facts

- Adequate government responses and relief can avoid grievances and prevent large negative impacts following disasters and extreme weather events.
- Insufficient management can reduce the opportunity costs of joining non-state armed groups, create budgetary pressures and large public debts, and divert resources from development policies, spurring tensions and grievances.

Projected climate change will increase the likelihood and intensity of extreme weather events in many regions (Im, Pal & Eltahir, 2017; Dottori et al., 2018; Naumann et al., 2018). Climatic shocks and the disasters that follow can either undermine or improve relations between citizens and their government, as well as between citizens themselves. The political effect of such events depends largely on the (perceived) commitment of authorities to protect and help adversely affected people, as well as on the ability of affected people to create and maintain trustful relations and cooperative structures among themselves (see Le Billon & Waizenegger, 2007; Olson & Gawronski, 2010; Pelling & Dill, 2009; Slettebak, 2012; Canetti et al., 2017).

Grievances among affected populations can increase due to the inability or (perceived) unwillingness of public authorities to provide adequate protection or relief in times of emergency - especially

since extreme weather events are expected to substantially affect vulnerable regions with low adaptive capacity, e.g. in Africa and Central Asia (Hijioka et al., 2014; Niang et al., 2014). For example, Detges (2017b) finds that droughts lead to more radical political attitudes in a number of African countries among persons with low trust in public authorities. Whereas affected people will resent a neglectful government, they are just as likely to praise a more attentive and proactive one that keeps them out of harm's way (Olson & Gawronski, 2010; Pelling & Dill, 2009).

Disasters might also reduce the opportunity costs of joining non-state armed groups, which can capitalise on the hardship faced by individuals, especially when they are underserved by governments. In regions where individuals face political exclusion, low development, and high population, these dynamics have been shown to emerge shortly after a natural disaster (Ide et al., 2020).

While adequate emergency relief and reconstruction can facilitate positive relations with government, there are risks attached. In addition to substantial short- and long-term economic losses (Bergholt & Lujala, 2012; Panwar & Sen, 2018), disasters can lead to budgetary pressure, given the potentially large sums of money to be invested in affected areas. To meet these resource demands, governments have been shown to reallocate resources (Benson & Clay, 2004), creating potentially far-reaching negative effects. Many places that are especially vulnerable to disasters are developing economies, fragile states, and regions where governmental resources are already stretched, infrastructure is weak and services are poor (Kellet & Sparks, 2012; Neumayer, Plümper & Barthel, 2014; Peters & Budimir, 2016; Panwar & Sen, 2018). Any budgetary reallocation, if not managed carefully, can divert resources from pressing and necessary uses, such as interventions and policies for sustainable development or political reform (Foster & Fozzard, 2000). As a result, the problems that have contributed to the strong impact of disasters in the first place might grow (Benson & Clay, 2004). For example, scaling back service provision and infrastructure maintenance negatively affects poor populations, and potentially aggravates economic and political grievances as well as conflict risk. Aware of such risks, state repression has increased following a number of disasters (Wood & Wright, 2015; Pfaff, 2020).

Where budgetary allocation cannot free up sufficient funding, governments might also be forced to borrow large sums of money (Foster & Fozzard, 2000; Benson & Clay, 2004). As climate change increases the frequency and magnitude of disasters (IPCC, 2014), risk-prone areas might face natural pressures to such a degree that public debts steadily increase. Combined with the economic downturn following a disaster, this may overwhelm the abilities of states to meet guarantees, provide necessary state functions, and push them into bankruptcy (for an example of disaster impact in already-fragile situations, see Aldrich, 2013 on Haiti). Without international support, states might fail, creating a substantial risk of violent conflict over sovereign control (DFID, Foreign and Commonwealth Office and Ministry of Defence, 2011).

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Insight 6

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6. The unintended consequences of poorly designed climate and security policies carry their own risks

Key facts

- Mitigation and adaptation policies can have unintended side-effects that increase social tensions and the risk of conflict.
- Military responses to conflict can add further pressure on climate-sensitive livelihoods if planning disregards climate vulnerability.

Unintended side-effects of climate change mitigation and adaptation can create conflict risks. The pace of climate change requires ambitious responses, but the scale of the required responses implies conflict risks.

In the face of the climatic risks the world is experiencing, it is critical that policy and programmes act swiftly on the danger of climate change and ensure effective mitigation and adaptation. However, as such policies are scaled up, it is also important to beware of local side-effects and unintended consequences of an intervention or policy, especially on conflict risks (IPCC, 2014; Tänzler & Scherer, 2019; Crawford & Church, 2019). Both the implementation of adaptation measures, as well as transitions to greener economies can create additional pressure on natural resources such as land or water, exacerbate existing inequalities in resource and service access, negatively affect livelihoods, and deepen existing social cleavages,

thus contributing to conflict risks (Tänzler, Maas & Carius, 2010; Jakob & Steckel, 2013; Doelman et al., 2019; Dorband et al., 2019). By way of example, additional wells have repeatedly fuelled tensions in the Central Sahel as they heightened competition for land access (ICG, 2020).

Developmental interventions in mitigation or adaptation can also be a direct source of risk when poor project design or implementation allows for mismanagement of resources or creates incentives for corruption (Bofin et al., 2011; Evan, Murphy & de Jong, 2014; Sheng et al., 2016; Mosello & Rüttinger, 2019). For example, these issues might emerge in land restoration or nature conservation efforts (e.g. Doelman et al., 2019), in land acquisition for the production of biofuels (e.g. Borras et al., 2011), or in the mining for rare earths and resources required for low-carbon technologies (e.g. Hunsberger et al., 2017; Hausermann et al., 2018). All these interventions increase resource demand and reduce land access for populations, thereby threatening livelihoods.

Climate policies themselves can also be a source of contention when measures are seen as either too restrictive or inadequate. Europe has seen violent protests following environmental taxation that was seen as unjust (e.g. Rubin & Sengupta, 2018), as well as civil disobedience and deepened political divides over a need for more ambitious climate change mitigation (e.g. BBC News, 2019). Even bigger risks loom in the context of solar radiation management or similar large-scale interventions, which might bring about not only unintended, but also highly unequal side-effects.

While climate policies can unintentionally fuel conflict, peacebuilding and peace enforcement can likewise exacerbate climate-related security risks. Military interventions often have negative impacts on the livelihoods and resilience of local populations, for example by contributing to displacement or restricting legal livelihoods. In parts of Niger's Diffa Region, for example, the army declared the cultivation of red pepper illegal, as they associated its planting with monetary flows to non-state armed groups (Vivekananda et al., 2019). Such actions put additional pressure on individuals to employ any available

coping strategy, even if illegal, and exacerbate grievances against the state and its security forces. Mediation and peacebuilding also need to account for climate change impacts. Access to natural resources often underpins peace agreements. Failure to account for future climate impacts, and the attendant lack in sustainability of livelihoods, can undermine the effectiveness of agreements.

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Insight 7

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7. Climate-related security risks are particularly significant where governance mechanisms are weak or failing

Key facts

- Across compound risks, context and governance play a large role in determining how climate-related security risks manifest. By adding to existing pressures, climate change impacts inhibit peace.

Research into the different pathways connecting climate change and fragility shows that scope conditions, i.e. contextual factors, are crucial. Local competition over resources does not turn violent in the presence of functioning conflict management mechanisms. Migration is not a risk in itself, but rapid and unmanaged migration and a lack of support for receiving communities or policies that exclude and marginalise migrants often lead to tensions. Food price spikes are unlikely to fuel social unrest in countries that do not import a large part of the food they consume, or in which food prices and subsidies bear less political weight, for example due to lower shares of food in household expenditure.

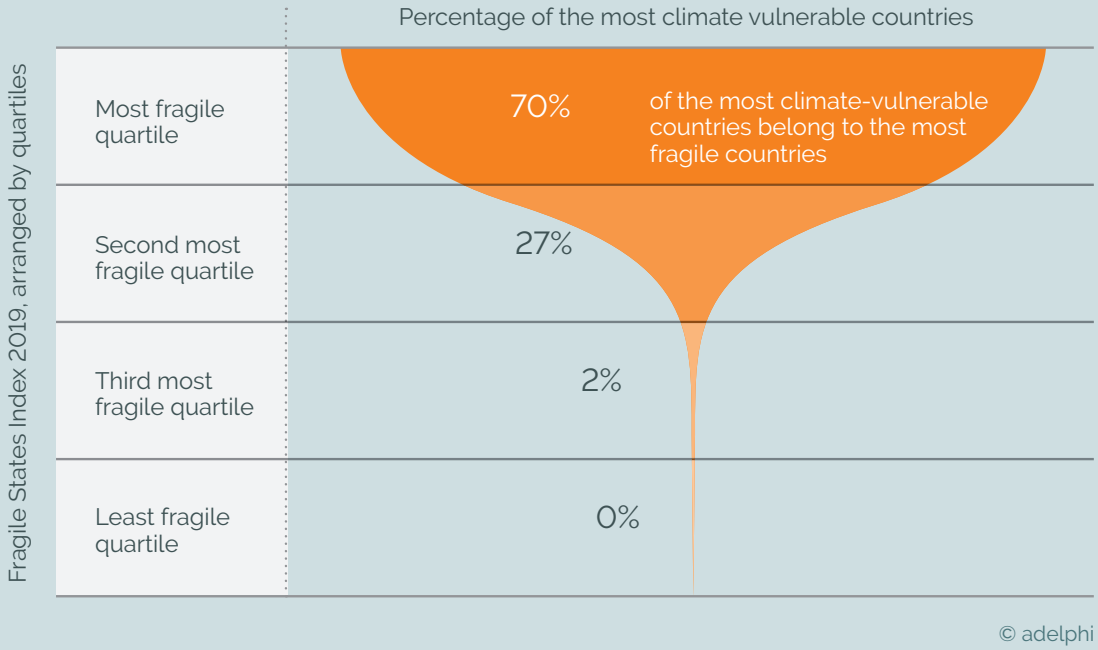
In general, the scientific literature agrees that violence in connection with climatic extremes is more likely to occur in places where institutions are less effective, affected people are socially and politically marginalised, and basic services such as education and health care are lacking (von Uexkull, 2016; Detges, 2017b, 2018; see also Salehyan, 2014; Buhaug, 2015a). Econometric analyses show that

exclusion from political power and perceived political discrimination increase the risk of radicalisation and violence in the wake of adverse precipitation shocks (Fjelde & von Uexkull, 2012; von Uexkull et al., 2016; Detges, 2017b). Poor infrastructure and access to services increase the risk of violence following drought (Detges, 2016).

Similarly, security risks in connection with climate hazards are estimated to be systematically higher in countries with significant ethnic divides (Schleussner et al, 2016) and lower levels of democracy (Couttenier & Soubeyran, 2014). Likewise, a recent history of conflict makes societies more vulnerable to renewed violence in the wake of major climatic shocks (see Vivekananda et al., 2019).

This is both good and bad news. The bad news relates to the fact that fragility and climate vulnerability overlap substantially, threatening to lock affected regions in a climate-fragility-conflict trap. The good news, however, lies in the fact that improvements in governance simultaneously reduce the security risks of climate change. This also implies that both sides of the debate as to whether climatic or non-climatic (governance) factors are more important for causing conflict are right: improving governance is a critical entry point for reducing climate-related security risks.

Vulnerability to climate change and state fragility correlate strongly and can feed each other.



Based on: Fund for Peace Fragile States Index (2019), ND-GAIN Vulnerability country rankings (2017). Lists adjusted to match respective entries, 175 total countries, 44 countries per quartile (ND-GAIN bottom quartile).

Insight 8

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8. We are very likely underestimating the scale and scope of climate-related security risks

Key facts

- Many climate-related security risks remain under-researched because of the complexity of cascading risks, and the difficulty of clear attribution.
- Climate change impacts might also contribute to conflict in indirect ways through, for example, their effects on inequality and health.

Whilst the scientific literature on the security impacts of climate change has grown exponentially over recent years (see Detges, 2017a), we know that we are very likely underestimating the scale and scope of climate-related security risks.

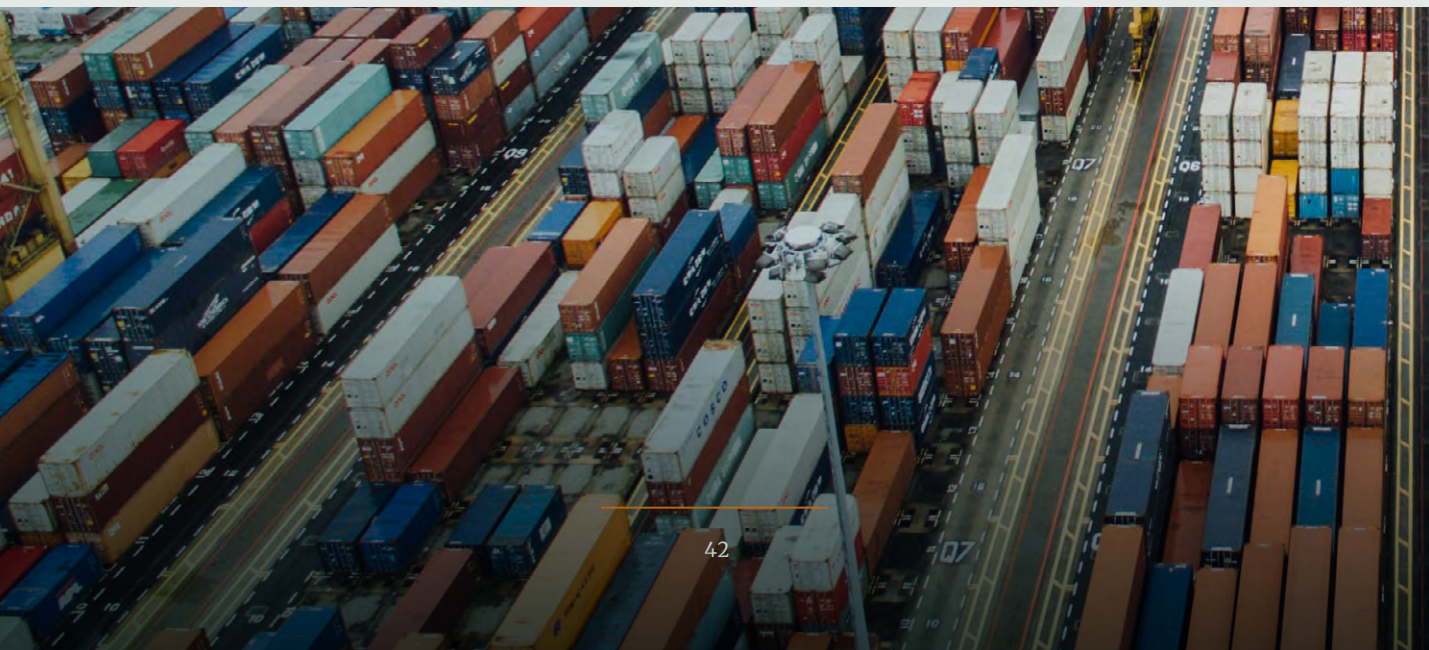
First, for reasons of convenience and data availability, past climate-security research has emphasised certain regions and types of risks (Adams et al., 2018; Hendrix, 2017b). Research has largely focused on direct impacts where links are easier to verify, than indirect, cascading risks, which may ultimately prove far more significant.[3] Much more attention has focused on the effect of short-term variations in temperature and rainfall – for which rich data are available – than to the effect of long-term trends and slow-onset hazards like sea-level rise (see Selby, 2014). Similarly, most research focuses on violent conflict, often defined by a certain threshold of people killed, whereas only a few studies focus on latent fragility risks – like inter-

3 In an imperfect analogy, consider that the fatalities directly attributed to COVID-19 significantly underestimate the virus' full effects as measured through 'excess mortality' – because authorities may be unable to test or verify infections fully, but also because people may die from indirect effects such as reduced access to healthcare.

communal tensions or mistrust in political authorities – that are much harder to measure (see for example Detges, 2017b; Linke, Schutte & Buhaug, 2015; Linke et al., 2015, 2017). Further, we can observe a research bias towards field research in Anglophone countries and for focusing on cases, in particular in Africa and in rural settings, for which a rich literature and detailed conflict data already exist. South America and the Pacific, regions which are among the most climate vulnerable in the world and susceptible to conflict and fragility, have been largely absent from research (Adams et al., 2018). So too have been urban areas, despite the reality of rapid population growth in climate-vulnerable urban centres (Plänitz, 2017, 2019), and the specific and very significant challenges for climate adaptation and conflict prevention in these contexts.

Second, much research has assumed that climate-related security risks would be felt where the biophysical impacts of climate change occur. However, in an interconnected world, climate shocks reverberate through international markets and supply chains, change migratory patterns and hamper aid efforts (Benzie et al., 2016, 2019). Only recently have such indirect cross-border climate risks been studied more systematically (see Benzie et al., 2019 and references therein). Therefore, the transboundary reverberations of climate-related security risks remain poorly understood.

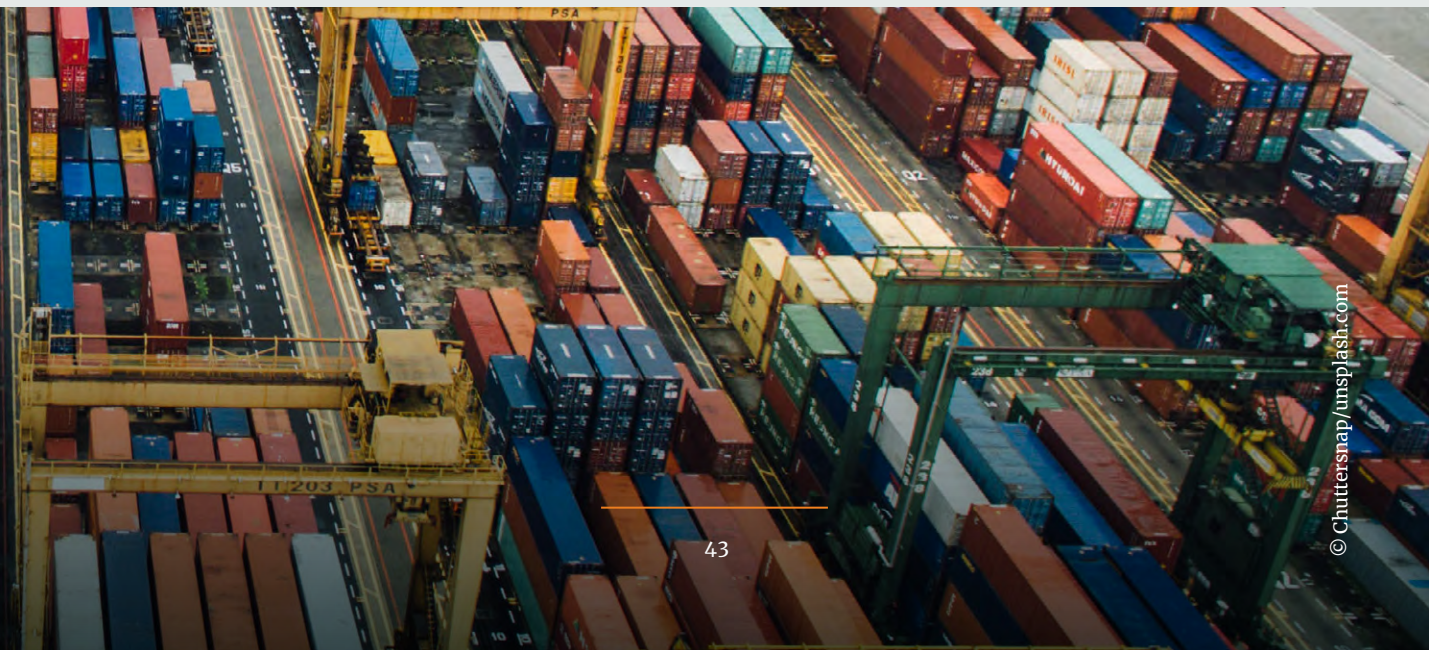
Third, certain pathways of climate-related security risks have largely escaped research attention. For example, climate change



is expected to aggravate the prevalence of child stunting through its impacts on food prices and poverty (Lloyd et al., 2018). Stunting before the age of two can lead to poorer adolescent emotional and behavioural outcomes (Walker et al., 2007), with consequences in adult life including less capacity for peaceful conflict resolution. Early childhood malnutrition thus is a risk factor for adult violent behaviour (Liu, 2011). If large cohorts of children are exposed to stunting due to climate-related malnutrition and poverty, this could dent peaceful societal development in many countries for decades onwards.

Inequality between and within countries is also expected to rise due to climate change – particularly adversely affecting agrarian economies and poorer groups within countries (Mendelsohn, Dinar & Williams, 2006; Burke, Hsiang & Miguel, 2015; Kalkuhl & Wenz, 2018; Narloch & Bangalore, 2018; Sedova, Kalkuhl & Mendelsohn, 2019; Warr & Aung, 2019). This will undermine resilience to climate change and leave more people vulnerable to climate-related security risks. If growing inequalities and larger relative deprivation overlap with group identities, they fuel conflict, as frustration between groups rises (Cederman, Gleditsch & Buhaug, 2013; Guariso & Rogall, 2017).

In a nutshell, for a full account of climate-related security risks, it is important to consider not only the impacts that climate change may directly have on violence, but to also examine the indirect effects of holding back development, which contribute to instability and conflict risk.



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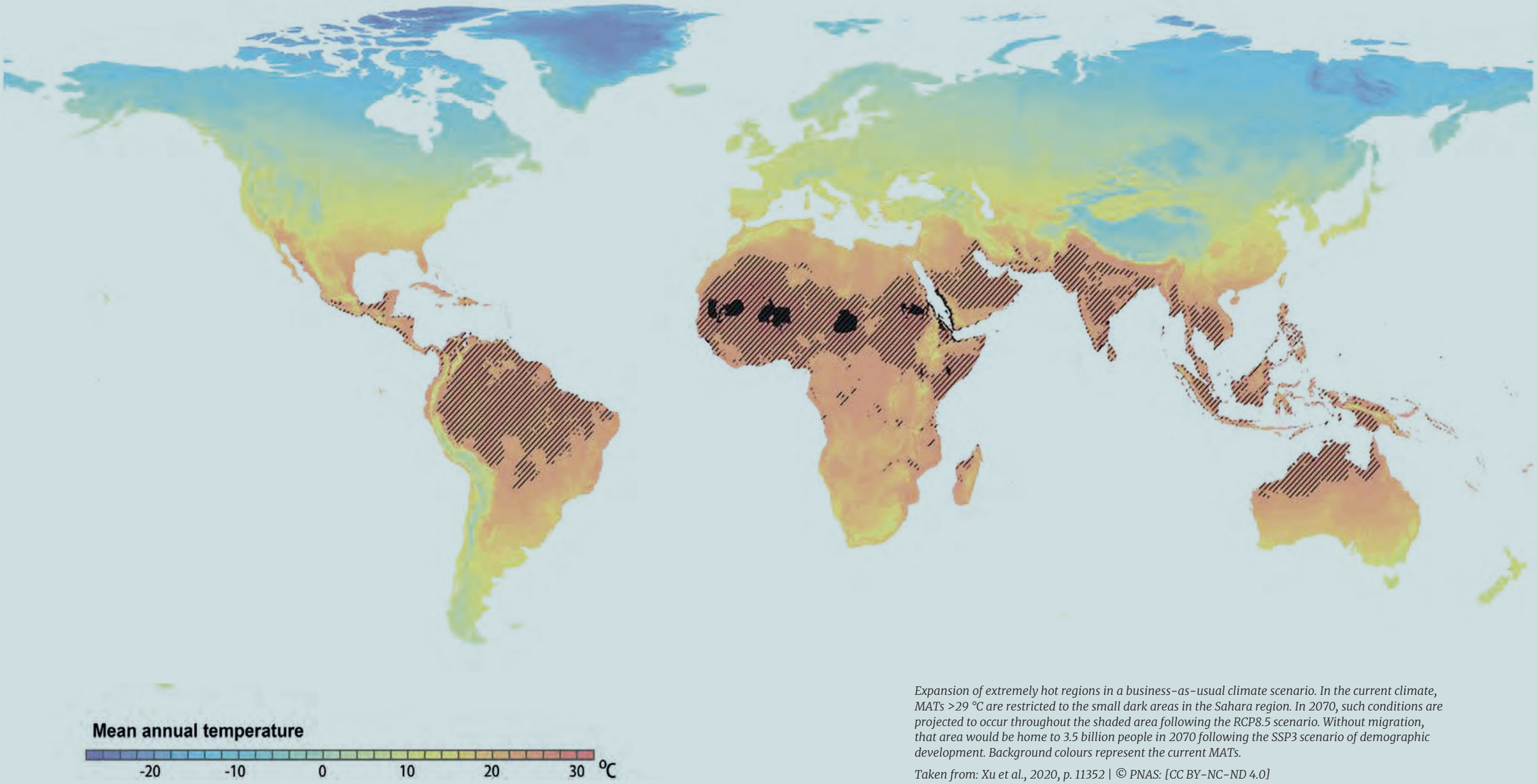
Who manages the risk that densely populated parts of the world may become uninhabitable, and its political consequences?



Expansion of extremely hot regions in a business-as-usual climate scenario. In the current climate, MATs >29 °C are restricted to the small dark areas in the Sahara region. In 2070, such conditions are projected to occur throughout the shaded area following the RCP8.5 scenario. Without migration, that area would be home to 3.5 billion people in 2070 following the SSP3 scenario of demographic development. Background colours represent the current MATs.

Taken from: Xu et al., 2020, p. 11352 | © PNAS: [CC BY-NC-ND 4.0]

Insight 9

9. Climate-related security risks will increase and multiply in the future

Key facts

- As temperatures rise, many impacts of climate change will intensify, while other effects will only materialise over decades to come. These increasing pressures imply further risks for peace and security.
- Climatic tipping points are creating large uncertainties over future climatic changes and their effects on societies. They might be a source of sudden and large risks.

The impacts of climate change on international peace and security are already visible. Yet they will likely be dwarfed by future climate change. What we can reasonably expect for the future very much depends on how quickly and radically changes in the environment will affect us, as well as the speed of appropriate countermeasures. If greenhouse gas (GHG) emissions and global mean temperature continue to rise, impacts on conflict will become much more severe than if warming stays below 2°C. The implementation of the Paris Agreement thus has decisive implications for global peace and security.

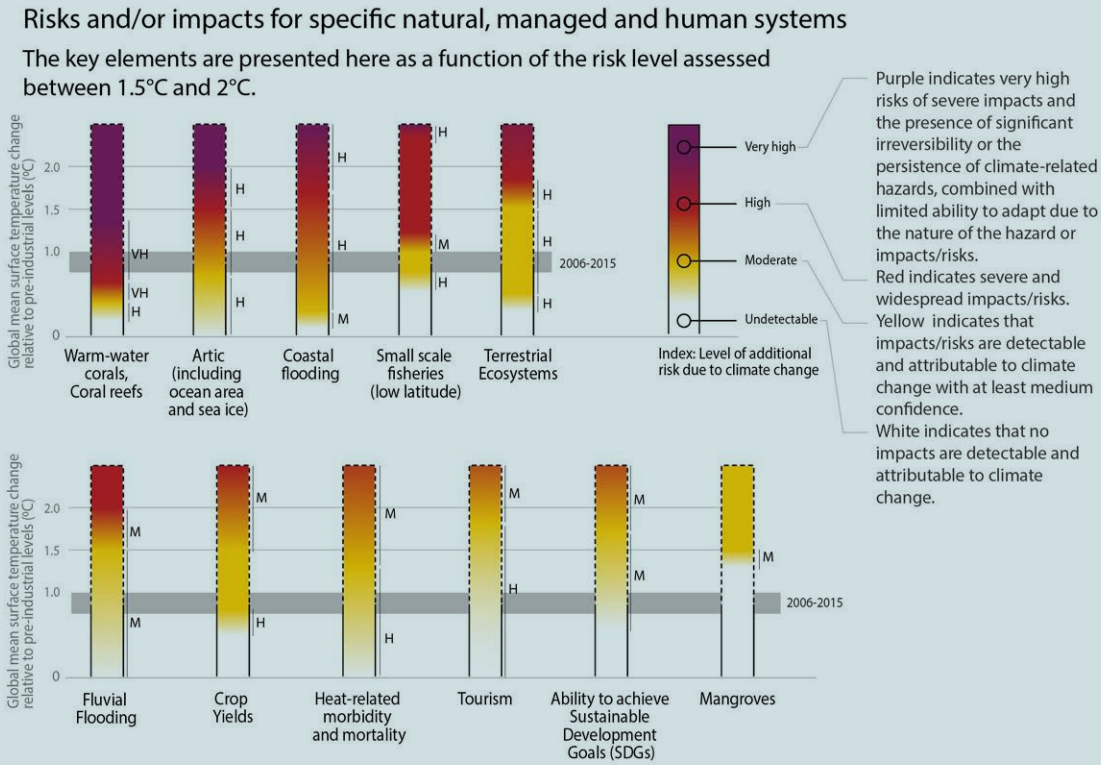
Impacts intensify with global warming. While some impacts of climate change increase linearly with global temperature, in other cases the increase will likely accelerate as the world moves further out of the stable Holocene climate regime (Ricke et al., 2016). For instance, food crops have some tolerance for weather fluctuations, but yields

decline substantially outside that window of tolerance (Schlenker & Roberts, 2009; Rosenzweig et al., 2014, Deryng et al., 2014, Gourdji, Sibley & Lobell, 2013). Drought and heat waves amplify each other, dramatically increasing the probability of extreme events in a warmer climate (Berg et al., 2016; Vogel et al., 2017), while heat extremes increase faster than mean temperatures (Wartenburger et al., 2017), and heat waves may render entire regions uninhabitable (Pal & Eltahir, 2015; Im, Pal & Eltahir, 2017).

Some impacts have not yet materialised but are already locked in. If we were to halt global GHG emissions today, the world would still heat up roughly by another 0.5˚C over the course of the century as a result of GHGs already accumulated (Collins et al., 2013). And even if the world heated no further, many of the impacts of the recent ~1˚C global warming have not yet fully materialised. Similarly, climate-related damages to institutions, infrastructure or financial systems may accumulate for some time before they contribute to fragility or conflict.

Meanwhile, climate tipping points might lead to dramatic changes occurring fast. While climate change impacts continually rise with global mean temperature, overlaid on this trend are sudden shifts or failures in natural or social systems that could additionally stress societies' coping capacities. For example, most coral reef ecosystems are very likely to suffer long-term degradation even at global warming of around 2˚C (Frieler et al., 2012; Hughes et al., 2017); but when and where destructive mass bleaching will occur next is hard to predict. Entire countries may see their fishing grounds deteriorate without much prior warning. In the Sahel, rainfall might soon fundamentally alter its pattern towards a much stronger monsoonal influence if global warming continues (Schewe & Levermann, 2017). Such a fundamental change in weather patterns is likely to induce additional pressures on livelihoods. Furthermore, social, political or economic disruptions could fundamentally change the way societies are affected by climate change and can adapt to it. If a country gets caught up in civil war, whether fuelled by climate change or not, its population may be rendered much more vulnerable to the impacts of climate change. A vicious circle of fragility, human insecurity and climate vulnerability can be kicked off by either social or climatic events or trends (Vivekananda et al., 2019).

The impacts of climate change will grow significantly in the future.



The dependence of risks and/or impacts associated with selected elements of human and natural systems on the level of climate change, adapted from Figure 3.21 and from AR5 WGII Chapter 19, Figure 19.4, and highlighting the nature of this dependence between 0°C and 2°C warming above pre-industrial levels.

The selection of impacts and risks to natural, managed and human systems is illustrative and is not intended to be fully comprehensive. For more information, see Hoegh-Guldberg et al., 2018.

Taken from: Hoegh-Guldberg et al., 2018, p.252.

Insight 10

10. Our capacities to assess and manage climate-related security risks lag behind the changing risk landscape

Key facts

- Assessment tools and early warning systems rarely address climate-related security risks.
- Conflict-affected countries are not sufficiently accounted for in funding and programming: The ten most fragile countries receive a mere 4.5% of all climate funding, while few projects address climate-conflict links.

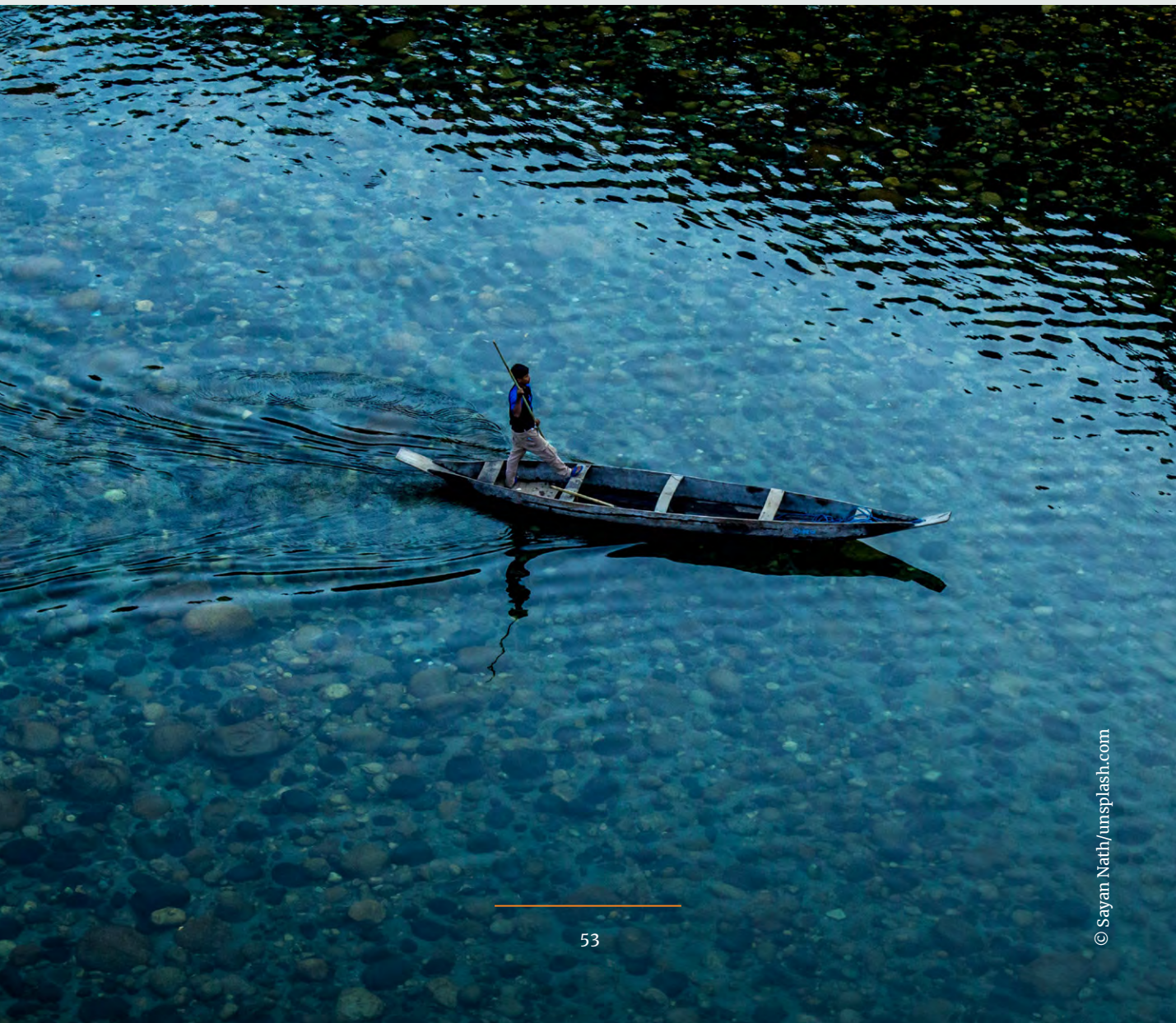
Serious gaps exist in terms of strategies and planning. Of the many plans and strategies that address climate change - adaptation, stabilisation, peacebuilding and development - few take a broad view of risk and response measures. Most climate vulnerability assessments do not take into account conflict dynamics, while most conflict and fragility assessments do not include climate risks (USAID, 2020). Most conflict and crisis early warning systems have yet to integrate climate data as well as more specific data or (proxy) indicators for specific climate-related security risks (Day & Caus, 2020). Even if climate-related security risks were better included in early warning systems, the link between existing early warning and preventative action remains weak (Bailey, 2013; Nyheim, 2015; Defontaine, 2019). Lessons from early warning systems show that effective interventions build on coordinated approaches, drawing on local knowledge (see for example Marchezini et al., 2018).

Learning from these lessons, a climate and security risk assessment approach requires strong linkages to conflict situations on the ground and a central coordination mechanism to inform a wide variety of actors and avoid duplication of actions. The UN's Climate Security Mechanism is developing a common UN framework for assessing climate-related security risks. However, it is too early to tell what coordination role it might play and how widely the approach will be used. Even with better assessment capacity, managing these risks requires institutions and processes which can function across sectoral silos. Climate-related security risks do not fit within the parameters of most existing institutions. The most effective responses are those crossing sectors and policy areas, in particular by integrating climate, disaster risk reduction, development, humanitarian, stabilisation and peacebuilding efforts (USAID, 2020; Mosello, Rüttinger & Sauerhammer, 2019). Such integrated responses are still few and far between (USAID, 2020). Single-sector responses will be less effective. In the worst case, dealing with one set of risks in isolation may exacerbate other risks.

When it comes to addressing these risks, the allocation of climate finance presents additional difficulties. While funding for crisis- and conflict-affected countries, and for climate change adaptation, has increased significantly over the past years, this has not reached those contexts where climate and conflict risks intersect. Climate change adaptation funding for fragile contexts makes up only a small share of total adaptation funding allocated by international bodies such as the Adaptation Fund, Climate Investment Fund, Global Environment Facility and Green Climate Fund (Climate Funds Update, 2019; The Fund For Peace, 2019). At the same time, most peacebuilding funding instruments do not specifically support projects with a climate dimension or that foster integrated approaches to climate-related security risks (Mosello & Rüttinger, 2019).

A growing number of pilot projects that address climate-related security risks directly are being implemented. Evaluations of these projects show that integrated approaches create significant synergies and can help address climate-related security risks (GIZ, 2018; USAID, 2019a, 2019b, 2020). While there is no universal set of activities that

provides climate change adaptation, peacebuilding, and development benefits in any given context (Mosello & Rüttinger, 2019), evaluations point towards a number of activity areas with the largest potential for integrated programming. They include improving natural resource access and management, fostering sustainable livelihoods for vulnerable population groups, strengthening social cohesion within and between groups, and addressing exclusion and marginalisation (Mercy Corps, 2019; USAID 2019a, 2019b). These challenges need to be overcome as they restrict our abilities to anticipate, prepare for, and respond to climate-related security risks, resulting in an overall increased vulnerability.



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Conclusion

There is ample evidence that climate change undermines international peace and security. However, we must assume that we continue to significantly underestimate these risks because of gaps in our capacity to fully appreciate important effects. Moreover, we also know that the impacts of climate change will increase considerably over the coming decades. This does not imply that climate change by itself is a direct or the most significant single driver of conflict. Instead, it exacerbates many drivers of conflicts and fragility, thereby challenging the stability of states and societies and, ultimately, threatening international peace and security.

This implies that, if we do not act swiftly, climate change will mean more fragility, less peace and less security. The risks that climate change presents to international peace and security need to be addressed across the entire impact chain – by mitigating climate change, attenuating its consequences on ecosystems, adapting its socio-economic systems, better managing the heightened resource competition it will bring about, and strengthening conflict management institutions. As this report shows, every dimension of the response needs to be conflict-sensitive – just as peacebuilding, humanitarian responses and socio-economic development need to become climate-sensitive.

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