# THE GATHERING STORM

## Climate Change, Security and Conflict

ENVIRONMENTAL JUSTICE FOUNDATION

Protecting People and Planet

A report produced by the Environmental Justice Foundation

ENVIRONMENTAL JUSTICE FOUNDATION

Protecting People and Planet

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# MISSION STATEMENT:

## To Protect People and Planet

### EJF believes environmental security is a human right.

**EJF strives to:**

- Protect the natural environment and the people and wildlife that depend upon it by linking environmental security, human rights and social need.
- Create and implement solutions where they are needed most – training local people and communities who are directly affected to investigate, expose and combat environmental degradation and associated human rights abuses.
- Provide training in the latest video technologies, research and advocacy skills to document both the problems and solutions, working through the media to create public and political platforms for constructive change.
- Raise international awareness of the issues our partners are working locally to resolve.

Climate change is creating millions of climate refugees – people forced from their homes and land – by rising temperatures, sea-level change and extreme weather events. Many are among our planet's poorest and most vulnerable people. These are the first victims of our failure to prevent climate change: people who, without international help and new binding agreements on assistance, have nowhere to go and no means to survive.

EJF is dedicated to arguing their case: putting the call to governments and our political leaders for a new agreement on climate refugees, guaranteeing them rights, assistance and a fair claim to our shared world.

EJF is also committed to empowering individuals and organisations to take positive actions to reduce their impact on the natural environment; encouraging them to act now, before the irreversible effects of climate change take hold.

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## Abbreviations

**EJF**: Environmental Justice Foundation
**EU**: European Union
**GDP**: Gross domestic product
**GHG**: Greenhouse gases
**ICWC**: Interstate Coordinating Water Commission
**MDG**: Millennium Development Goal
**SIDS**: Small Island Developing State
**UK**: United Kingdom
**UN**: United Nations
**UNEP**: United Nations Environment Programme
**UNFCCC**: United Nations Framework Convention on Climate Change
**UNGA**: United Nations General Assembly
**UNHRC**: United Nations Human Rights Council
**US**: United States

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# EXECUTIVE SUMMARY

- In 2013, the World Bank warned that 4°C of warming by the end of the century is a real and urgent risk.[1] According to an influential study published the same year, such a rise in global temperature could precipitate as much as a 56 per cent increase in the frequency of intergroup conflicts across the world.[2] Once only considered as an 'environmental issue', climate change is an emerging concern on international security agendas. It is seen as a threat to both human and national security. This reframing has seen climate change discussed in two high-profile debates in the United Nations Security Council and become the subject of United Nations General Assembly (UNGA) resolution 63/281.

- This report finds that while climate change may not be the sole cause of conflict in the future, it will increasingly become one of the most important and decisive factors. It will play a prominent role as a 'threat multiplier' – in situations where multiple stressors already exist, climate change may breach critical thresholds that lead to outbreaks of conflict. This is particularly true in situations where climate change impacts actual or perceived resource scarcity, patterns of human migration or unfolds within contexts of existing state fragility. In some cases, such as vulnerable small island nations, climate change threatens the integrity and sovereignty of the state itself.

- One of the most pronounced links between climate change and conflict is access to natural resources. Many less-developed countries are acutely dependent on ecosystem services and already experience tensions related to the uneven distribution of resources and services both within and across countries. Climate change may exacerbate resource-related insecurities and generate conflict by increasing the likelihood that actors resort to coercion or violence.

- Unequal access to resources fuels tensions within societies, particularly where there is a history of specific groups being marginalised. Climate change will likely entrench or expand unequal systems of entitlement that alienate vulnerable populations.

- Freshwater availability is a significant contributing factor to stability. The relative scarcity of water between areas is an existing fault line driving economic and political tensions amongst some states. Failure to cooperate over water resources which straddle international boundaries is likely to exacerbate pre-existing pressures in geopolitical hotspots, with repercussions for regional stability and foreign policy objectives.

- Inadequate access to water also drives tensions. Obstructed access to water has historically been used to undermine particular regions or populations within countries. A water-scarce future, driven by overexploitation and exacerbated by rainfall variability, may witness the increasingly strategic use of water as leverage – or even as a weapon – in situations of conflict.

- In 2012, one person every second was displaced by a climate- or weather-related natural disaster.[3] This report finds that, with millions of people displaced each year by rapid-onset climate-related hazards and an unknown number fleeing slow-onset environmental degradation, a changing climate presents pressing operational and geopolitical challenges to a number of states. Failure to adequately respond to these challenges generates types of population mobility which have severe implications for social wellbeing, human rights and even state stability.

- This report demonstrates that fragile and post-conflict states are particularly susceptible to the impacts of climate change. Pre-existing constellations of vulnerability in these contexts may lead to 'tipping points' where the influence of climate change on other drivers of instability spills over into crisis and conflict.

- The destabilising effect of climate change on fragile states could also aggravate or generate instability on an international scale by transmitting risk across borders. US military experts, for instance, consistently raise concerns that a failure to address the impacts of climate change in some regions might generate 'ungoverned spaces' – where the capacity of states to maintain security is fundamentally compromised – and provide fertile breeding grounds for armed non-state actors.[4]

- EJF acknowledges the commitments made by the global community to mitigation and adaptation under the Copenhagen Accord. Nevertheless, further and urgent action is needed to ensure the prevention of conflicts related to climate change. In particular, EJF urges governments to deliver 'linked-up' policies on the environment, human rights, development, migration and peacebuilding. EJF recalls the findings of the Stern Review, which highlighted that investment in climate mitigation equivalent to 2 per cent of global GDP is preferable to the huge future costs to economic productivity anticipated as a result of climate change.[5/6] Similarly, EJF emphasises that investment in mitigation now is also investment in a safer and more secure future for vulnerable people across the world.

- The international community must recognise that climate change is a human rights issue as much as an environmental issue. The linkage between climate change and conflict is one of the clearest examples of this fundamental interrelationship between the environment and human rights. EJF urges the United Nations Human Rights Council (UNHRC) to take positive action to safeguard rights under threat in the world's most vulnerable countries by instating a Special Rapporteur on Human Rights and Climate Change.

# INTRODUCTION

As the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report reiterates, the environmental impacts of anthropogenic climate change are becoming increasingly apparent.[7] Each recent decade is warmer than all those proceeding it since 1850, ice is now melting at a rate six times faster than during the 1990s and rainfall patterns are becoming increasingly erratic. Large swathes of agricultural land and crucial sources of freshwater are being contaminated by saltwater intrusion. Sea-levels are rising, warming and becoming more acidic – transforming the coastal and marine ecosystems which constitute some of the world's most productive regions. At the same time, some extreme weather events such as droughts are becoming more intense and frequent.[8] Over the next century, catastrophic levels of global environmental change are within a defined realm of possibility.[9]

As these changes unfold, they amplify existing environmental, social, economic and political pressures.[10/11] The result has been, and will continue to be, tangible and severe human impacts: declining agricultural productivity and food insecurity, the collapse of livelihoods, increased poverty and hunger, deteriorating water security, public health crises, loss of assets and lives at risk. Many of these impacts obstruct processes of development and undermine the viability of national and international governance systems. Consequently, climate change both directly and indirectly threatens the effective realisation of human rights.[12/13]

In 2014, the IPCC's Fifth Assessment Report section on impacts, adaptation and vulnerability featured, for the first time, chapters dedicated to the security implications of climate change.[14] It concludes that climate change will generate new challenges to states and will "increasingly shape both conditions of security and national security policies." In particular, it finds that: slow- and rapid-onset environmental changes have significant impacts on forms of migration that compromise human security; that climate change negatively affects many of the factors that increase the risk of civil war and other armed conflicts; that climate impacts will create contested claims to resources, particularly transboundary water basins, causing geopolitical rivalry; and that climate change will affect the capacity, integrity and in some cases the viability of states.

**climate security, resources, water, extreme weather, displacement, scarcity, violence, instability, mitigation, human rights, cooperation, risk, adaptation, crisis**

> *I frequently find myself watching my grandchildren and wondering what sort of a future we are leaving them. For their sake, climate change is an issue that I will continue to talk about for as long as I have breath in my body.*

President Tong of Kiribati
at the United Nations General Assembly[15]

The impacts of climate change are being felt most acutely in arid, mountainous and low-lying coastal regions of less-developed countries where exposure to rapid-onset hazards and slow-onset changes are the most pronounced, sensitivity is high and there is limited capacity to adapt. These regions and countries are home to 98 per cent of the seriously affected people, over 90 per cent of the total economic losses and 99 per cent of all deaths from climate- and weather-related disasters alone.[16] In short, it is the world's poorest who are first and worst affected by climate change – as a 2013 report from the World Bank reiterates.[17] Perversely, many of these countries have the lowest cumulative greenhouse gas (GHG) emissions on record. Industrialised countries have historically emitted over three-quarters of all global carbon dioxide.[18] The country with the least emissions, Kiribati, has emitted a mere 0.0007 per cent of the United States's GHGs during the two decades 1990-2010 – yet the impacts of climate change threaten its existence as a state.[19]

Such facts serve as a reminder that the transformation of our global environment is inherently linked to issues of climate justice: equity, responsibility and collective rights. When Yoweri Museveni, President of Uganda, declared climate change to be an "act of aggression" perpetrated by the rich against the poor it proved a divisive statement.[20] Although polemic, his statement indicates conflict as an important interface between the environment and human rights and reflects the increasingly prominent framing of climate change as a security threat. 'Climate security' has brought environmentalists and militaries across the world into a unique accord: both are concerned by the effects that climate change does and will have on existing situations of insecurity. For military forces, who are often deployed to the frontlines of natural disasters and are usually the leaders of national and international peacekeeping efforts, the uncertainty surrounding the relationship between climate change, security and conflict warrants urgent international attention.

Cyclone Nargis displaced 800,000 and caused an estimated $4 billion worth of damage. Underdeveloped, fragile countries like Myanmar are the first and worst affected by climate change.
© UNICEF/Adam Dean

> *Sticking your head in the sand might make you feel safer, but it's not going to protect you from the coming storm.*

US President Barack Obama[21]

This report is one of a series by EJF that explores why there is an urgent need for climate change mitigation and adaptation efforts embedded within a framework that recognises climate change as both a human rights issue and an environmental issue. In it, EJF examines the extent to which institutions committed to safeguarding human and national security are incorporating climate change as an important factor into their analyses. This report argues that climate change can and does undermine human security and that it also contributes to intra- and inter-state insecurity. Using country case studies, it considers some of the ways through which climate change may cause instability and how these may contribute to the generation or escalation of conflict at local, national and international levels. It stresses that the rapid incorporation of climate change into global security agendas indicates high-level support for the urgent prioritisation of climate change as an international issue affecting individual and collective wellbeing, security and human rights.

Finally, this report underscores the significant human, economic, social and environmental costs that will be incurred as a result of our continued collective failure to mitigate climate change. In 2006, Sir Nicholas Stern stressed that mitigation "must be viewed as an investment, to avoid the risks of very severe consequences in the future."[22] A recent report from DARA and the Climate Vulnerable Forum calculates that, together, climate change and our carbon-intensive economy annually result in 4.9 million deaths and net reductions in world output equal to 1.6 per cent of GDP (or US$1.2 trillion).[23] Accounting for these negative externalities, they estimate that decadal investments in mitigation measures equal to 0.5-1.5 per cent of global GDP would result in net returns of 1 per cent through to 2100. EJF are in agreement with a 2013 letter to Congress from leading US security experts, which notes that investment in mitigation now is an investment in saved lives, prevented conflicts and greater wellbeing in the future.[24]

Governments must begin to deliver policies that explicitly address the linkages between environmental sustainability, human rights, migration, development and conflict prevention. At the international level, EJF urges the UNHRC to instate a Special Rapporteur on Human Rights and Climate Change based on the fact that the principal barrier to a comprehensive realisation of the true costs of climate change lies in the international community's reluctance to view climate change as a human rights issue as much as an environmental issue.

# A CLIMATE OF CONFLICT

Climate change poses a major threat to both human and national security. The UK government has described climate change as potentially constituting the "greatest challenge to global stability and security, and therefore to national security".[25] A 2013 report from the American Security Project highlights that 71 per cent of countries view climate change as a key national security issue whilst the world's top military spenders – with the notable exception of China – have begun to develop new strategic approaches to addressing the impacts of climate change.[26/27] These countries include the UK, the US, Russia, Japan, France and Germany.[28/29/30/31/32/33] Changing perceptions are motivating important international actors to debate climate change as a security issue. In 2013, at the 68th Session of the UNGA, European Union priorities include pursuing "climate diplomacy for conflict prevention".[34] Climate security has similarly been the subject of several debates within the UN Security Council as well as a UNGA resolution.

In 2009, an alliance of Pacific island states successfully tabled resolution 63/281, 'Climate change and its possible security implications', in the General Assembly.[35] It urged the UN and its bodies to intensify efforts to address the security challenges of climate change and asked the Secretary-General to submit a comprehensive report at the next session. This was an historic moment, as it was the first resolution that the Pacific coalition had drafted and the first time Member States agreed, by consensus, on the link between climate change and security. It reaffirmed the United Nations Framework Convention on Climate Change (UNFCCC) as the central, guiding framework for all coordinated action on climate change, but added that primary responsibility for the maintenance of international peace and security rested with the Security Council.[36]

Despite this affirmation, the extent to which the Security Council has a mandate to discuss or act on climate change has provoked heated debates. Whilst tentatively recognising that climate change 'could' affect security, China – backed by Russia as well as several other emerging economies and less-developed countries – has argued that the Council is not the appropriate forum to discuss climate change.[37] In 2013, a Security Council session addressing climate change was conducted informally as a result of pressure from China and Russia.[38] Smaller states meanwhile argue that the deleterious and life-threatening effects of climate change are at the very least comparable to the impact of warfare. An alliance of small island states has called on Council members to express solidarity with vulnerable countries by "formally recognizing that climate change is a threat to international peace and security".[39]

**Over 70%**
**of countries view climate change as a national security issue**

Source: American Security Project (2013)

The question of whether the UN Security Council should have any involvement in climate change is hotly contested amongst the international community. © UNGermany

The small island states have been supported by countries from the EU as well as the US and Japan, who have noted that although the anticipated timeframe for responding to climate change is different from that for armed conflict, climate change does have indirect adverse effects on security that must be addressed. They underscore the particular threat of rising seas to small island states, as well as the potential for dispute over territorial waters and the increased vulnerability of coastal areas to natural hazards, arguing that where instability occurs there is a heightened risk of conflict.[40] Consequently, many states support the contention that, as it falls within the Security Council's mandate to prevent conflicts, it is the duty of the Council to consider appropriate courses of action in response to the impacts of climate change.[41]

> *"The pressures caused by climate change will influence resource competition while placing additional burdens on economies, societies, and governance institutions around the world. These effects are threat multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political instability, and social tensions."*

US Quadrennial Defense Review Report, 2014[42]

# Understanding Environmental Security

Security as a concept is often interpreted in two different ways. It can refer to national or state security, which generally emphasises a military perspective, or it can relate to human security, which sees individual people as the subject of security studies. Climate change and the environment have long been looked at from both perspectives.[43/44] EJF acknowledges the ongoing academic debate concerning the nature and scope of environmental security as a concept. Nevertheless, the idea that climate change has human and national security implications has become embedded within the policy discourses of many countries.

Influential strategic policy documents which reference climate change, such as the US Department of Defense's 2010 Quadrennial Defense Review, can translate into potentially dramatic shifts in the way national resources are allocated – as the Department's 2013 Climate Change Adaptation Roadmap and a 2013 Executive Order from President Obama demonstrate.[45/46/47] Consequently, this report responds to the need to address the accelerating sense of urgency with which many security institutions regard the issue of climate change and how they interpret its implications for human, national and global security.

Some commentators note that the increasing attention which security institutions, particularly the military, afford climate change may result in undesirable outcomes.[48/49/50] Concerns tend to address the fact that militaries themselves have significant negative environmental impacts and substantial GHG emissions and question whether military and security institutions are suited to addressing the underlying social and economic factors driving climate change. They also highlight the opportunity costs associated with funding military expenditure versus direct climate change mitigation.

Framing matters in national security terms may not necessarily always facilitate progressive change: invoking 'threats beyond borders' ignores the role of domestic policy in creating climate insecurity and 'securitised' discourse can just as easily translate into crusades for energy independence as calls for multilateral emissions reductions. EJF does not view any future militarised response to climate change as a positive or productive development. It does, however, recognise that failure to sufficiently engage with climate change as a security issue now may necessitate the involvement of the world's militaries in future situations of conflict driven by climate change.

# AN EMERGENT THREAT TO SECURITY

Climate change is of increasing interest to security institutions – both state (military, intelligence agencies, etc) and non-state (think-tanks, policy research groups, private analysts, etc). In 2004, when chief scientific advisor to the UK government, Sir David King, warned that climate change posed a greater threat than terrorism, US President George W. Bush demanded that he be gagged.[51] Less than a decade later, a stream of publications from high-profile US security institutions has directly challenged the political atmosphere of climate change scepticism in the US and has brought leading security analysts into conflict with members of Congress.[52/53/54/55/56/57/58]

In many countries, the acknowledgement of climate change as a security issue is linked to the recognition that an increasingly globalised world presents new and complex challenges such as the reliable supply of energy, the stability of international economic markets and the prevalence of terrorism and transnational crime.[59/60] Understanding climate change as both a human rights and an environmental issue highlights not only the interconnectedness of security threats and risk but also the interdependence of nation states in the post-Cold War security landscape. In an increasingly integrated global system, contagion spreads with unprecedented speed and scale, as the 2008 financial crisis and H1N1 flu pandemic evidence. Climate change may well open avenues for local insecurities to act upon the international stage: human and national security have therefore become issues with international scope.

At the highest levels of government, the crossover between security and climate change is becoming increasingly apparent: in 2013, former Commander of the UK's Maritime Forces, Rear Admiral Neil Morisetti, was appointed as Special Representative for Climate Change, or the country's 'international climate ambassador'.[61] Military analysts, intelligence advisors and policymakers in strategic and security circles are all actively engaging with climate change as a security issue. Academic scholarship meanwhile continues to explore and untangle the complex pathways linking environmental change and conflict, with considerable disagreement amongst scholars over the same issues: lively debate exists, for example, as to whether climate change exacerbates the risk of civil war in Africa or is a poor predictor of conflict.[62/63] A 2013 study incorporating psychological and historical data into a synthesis of quantitative research addressing the influence of climatic variables on conflict, worryingly concludes that by 2050 instances of interpersonal violence and intergroup conflict will increase by between 8-16 and 28-56 per cent respectively.[64]

There is considerable variation to the ways in which security institutions are engaging with climate security. Militaries are becoming increasingly concerned with the operational challenges climate change presents. Whilst the US Navy Seals and the Army have their sights set on becoming carbon-neutral, recent US Department of Defense policy is targeting climate change adaptation as a cornerstone of operational success.[65/66]

> *We recognise climate change as a contributing factor in increased economic and security risks globally. The G8 has agreed to consider means to better respond to this challenge and its associated risks, recalling that international climate policy and sustainable economic development are mutually reinforcing.*

Lough Erne G8 Leaders Communique[67]

> *Tackling climate change urgently, through mitigation and adaptation measures, is not only an environmental imperative but also, fundamentally, a necessary condition for peace and security, development and prosperity.*

Council of the European Union[68]

> *...whether you're from Australia or Bangladesh, South Africa or Japan, your presence here today speaks to the seriousness of the climate security agenda. For governments, the risks are clear: to development, to democracy, and to peace itself. We cannot afford to ignore them.*

UK Secretary of State for Energy and Climate Change Ed Davey[69]

From the US to Bangladesh, governments are positioning their armed forces as essential components of national response mechanisms to the periods before, during and after climate change-related disasters.[70/71]

At the other end of the spectrum, security institutions dedicate considerable resources to investigating the strategic, geopolitical implications of climate change. Whilst such implications are obviously uncertain, security as a discipline is largely focused on the assessment and management of risk. Therefore security institutions, much like climate scientists, are concerned with the full range of potentialities – rather than discarding some as implausible and thus irrelevant. In the broadest sense, this means looking at climate change as a 'threat multiplier' or a vector for the transmission of risk in existing situations of instability.[72]

Climate change is often described as a threat multiplier, a way of implying that it is akin to an aggravator of the underlying social, economic, demographic, political and environmental causes of conflict.[73] It amplifies both existing and emergent pressures – such as high population growth, resource scarcity, poverty and poor governance – and can create tipping points whereby states are 'pushed' over critical thresholds and erupt into instability and conflict . This kind of logic is already apparent in analyses of many climate-vulnerable countries – the International Organization for Migration, for example, identifies the risk of a destabilising 'cascade effect' in Bangladesh resulting from the influence of climate change on environmental degradation, urbanisation, human insecurity and migration.[74]

The complexity of the climate system itself presents novel security challenges, which both policymakers and analysts risk overlooking should they fail to appreciate the security implications of climate change. In 2010, for instance, the devastating floods in Pakistan – which left 1.5 million displaced and consolidated the Taliban's hold on Balochistan, the Sind plains and Khyber Pakhtoonwa – were caused by the same meteorological event which precipitated the worst Russian drought in half a century and wildfires which wiped out an estimated 30 million tonnes of grain production.[75/76/77] Emerging research is beginning to suggest that the intensity and duration of these kinds of extreme weather events – blocking abnormalities in atmospheric jet streams – may be linked to both natural and human factors, such as Arctic ice loss, resulting from anthropogenic climate change.[78/79/80] Whilst the global spate of record-breaking extreme weather in the first quarter of 2014 prompted the World Meteorological Organization to declare that such events are fundamentally interlinked, top science advisors in the UK and US have cautiously attributed such extreme weather events to climatic change.[81/82/83]

As mentioned, the interconnectedness of modern economic, political, social and cultural systems allows for the effective and rapid transmission of global 'pathogens' or crises – the international trade in illicit narcotics, for instance, already demonstrates how, under the right conditions, market forces alone transmit instability and violence across producer, transit and consumer countries.[84] Framing climate change as a security issue provides a valuable way of linking together the various challenges posed by climate change across multiple scales – from the household and individual levels up to the regional and international. By exposing interrelated threats to scrutiny,

Hurricane Sandy demonstrated that no country is immune to the destruction wrought by extreme weather events.
© Scott Whiting

this process of 'linking-up' enables a wider dialogue between governments, militaries, donors and civil society that feeds back into policy processes on development, human rights, climate change adaptation and disaster risk reduction. It also provides much-needed information regarding how stakeholders can work collaboratively on conflict prevention and governance-building activities.[85]

Understanding the complex relationship between climate change and conflict is a crucial part of planning and preparing for the impacts of climate change. It is also of particular benefit to many stakeholders because it constitutes the foundations of policymakers' ability to employ detailed analyses for the identification of specific regions and dynamics that may be destabilised by climate change. Some climate security analysts seek to identify coherent future scenarios in which environmental stressors might reasonably be expected to generate or exacerbate conflict.[86/87] Several institutions have plotted potential and emerging conflict 'hotspots', and there is general agreement that the risks of climate-related insecurity are concentrated in Africa and Asia – which climate change models also indicate are most vulnerable to the impacts of climate change.[88/89] This is a projection supported by historical trends: nearly three-quarters of all armed conflicts between 1946 and 2011 took place in these two regions.[90]

Scenario-based projections necessarily lack any degree of certainty. What they do contribute, however, is a comprehensive assessment of the different ways which climate change can jeopardise security as well as a consideration of the intervening and interrelated factors which affect the likelihood of insecurity arising. This is exactly the kind of treatment that climate change necessitates as a result of the pervasive nature of its effects, which is to say that it is the insidiousness of climate change which demands that it be held up to scrutiny under a full spectrum of potential security scenarios. As Lord Stern reiterated ahead of the release of the IPCC's Fifth Assessment report in 2013: "It would be absurd to say you are confident that the risks are small."[91]

*Climate change can now be considered another weapon of mass destruction, perhaps the world's most fearsome weapon of mass destruction.*

US Secretary of State John Kerry[92]

*Climate change is every much a security threat as an armed group bent on plunder.*

United Nations Secretary-General Ban Ki-moon[96]

*I believe that climate change is one of the most serious threats that this country and this world faces.*

UK Prime Minister David Cameron[93]

*Sticking your head in the sand might make you feel safer, but it's not going to protect you from the coming storm.*

US President Barack Obama[97]

*...unless action is taken soon some islands won't make it to the end of the century.*

President Baron Waqa of Nauru[94]

*Those who bear the burden of the impacts are the most vulnerable living the most challenging lives... We are at war; a war we cannot afford to lose.*

Philippines Climate Change Commissioner Naderev "Yeb" Saño[98]

*[Climate change] is a critical issue for the survival of our people and for all humanity. It remains the greatest moral challenge of our time.*

President Anote Tong of Kiribati[95]

*[Climate change] threatens our wellbeing, security and economic development. It will lead to uncontrollable risks and dramatic damage if we do not take resolute countermeasures.*

Chancellor of Germany Angela Merkel[99]

# SCARCE FUTURES: Climate Change and Natural Resources

The most clearly recognised link between the environment and conflict is through natural resources, particularly water, and the large number of resource-related conflicts throughout history seems to evidence this. At least 40 per cent of all intrastate conflicts in the past 60 years have a link to natural resources and more than 18 violent conflicts have been fuelled by the exploitation of natural resources since 1990.[100/101]

In many cases, these historical conflicts have centred on resource abundance – or the acquisition and trade of resources with a high market value – which has subsequently played an important role in financing and sustaining conflict. In others, conflicts have broken out and peacebuilding efforts have been undermined by environmental scarcity – particularly of land and water – in areas where there is significant economic and social dependence on natural capital. In a small number of cases, conflicts emerged as a result of economic scarcity when the ability of groups or populations to secure access to natural capital was undermined or obstructed by others. Climate change primarily impacts on the latter two routes to instability: environmental and economic scarcity.

**US$ 35 billion**

**The amount the UN has spent deploying peacekeeping operations to conflicts involving natural resources**

Source: UNEP (2011)

Driven by population growth and rising per-capita incomes, today's global demand for natural resources is unprecedented and set to increase as the world's population grows to an estimated 9.6 billion by 2050.[102] In 2013, Earth Overshoot Day – which annually marks the date when humanity has exhausted its 'budget' of natural capital for the year and moves into ecological 'deficit' – was 20 August and the date has been steadily arriving earlier and earlier year on year for the last few decades.[103] Rising demand will contribute to local, national and regional scarcities of both renewable and non-renewable resources already exacerbated by the deleterious effects of climate change and a carbon-intensive economy. Never before has a clear understanding of the relationship between environmental change, resource availability and conflict been so important.

In areas where the abundance of natural capital is deteriorating as a result of climate change, environmental scarcity could lead to crises of availability which might cause some actors to perceive violence as the best alternative to other actions. For instance, climate-related water scarcity in the Horn of Africa has long generated conflicts between pastoralist and agrarian communities – which are now exacerbated by political transitions and the degradation of grasslands.[105] Ecological regions vulnerable to climate change straddle multiple human societies, which can increase the potential for conflict: transboundary river basins and underground aquifers are particularly clear examples of this kind of potentially unstable co-dependency.

> *"Pressure on resources, climate change, population increases and the changing distribution of power are likely to result in increased instability and likelihood of armed conflict."*
>
> UK Ministry of Defence[104]

In Myanmar, natural resources have ignited and fuelled brutal conflicts for decades. © Rusty Stewart

Rainfall variability and drought have long caused resource-related conflicts between pastoralists and settled communities across arid regions of Africa. © IFRC

In societies where the uneven distribution of resources and services is already an issue, climate change may exacerbate inequalities and cause crises of accessibility which can lead to instability and conflict. Particular groups within societies, because of their social, ethnic, linguistic or religious characteristics, often experience forms of discrimination and marginalisation that restrict their access to natural resources and which can provide fertile breeding grounds for intrastate conflicts, particularly between groups of different ethnicity.[106]

The UK Ministry of Defence asserts that in contexts of poor governance, rapid population growth and ineffective resource management, climate change has a high likelihood of generating conflict.[107] Clearly there is a real need to improve our understanding of how climate change affects the availability and accessibility of natural resources in particular regions. This research should form a foundation for action that enables collaborative rather than competitive approaches to resource management and protection in areas where types of natural capital are scarce. Strategies to secure access to resources which resemble 'ring-fencing', or the use of force to privilege some groups over others, risk violating the basic human rights of vulnerable populations. In such cases, international and regional legal frameworks should focus on protecting the rights of individuals to secure access to the resources which are essential to their lives, livelihoods and psycho-social wellbeing.

**At least 40% of all intrastate conflicts in the past 60 years have a link to natural resources**

Source: UNEP (2009)

# A New Cold War?

On 27 August 2012, summer ice in the Arctic shrunk to the smallest extent on record – almost half that of its average during the 1970s.[108] A significant proportion of the accelerated Arctic melt is a result of feedback mechanisms and the concentration of warming effects at the Earth's poles.[109] Recent studies suggest that trans-Arctic shipping routes will be viable by mid-century.[110] The opening up of the Arctic presents new opportunities for the commercial exploitation of oil, gas, coal, iron, diamonds and copper, as well as shipping and fishing routes which could bring Arctic countries into competition.

A 2012 US National Academy of Sciences report envisages one such scenario: polar states develop assertive national postures, becoming concerned with the protection of what they perceive to be their core interests in the region, rebuild their military capabilities and reform old or create new defensive partnerships.[111] The current claimants to the Arctic are Russia, Norway, Iceland, Denmark, Canada and the United States – but even China, a 'near-Arctic state' according to its own definition, has strong strategic interests in the region and has recently secured observer status in the Arctic Council.[112]

Russia's claim over the Lomonosov ridge – likely home to several billion barrels of Arctic oil – by a flag-planting submarine expedition in 2007 aggravated existing disputes between itself and fellow claimants Canada and Denmark. The vast majority of Arctic resources, however, are within agreed national boundaries, whilst an eagerness to start profiting from exploitation, as well as the high costs of operating in the region, incentivise cooperation and conflict resolution.[113] A 2013 American Security Project report calculates that a de-militarised Arctic is essential in an increasingly accessible region rich in opportunities for the exploitation of resources.[114]

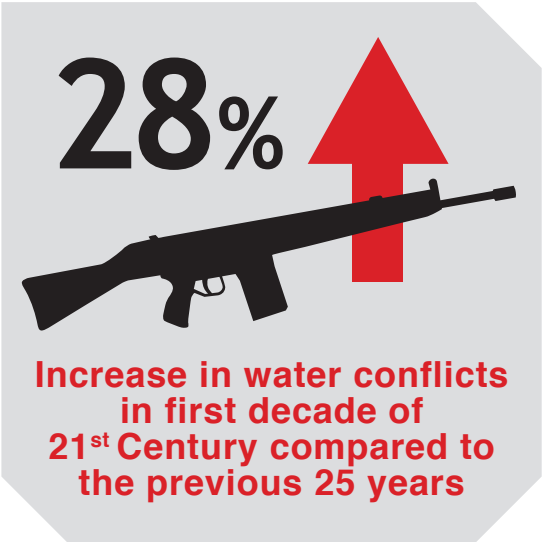
However, the greatest Arctic security threat may not be human at all. The presence of huge amounts of subsurface methane, a greenhouse gas with 25 times the potency of carbon dioxide over a 100-year period, presents a real risk of vastly accelerating global climate change.[115] Polar warming is already melting the permafrost which locks in this methane, causing it to escape into the atmosphere at an alarming rate.[116] Recent research places the economic benefits of a race for Arctic resources in stark contrast to the global economic costs of a large release of Arctic methane over several decades which are calculated to total US$60 trillion.[117]

> *Throughout human history, mankind has raced to discover the next frontier. And time after time, discovery was swiftly followed by conflict. We cannot erase this history. But we can assure that history does not repeat itself in the Arctic.*

US Secretary of Defense Chuck Hagel[118]

**Arctic ice is melting at an unprecedented, alarming rate and presents new challenges to geopolitical and climate security. © Patrick Kelley**

# UNDER FIRE OVER WATER: Conflict and Water Scarcity




Source: UNEP (2013)

> *Water scarcity could have profound implications for security.*
>
> Hillary Clinton, former US Secretary of State[123]

Some of the most severe impacts of climate change will be on freshwater resources.[119/120] Mass losses from glaciers and reductions in snow cover over recent decades are projected to accelerate throughout the 21st Century, reducing water availability, hydropower potential and seasonal river flows for the one-sixth of the world population living in regions supplied by meltwater from major mountain ranges. Rainfall variability and declining groundwater recharge will exacerbate drought in already water-stressed regions, while ground and surface water stores in low-elevation coastal zones and river deltas – home to two-thirds of the world's large cities with populations over five million – will be threatened by saltwater intrusion from rising sea levels and extreme hydro-meteorological hazards.

An estimated 1.4 billion people inhabit river basins where water use already exceeds the minimum rate of recharge and a quarter of the world's population face severe water shortages for at least one month of every year.[121/122] In regions already suffering acute water stress, a changing climate entails radical implications for a number of sectors including agriculture, city planning, energy production, public health and sanitation. Despite the achievement in 2010 of the Millennium Development Goal (MDG) target of improved water access for 88 per cent of the world's population, huge numbers of people still lack access to safe drinking water and sanitation. With freshwater withdrawals for irrigation accounting for some 70 per cent of global freshwater use, climate change-related food insecurity from production bottlenecks or inefficient agricultural markets constitutes a real threat.

For example, rapid depletion of the driving force behind the US agricultural revolution – the Ogallala aquifer – not only threatens the Midwest breadbasket but international food security as well.[124/125] Declining supplies of freshwater as a result of climate change will also interact with complex pre-existing issues. In Yemen, for instance, where Sana'a could become the first capital city to run out of water, the effects of saltwater intrusion into groundwater supplies are exacerbated by the pumping of water out of underground aquifers to cultivate *qat* – a popular but illegal narcotic.[126]

There has not been a conventional interstate war directly attributable to water – although some suggest that control over the Jordan River basin was a major factor in the Arab-Israeli Six-Day War of 1967.[127/128] There have, however, been hundreds of incidences where water was a major generator, strategic feature and objective of conflict.[129] One influential study observes that "water resources can make good relations bad and bad relations worse" but highlights the fact that, as the majority of international interactions relating to transboundary water resources have been cooperative, institutional and governance contexts play a major role in mediating situations of potential conflict.[130]

Nevertheless, water scarcity has historically coincided with outbreaks of violence and instability – it played a central role in the collapse of the Anasazi and Mayan civilisations, among others.[131/132] Water scarcity can be considered one of the principal factors influencing the outbreak of conflict in some contexts.[133] From the low-intensity 'water wars' between the city of Los Angeles and Owens Valley farmers in the early 20th Century to the civil unrest in 2000 surrounding the use and allocation of water from Baiyangdian Lake in China, inadequate supplies of clean freshwater for drinking, agriculture and energy production have led to political instability and, in some cases, outbreaks of violence throughout modern history. For the years 2000-2012, 88 per cent of the events listed by the Pacific Institute's chronology of water conflicts have involved violence.[134] Quantitative research indicates that the El Niño Southern Oscillation (ENSO) – which causes inter-decadal climate variability across many regions of the world – is associated with 21 per cent of conflicts in the years 1950 to 2004.[135]

In a context of climate change, energy production introduces a unique stress on water security. On the one hand, many less-developed countries favour hydroelectric dams as sources of renewable energy and as alternatives to coal and gas power. Damming, however, captures the sediment load of rivers and has implications for agricultural productivity and food security downstream, as well as accelerating processes of coastal erosion. More worryingly, as huge infrastructure projects, hydroelectric dams always create significant numbers of displaced people, which often generates intense conflicts.[136] Sometimes these conflicts spill over into violence. China's dam projects within Myanmar have fuelled conflict and displacement: its Myitsone dam project has been a central point of contention driving the ongoing low-intensity civil war in Kachin state.[137]

Not enough action is being taken to prevent future conflicts over water resources. Since the start of the 21st Century, a growing proportion of conflicts over water resources are being driven by tensions related to joint management and infrastructure but there is a global lack of cooperation over shared water resources: 60 per cent of transboundary fresh water resources have no cooperative management systems in place and, for those that do, less than 20 per cent have established multilateral agreements.[138] Shared water sources and competing demands have been a source of tension between upstream and downstream communities throughout history. Disputes are likely to increase given that climate change exerts extra pressure on water resources, as the case of the Amu Darya river basin in Central Asia demonstrates.

> *As water demand for food production and electricity generation increases, in part as a result of the quickening pace of climate change, so too must our efforts to provide water security.*

US Secretary of State John Kerry[139]

## When Rivers Run Dry

Central Asia's Amu Darya river basin extends across Uzbekistan, Turkmenistan, Afghanistan and Tajikistan. Under the USSR's central planning, the Amu Darya river system became the focus for an extensive irrigation system that covered 70,000 km$^2$ by 1980.[140] In the post-Soviet period, water withdrawals are governed by four governments, each intent on pursuing their own national interests. Despite the establishment of the Interstate Coordinating Water Commission (ICWC) – under which states agreed to retain the Soviet system of water allocation – tensions over water run high.[141]

Turkmenistan and Uzbekistan, water-hungry downstream states, consume some 85 per cent of the ICWC withdrawal quotas, despite most of the Amu Darya's water forming upriver in Tajikistan. Governments routinely accuse one another of breaching water quotas and localised pockets of armed violence and threats have already occurred: in 2001, Uzbek troops reportedly used force to gain control of water installations across the border in Turkmenistan.[142/143] When Uzbekistan halted gas exports to Tajikistan in 2012 in retaliation for the Rogun dam development, it crippled the country's heavy industries.[144] Later in the year, Uzbek President Karimov stated that mega-dam projects could result in "not just serious confrontations, but even wars".[145] The Economist reports that Uzbekistan has even mined parts of the Uzbek-Tajik border, unilaterally closed all checkpoints and may have been implicated in the 'terrorist' detonation of an Uzbek railway bridge in 2011 which wiped out southern Tajikistan's rail network.[146] Despite the halting of Uzbek gas, yet again, in early 2013, Tajik president Emomalii Rahmon appears steadfastly committed to the Rogun` dam-building project.[147]

Climate change looks set to exacerbate insecurity in the region. As the glaciers of the Pamir mountain range which feed the Amu Darya continue to melt, water inflows will initially increase and then dramatically decrease.[148] It is likely that Tajikistan will need to increase its dam reserves to safeguard its energy and water needs – an action which poses a direct threat to Uzbek livelihoods, the economy and the country's ability to support major cities such as Qarshi.[149]

Both the EU and the US Senate have acknowledged the security threat. The European Council and the European Commission concluded that water management has become the most sensitive environmental issue in Central Asia and that failure to address it could develop into "a serious security threat for the entire region in the medium term".[150] Meanwhile, a majority staff report prepared for the Committee on Foreign Relations in the US Senate, warned that "the impacts of water scarcity are fuelling dangerous tensions that will have repercussions for regional stability and US foreign policy objectives".[151]

# ...Not a Drop to Drink

In the third millennium BC, the kings of Lagash cut off water supplies to their rival Umma in a violent border dispute.[152] There are a further 261 examples of the threatened or actual use of water as a weapon or political tool during the intervening thousands of years.[153] In 2011, the European Union's Humanitarian Office claimed that pro-Gaddafi forces in Libya had deliberately shut off water to the capital, Tripoli.[154] As mentioned, crises of accessibility can potentially lead to instability and conflict – particularly when they are concentrated amongst specific groups within a society and exclusionary in nature. A recent report from the US Office of the Director of National Intelligence similarly warns that over the coming decades countries are expected to increasingly instrumentalise water supplies as leverage in order to "pressure populations and suppress separatist elements".[155] A senior US intelligence official has been quoted as saying that "as water problems become more acute, the likelihood. . . is that states will use them as leverage".[156] Recent studies have already observed an increased incidence in the threatened or actual poisoning of water supplies over the last few decades.[157]

One common example is the Israel-Palestine conflict. Palestinian per-capita daily freshwater consumption is four times lower than Israeli use and below the World Health Organization standard.[158] In the West Bank, approximately 300,000 Palestinians are vulnerable to water scarcity – including 14,000 who are without any water infrastructure. Israeli settlers in the West Bank, by contrast, are serviced by Israel's national water authority and it is estimated that Israel consumes over 86 per cent of the West Bank's principal aquifer whilst controlling Palestinian extraction and prohibiting new wells.[159/160]

Limited access to freshwater does not always have to be in conflict situations in order to generate severe tensions and insecurity. In 2000, violent protests erupted in Bolivia's third largest city, Cochabamba, after a dramatic rise in water rates which priced impoverished citizens out of the market.[161] In the same year, privatisation of water supplies in South Africa led to a cholera outbreak which infected approximately 120,000 people.[162] Across the world, the blunt privatisation of water supplies by transnational companies penalises vulnerable sections of societies and sows considerable discontent.[163] That climate change could drive the commodification of increasingly scarce water resources by increasing their economic value is particularly worrying, given the role that poverty plays in generating and sustaining conflict.

> *As water shortages become more acute beyond the next 10 years, water in shared basins will increasingly be used as leverage; the use of water as a weapon or to further terrorist objectives also will become more likely.*

US National Intelligence Council[164]

**1 in 8 people worldwide lack a safe and clean supply of water. Increasingly strained water resources will see access to water being used as a means of control. © Tim Abbot**

# SEEKING SURVIVAL: Climate Change, Migration and Conflict

The Internal Displacement Monitoring Centre reports that in 2012 alone, 31.7 million people were displaced by climate- and weather-related events.[165] This is roughly triple the total number of legally-recognised refugees and people who live in refugee-like situations.[166] As we move forward into the future, climate change is expected to have major implications for human migration patterns, depending on the rate at which climate change mitigation measures are undertaken, the capacity of countries to adapt to changes and respond to hazards, and the future of national and international migration policies.[167] Recently, researchers have started to use the term 'crisis migration' to refer to the complex interactions between the multiple drivers of migration.[168] In this context, climate change has a multiplier effect on other drivers of population mobility and particular environmental events trigger displacement.

Generally speaking, people are likely to be temporarily displaced as a result of rapid-onset disasters or extreme weather events such as flooding, whilst slow-onset environmental degradation such as gradual declines in agricultural productivity generates longer-term, sometimes permanent, out-migration. Climate change already contributes to both migration and displacement.[169/170] The two major pathways through which climate change and migration can be expected to impact on conflict are via livelihoods impacts and on the intensity and/or frequency of extreme weather events.

Migration may be one of the simplest and most effective ways to build the resilience of communities whose livelihoods are curtailed or threatened by the impacts of climate change.[171] At the same time, however, movements can take many forms, including: rural-to-urban migration; short-term or labour migration; undocumented migration across borders; and forced displacement. Consequently, unmanaged and unanticipated movements of people generate both operational and geopolitical challenges. For less-developed countries that face widespread internal displacement as a result of climate change, the threat of becoming engulfed by humanitarian crises or under-resourced services in destination areas being overwhelmed and generating serious conflicts is very real. Other countries may have to reconcile the geopolitical conflict potential of cross-border movements with the necessity or desirability of out-migration from areas severely impacted by the deleterious effects of climate change.

> *"Climate change is today one of the main drivers of forced displacement, both directly through impact on environment – not allowing people to live any more in the areas where they were traditionally living – and as a trigger of extreme poverty and conflict."*
>
> António Guterres, UN High Commissioner for Refugees[172]

In 2008, the head of UNHCR, António Guterres, explicitly referred to the climate change-security-migration nexus when he stated that climate change was driving conflicts which were uprooting people from their homes.[173] Unfortunately, the links between climate change, migration and conflict are noticeably under-researched. Rafael Reuveny, a prominent US academic, has collated existing research and compiled a list of nineteen instances of large-scale

## Climate-related displacement in 2012

A Filipino boy carries supplies through floodwater. Over the last few years, storms and cyclones have displaced millions in the Philippines. © UNICEF Asia-Pacific

population movements in the 20th Century related to environmental or climatic changes which have resulted in violent conflict.[174] It includes high-intensity conflicts such as the Football War between El Salvador and Honduras in 1969, the Rwandan civil war and genocide of the early 1990s and the Somalian-Ethiopian Ogaden War and border disputes.

Other research focuses on the interaction between ecological dependence, poverty and conflict, suggesting that configurations of these factors shape the way in which civilians respond to economic and political threats and can create self-reinforcing cycles of 'unsafe' migration.[175] Studies focusing on refugee movements, meanwhile, demonstrate that forced displacement across borders can serve as a vector for the transmission of conflict to host regions as well as generating resource competition between displaced and host populations.[176/177] It is important, however, not to underestimate the role of social and institutional contexts in undermining human security and generating situations of conflict.[178]

The idea that people whose lives and livelihoods are severely affected by the impacts of climate change will abandon their homes and move to richer countries is overly simplistic. Given that migration decisions at the individual and household level are shaped and constrained by both financial and social resources, the burden of care for those displaced will overwhelmingly fall on less-developed countries.[179] Despite this, the idea of 'floods' of people overwhelming the borders of more developed countries has prompted many states to press for tighter immigration controls – a move that jeopardises existing protection regimes for those fleeing persecution.[180] This policy approach neither addresses the human rights implications of those affected by climate change nor fosters conditions that will enable social or economic development in countries of origin.

Enhancing the capacity of rural households to remain resilient in the face of climate change or adapt to its effects, increasing migration options at the policy level, bolstering the carrying capacities of urban centres, and reducing vulnerability to natural disasters offer the best means of assisting the countries that are first and worst affected by climate change in this respect. Ultimately, it is policy decisions that are made today which will determine whether migration is one amongst a range of adaptation options or a future necessity – as a matter of survival.

> *We do not carelessly call climate change a security threat. When we are told by scientists to prepare for humanitarian crisis, including exodus, in our lifetimes, how can it be different from preparing for a threat like war?*

Joan Yang, Deputy Permanent Representative to the United Nations for Palau[181]

# Stateless by Degrees

As sea levels rise, extreme hydro-meteorological hazards intensify, and coastal and marine ecosystems undergo accelerated degradation due to climatic change, low-elevation coastal zones are becoming some of the most vulnerable ecological regions in the world.[182] At particular risk from these changes and hazards are small island developing states (SIDS).

Research suggests that, regardless of mitigation scenarios, sea levels will continue to rise for centuries due to thermal expansion – making the catastrophic and literal disappearance of some SIDS inevitable.[183] It is certain that, long before submersion, many inhabitants of SIDS will be forced to flee shrinking freshwater supplies, disasters and decimated livelihoods. Stuart Beck, Palau's Permanent Representative to the United Nations, described SIDS as "in the red zone" whilst Philip Mueller, Foreign Minister of the Republic of the Marshall Islands, has labelled his country "ground zero".[184/185] Kiribati recently confirmed purchase of 6,000 acres of cultivable land in Fiji in the face of rising food insecurity – the land purchases had been rumoured to be for the purposes of population relocation.[186/187]

The threat to some SIDS is so severe that it undermines their very existence as sovereign nations – the most fundamental security of a state. The literal disappearance of states is unprecedented and its legal implications are uncertain.[188] A complete loss of territory or population is technically enough to challenge statehood itself but it seems that individual SIDS may well have to rely upon the willingness of other states to continue recognising a kind of 'government-in-exile' – and other states to host them.

Those forced to flee SIDS are out in the cold and completely unprotected by international law. They do not qualify as refugees under the 1951 Refugee Convention, and the 1954 Convention Relating to the Status of Stateless Persons was designed to respond to people denied a nationality by the actions of a state – not faced with the disappearance of one.[189] Their presence in countries of resettlement would be entirely dependent on the good grace – or whims – of host governments.

If SIDS governments managed to secure territory for the relocation of their citizens there is no guarantee that resettlement would respect the cultural, social and political rights of people to move with dignity, as community relocation in the Pacific has already demonstrated.[190/191]

Jurelang Zedkaia, President of the Republic of the Marshall Islands, has described relocation as an "undeniable threat knocking at our door... a threat that the international community is presently unprepared to address".[192] It seems that whatever else the future holds, climate change may well lead to the death of nations – and almost certainly the death of cultures.

In Kiribati, Toani Benson stands in the submerged ruins of a shop which used to sell him petrol. © Mike Bowers/The Global Mail

*When the President of a low-lying island nation is forced to confront these issues of sovereignty and political borders, of statehood, of defending the very shores of his nation, it should be self-evident and beyond question that climate change impacts pose a clear threat to international peace and security.*

Jurelang Zedkaia, President of the Republic of the Marshall Islands[193]

# A Disaster Waiting to Happen?

Bangladesh is consistently identified as one of the countries most at risk from the impacts of climate change. Changes to precipitation patterns and surface temperatures are leading to increasingly significant changes in runoff with upward and downward shifts as high as 40 per cent in some ecological regions. This will exacerbate the intensity of both flooding and droughts. Accelerated glacial melt exacerbates river bank erosion, whilst rising sea levels and creeping saltwater intrusion threaten cultivable land and communities throughout the country.[194] The fact that Bangladesh is the ninth most populous country in the world and one of the least developed means its capacity to assist and protect those displaced by the impacts of climate change is fundamentally constrained.

Bangladesh's Climate Change Strategy and Action Plan states that "millions" of people are at risk from climate-induced displacement.[195] These types of projections may be empirically unsound – but they reflect a very real underlying risk.[196] The consequences of sea level rise alone are dramatic: Bangladesh stands to lose 15,668 km$^2$ of coastline and 20.7 per cent of its land from a one-metre rise in sea level.[197] The funnel-like coastal geography of Bangladesh channels the tidal effects of cyclones straight into densely populated areas – the average loss of life for each of the fifteen major cyclones since 1960 exceeds 46,000.[198] The International Disaster Database, meanwhile, records that taken together the ten largest natural disasters in Bangladesh over the last 30 years have affected more than 260 million people.[199]

Bangladesh is a compelling example of a country where climate-induced displacement could generate both operational and geopolitical crises which exacerbate instability. Within Bangladesh, migration is an established and traditional risk-reducing strategy in a country where, during monsoon seasons, up to a third of the country can be inundated – households often send family members to nearby urban centres or agricultural areas to diversify household income streams and manage risk.[200] Field research, however, indicates that the additional strain of climate change is exacerbating conflicts over land in migrant sending-areas suffering from high salinity and fuelling tensions over water on coastal and river islands *(chars)*.[201] Conflicts are also arising in migrant receiving-areas – violence between local and immigrant communities over land, water and employment is a complaint voiced across Bangladesh from small villages to Dhaka.[202] Migration has already been linked to the emergence of violent conflicts within Bangladesh. During the latter half of the 20$^{th}$ Century, large-scale environmentally induced migration into Bangladesh's only highland area, the Chittagong Hill Tract, exacerbated the tensions which eventually erupted into two decades of armed conflict between the state and the Chittagong hill tribes.[203]

Multiple stressors could result in a cascading effect where environmental degradation, accelerated rural-urban migration and declines in human security all feedback to reinforce internal migration dynamics.[204] This could seriously impede state capacity to maintain food and water security, contain health crises, provide safe habitable spaces in urban areas and counteract loss of livelihoods – one former Bangladeshi general has even been quoted as saying: "Bangladesh's internal regions are already under stress.

> *Climate change is an unfolding physical phenomenon with very drastic and adverse environmental, economic, social and human consequences, particularly for Bangladesh.*

A. K. Khander, Chairperson, Bangladesh Climate Change Strategy and Action Plan[205]

The worst-case scenario for Bangladesh, which has been identified by military analysts in the US, is of state collapse".[206] Such statements remain, for now, in the domain of risk assessment, but research addressing the potential for migration to generate conflict does indicate, for instance, that "unstable urban and rural demographics are related to higher risks of civil war, and low-level communal conflicts during periods of environmental stress are common."[207]

Some researchers show how water and land scarcity in rural Bangladesh – in operation with other political and economic drivers – have historically caused cross-border migration into Northeast India and subsequently generated severe conflicts in migrant receiving-areas.[208/209] If future climate change has a sufficiently transformative effect on coping strategies in rural Bangladesh (such as temporary labour migration to cities), or if the capacity of the Bangladeshi state to 'rehabilitate' areas and populations affected by climate-related disasters becomes severely compromised, then increased cross-border movements to India may result. This could have serious implications.

Saltwater intrusion has decimated freshwater supplies and crop production in Southwest Bangladesh.
© Kumar Bishwajit

Children wade through the waters following Cyclone Aila to attend school in Chittagong. Without sufficient action, climate-induced displacement could destabilise the entire country of Bangladesh. © Jashim Salam /Marine Photobank

> *The gravest effect of climate change may be on human migration.*

Sheikh Hasina, Prime Minister of Bangladesh[210]

In a security briefing, the Bangladesh Institute of Peace and Security Studies outlines concerns that migration could spill over the Bangladeshi border and exacerbate tensions with India.[211] A Center for American Progress report emphasises that potential future changes to South Asian migration patterns must be seen within the regional and historical cultural, political, religious and ethnic contexts.[212] It recalls the rise of anti-immigrant violence in areas of Northeast India, particularly Assam, which resulted in over 7,000 deaths during the 1980s, concluding that "the political and social implications of even a modest increase or perception of increase in the number of immigrants across India's borders need to be taken very seriously."[213] Though it is hard to derive accurate statistics concerning undocumented migration, the Bangladesh-India flow has been described as one of the largest bilateral migration corridors in the world.[214] India has indicated that it sees immigration from its neighbour as a social and economic threat. Responding to this threat, it began constructing a fence to stem flows of smuggled goods, undocumented migrants and armed militants in the 2000s. As of 2007, over half of the border had already been sealed – human rights groups express ongoing concern at the Indian Border Security Force's excessive use of lethal force against Bangladeshi civilians.[215/216]

Local concerns regarding the delicate balance between India and Bangladesh are echoed within the wider security community. A report from the German Advisory Council on Climate Change, an independent scientific body, presents a 'fictitious confrontation scenario' based on a breakdown of disaster management in Bangladesh.[217] They predict that in a situation where stronger cyclones and tidal surges encounter poor disaster preparedness and governance systems, protracted local displacement could force people onwards towards the interior and borders. Internal frictions in non-coastal regions between Muslim immigrants and minority Hindu locals might re-ignite ethnic conflicts, whilst rampant undocumented migration to India could generate diplomatic and political tensions – potentially leading to Indian threats of 'humanitarian intervention'. A publication from the Henry L. Stimson Center, a US-based security think-tank, agrees that the future of Indian-Bangladeshi relations will depend, to a significant degree, on the extent of environmental impacts and the capacity of the Bangladeshi state to respond to the vast operational challenges that they present.[218]

# Deserted Livelihoods

Much like the desert itself, crises in the Western Sahel cut across political boundaries. The predominantly rural populations of this region's desert, semi-desert, savannah and savannah woodland ecologies are highly sensitive to rainfall variability and the periodic failure of agricultural and pastoralist livelihoods leads to widespread food insecurity. A 2011 UNEP report outlines in detail the role of climate change-induced livelihoods insecurity and natural disasters in impacting on existing migration patterns, pervasive conflicts and structural underdevelopment.[219]

Meanwhile, the links between a changing climate, the migration of pastoralists into agricultural areas and subsequent conflicts over land and water are well documented across the Sahel and the wider continent.[220/221] On a tour of the Sahel region, the former Special Advisor to the UN Secretary-General for Conflict Prevention and Resolution expressed particular concerns about the potential for climate change-induced migration and the availability of small arms and light weapons in the region to amplify conflicts.[222]

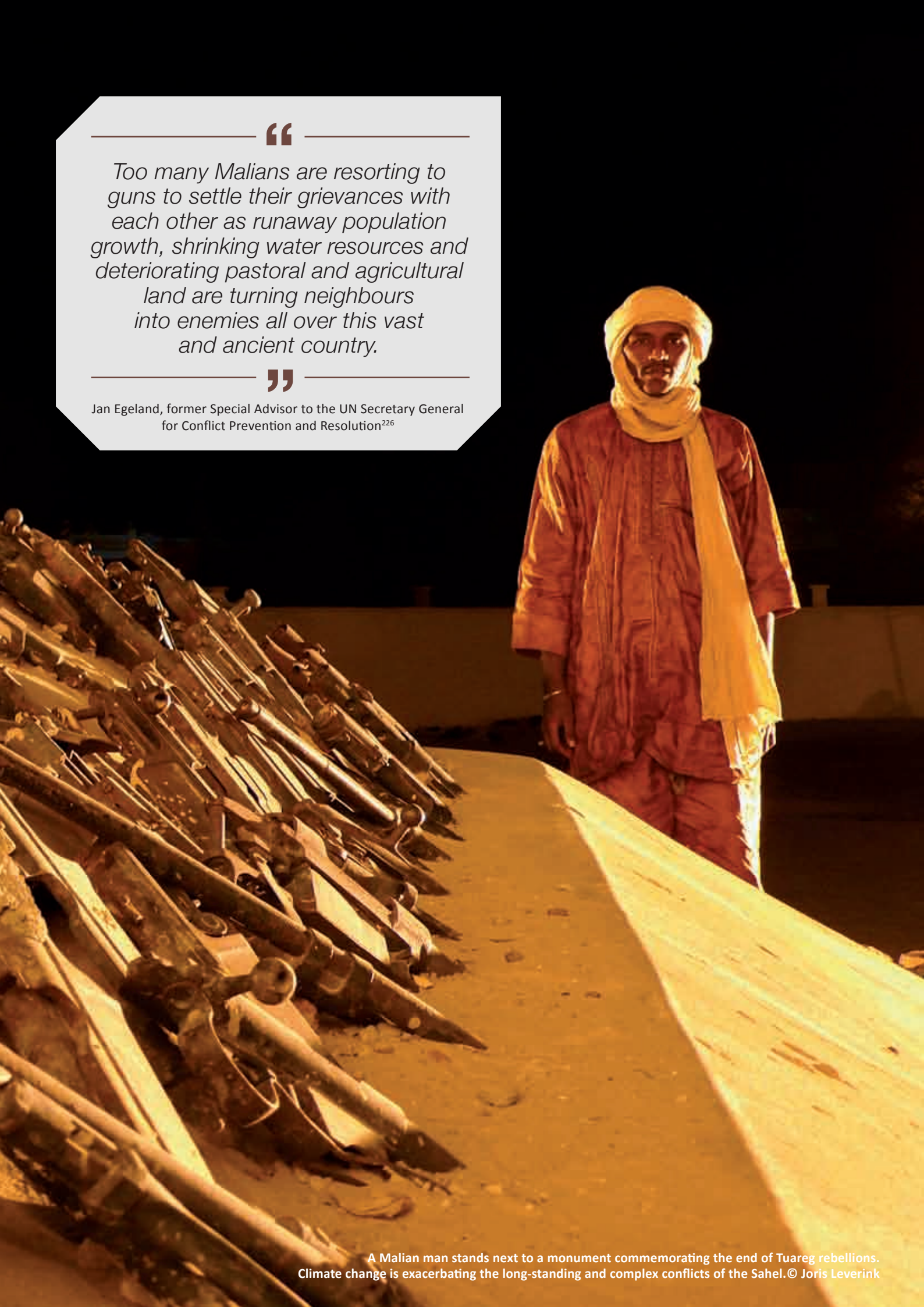
One Center for American Progress report, focusing on the "arc of tension" stretching from Nigeria through Niger and Algeria to Morocco, similarly emphasises that a range of environmental and economic problems in conflict-affected areas which already generate significant population mobility in the Sahel will be severely impacted by climate change.[223]

The relatively prosperous North African countries are themselves becoming destinations for many African migrants, particularly after the closure by Frontex – the EU's border guard force – of Mediterranean channels facilitating irregular entry into Europe. This trend brings new human security challenges as the demand for unskilled migrant workers in North African countries jars with their broad failure to observe and uphold international human rights standards.[224]

The National Adaptation Programmes of Action (NAPA) submitted to the UNFCCC by Burkina Faso, Mali, the Gambia, Cape Verde, Mauritania and Guinea-Bissau all acknowledge the threat that conflict could arise from rural-rural and rural-urban migration patterns linked to climate change.[225] Within contexts of underdevelopment, previous or existing conflict and in the face of emerging security challenges – such as armed non-state groups and the increasing significance of trans-Sahelian drugs- and weapons-trafficking routes – the impact of climate change risks overpowering the capacities of these fragile African states.

> *Too many Malians are resorting to guns to settle their grievances with each other as runaway population growth, shrinking water resources and deteriorating pastoral and agricultural land are turning neighbours into enemies all over this vast and ancient country.*

Jan Egeland, former Special Advisor to the UN Secretary General for Conflict Prevention and Resolution[226]



**A Malian man stands next to a monument commemorating the end of Tuareg rebellions. Climate change is exacerbating the long-standing and complex conflicts of the Sahel.© Joris Leverink**

# THE DELICATE BALANCE: State Fragility and Climate Change

According to the World Bank, fragile and conflict-affected states host some 25 per cent of the world population and constitute the toughest developmental challenge of our era.[227] They are plagued by high poverty rates, fractious or unstable political settlements, public health crises and stalled economies. Fragility refers to a number of different but often overlapping characteristics, including: political instability, the inability to deliver basic services, vulnerability to humanitarian emergencies and endemic political or legitimacy crises as well as conflict or post-conflict situations. The rise of intrastate or internal conflicts since the end of World War II has left behind poisonous legacies of environmental distress, political and economic instability, social fragmentation and persisting trauma. In fact, from Northern Ireland to Mali to Papua New Guinea, many fragile and conflict-affected areas exhibit multiple forms of violence: political conflict, intergroup violence, widespread gang violence and transnational organized criminal or terrorist networks.[228]

Fragility is a hard trap to escape. Research suggests that around 40 per cent of all post-conflict societies relapse into violence within one decade – and economies dependent on natural resources such as timber or agricultural exports face even more acute risks of relapse.[229/230] Even without widespread violence, ineffective governance and low-intensity conflicts can severely arrest development – Myanmar, for instance, has been plagued by an endless stream of internal conflicts since independence; one of them, at 63 years, was the longest 'civil war' in modern history.[231] The cyclical nature of fragility – recurring violence and derailed social and economic progress – erodes the capacities and resources of both communities and states, making them vulnerable to external shocks such as those induced by climate change.

As with conflict itself, direct links between climate change and state fragility are weak. This does not, however, mean that climate change cannot have strong causal impacts on the rapid or eventual emergence of fragility. First of all, it is necessary to distinguish between the primary and secondary impacts of climate change. While a drought may curtail a population's access to or the regional availability of food supplies in the short-term, it also has long-term implications, such as: changes in migration patterns (from the reallocation of household labour); arrested childhood development (from using meal-skipping as a coping strategy); and even national trade deficits and structural debt (from the decimation of primary commodity export bases).

Consequently, the emphasis should not be on whether climate change can itself be considered a driver of state fragility but how climate change impacts on existing drivers of state fragility. In this context, climate change exerts additional pressures on the institutional, social and economic stressors which render states fragile. Security analyses subsequently try to identify the critical thresholds or 'tipping points' whereby the influence of climate change can catalyse instability and ignite conflict.

> *If the destabilizing effects of climate change go unchecked, we can expect more frequent, widespread, and intense failed state scenarios creating large-scale humanitarian disasters and higher potential for conflict and terrorism.*
>
> Vice Admiral Dennis McGinn, US Navy (Ret.)[232]

A report prepared by the High Representative for Foreign Affairs and Security for presentation to the European Council, for instance, warns that climate change has the potential to "significantly increase instability in weak or fragile states by over-stretching the already limited capacity of governments to respond effectively to the challenges they face".[233] In early 2013, US chief of military forces in the Pacific, Admiral Samuel J. Locklear, stated that unrest and instability as a result of climate change "is probably the most likely thing that is going to happen... that will cripple the security environment, probably more likely than the other scenarios we all often talk about".[234]

Security assessments are complicated enormously by the fact that the extent of climate impacts on global, regional and local stability in the long term remains to be determined. A recent Chatham House report emphasises that the timescale over which climate change unfolds presents a fundamental challenge to policymakers concerned with global networks of vulnerability and the risk of high-impact, low-probability events (such as a super cyclonic storm) with potentially enormous ramifications for national and international security.[235] Similarly, the global climate is governed by complex feedback effects which respond to both environmental and human variables. Consequently, processes of change can lead to drastic, unpredictable and sometimes irreversible outcomes which can have major security implications – consider, for example, the abrupt release of Arctic methane mentioned earlier in this report.[236/237]

The pathways through which climate change can impact upon existing drivers of state fragility may be complex, circuitous and interrelated: for example, states vulnerable to economic shocks caused by climate impacts on local productivity or global commodity chains are at risk of instability if they have rapidly

growing populations. Unemployment and social exclusion amongst populations of young adult males, in particular, can swell enlistment in armed groups, which threatens the stability of states.[238] A recent National Intelligence Council report states that "water problems – when combined with poverty, social tensions, environmental degradation, ineffectual leadership, and weak political institutions – contribute to social disruptions that can result in state failure."[239] A 2013 report considers the influence that climate change had on exacerbating the conditions which gave rise to the Arab Spring and accelerating its eruption across the Middle East and North Africa.[240]

The ability of fragile states to respond to the complex constellations of factors which drive instability is fundamentally constrained. Under-resourced institutions severely curtail state performance.[241] When a country such as the Central African Republic receives a mere US$53 in per-capita tax revenues – compared to Denmark's US$18,100 – there are upper limits to what states can achieve, both in adapting to the new challenges climate change presents and responding to existing drivers of stability which may be aggravated by change.

The implications of a failure to balance the complex needs and demands of populations in contexts of fragility include growing disenfranchisement with and resistance to central governments, inflamed tensions based on religious, ethnic and social fault-lines, increased political radicalisation and a potential strengthening or consolidation of non-state actors which threaten state security.[242/243] Consequently for fragile states in particular, climate change will be the ultimate test of resilience.

> *It is unlikely that climate change will be a direct cause of conflict. However, the impact of the second- and third-order consequences — loss of land or livelihood — has the potential to increase the risks of global instability and conflict in those parts of the world already experiencing other stresses.*

Rear Admiral Neil Morisetti, former UK Special Representative for Climate Change[244]

Observers note that water shortages, crop failure and rural-urban migration may have contributed to the ongoing civil war in Syria.
© Freedom House

# A Climate Change War?

> *Climate change, land degradation and the resulting competition over scarce natural resources are among the root causes as well as the consequences of the violence and grave humanitarian situation in the region.*

United Nations Environment Programme[245]

Prior to separation in 2011, the former country of Sudan endured several decades of civil conflict between rebel forces (including the Sudan Liberation Army and the Justice and Equality Movement), the Sudanese Government and the government-backed *janjawid* militia. This tension was concentrated in the western region of Darfur, and culminated in a situation that became one of the most pressing and longstanding humanitarian crises in the world. An estimated two million people are believed to have died as a result of fighting and conflict-induced famine, whilst four million people were forced from their homes.[246]

The origins of the conflict in Darfur have been attributed to many different factors at local, regional and international levels, including post-colonial legacies.[247] Following a report released by UNEP and an article published in Nature in 2007, commentators started to refer to Darfur as a 'climate change war' – a similar connection was made by UN Secretary-General Ban Ki-moon.[248/249/250] Understandably, this has sparked heated debate and it seems reductionist to obscure the complex causes of a particularly violent conflict by attributing it to a single factor.[251] The argument, however, that climate change and ecological stress contributed to the intensity and duration of the conflict by impacting on the existing drivers of insecurity is hard to refute.

Former Sudan was the largest country in Africa and sections of its population faced severe shortages of productive land through a combination of overgrazing, deforestation, topsoil erosion and declining freshwater availability. During the 20th Century, the boundary between semi-desert and desert shifted by an estimated 50-200km.[252] The decline in cultivable land was exacerbated by droughts, erratic rainfall, and population growth (human and animal), which created subsequent issues concerning land tenure and use. This situation placed ethnic groups with different traditions of land use against one another.[253]

As grazing grounds were lost, for instance, the predominantly pastoral Zaghawa people saw their livelihoods threatened. Whilst nomadism and migration constitute well-established strategies for coping with drought in Africa, the comparatively poor availability of productive land brought Zaghawa pastoralists into areas inhabited by sedentary agriculturalists such as the Fur.[254] Subsequent conflict was exacerbated by both groups using force to protect access to *wadis* – seasonal riverbeds formed of clay.

Darfur was already a seat of tensions influenced by deep-rooted ethnic and social divisions within former Sudan, exacerbated by years of regionalised underdevelopment and easy access to small arms. Environmental stressors helped translate these pressure points into a situation of heightened instability and then conflict. Because of this, it is more accurate to describe the conflict as being rooted in the multiple religious, ethnic and socio-economic divides that existed in former Sudan; where unequal political power,

A UN Peacekeeper speaks with three Sudanese boys in Darfur. In 2014, competition over resources and land is once again fuelling conflict and violence in this region. © UN Photo/Albert Gonzalez Farran

control over and access to resources resulted in at least two lethal and devastating wars which together lasted over 50 years. Climate change – as has been stressed in much of the literature outlined throughout this report – clearly acted as a threat multiplier by transmitting and intensifying risk.

In light of this analysis of the Darfur conflict and in regard to future and emerging scenarios, we should conclude that there is a strong relationship between climate change, fragility and conflict – but that the links are mediated by a range of social, political and economic factors specific to particular contexts and periods. Political settlements, the availability of natural resources, patterns of human migration, and governance structures all have the potential to influence whether climate change, in one context, leads to conflict but in another does not.

Research in West Africa, for instance, shows that climatic variability led to rural livelihood insecurity and migration that pitted pastoralist communities against agriculturalist communities, in a similar situation to Darfur.[255] In West Africa, however, traditional conflict resolution structures which focus on the stewardship of natural resources over the apportionment of blame for misuse successfully arrested anything beyond specific and localised instances of violence. Meanwhile for Somalia, a 'perfect storm' of drought, poor governance and low-intensity conflict have erupted in humanitarian crises and virtual state collapse.[256] The case of Darfur underscores how centrally important it is to view each conflict as unique, examining its causes through a holistic approach that includes the environment and climate change as well as other socio-economic factors.

As a 2013 report from the Environmental Change and Security Program at the US-based Woodrow Wilson Center reiterates, there is little doubt that climate change complicates conflict prevention, resolution and peacebuilding in many regions across the world.[257] Effective climate change adaptation could potentially prevent countries from reaching tipping points which expose large populations to conflict and violence. Failure to adequately prepare now, on the other hand, directly places significant numbers of people at future risk.

> *"Amid the diverse social and political causes, the Darfur conflict began as an ecological crisis, arising at least in part from climate change."*
>
> UN Secretary-General Ban Ki-moon[258]

# Internal Decay

Military experts in the US have been among the first to draw a connection between climate change and terrorism. The 2014 US Quadrennial Defense Review noted that the effects of climate change will aggravate the stressors "that can enable terrorist activity."[259] This is undoubtedly a controversial view. But there is some evidence that suggests linkages between climate change, violent non-state actors and security. As mentioned earlier in this report, the devastating 2010 floods in Pakistan most likely consolidated the Taliban's hold on vast swathes of territory after they capitalised on the anger and frustration of those left stranded by the inept or non-existent disaster response efforts of the Zardari government.[260/261] In fact, the inadequate response to the floods played a major role in the subsequent toppling of the Zardari premiership. Zardari's staunchly anti-militant legacy and fierce hatred of the Taliban is finding infertile ground in post-Zardari Pakistan's political landscape.[262]

Nigeria offers a pertinent example of the nexus between ethnic insurgencies, terrorism and energy security. In some studies, Nigeria ranks as one of the most climate-sensitive countries in the world, with internecine conflict, nderdevelopment, economic malaise and corruption all significantly hindering the country's capacity to adapt to climate change.[263] Prior to 2012, Nigerian oil constituted approximately 10 per cent of US imports and, though imports are now declining in the face of large-scale exploitation of US shale gas reserves, national and international energy security is still a core pillar of US military involvement in African and Middle-Eastern theatres.[264/265]

In a 2007 speech to Congress, then Director of National Intelligence, John McConnell, highlighted US fears of Nigerian instability.[266]

Over half a decade on and climate-vulnerable Nigeria, wracked by sectarian and religious conflict, has failed to resolve the endemic and violent economic, social and political crises disrupting oil production.[267/268] Some Western military analysts fear that Nigeria is facing increasing infiltration from extremist Islamist groups operating in the 'ungoverned spaces' of the Sahara, but Nigerians themselves point to the decades of ecological degradation, increasing climate variability and food insecurity as contributing to the blossoming of home-grown terrorist movements such as Boko Haram.[269/270]

The argument that climate change is a direct cause of terrorism or extremism is, of course, almost never made. It is argued that, in contributing to destabilisation, climate change can help create spaces in which state capacity is diminished to such an extent that non-state actors have the freedom to carry out the various activities which enable them to thrive. Economic malaise has long been recognised as one of the 'root causes' of terrorism. Security analysts now speak of the linkages between climate change's deleterious impacts on economic development and subsequent challenges addressing one of the underlying factors influencing the rise and persistence of terrorist networks – poverty.[271]

> *In the long term, we want to address the underlying conditions that terrorists seek to exploit... But climate change prolongs those conditions. It makes them worse.*

Admiral Joseph Lopez (Ret.), Former Commander-in-Chief of the US Naval Forces[272]

A Ugandan soldier with AMISOM looks out over territory just outside the Somali capital which has been newly captured from insurgents. © UN Photo/Stuart Price

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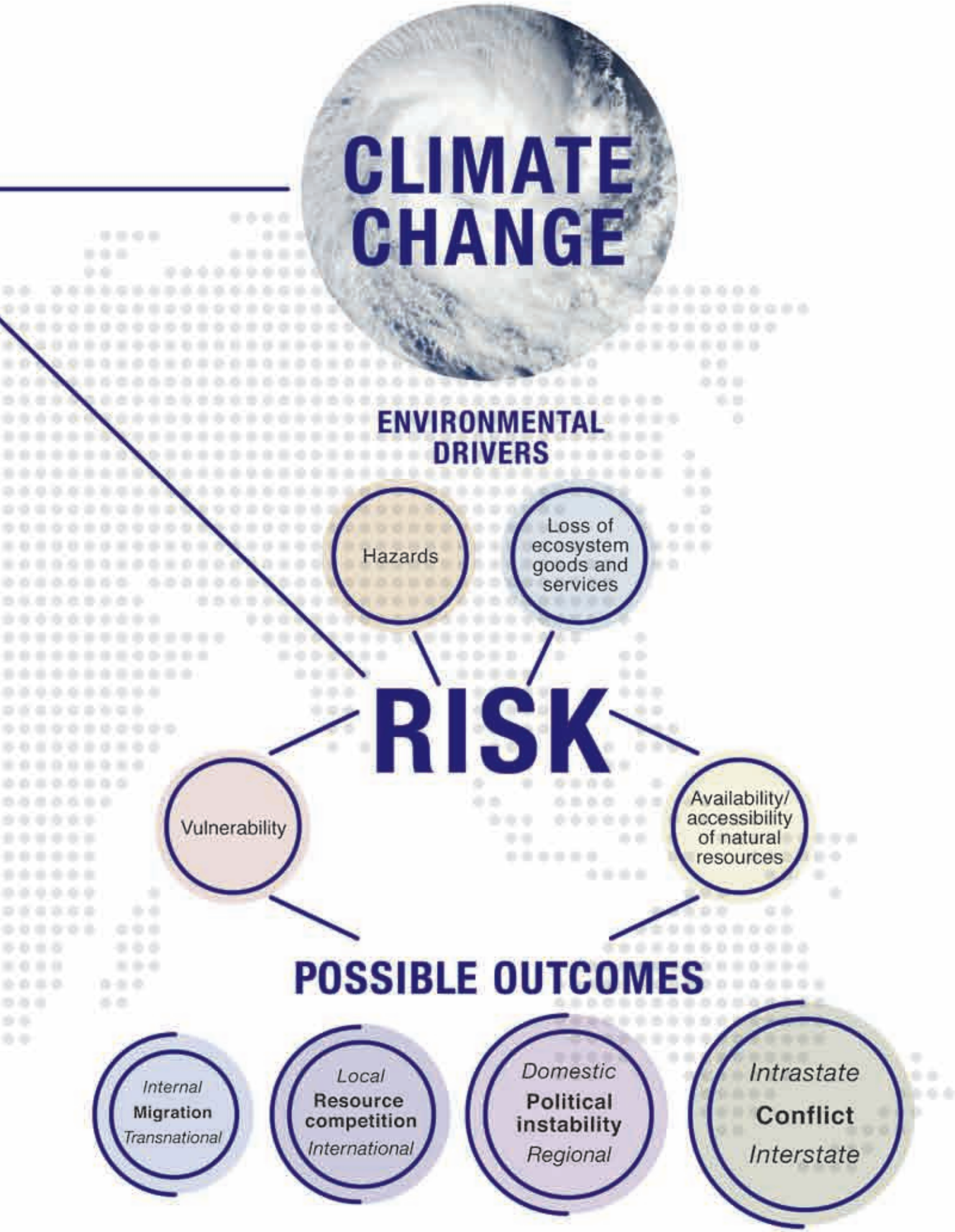
**EXISTING DRIVERS**

- Economic
- Political
- Demographic
- Social

> *...climate change is always refracted through the complex socio-political, economic and cultural relations of different societies. It is precisely the way in which climate change might impact on those relations, and the way that those societies then choose to respond to those impacts, that determines the trajectory toward violence.*

Dr Nafeez Ahmed, Executive Director of Institute for Policy Research and Development[273]


CLIMATE CHANGE
ENVIRONMENTAL DRIVERS
Hazards
Loss of ecosystem goods and services
RISK
Vulnerability
Availability/ accessibility of natural resources
POSSIBLE OUTCOMES
Internal
Migration
Transnational
Local
Resource competition
International
Domestic
Political instability
Regional
Intrastate
Conflict
Interstate

# CONCLUSION

The threat posed by climate change cannot be understated. In May 2013, measurements of the global concentration of carbon dioxide in the atmosphere exceeded 400 parts per million.[274] The last time such levels were present, during the Pliocene era three million years ago, sea levels were nine to 27 metres higher.[275] We are currently only spared such effects by the time that it takes for the climate to respond and reach equilibrium with GHG levels.

Climate change is fast becoming one of the most pressing issues on the international security agenda. Its nature as a threat multiplier not only jeopardises the fundamental human rights of populations but also pushes some of the world's poorest and most vulnerable people deeper into poverty.[276] It amplifies strains on infrastructure and services within society, and on national and international governance structures. Where exposure to the impacts of climate change is greatest, sensitivities are high, and there is limited resilience, states face a pressing security threat. Depending on how affected populations react to this threat, the impacts of climate change may contribute to the outbreak of conflict or help sustain existing conflicts.

This report has highlighted the particular role played by climate change in combination with different types of resource conflicts, patterns of human migration, and existing situations of fragility in generating insecurity and conflict. In accordance with the fact that climate change takes the most from those who have the least, climate impacts will be most profoundly felt in regions and countries where exposure is greatest and where there is the lowest capacity to adapt. Many climate-vulnerable regions already exist in situations of state fragility, conflict or post-conflict recovery.

The potent significance of the fact that the world's major military powers and security institutions consistently and increasingly voice their concerns regarding the impacts of climate change jars with the simple fact that there has been a failure to act on the issue. EJF interprets this collective failure as the gravest threat to human and national security: the insecurity wrought by climate change is the defining global human rights issue of the 21st Century. Where existing international human rights frameworks have sufficient scope to protect those affected by the impacts of climate change, regulatory measures and precedents need to be established and then rigorously and equitably enforced.[277] Where existing legal frameworks fall short of protection and mandating assistance for some groups, *sui generis* instruments may need to be created. Of equal importance is the gradual recognition that not only ethical but legal, rights-based imperatives need to exist for the safeguarding of the environment for future generations.[278]

The notion of 'climate security' is what provides the linkages between climate change as a physical and environmental process and climate change as a human rights issue. For this reason alone, the increasing attention that security institutions are paying climate change – which this report has highlighted – should be of the highest significance to policymakers, academics and the public.

The recognition of climate change as a threat not only to the stability of ecological systems which have sustained human life for thousands of years but also to the rights of those living today, who are often the most vulnerable and exposed, is the siren call for a new paradigm of environmental cooperation in which progressive and ambitious action on climate change should be central to conflict prevention and human rights protection strategies.

> *There is no reason why the international community cannot avoid escalating conflicts, tensions and insecurity related to a changing climate if a deliberate, focused and collective response can be catalysed that tackles the root causes, scale, potential volatility and velocity of the challenges emerging.*

Achim Steiner, Executive Director of the United Nations Environment Programme (UNEP)[279]

> *Climate change not only exacerbates threats to international peace and security – it is a threat to international peace and security.*

Secretary-General Ban Ki-moon[280]

# RECOMMENDATIONS

## The international community must

- Establish a new mandate for a UN Special Rapporteur on Human Rights and Climate Change to safeguard against the worst-case scenarios of the human impact of climate change.
- Consolidate political will for renewed international action on climate change.
- Immediately develop research into the relationship between climate change, human rights and conflict, focusing on:
  - How climate change affects the availability and accessibility of natural resources in particular regions.
  - How climate change impacts upon patterns of human migration in specific social, political, cultural and economic contexts.
  - How climate change impacts upon the resilience and stability of individual states.
- Interpret climate change as an opportunity for peacebuilding, cooperation and enhancing transnational resource management.

## National governments should

- Deliver 'linked-up' policies on environment, human rights, development, migration and peacebuilding.
- Ratify or work to generate national, regional and international legal frameworks protecting citizens from climate-related insecurity
- Collaborate to ensure that agreements governing. transboundary water resources are in place and operating effectively to avert conflict.

## EJF will

- Continue to call for urgent action to address the human impacts of climate change from a rights-based framework.
- Endeavour to contribute to improving understanding of the relationships between climate change and security.

A coastal road in Queensland, Australia in the aftermath of Cyclone Yasi.© Paul Toogood

# Glossary

**CLIMATE JUSTICE:** Climate change has ethical dimensions which relate to concepts of justice and decision-makers must address the unequal degrees of responsibility for and exposure to climate change between different countries.

**CLIMATE SECURITY:** Climate change adaptation and mitigation strategies are essential parts of ensuring the safety and wellbeing of vulnerable populations. In the broadest sense, a stable global climate provides a safe operating space for humanity.

**ECOLOGICAL DEPENDENCE:** Populations are ecologically dependent when they have a high degree of sensitivity to changes in the availability or accessibility of natural capitals or valuable ecosystem goods and services.

**FEEDBACK EFFECTS:** Effects of processes within a chain of cause and effect which form a circuit. Negative feedback effects counteract the processes which give rise to them whilst positive feedback effects amplify them. For instance, a car deviating from its course is corrected by negative feedback (adjusting the steering). If the car's steering mechanism was faulty and adjustments to steering amplified deviation, this would be positive feedback.

**GROUNDWATER RECHARGE:** The rate at which sub-surface supplies of freshwater are sustainably replenished. For some freshwater resources, such as fossil water, this rate may be so slow that they are considered 'non-renewable'.

**HYDRO-METEOROLOGICAL HAZARDS:** Refers to any hydrological, atmospheric or oceanographic phenomenon which may cause loss of life, injury, damage to property, loss of livelihoods, environmental harm or social and economic disruption (e.g. floods, cyclones, coastal storm surges, etc).

**TIPPING POINT:** When the accumulation of minor changes or events in a system reaches a critical threshold whereupon drastic, sudden and sometimes irreversible developments fundamentally alter the state of the system.

**THREAT MULTIPLIER:** Rather than constituting a 'new' threat in itself, climate change acts upon existing threats and hazards to amplify or exacerbate the risk that they pose.

**UNGOVERNED SPACES:** Where territorial state control has been voluntarily or involuntarily ceded to actors other than the relevant, legally sovereign authorities, and/or the state faces significant challenges in establishing control.

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Climate change not only exacerbates threats to international peace and security it *is* a threat to international peace and security.

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United Nations Secretary-General Ban Ki-moon

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