

## The climate-security nexus in the IPCC report *Climate Change 2022: Impacts, Adaptation and Vulnerability*

### Introduction

This document gathers quotations on the links between climate change and conflict in the IPCC Working Group II report *Climate Change 2022: Impacts, Adaptation and Vulnerability*. As noted by [adelphi](#): “These findings underline and confirm important lessons that have been emerging from recent research: climate change does contribute to increased conflict, but along indirect pathways and via intermediate factors such as governance. Adapting to and mitigating climate change can also play an important role in addressing many drivers of conflict and building peace.”

### Findings<sup>1</sup>

#### Summary for Policymakers

- While non-climatic factors are the dominant drivers of existing intrastate violent conflicts, in some assessed regions extreme weather and climate events have had a small, adverse impact on their length, severity or frequency, but the statistical association is weak (medium confidence). (SPM-11)
- Violent conflict and, separately, migration patterns, in the near-term will be driven by socio-economic conditions and governance more than by climate change (medium confidence). (SPM-13)

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<sup>1</sup> The following points are direct quotes from the IPCC report.

- At progressive levels of warming, involuntary migration from regions with high exposure and low adaptive capacity would occur (medium confidence). Compared to other socioeconomic factors the influence of climate on conflict is assessed as relatively weak (high confidence). Along long-term socioeconomic pathways that reduce non-climatic drivers, risk of violent conflict would decline (medium confidence). At higher global warming levels, impacts of weather and climate extremes, particularly drought, by increasing vulnerability will increasingly affect violent intrastate conflict (medium confidence). (SPM-16)
- Climate change causes the redistribution of marine fish stocks, increasing risk of transboundary management conflicts among fisheries users, and negatively affecting equitable distribution of food provisioning services as fish stocks shift from lower to higher latitude regions, thereby increasing the need for climate-informed transboundary management and cooperation (high confidence). (SPM-19)
- Increasing adaptive capacities minimises the negative impacts of climate-related displacement and involuntary migration for migrants and sending and receiving areas (high confidence). This improves the degree of choice under which migration decisions are made, ensuring safe and orderly movements of people within and between countries (high confidence). Some development reduces underlying vulnerabilities associated with conflict, and adaptation contributes by reducing the impacts of climate change on climate sensitive drivers of conflict (high confidence). Risks to peace are reduced, for example, by supporting people in climate-sensitive economic activities (medium confidence) and advancing women’s empowerment (high confidence). (SPM-26).

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SUMMARY FOR POLICYMAKERS, P. 16

## **Chapter 2: Terrestrial and Freshwater Ecosystems and their Services**

- It is important that the right adaptation actions are carried out in the right place and that local communities play an active part in making decisions about their local environment if Nature-based Solutions are to be effective. When they are not part of the process, conflicts can emerge and benefits can be lost. (2-141)

## **Chapter 3: Oceans and Coastal Ecosystems and their Services**

- Without transformation, global inequities will likely increase between regions (high confidence) and conflicts between jurisdictions may emerge and escalate. (3-6)<sup>2</sup>

<sup>2</sup> This quote refers to the need for transformative climate adaptation in marine systems, as under high emissions scenarios, adaptation options are uncertain.

- Without considering both short- and long-term adaptation needs, including beyond 2100, communities are increasingly confronted with a shrinking solution space, and adverse consequences are disproportionately borne by exposed and socially vulnerable people (Chapters 1, 8). SLR is likely to compound social conflict in some settings (high confidence) (Oppenheimer et al., 2019). (3-127)
- Increased maritime transport and cruise-ship tourism in the Arctic are already impacting local and Indigenous Peoples, revealing conflicts over the uses of the ocean and the governance needed to support local people and a sustainable blue economy (high confidence) (Debortoli et al., 2019; Palma et al., 2019; Berman et al., 2020; Dundas et al., 2020). (3-131)

#### Chapter 4: Water

- According to AR5, violent conflict increases vulnerability to climate change (Field et al., 2014a) (medium evidence, high agreement). Furthermore, the IPCC SRCCL (Hurlbert et al., 2019) concluded with medium confidence that climatic stressors can exacerbate the negative impacts of conflict...Since AR5, only a few studies focused specifically on the association between observed changes in the hydrological cycle linked to climate change and conflicts (Zografos et al., 2014; Dinar et al., 2015). Some studies associate conflicts with local abundance of water (Salehyan and Hendrix, 2014; Selby and Hoffmann, 2014; de Juan, 2015), mainly because of political mobilization around abundant waters and the need for developing new rules of allocation among competing users. Others provide evidence that the increase in water availability in some areas versus a decrease in other surrounding areas can affect the risk of a conflict in a region (de Juan, 2015) (low to medium confidence). However, the large majority acknowledges reduction of water availability due to climate change as having the potential to exacerbate tensions (de Stefano et al., 2017; Waha et al., 2017), especially in regions and within groups dependent on agriculture for food production (von Uexkull et al., 2016; Koubi, 2019) (high confidence). (4-53)
- Additionally, there is no consensus on the causal association between observed climate changes and conflict (Hsiang Solomon et al., 2013; Burke et al., 2015; Selby, 2019). However, evidence suggests that changes in rainfall patterns amplify existing tensions (Abel et al., 2019); examples include Syria, Iraq (Abbas et al., 2016; von Lossow, 2016) and Yemen (Mohamed et al., 2017) (medium confidence). There is also medium evidence that in some regions of Africa (e.g., Kenya, Democratic Republic of Congo), there are links between observed water stress and individual attitude for participating in violence, particularly for the least resilient individuals (von Uexkull et al., 2020) (medium confidence). A reverse association from conflict to climate impacts has also been observed (Buhaug, 2016). For example, conflict-affected societies cannot address climate-change impacts due to other associated vulnerabilities such as poverty, food insecurity, and political instability. (4-53)
- For transboundary waters, the probability of inter-state conflict can both increase and decrease (Dinar et al., 2019) depending on climatic variables (e.g. less precipitation) and other socio-economic and political factors, such as low levels of economic development and political marginalization (Koubi, 2019). (4-53)

- In summary, there is no consensus on the causal association between observed climate change and conflicts. Still, evidence exists that those tensions can be amplified depending on climatic variables and other concomitant socio-economic and political factors. (4-54)
- At the intra-state level, analysis suggests that additional climate change will increase the probability of conflict risks, with 13% increase probability at 2° C GWL and 26% probability at 4° C GWL scenario (Mach et al., 2019). However, to date, other factors are considered more influential drivers of conflict, including lack of natural resource use regulations (Linke et al., 2018b), societal exclusion (von Uexkull et al., 2016; 5 van Weezel, 2019), poor infrastructures and a history of violent conflict (Detges, 2016) (high confidence). In addition, medium-high evidence exists that climate change imposes additional pressures on regions that are already fragile and conflict-prone (Matthew, 2014; Earle et al., 2015) (medium agreement). (4-86)
- Increased risk of conflict between different sectors (agriculture, industry, domestic) and needs (urban, rural) is projected to arise in several river basins due to climate change and socio-economic developments, including urbanization (Flörke et al., 2018). (4-86)
- In summary, the impact of climate change on water resources might increase tensions, particularly in the absence of strong institutional capacity. However, whether conflict arises or increases depends on several contextual socio-economic and political factors. Evidence exists that climate change imposes additional pressures on regions already under water stress or fragile and conflict-prone (medium confidence). (4-86)
- The potential for climate change to influence conflict is highly contextual and depends on various socio economic and political factors. However, water-specific conflicts between sectors and users may be exacerbated for some regions of the world (high confidence) (4.5.7). (4-91)
- Discourses around climate-conflict inter-linkages can present opportunities for peace-building and cooperation (Matthew, 2014; Abrahams, 2020). Indeed, adaptation efforts are needed in the context of conflict, where the pre-existing vulnerability undermines the capacity to manage climatic stresses. (4-104)

## **Chapter 5: Food, Fibre, and other Ecosystem Products**

- There is high confidence that climate change increases the risk of conflicts due to the redistribution of stocks and their abundance fluctuations, with subsequent impacts on resource sharing (Spijkers and Boonstra, 2017; Pinsky et al., 2018; Spijkers et al., 2018; Mendenhall et al., 2020; Pinsky et al., 2020). High vulnerability and lack of adaptive capacity to climate change impacts (including fisheries-dependent livelihoods, attachment to place, and pre-existing tensions) increase the risk of conflicts, including among fishery area users and authorities (Ndhlovu et al., 2017; Shaffril et al., 2017; Spijkers and Boonstra, 2017; Mendenhall et al., 2020). (5-72)
- Increased drought and flood events and increased pests and disease from rising temperatures cause widespread crop failure. Rising ocean temperatures, marine heatwaves, and ocean acidity lead to dramatic decline in fisheries contributing to migration and conflict. (5-110)

- Weather extreme events increased food prices and food price volatility (Peri, 2017), thereby worsening food insecurity (Shiferaw et al., 2014; Bene et al., 2015; Miyan, 2015; FAO et al., 2018; Ilboudo Nébié et al., 2021). Rising food prices can affect conflict, political instability, and migration (Bush and Martiniello, 2017) but the relationship between climate change, political instability and conflict is often mediated by other underlying factors such as poor governance (Chapter 7.2.7, Mach et al., 2019; Selby, 2019). (5-112)
- Food insecurity from food price spikes due to reduced agricultural production associated with climate impact drivers such as drought can lead to both domestic and international conflict, including political instability (Abbott et al., 2017; Bush and Martiniello, 2017; WEF, 2017; D'Odorico et al., 2018; de Amorim et al., 2018; Chapter 7.2.7). While climate change impacts, including drought impacts on food security are important risk factors for conflict, other key drivers are often more influential, including low socioeconomic development, limited state capacity, weak governance, intergroup inequities, and recent histories of conflict (medium confidence) (Mach et al., 2019; Selby, 2019; Chapter 7.2.7). (5-114,115)
- Increasing demands for food, energy and water can lead to domestic and international conflict, including political instability and migration, often in the context of drought (high confidence) (Abbott et al., 2017; Bush and Martiniello, 2017; WEF, 2017; D'Odorico et al., 2018; de Amorim et al., 2018). de Amorim et al. (2018) conclude that the WEF nexus is susceptible to many global risks, including extreme weather events and human migrations and predominantly endanger vulnerable communities of less developed countries. There is emerging evidence that food and water insecurity enhance social conflicts, including protests and violent riots, at least partially, by accelerating existing grievances (Heslin, 2021; Koren et al., 2021). Closer coordination at global, regional, and national levels could be recommended to manage these risks. (5-134)

## **Chapter 6: Cities, Settlements and Key Infrastructure**

- Climate change can be a threat multiplier in cities and urban regions, exacerbating existing human security tension (limited evidence, medium agreement) (Froese and Schilling, 2019; Flörke, Schneider and McDonald, 2018; Rajsekhar and Gorelick, 2017). Where conflict or administrative tensions extend beyond cities, adapting regional infrastructure systems that underpin urban life is challenging for example where elements of networked infrastructure are under the control of conflicting political interests. This has been noted for the water sector (Tänzler, Maas and Carius, 2010). (6-41)
- In planning adaptation measures in cities, conflict-sensitive approaches to ensure participatory methods (Bobylev et al., 2021) can avoid adaptation being a polarising activity (Tänzler, Maas and Carius, 2010; Tänzler, 2017). Adaptation can provide a common goal reaching across political differences and be a part of building political trust and local cooperation between alienated communities (Tänzler, Maas and Carius, 2010). Peacebuilding programmes led by government or civil society are typically concerned with the short term and framed by socioeconomic policy, integrating the longer-term view and engineering-technical expertise for adaptation is a challenge (limited evidence, medium agreement) (Ishiwatari, 2021). (6-42)

## Chapter 7: Health, Wellbeing, and the Changing Structure of Communities

- Climate hazards are a growing driver of involuntary migration and displacement (high confidence) and are a contributing factor to violent conflict (high confidence). (7-3)
- Since AR5, new evidence and awareness of current impacts and projected risk of climate change on health, wellbeing, migration, and conflict emerged, including greater evidence of the detrimental impacts of climate change on mental health (very high confidence). (7-3)
- Climate hazards have affected armed conflict within countries (medium confidence), but the influence of climate is small compared to socio-economic, political, and cultural factors (high confidence). Climate increases conflict risk by undermining food and water security, income and livelihoods, in situations where there are large populations, weather-sensitive economic activities, weak institutions and high levels of poverty and inequality (high confidence). In urban areas, food and water insecurity and inequitable access to services has been associated with civil unrest where there are weak institutions (medium confidence). Climate hazards are associated with increased violence against women, girls and vulnerable groups and the experience of armed conflict is gendered (medium confidence). Adaptation and mitigation projects implemented without consideration of local social dynamics have exacerbated non-violent conflict (medium confidence). (7-5)
- Climate change may increase susceptibility to violent conflict, primarily intrastate conflicts, by strengthening climate-sensitive drivers of conflict (medium confidence). Future violent conflict risk is highly mediated by socio-economic development trajectories (high confidence) and so trajectories that prioritise economic growth, political rights and sustainability are associated with lower conflict risk (medium confidence). Future climate change may exceed adaptation limits and generate new causal pathways not observed under current climate variability (medium confidence). Economic shocks are currently not included in the models used and some projections do not incorporate known socio-economic predictors of conflict (medium confidence). As such, future increases in conflict-related deaths with climate change have been estimated, but results are inconclusive (medium confidence). (7-6)
- Environmental peacebuilding through natural resource sharing, conflict-sensitive adaptation, and climate-resilient peacebuilding offer promising avenues to addressing conflict risk but their efficacy is still to be demonstrated through effective monitoring and evaluation (high confidence). (7-8)
- With respect to violent conflict, AR5 Chapter 12 found that people living in places affected by violent conflict are particularly vulnerable to climate change (medium evidence, high agreement), that some of the factors that increase the risk of violent conflict within states are sensitive to climate change (medium evidence, medium agreement) and that climate change will lead to new challenges to states and will increasingly shape both conditions of security and national security policies (medium evidence, medium agreement). As with other subjects assessed in this chapter, there has been significant growth in the number of assessable studies, but there remain shortcomings with respect to the availability of evidence regarding the specific nature of causal linkages and the attributability of particular outcomes to climate events or conditions. (7-9)
- Positive temperature anomalies, and average increases in temperature over time, have been associated with collective violent conflict in certain settings (medium agreement, low evidence). (7-61)

- Extreme weather events can be associated with increased conflict risk (low agreement, medium evidence). There is the potential for extreme weather events and disasters to cause political instability and increase the risk of violent conflict, although not conclusively (Brzoska, 2018). Post-disaster settings can be used to intensify state repression (Wood and Wright, 2016) and to alter insurgent groups' behaviour (Walch, 2018). Different stakeholders use disasters to establish new narratives and alter public opinion (Venugopal and Yasir, 2017). However, some research has demonstrated how post-disaster activities have had positive impacts on the social contract between people and the state, reducing the risk of conflict by strengthening relations between government and citizens and strengthened citizenship of marginalized communities (Siddiqi, 2018; (Pelling and Dill, 2010; Siddiqi, 2019). However, post-disaster and disaster-risk related activities in of themselves, have limited capacity to support diplomatic efforts to build peace (Kelman et al., 2018). (7-61)
- Increases in food price due to reduced agricultural production and global food price shocks are associated with conflict risk and represent a key pathway linking climate variability and conflict (medium confidence). (7-61)
- Climate adaptation and mitigation projects implemented without taking local interests and dynamics into account have the potential to cause conflict (high agreement, medium evidence). (7-63)
- Climate change may increase susceptibility to violent conflict, primarily intrastate conflicts, by strengthening climate-sensitive drivers of conflict (medium confidence). Section 7.2.7 demonstrated how climate variability and extremes affect violent conflict through food and water insecurity, loss of income, and loss of livelihoods. Risks are amplified by insecure land tenure, competing land uses and weather-sensitive economic activities, when they occur in the context of weak institutions and poor governance, poverty, and inequality (7.2.7). These known, climate-sensitive risk factors allow projections of where conflict is more likely to arise or worsen under climate change impacts (see Chapters 1, 4, 5, 6, 16) (Mach et al., 2020). However, there is also the potential for new causal pathways to emerge as climate changes beyond the variability observed in available datasets and adaptation limits are met (Theisen, 2017); (Mach et al., 2019); (von Uexkull and Buhaug, 2021). (7-80)
- Climate-resilient peace building has the potential to limit the impact of future climate change on peace efforts (medium confidence). Practical guidance has been developed, driven by policy concerns on climate conflict links. The United Nations Environment Programme, the European Union and Adelphi have developed a toolkit for addressing climate fragility risks in peacebuilding, adaptation and livelihoods support (Programme et al., 2019)) (7-107)
- Conflict-sensitive adaptation that focuses on institutional frameworks, conflict management, and governance mechanisms has the potential to address complex interacting risks and emergencies over the long term (medium agreement, limited evidence) (7-107)

## Chapter 8: Poverty, Livelihoods and Sustainable Development

- Under higher emissions scenarios and increasing climate hazards, the potential for social tipping points increases (medium confidence). Even with moderate climate change people in vulnerable regions will experience a further erosion of livelihood security that can interact with humanitarian crises, such as displacement and forced migration (high confidence) and violent conflict, and lead to social tipping points (medium confidence). Social tipping points can also be coupled with environmental tipping points {8.3, 11 8.4.4}. (8-4)
- Climate change impacts carry the risk of amplifying or aggravating existing tensions within and between communities or countries (Sakaguchi et al., 2017). There is however little evidence for a universal direct causal linkage between climate change and violent conflicts (Mach et al., 2019). The triggering of conflicts related to climate impacts is strongly determined by contextual factors, such as the type of government or the level of development (Mach et al., 2019). (8-24)
- Frequently the possibility of migration from climate change is conflated with conflict outcomes from climate change; however, there is limited evidence and low agreement that climate change and migration will result in increased conflict (Okpara et al., 2016b), while there is robust evidence and medium agreement that climate change can exacerbate existing tensions, which can in turn result in political violence and an increase in asylum-seeking (Marchiori et al., 2012). (8-24)
- In recent years, research on the climate-security nexus has developed considerably, and has highlighted risks pertaining to conflicts, geo-political rivalries, critical infrastructure, terrorism or human security (Gemenne et al., 2014). While different studies have identified have identified strong past correlations between climatic variations (of temperature and rainfall in particular) and the occurrence of violent conflicts (Hsiang et al., 2013), while others have stressed the need for stronger explanatory models or the risk of a selection bias (Benjaminsen et al., 2012; Solow, 2013; Buhaug et al., 2014). While climate change may increase armed conflict risks in certain contexts (Mach et al., 2019), responses to climate change will be crucial to mitigate these risks. Poor institutional responses can directly drive violence, and there is robust evidence that inequitable responses further exacerbate marginalisation, exclusion or disenfranchisement of some populations, which are commonly recognized drivers of violent conflict. (8-25)

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CHAPTER 8, P. 4



## Chapter 9: Africa

- There is increasing evidence linking increased temperatures and drought to conflict risk in Africa (high confidence). Agriculturally dependent and politically excluded groups are especially vulnerable to drought-associated conflict risk. However, climate is one of many interacting risk factors, and may explain a small share of total variation in conflict incidence. Ameliorating ethnic tensions, strengthening political institutions, and investing in economic diversification could mitigate future impacts of climate change on conflict. {Box 9.9}. (9-9)
- Climatic conditions also change the risk of large-scale conflicts such as riots, ethnic conflicts and civil war (Burke et al., 2014; Koubi, 2019). The effects of temperature are particularly well-studied in Africa. Risk of violent conflict rises with temperature in Sudan and South Sudan (Maystadt and Ecker, 2014; Maystadt et al., 2014; Scheffran et al., 2014), Kenya (Hsiang et al., 2013b; Scheffran et al., 2014), the East African region (O'Loughlin et al., 2012) and across sub-Saharan Africa (Burke et al., 2009; O'Loughlin et al., 2014; Witmer et al., 2017). Estimates indicate that warming trends since 1980 have elevated conflict risk across sub-Saharan Africa by 11% (Burke et al., 2009; Carleton et al., 2016). (9-141)

## Chapter 14: North America

- Climate change poses risks to peace (16.5.2.3.8) that could affect North America (medium confidence). Military and security communities are adapting their planning, operations and infrastructure to current impacts of climate change in North America and globally (medium agreement, medium evidence). Arctic nations are renewing their military capacity and expanding their constabulary presence around their existing boundaries (Choi, 2020). There is increasing awareness that climate change causes weather patterns and extreme events that directly harm military installations and readiness through infrastructure damage, loss of utilities, and loss of operational capability (Duffy-Anderson et al., 2019). Transboundary disputes and competition over resources such as fish (Østhagen, 2020) are a concern in the changing Arctic and increases in military and constabulary operations are being observed (Jönsson et al., 2012; Smith et al., 2018; Eyzaguirre et al., 2021). (14-72)

## Chapter 16: Key Risks Across Sectors and Regions

- Climate variability and extremes are associated with increased prevalence of conflict, with more consistent evidence for low-intensity organized violence than for major armed conflict (medium confidence). Compared to other socio-economic drivers, the link is relatively weak (medium confidence) and conditional on high population size, low socioeconomic development, high political marginalization, and high agricultural dependence (medium confidence). Literature also suggests a larger climate-related influence on the dynamics of conflict than on the likelihood of initial conflict outbreak (low confidence). There is insufficient evidence at present to attribute armed conflict to climate change. {16.2.3.8} (16-3)
- Research on weather-related effects on interstate security generally conclude that periods of transboundary water scarcity are more likely to facilitate increased international cooperation than conflict (Bernauer and Böhmelt, 2020). (16-23)

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