

Understanding the climate-conflict nexus from a humanitarian perspective:

a new quantitative approach

**OCCASIONAL
POLICY PAPER**

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Introduction

This occasional policy paper aims to improve the humanitarian sector's understanding of the nexus between climate change and violent conflict. This is crucial, given that about 80 per cent of the humanitarian crises with an inter-agency humanitarian appeal are conflict related, and climate change is expected to exacerbate this. The chair's summary of the World Humanitarian Summit made it clear that in order to prevent conflict, a complementary approach which includes addressing climate change, is needed. The High-Level Panel on Humanitarian Financing also highlighted "the growing inter-linkages between humanitarian, development, peacekeeping and climate change-related interventions" and their relevance for humanitarian action.

This paper suggests a series of indicators and new metrics for assessing the risk of climate change-induced conflict for 157 countries covering more than 99 per cent of the world's population. The aim is to identify indicators that can help to identify countries that are exposed to what is described here as the climate-conflict nexus, i.e, the intersection between two key factors: weak institutions and pre-existing social fragility, as well as climate change vulnerability. Measuring and quantifying these interlinks, particularly their humanitarian impact, is essential for delivering on the High-Level Panel's call to reflect their implications in humanitarian finance allocations.

This paper identifies 20 countries in the climate-conflict nexus. They encompass some 780 million people living mostly in South Asia, South-East Asia and sub-Saharan Africa. All of the countries in the climate-conflict nexus

are low- or lower-middle-income nations, where the international humanitarian system is already actively providing life-saving assistance to millions of people affected by recurrent humanitarian crises.

In the wake of last year's COP21 agreement in Paris and the World Humanitarian Summit, it is important to provide further research and analysis on the interlinks between climate change and conflict, and to better understand how newly agreed climate finance can help support the countries that are most vulnerable to climate change-induced conflict.

This paper presents a new composite measure called the Resource and Climate Vulnerability Index (RCVI), which provides a framework for observing and ranking the countries most at risk from resource stress and changes in weather patterns. Due to a lack of data, the analysis does not include microstates. Their exclusion does not imply they are free from climate change vulnerability. By comparing the RCVI to a measure developed by the Institute of Economics and Peace called the Positive Peace Index, which captures the key institutions, attitudes and structures that maintain peace, it is possible to quantify the climate-conflict nexus and contribute to a better understanding of possible future humanitarian needs.

Independently, climate change does not lead to violence. As is made clear in conflict and climate change literature, it is the intersection between vulnerability to climate change and broader institutional and socioeconomic fragility that drives the potential for conflict and violence. Countries that are most vulnerable to climate change are often the

least developed or most fragile. This is a significant factor in determining the climate-conflict nexus. Social unrest, intergroup grievances and gender-based violence can increase if a country or Government is unable to provide the resources needed to cope with a changing environment or destruction from extreme weather conditions, or if international climate change adaptation support is insufficient. This, in turn, may contribute to violent conflict.

Fundamentally, many high-income countries that will experience changing weather patterns or shocks to their resource supply due to climate change will have a greater capacity to manage social and economic stresses that may eventuate from climate change. Conflict and social upheaval are much less likely in contexts whereby competition for scarce natural resources is less intense due to lower concentrations of vulnerable populations and fewer people exposed to shocks in livelihood patterns. The quantitative analysis in this paper is based on the existing literature on the link between climate change and conflict. This conceptualizes climate change predominately as a

stressor negatively driving at least two critical factors: forced displacement and resource scarcity leading to increased risk of violence and conflict. Countries with weak institutions, high levels of poverty and agricultural-based economies are particularly vulnerable to these negative stressors or threat multipliers.

Gender inequality further exacerbates risk and vulnerabilities related to climate change and disasters, as well as in conflict. This paper refers to the gender inequality of risk in a changing climate (the fact that women are disproportionately affected by disasters and conflict) as a root cause of fragility at all levels.

This research aims to spur discussion and deeper analysis on the links between conflict and climate change to inform the critical decisions that policymakers, practitioners and Governments will make to mitigate and adapt to the worst impacts of climate change in the coming years to prevent human suffering and save more lives.

The impacts of climate change can exacerbate resource competition, threaten livelihoods, and increase the risk of instability and conflict, especially in places already undergoing economic, political, and social stress. And because the world is so extraordinarily interconnected today – economically, technologically, militarily, in every way imaginable – instability anywhere can be a threat to stability everywhere. The kind of strife that we’re talking about is not going to be contained by international borders any more than all of those refugees pouring out of Syria are contained by the borders of Europe.

John Kerry, United States Secretary of State

Conceptualizing the link between conflict and climate change

The Paris Agreement on Climate Change unequivocally recognizes that climate change poses an urgent and potentially irreversible threat to human societies and the planet, requiring all countries to address this threat through the widest possible cooperation. As the world moves to the brink of a climate crisis with a record temperature rise and population displacement, interstate conflict and polarization among countries are increasing, hindering the prospects of effective global collaboration.

The world is experiencing two major trends in global volatility: (1) the threat of climate change with seven of the hottest years on record having been registered in the past 10 years (NOOA, 2015), and (2) the fall in world peace in the late 2000s to 2015 (IEP, 2015). According to the International Panel on Climate Change (IPCC), the frequency and intensity of weather patterns and natural disasters have been increasing, and this pattern is predicted to continue (IPCC, 2007). The evidence of global warming is unequivocal: a recent synthesis report by the IPCC (2014) shows that “each of the last three decades has been successively warmer at the Earth’s surface than any preceding decade since 1850”, and the period from 1983 to 2012 has been the warmest 30-year period of the last 1,400 years. Warming and acidification of oceans, mass loss from ice sheets in Greenland and Antarctica, and shrinking glaciers almost worldwide are some of the trends that can be observed through scientific measurement. The IPCC projects that climate change will continue to put stress on the availability and quality of drinking water, damage crop yields and negatively affect the lives and health of millions of people. In countries where such resources are already scarce and adaptive capacities are low, climate change can force people to move to more



is the position that interstate conflict with regional impact and extreme weather events rank as the top risks in terms of likelihood according to the 2015 WEF’s Global Risks report.

favourable but often quickly overcrowded places. Increased population density coupled with exposure to climate-driven disasters or resource scarcity might have contributed to growing instability.

Further, according to the Global Peace Index (GPI), the world has become less peaceful over the last eight years, reversing a long period of increasing peacefulness. This is evidenced by the increase in the number of refugees and internally displaced persons (IDPs) to nearly 60 million people as of the end of 2014. This is the highest number since the Second World War. Deaths from terrorism reached the highest-ever recorded level to over 32,000 in 2014, and the number of armed-conflict deaths reached 180,000 in 2014, up from 56,000 in 2008. Pervasive State fragility, proliferation of international criminal networks, lack of political legitimacy and even the re-emergence of the threat of interstate conflict in Eastern Europe have been driving factors in this negative global trend. A survey conducted by the World Economic Forum (WEF) with leading private sector entities has placed interstate conflict and extreme weather events as the top risks in terms of likelihood in 2015. For the first time in 10 years of WEF’s consecutive yearly reporting on risks, conflict risk made the top five.

Women and girls experience the nexus between climate change and peace and security in direct and profound ways. For example, since women are often the providers of food, water and energy for their families—socially prescribed on the basis of their gender in many societies—they are likely to face increased challenges in accessing resources due to climate change. This becomes a devastating burden in conflict-affected areas, where women face an increased risk of insecurity and violence in carrying out these daily tasks. Climate change is also a growing factor affecting migration and displacement, combining with other influences including unequal land distribution, insecure land tenure and inadequate infrastructure, to push populations to seek alternative livelihoods in urban areas and across borders, raising local, regional and international tensions.⁹³As with all displaced populations, women and girls displaced by climate change and resource scarcity are vulnerable to sexual and gender-based violence and other violations of their human rights.

Excerpt from the Global Study on the Implementation of UN Security Council Resolution 1325

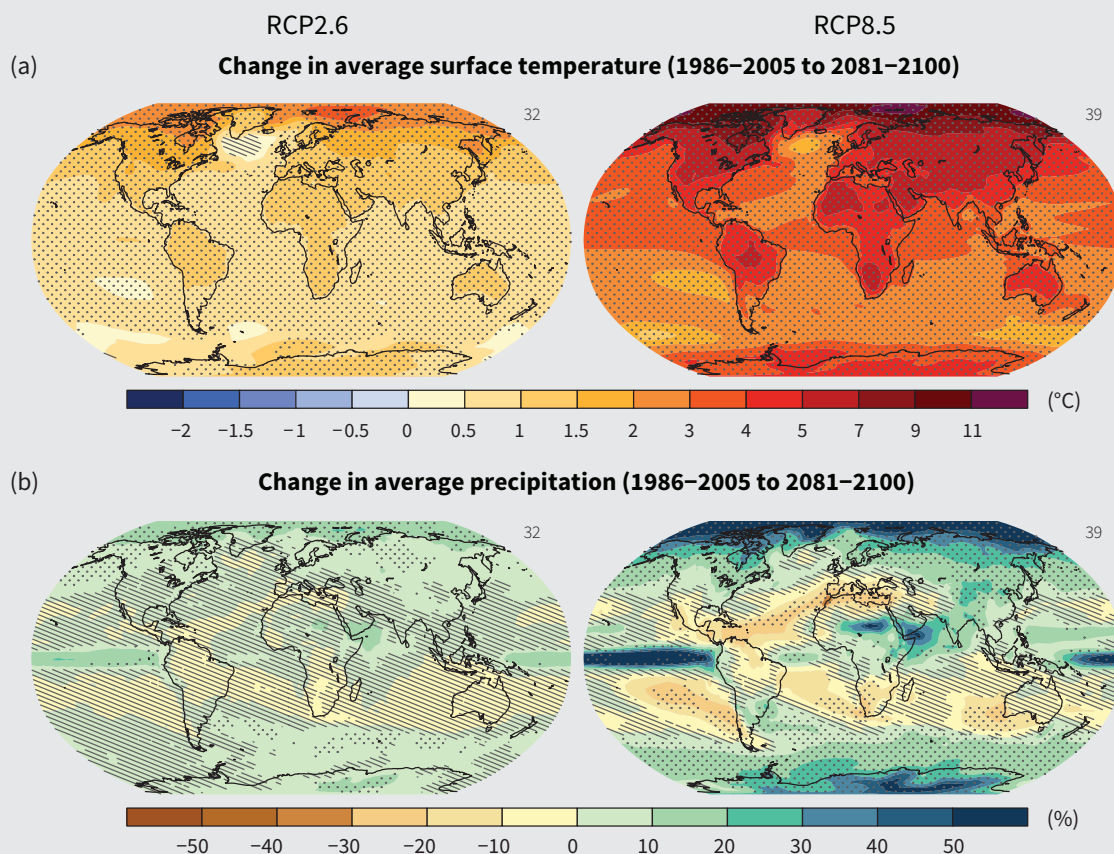
As these two volatile trends continue, the link between climate change and conflict needs to be better understood. It is well established that over the last 60 years, 40 per cent of all intrastate conflicts have had a link to natural resources, while specific conflicts within the Middle East and Sudan have links to the control of scarce resources, such as land and water (UNEP, 2009). El Niño events are not directly caused by climate change, but it is estimated that global warming exacerbates their intensity. This is particularly alarming given that El Niño impacts can lead to an estimated twofold increase in conflict risks. (Levy, 2015).

In 2015, well-publicised meta-analysis by Hsiang, Burke and Miguel reviewed the emerging literature on climate change and conflict. Via a summary of 55 separate studies, it found

that changes from moderate temperatures and precipitation patterns systematically increase conflict risk. One key finding is that temperature has the largest average impact, with each one-degree increase in temperature increasing interpersonal conflict by 2.4 per cent and intergroup conflict by 11.3 per cent. Such findings need to be interpreted carefully, as research by the Institute for Economics and Peace (IEP) has found that conflict is driven by a multitude of factors, and climate change should be understood as a conflict stressor or threat multiplier. Like any other type of stressor, climate change has the potential to exacerbate other conflict drivers that are present in fragile settings, such as unemployment, contested Government legitimacy, and inequality and its gender dimensions.

Change in average surface temperature and average precipitation

Change in average surface temperature **(a)** and change in average precipitation **(b)** based on multi-model mean projections for 2081–2100 relative to 1986–2005 under the RCP2.6 (left) and RCP8.5 (right) scenarios. The number of models used to calculate the multi-model mean is indicated in the upper right corner of each panel. Stippling (i.e., dots) shows regions where the projected change is large compared to natural internal variability and where at least 90% of models agree on the sign of change. Hatching (i.e., diagonal lines) shows regions where the projected change is less than one standard deviation of the natural internal variability.



If current trends continue, by 2030, when the SDGs expire, the cost of humanitarian assistance will have risen to US\$50 billion and 62 per cent of the world's poor could be living in fragile and conflict-affected countries, a clear warning that humanitarian needs will spiral even higher. The Intergovernmental Panel on Climate Change (IPCC) projections on the growing intensity and frequency of climate-related disasters, as well as a deterioration of peace indicators over the past decade, point in this direction and the costs could be even higher than current estimates.

Report of the High Level Panel on Humanitarian Financing

This point has been reinforced by a variety of intergovernmental organisations and by the research community. The IPCC stated in 2014 that human security will be progressively threatened as the climate changes: “Climate change can indirectly increase risks of violent conflict by amplifying well-documented drivers of these conflicts, such as poverty and economic shocks” (IPCC, 2014). While climate change has not been the sole driver of conflict, evidence suggests that it does contribute to the deterioration of peace by inflaming existing tensions and structural issues (UNOCHA, 2009; European Commission, 2008; G7 2014).

Climate change increases volatility within economic and social systems. Rapidly changing weather conditions can lead to sudden population displacement, changes in the distribution of resources within society, exacerbating gender inequalities, undermining of livelihoods, the destruction of infrastructure, increased resource scarcity and also reduce a government’s capacity to provide services to its citizens. Inability to deal with these stressors can lead to widespread famine, poverty, population displacement and eventually lead to grievances within society.

The intersection between climate change, pre-existing social and economic grievances and state fragility and poor governance was present at the beginning of the Syrian conflict (See case study in annex 1). While the climate related factors that contributed to the current Syrian conflict remain debated (Gleick, 2014), a recent paper in the U.S. journal *Proceedings of the National Academy of Sciences* detailed how climate change had directly contributed to the 2007-10 drought (Kelley et al). The primary stressor was via the mass migration of up to 1.5 million people from rural farming areas to urban centres as a result of a three year drought. This, coupled with the influx of Iraqi refugees, placed an enormous strain on urban areas which were largely unsupported by the Assad regime. This led to increased unemployment, inequality, poverty and crime. These were also some of the first neighbourhoods to revolt at the start of the Syrian civil war (ibid). The Kelley et. al. research showed the 2007-2010 drought, which was the worst on the instrumental record, was directly attributable to man-made climate change. The analysis further

suggested that the severity and duration of the 2007-10 Syrian drought has become more than twice as likely as a consequence of human interference in the climate system.

Yet, independently climate change does not lead to violence. Rather it is the consequences of climate change combined with other social and institutional variables that can significantly increase the risk of climate-induced conflict. A significant factor in determining the climate-conflict nexus is whether a country exposed to climate change effects is already fragile or less developed. If a country or government is unable to provide the resources needed to cope with a changing environment or destruction from extreme weather conditions, social unrest and intergroup grievances, including increased levels of violence against women and girls, can increase, which may lead to violent conflict.

It is important to stress that the climate-conflict nexus affects men, women, boys and girls differently within each society and that gender inequality exacerbate risk and vulnerabilities in a changing climate. For example, when Cyclone Nargis hit the Ayeyarwaddy Delta in Myanmar in 2008, there were twice as many women deaths compared to men. (UNWOMEN, 2015). For more details, see case study in Annex 1.

Another important factor that must be accounted for when quantifying the climate-conflict nexus is variation in degree, intensity and types of disasters affecting different regions. Efforts have been made by third parties such as CARE International, Maplecroft and the Center for Global Development (CGD) to estimate the specific geographic locations and countries most vulnerable to different forms of climate change-driven disasters. Flooding and cyclones are predicted to affect Africa, Central, South and Southeast Asia, Central America and Western South America. Drought is estimated to have the most significant effect on sub-Saharan Africa, South Asia and South East Asia. The greatest level of human vulnerability due to climate change is observed in Africa, Central and South Asia and South East Asia (CARE, Maplecroft, 2009).

Case Study: Is climate change a trigger behind Syria's conflict?

In 2015, the **Global Peace Index ranked Syria** as the world's least-peaceful country (IEP, 2015). The subtly devastating role of climate change and its exacerbating effect on Syria's ongoing conflict remain largely ignored amid prominent social, economic and political contributors. Recent drought conditions were exacerbated by the lack of legal water resource management and poor water governance in Syria. Human contribution to these droughts is debated (Joodaki, 2014), but a report from the National Oceanic and Atmospheric Administration attributes them to anthropogenic climate change, with greenhouse gases accounting for roughly half of the decline in precipitation (NOAA, 2011). A study published in the *Water Resources Research* journal confirmed that observations from gravity-measuring satellites provided groundbreaking accuracy in measuring water reserves found above and below ground. Comparing changes in water levels from 2003 to 2009 showed an alarming decrease in water reserves since the drought began, exposing a grim forecast of limited future water availability. Moreover, the study explored consequences from unregulated water practices stemming from differences in interpreting international water law (Voss et al., 2013; United Nations, 1997). The lack of transnational water-allocation rights undermines countries such as Syria that rely heavily on the Tigris-Euphrates river system (UNEP, 2008). As a downstream country, Syria suffered a 40 per cent reduction in water flow that damaged its crop yields (USDA, 2011). To keep up with agriculture and domestic needs, Syria began pumping groundwater from aquifers. However, unrestricted water extraction resulted in a rapid decrease of groundwater levels and the largest observed water loss from the study (ibid).

The lack of regulation over shared water resources accelerated Syria's water loss and deeply affected its agriculture-dependent population and economy. Historically, Syrians predominantly made a living from growing water-intensive crops, such as cotton and wheat, which were heavily subsidized and inefficiently irrigated. This poor management of natural resources not only contributed to water shortages but also damaged arable soil, resulting in crop failure and desertification (Femia 2012). As a result of this food and economic insecurity, millions of Syrians were forced to migrate en masse to urban areas. Alongside an influx of Iraqi refugees, population increases led to increased unemployment, inequality, poverty and crime. This rapid urbanization coupled with unreliable support from the Government also placed an enormous strain on infrastructure and Government services, such as water, energy and transportation. As Syria's civil and economic health deteriorated with most people in extreme poverty, sociopolitical grievances heightened. In 2011, political protests erupted as the Arab Spring had finally reached Syria. Brutally violent suppression of opposition movements led to further marginalization and hostilities between different religious and ethnic groups, leaving regions vulnerable to exploitation by Syrian Kurds and terrorist groups. Ravaged by civil war, the politically volatile and dangerous environment not only made it impossible for humanitarian organizations to provide aid, but it caused the world's largest influx of IDPs and refugees (IEP, 2015).



Syrian refugee children run towards the sprawl of tents in which they and their families are taking shelter in Domiz refugee camp, near Dohuk, in the Kurdistan Region of Iraq, November, 2012
CREDIT: B. Sokol, UNHCR. OCHA. 2012.

The mechanisms driving the climate-conflict nexus: forced displacement and resource stress

Climate change can drive conflict stressors in multiple ways. This paper focuses on forced displacement and resource stress as two critical mechanisms through which the risk of conflict is intensified. Changing and severe weather patterns have at least two impacts: interruption of resource supply leading to greater resource scarcity, and increased natural disaster risk and its potential to trigger population displacement. These two factors, resource scarcity and population displacement, are particularly influential factors in the climate-conflict nexus.

Estimates on the total number of people likely to be displaced by climate change between now and 2050 vary from 250 million to a billion people.

United Nations High Commissioner for Refugees

This is particularly the case in underdeveloped, fragile and low-income countries (Nel and Richarts, 2008; Besley and Persson, 2011). Volatile weather conditions have displaced millions of people in recent years, with the Internal Displacement Monitoring Centre estimating 17.5 million people displaced due to climatic events in 2014.¹ Additionally, increased levels of drought and changes to precipitation have increased levels of poverty and famine, and they have been linked directly to the conflicts in Sudan's Darfur region and Syria (Ban, 2007; Kelly et al, 2015).² See the case studies in annex 1 for more information on Sudan and Syria.

1. This excludes other natural events, such as volcanic eruptions, tsunamis and earthquakes.

2. Drier weather conditions have played a major role in the onset of conflicts in East Africa (Suliman 1999; Baechler 1999; Raleigh & Kniveton, 2012; Homer-Dixon and Mulugeta, 2008), Sudan (Ban, 2007) and Syria (Kelly et al. 2014). However, drier conditions are not the only form of climate change which can lead to conflict. Natural disasters and severe storms have the ability to destroy capital, productive land and crops (Raleigh and Kniveton, 2012). Theisen (2012) found that years following wetter periods were less safe than drier years in Kenya, this was also supported by Ando (2012) who came to the same conclusion.

While migration has been proven to accelerate a country's economic capacity and growth, large, rapid influxes of populations within weak political-economic systems can add strain and social unrest, increasing the risk of violence. Current trends show that 80 per cent of migration occurs within a country's borders, which is a significant amount accounting for shifts from rural to urban environments (UNDP, 2009). As highlighted by the IPCC special report Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaption, the increase in extreme weather events will lead directly to the increased risk of internal displacement (2007). The influx of migrants from neighbouring countries or other areas within a country may lead to ethnic tension, distrust and increased competition for resources (Reuveny, 2007). Reuveny found 19 cases where areas receiving large migration movements experienced conflict. This data set included Brazil, Ethiopia, Nigeria, Pakistan, the Philippines and Sudan, among others.

Furthermore, with the majority of IDPs globally located in low-income countries with limited Government or economic capacity, this is significantly straining the resource pools of resettlement areas and increasing the financing burden on responsible UN humanitarian agencies.



22.5
million

In the last 7 years, an average of 22.5 million people were displaced from their homes each year by disasters brought on by climate-related hazard events mostly floods and storms. That is equivalent to 62,000 people every day.

IDMC 2015

Modelling and understanding the climate-conflict nexus

Conflict and violence can be driven by a multitude of factors. While singular factors can have a significant impact on conflict onset, its drivers are multidimensional and no single factor ever leads to violence or conflict.

The converse of violence and conflict is peace, which can be defined in at least two ways: negative peace, which is the absence of direct violence or the fear of violence, and positive peace, which is the presence of the attitudes, institutions and structures that create and sustain peaceful societies through the non-violent resolution of grievances.

To understand the multidimensional factors that support positive peace, this paper uses statistical analysis developed by IEP and published in 2015, which analysed

over 4,700 cross-country data sets to develop the Positive Peace Index (PPI).

The PPI measures the level of positive peace in 162 countries, covering over 99 per cent of the world's population. The measure represents the attitudes, institutions and structures that create and sustain a peaceful society and provide an optimal environment for human potential to flourish. The PPI can be considered a proxy measurement for resilience and institutional capacity, as IEP research has shown that countries low in positive peace tend to be less able to deal with external shocks and experience sudden falls in peace. The PPI measure is composed of 24 indicators, and it can be disaggregated into eight domains. See text box 1 for a description.

Climate change affects regions in different ways at differing levels of intensity. Lower-income nations tend to have greater vulnerability on account of their general increased dependence on agriculture as a greater proportion of economic activity and livelihoods. They also tend to be less resilient to shocks in resources and tend to already have scarcity in water, food and housing. The Advisory Group of Experts on the review of the UN Peacebuilding Architecture in 2015 highlighted how contexts of State fragility and the adverse effects of climate change can exacerbate conflict drivers at national and regional levels (AGE 2015).

As is made clear in the conflict and climate change literature, it is the intersection between vulnerability to climate change and broader institutional and socioeconomic fragility that drives the potential for conflict and violence.

Text Box 1: Key definitions

Positive peace: the attitudes, institutions and structures that support non-violent resolution of conflict and create and sustain peaceful societies.

Negative peace: the absence of direct violence or the fear of violence.

Direct violence: the intentional use of physical force that results in injury, death, psychological harm or deprivation.

Conflict: a disagreement between two or more individuals or groups. Conflict can either be nonviolent or violent. Depending on how it is dealt with, it can be constructive or destructive.

Resilience: the ability to absorb and recover from shocks. High levels of positive peace enhance resilience in situations such as natural disasters or economic shocks.

Text Box 2: Positive Peace factors:

Well-functioning Government: A well-functioning government delivers high-quality public and civil services, engenders trust and participation, demonstrates political stability and upholds the rule of law.

Sound business environment: The strength of economic conditions as well as the formal institutions that support the operation of the private sector determine the soundness of the business environment. Business competitiveness and economic productivity are associated with the most peaceful countries, as is the presence of regulatory systems that are conducive to business operation.

Equitable distribution of resources: Peaceful countries tend to ensure equity in access to resources such as education and health, as well as, although to a lesser extent, equity in income distribution.

Acceptance of the rights of others: A country's formal laws that guarantee basic human rights and freedoms and the informal social and cultural norms that relate to the behaviours of citizens serve as proxies for the level of tolerance between different ethnic, linguistic, religious and socioeconomic groups within the country. Similarly, gender equality, worker's rights and freedom of speech are important components of societies that uphold acceptance of the rights of others.

Good relations with neighbours: Having peaceful relations with other countries is as important as good relations between groups within a country. Countries with positive external relations are more peaceful and tend to be more politically stable, have better-functioning Governments, are regionally integrated and have lower levels of organized internal conflict. This factor is also beneficial for business, and supports foreign direct investment, tourism and human-capital inflows.

Free flow of information: Peaceful countries tend to have free and independent media that disseminates information in a way that leads to greater openness and helps individuals and civil society work together. This is reflected in the extent to which citizens can gain access to information, whether the media is free and independent and how well-informed citizens are. This leads to better decision-making and more rational responses in times of crisis.

High levels of human capital: A skilled human-capital base reflected in the extent to which societies educate citizens and promote the development of knowledge improves economic productivity and care for the young, enables political participation and increases social capital. Education is a fundamental building block through which societies can build resilience and develop mechanisms to learn and adapt.

Low levels of corruption: In societies with high corruption, resources are inefficiently allocated, often leading to a lack of funding for essential services. The resulting inequities can lead to civil unrest and in extreme situations can be the catalyst for more serious violence. By contrast, low corruption can enhance confidence and trust in institutions.

From this framework IEP has developed a composite measurement of Positive Peace – the Positive Peace Index (PPI). The methodology and indicators informing the PPI are detailed in Appendix A.

Simply speaking, many high-income countries that will experience changing weather patterns or shocks to their resource supply due to climate change will have the institutions and structures in place to safely mitigate and manage the various social and economic stresses that may occur. Conflict and social upheaval are much less likely in these contexts whereby competition for scarce natural resources is less intense due to lower concentrations of vulnerable people and fewer people exposed to changing livelihood patterns.

Therefore, this paper aims to identify the countries that are exposed to what is described here as the climate-conflict nexus. This is the intersection between two key factors: weak institutions and pre-existing social fragility in combination with climate-change vulnerability.

By comparing the PPI, measuring the institutional capacity, resilience and ability of a country to build long-term peace, to four existing measures developed by the Center for Global Development (Wheeler, 2011) capturing climate change vulnerability as well as a new measure developed in this paper called the Resource and Climate Vulnerability Index (RCVI) it is possible to quantitatively assess the climate-conflict nexus.

The RCVI comprises nine variables that measure volatility and dependency within agricultural and water resources and resource scarcity, as well as the risk of sudden- and slow-onset weather disasters. These factors are essentially proxy measures of key vulnerabilities to climate change in terms of the risk of destruction of capital, production, livelihoods and increased displacement.

Info Box: Climate Change and the UN Security Council

Climate Change made its way onto the Agenda of the UN Security Council for the first time in 2007 through an open debate on energy, security and climate under the presidency of the UK. The day-long debate on the relationship between climate, peace and security exposed deep divisions within the Council. Small-island countries were eager to display that climate change was an existential threat with serious security considerations, while member such as China questioned the rationale of addressing climate change in the council, referring to its lack of expertise in the area and the need to respect the various domains of other UN organs on issues that pertain to sustainable development. No resolution or statement was produced after the debate.

In 2011, a second Security Council session on climate change was held. As a sign of the growing urgency, at the end of its deliberations, the Council issued a presidential statement expressing “concern that possible adverse effects of climate change may, in the long run, aggravate certain existing threats to international peace and security”. The Council acknowledged that sea-level rise in particular can have serious security implications for the global community of nations. The Council called on the Secretary-General to include information on the climate-conflict nexus in his regular reports to the Council.

The Security Council has held two Arria-formula meetings to discuss climate change since 2011. In 2013, UK and Pakistan co-sponsored an Arria-formula meeting to discuss the security implications of climate change. In June 2015, Malaysia and Spain co-sponsored another Arria-formula meeting discussing the role of climate change as a threat multiplier.

Security Council resolution 2242 (2015), the eighth resolution on Women Peace and Security, noted the impacts of climate change as part of the changing global context of peace and security. It reiterated its intention to increase attention to women, peace and security as a cross-cutting subject in all relevant thematic areas of work on its agenda.

Additionally, at the Security Council Arria-formula meeting on food security, nutrition and peace in March 2016, co-sponsored by Angola and Spain, many Member States highlighted the role of climate change in exacerbating food insecurity and resource scarcity globally, potentially contributing to an erosion of peace.



A town in Myanmar recovers from devastating Cyclone Nargis.
CREDIT: Laura Sala, OCHA, 2009.



Case Study: Cyclone Nargis, Myanmar

When fragility and extreme weather collide

The 2016 **Global Climate Risk** report ranked Myanmar as one of the countries most affected by extreme weather events between 1995 and 2014 (Kre et al., 2016). The Global Peace Index Report 2015 found that Myanmar showed a negative trend compared with 2014, placing the country's overall score in the "moderate risk" category (IEP, 2015). Myanmar's susceptibility to climate hazards in combination with the prevalence of several forms of social and political conflict result in heightened vulnerability with regards to the climate-conflict nexus.

Due to its geographical location, Myanmar is constantly exposed to climate threats, such as cyclones, strong winds, floods and earthquakes. The 2007 report of the Intergovernmental Panel on Climate Change presented evidence of "increasing tendency in the intensity and frequency of extreme weather events in Asia over the last century and into the 21st century" (IPCC, 2007). The authors found strong evidence showing that climate change was directly linked to a decline in the region's crop yield, an increase in temperature and rainfall variability, sea-level rise, loss of biodiversity, droughts and soil degradation. These consequences are likely to cause stress to agricultural productivity, increase pressure on natural resources and adversely affect human health. These critical climate stressors only worsen pre-existing problems from policy failures and the ongoing civil war.

In 2008, a devastating cyclone hit Myanmar's Irrawaddy Delta. It was one of the country's deadliest humanitarian disasters, killing more than 140,000 people, destroying whole villages, and resulting in the deaths of thousands of

heads of livestock and shrimp, and the destruction of crop farms and critical infrastructure, such as schools and clean-water sources (WFP, 2008). The death rate of women was twice as high as those of men (UNWOMEN, 2015).

The country was already experiencing severe grievances before the storm. Weak land-tenure security is one of the most critical issues, since more than 70 per cent of Myanmar's citizens who live in rural areas rely on agriculture-related activities for their livelihoods (Adelphi, 2015). Access to land has been constrained due to confiscation and land expropriation by the military junta and left more than 50 per cent of the rural population landless (Adelphi, 2015). The composite effect of climate stressors and land scarcity led to a spike in food prices and an increase in the number of displaced people, and it intensified ethnic conflict (G7, 2014). In addition, the military Government obstructed international aid efforts and hindered the humanitarian community's ability to deliver impartial aid, fostering exacerbating grievances among different ethnic and religious groups (John Hopkins et al., 2009).

Cyclone Nargis was an example of how climate change can become a threat multiplier that can add more stress to an already fragile context where poverty, competition for resources and interstate violence paint a worrisome picture.

The Resource and Climate Vulnerability Index methodology

The Resource and Climate Vulnerability Index (RCVI)

is composed of nine variables to measure volatility and dependency within agricultural and water resources, as well as the risk of sudden- and slow-onset weather disasters that are linked to the destruction of capital, production and increased displacement. The unit of analysis is the nation State. RCVI ranks 157 countries³, or 99 per cent of the world's population, and it can be thought of as a single measure of a nation's social and economic vulnerability to climate-change stresses.

Severe flooding and drought account for the largest amount of climate-related internal displacement. As a result, countries that are at more risk of these events are more exposed to climate-induced conflict. This is compounded by countries' dependence on the agricultural sector as changes in production can decrease employment and output and increase poverty. The amount of water used within these sectors and the changes in water supply also affect climate-related conflict, which needs to be accounted for, and cyclones and tropical storms have become more common in recent years, leading to the sudden destruction of property, crops and water contamination.

The nine variables in the RCVI include:

- Employment in agriculture as a percentage of the workforce (World Bank)
- Agriculture as a percentage of GDP (World Bank)
- Water withdrawals in the agriculture sector as a percentage of total withdrawals (UNEP)
- Total water resources per capita (UNEP)
- Changes in total water resources over a 20-year period (UNEP)
- Food Security Index (INFORM⁴)
- Drought Risk Index (INFORM)
- Flood Risk Index (INFORM)
- Cyclone risk (INFORM)

These are weighted equally and scaled from zero to nine. Lower scores represent high levels of volatility and risk; higher numbers represent lower levels of risk and volatility. Thus, a score of nine represents the lowest possible relative score for climate change vulnerability.

Climate change can indirectly increase risks of violent conflicts in the form of civil war and inter-group violence by amplifying well-documented drivers of these conflicts such as poverty and economic shocks.

IPCC, 2014

3. Given the diverse ecological / climate zones of many large countries such as India or China, comparing countries rather than sub-national entities may lead to an analytical bias from a climate change perspective. However, due to the lack of comparable data at sub-national levels, the ranking had to restrict itself to comparing countries.

4. The Index for Risk Management (INFORM) is an inter-agency humanitarian risk index. It identifies where crises requiring international assistance may occur. It is based on a composite of many crisis risk indicators. It covers 191 countries, and it combines about 50 indicators that measure hazards (events that could occur), vulnerability (communities' susceptibility to those hazards) and capacity (available resources that can alleviate the impact). INFORM [www.inform-index.org/] is a joint initiative of the Inter-Agency Standing Committee and the European Commission.

Results

The preliminary results from this paper are consistent with the current conflict and climate change literature in identifying many low- and lower-middle-income nations as most vulnerable to the climate-conflict nexus. Many countries will be affected by climate change. However, low-income countries that have experienced multiple international humanitarian appeals constitute the majority of the worst-performing countries in the RCVI, indicating a high likelihood that crises will remain protracted and intensify year by year. The 20 highest-risk countries shown in table one represent a total population of 3.5 billion people, with India and China evidently accounting for the great majority of this number. Not all of these populations will be equally affected to the point of mass migration, but this is suggestive of the onset of future climate change-related stresses due to fluctuating food prices, increased competition for scarce resources and

shifting distributions and availability of resources, with related macroeconomic effects on national economies.

There is a significant regional and developmental trend evident in the results of the RCVI. Sub-Saharan Africa represents 35 per cent of the 20 worst-performing countries, South Asia represents 25 per cent and the Asia-Pacific region accounts for another 25 per cent. Russia, the Commonwealth of Independent States (CIS), the Middle East and North Africa region and Central America and the Caribbean comprise the remaining 15 per cent.

There is also a significant trend with the income classification of the countries. Except for China, the 20 lowest-performing countries are all low-income or lower-middle-income countries. About 60 per cent of the top 20 countries have already had international humanitarian appeals in the past decade.

Table 1: The 20 highest risk countries according to the RCVI.

RCVI Rank	Country	Humanitarian appeal in the past 10 years	RCVI Scores	Population
1	Madagascar	Y	2.5	22,924,851
2	Bangladesh	Y	2.7	156,594,962
3	Mozambique	Y	2.7	25,833,752
4	Ethiopia	Y	2.9	94,100,756
5	Myanmar	Y	2.9	53,259,018
6	India	N	2.9	1,252,139,596
7	Somalia	Y	3.0	10,495,583
8	Vietnam	N	3.0	89,708,900
9	Pakistan	Y	3.2	182,142,594
10	Chad	Y	3.3	12,825,314
11	Haiti	Y	3.4	10,317,461
12	Tanzania	N	3.4	49,253,126
13	Afghanistan	Y	3.4	30,551,674
14	Tajikistan	N	3.4	8,207,834
15	Nepal	Y	3.4	27,797,457
16	China	N	3.4	1,357,380,000
17	Philippines	Y	3.5	98,393,574
18	Cambodia	N	3.5	15,135,169
19	Kenya	Y	3.6	44,353,691
20	Sudan	Y	3.6	37,964,306

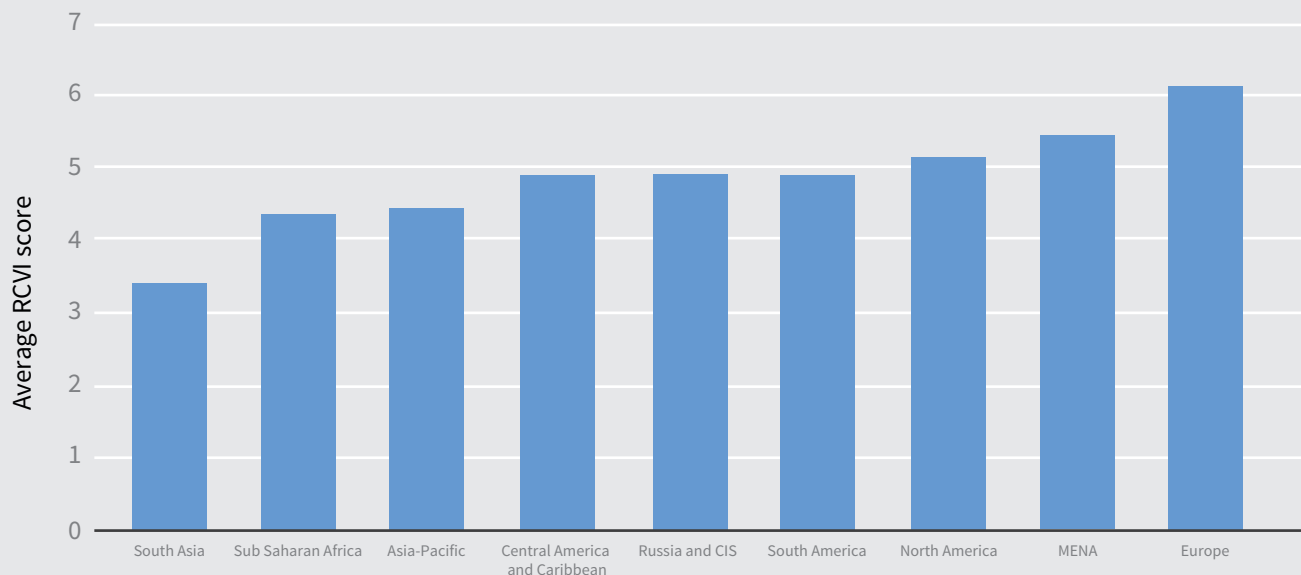
Source: IEP calculations

Asia Pacific, South Asia and sub-Saharan Africa are the three regions most at risk of resource scarcity and natural disasters. Other regions will be affected, but the economic systems within these areas are the most volatile to changes in agricultural output, water resources and natural disasters. See figure below.

When the index is divided by income classification, continuity with previous research is also shown. As highlighted by Nel and Richarts (2008), low-income and fragile economies are most at risk from climate-induced conflict. The RCVI shows that low-income and lower-middle-income economies score the lowest, representing high levels of volatility and risk.

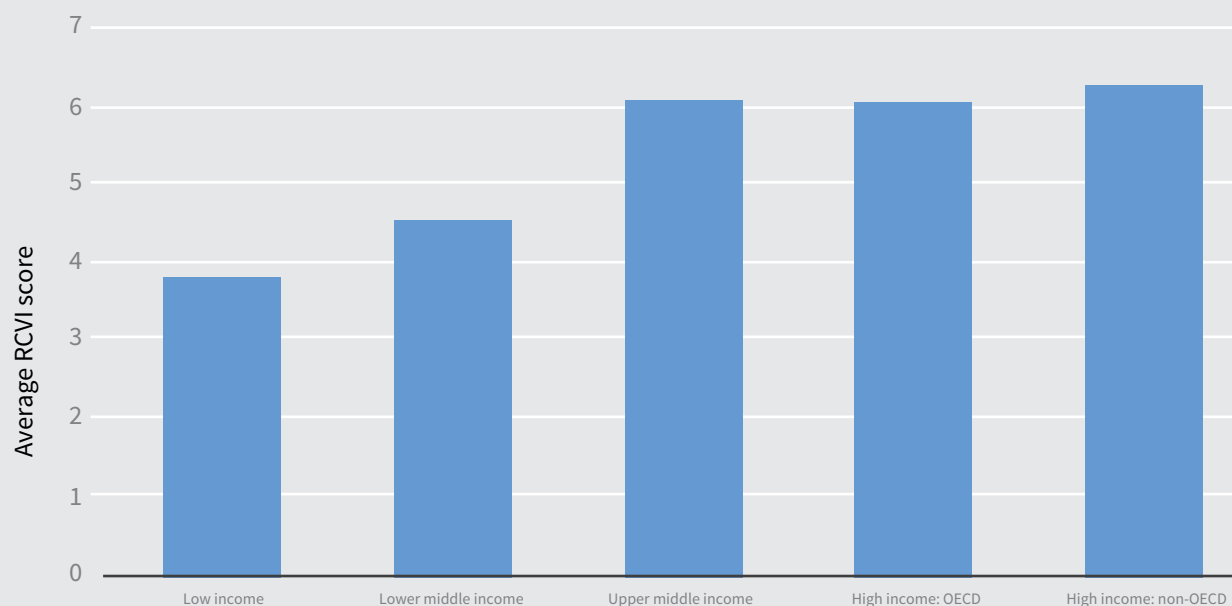
Figure 1: RCVI ranking by region

South Asia is the region most vulnerable to social and economic stress from climate change



Source: IEP calculations

Figure 2: RCVI ranking by income classification



Source: IEP calculations

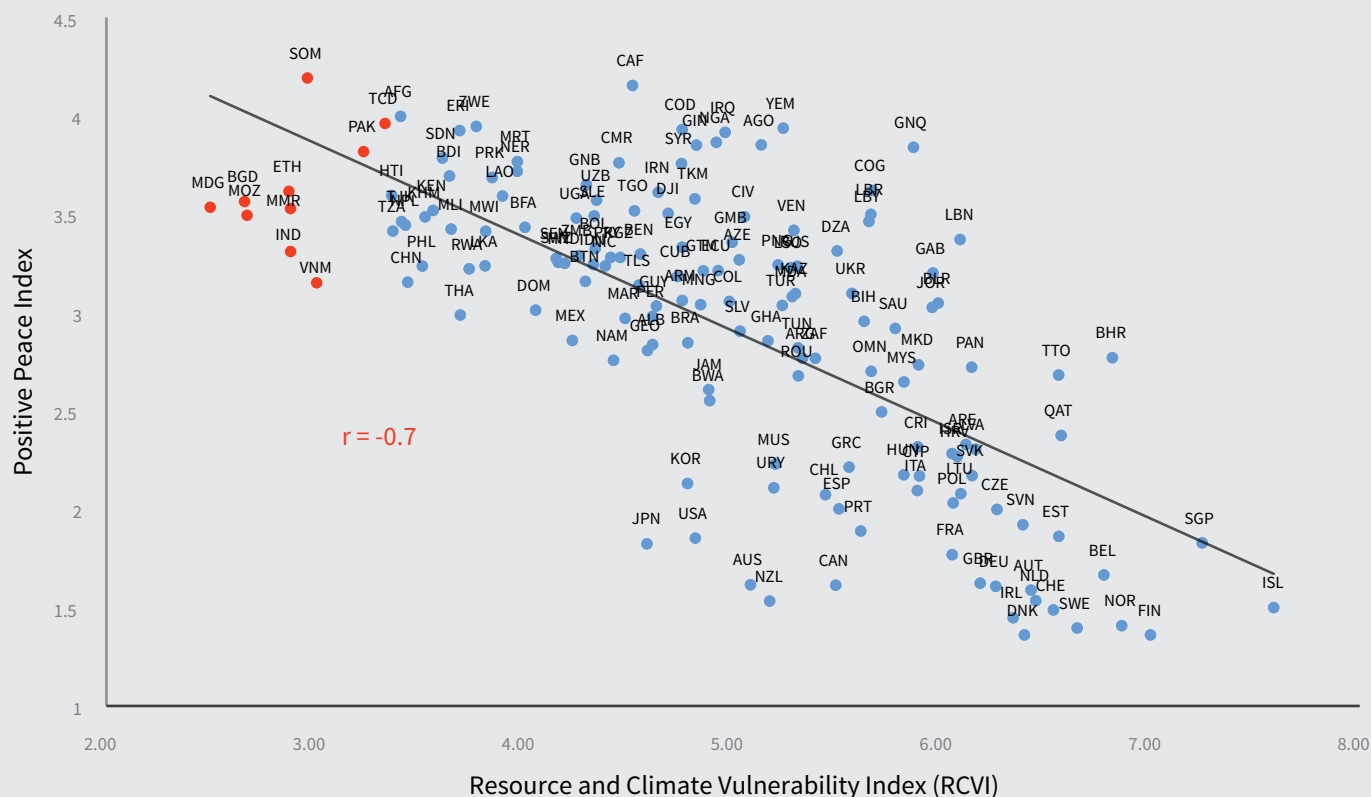
The RCVI provides a measurement of comparison to those economies that are at risk of economic and social volatility due to resource scarcity and weather patterns. However, the link to broader social and economic institutions is not represented. By looking at countries that have weak institutions and low resilience to deal with grievances as well as climate change, vulnerability to the conflict-climate nexus can be measured.

When the RCVI is correlated against the PPI, a significant negative correlation of $r=-0.70$ is shown. This is represented in figure three, which shows that the countries with a high risk of resource scarcity and natural disasters also tend to have weak institutions and resilience. This shows that the

countries most vulnerable to climate change are also weak institutionally, suggesting they are particularly vulnerable to climate change-induced conflict. While not as significant, the relationship between the RCVI and the GPI, which measures the absence of violence and fear of violence, is also correlated at $r=-0.5$. This shows that countries with higher levels of violence are also more vulnerable to climate change. More research should be conducted to assess the precise relationships between these variables. However, the results show evidence to conclude that the risk countries shown within the RCVI are also at risk from climate change-induced conflict.

Figure 3: PPI versus the RCVI, 2014, $r=-0.70$

Positive-peace measuring shows that the attitudes, institutions and structures that support resilience and peace are strongly correlated to social and economic vulnerability to climate change. This shows that many fragile and weak States are vulnerable to climate change-induced conflict. The 10 most vulnerable nations are highlighted in red.



Source: IEP

The countries that are in the conflict-climate nexus have been defined as those in the bottom quintile of both the PPI and the RCVI. Table 2 identifies 20 countries that have weak institutions to deal with grievances as well as social and economic vulnerability to climate change. It is important to note that due to a lack of comparable data, this analysis excludes many microstates that are evidently particularly vulnerable to climate change. Some 780 million people live in the large countries of the climate-conflict nexus and entirely include people living in low- and lower-middle-income contexts. This is an important preliminary risk-modelling exercise that should be supported with further discussion and research.

Table 2: Twenty countries in the bottom quintile of both the PPI and the RCVI.

These countries are in the conflict-climate nexus. They score poorly on resource and climate vulnerability, and they currently lack the institutions, attitudes and structures that support a resilient society. They encompass some 780 million people.

Country	Positive Peace Index	Humanitarian appeal in the past 10 years	Resource and Climate Vulnerability Index	Population
Afghanistan	4.00	Y	3.41	30,551,674
Bangladesh	3.56	Y	2.66	156,594,962
Burundi	3.69	Y	3.64	10,162,532
Cambodia	3.49	N	3.53	15,135,169
Chad	3.96	Y	3.33	12,825,314
Eritrea	3.93	Y	3.69	6,333,135
Ethiopia	3.62	Y	2.87	94,100,756
Haiti	3.60	Y	3.37	10,317,461
Kenya	3.52	Y	3.56	44,353,691
North Korea	3.69	Y	3.85	24,895,480
Lao PDR	3.59	N	3.90	6,769,727
Madagascar	3.54	Y	2.50	22,924,851
Mauritania	3.77	Y	3.97	3,889,880
Mozambique	3.49	Y	2.67	25,833,752
Myanmar	3.53	Y	2.88	53,259,018
Niger	3.72	Y	3.97	17,831,270
Pakistan	3.82	Y	3.23	182,142,594
Somalia	4.19	Y	2.96	10,495,583
Sudan	3.79	Y	3.61	37,964,306
Zimbabwe	3.95	Y	3.77	14,149,648

Vulnerability to climate change data set

This paper also looked at other attempts to measure climate change vulnerability. It used a data set developed by senior research fellow David Wheeler at the Center for Global Development (CGD), which measures four dimensions of climate impact: extreme weather, sea-level rise, agricultural productivity loss and overall adaptation assistance.

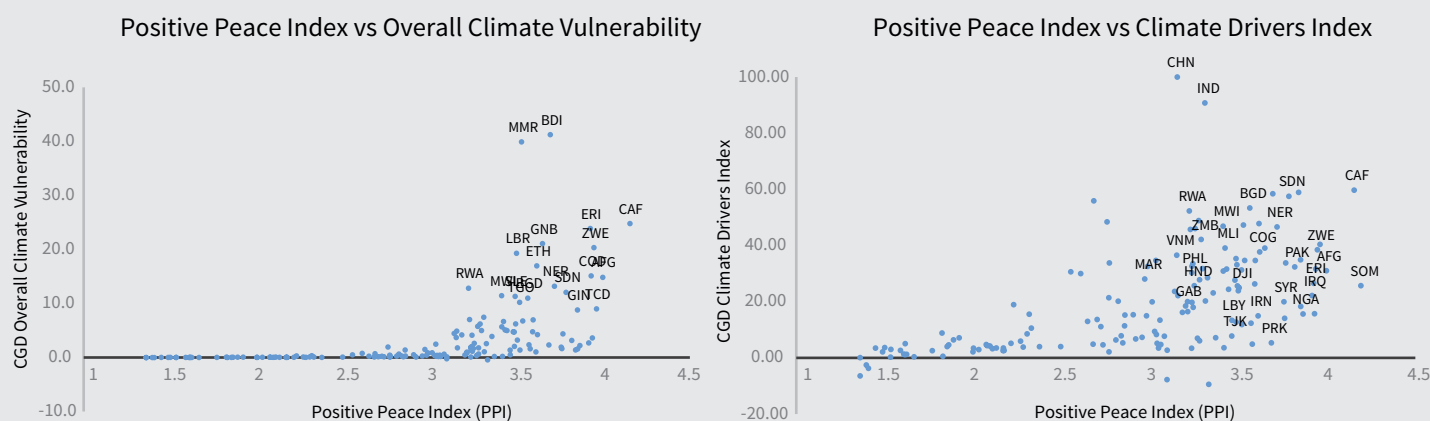
Figure four shows the correlations between the PPI and the two key measures from that data set. The Overall Climate Vulnerability and the Overall Climate Drivers Index show positive correlations with the PPI at $r=0.42$ and $r=0.57$, respectively.

The high correlation between the two measures supports the selection of similar indicators used in the RCVI. Economies that are most vulnerable to changes within the agriculture sector, sea-level rise and extreme weather have the lowest positive peace or ability to deal with conflict.

There are some nations that the CGD identifies as particularly vulnerable, but which the RCVI does not. This shows that further research and refinement of either measurement may yield more accurate assessments.

Figure 4: CGD measure of vulnerability and drivers of climate change versus the PPI.*

Analysis of CGD's data set measuring climate change drivers and vulnerability shows a correlation to the PPI, highlighting many of the same low-income South-East Asian and sub-Saharan nations.



*Outlier Somalia has been removed on the overall climate vulnerability measure.

Case Study: Is climate change the convoluted link in Darfur, Sudan?

The 2003 war in Darfur is one of the first cases where the link between climate change and conflict was highlighted. As the international community tried to understand the root causes of the violence, some pointed to historical rainfall data as a potential answer. In 2005, a study found that between 1950 and 1990, internal conflicts in Darfur flared up after periods of low rainfall and coincided with drought (Suliman, 2005). Each consecutive wave of drought was followed by more violent and longer conflict.

Between 1970-1980s, prolonged droughts and environmental degradation, among other factors, forced about 4 million Sudanese, mainly from the north, to take off in search for more favourable conditions (Reuveny, 2007). These conditions were to be found in southern areas where agricultural land was the main source of livelihoods. In other countries, such as Ethiopia, similar dynamics did not lead to high-intensity conflict. However, the context in Darfur set the stage for the awful violence that followed. In the early 1970s, the central Government banned the tribal-based

Native Administration in Darfur that was meant to manage communal grievances (Edwards, 2008). As resources became scarcer, land less fertile and demand ever increasing, tensions between farmers and pastoralists reached new highs and could not be mitigated through traditional means.

In 2007, the IPCC linked the war in Darfur to the worsening climate conditions. Climate change was understood as a contributing factor that, when left unmanaged, forced large numbers of people to move into areas that simply did not have resources to spare nor mitigation mechanisms to absorb the incoming people (ibid). It was this combination of factors within the tight timeline and in the context of chronic vulnerability, low human development indicators, population growth and a history of low-level conflicts that created conditions for an all-out war that claimed 300,000 lives and displaced over 2 million people.



CREDIT: Albert Gonzalez Farran, UNAMID. OCHA. 2014.

Conclusion

The preliminary results of this paper are consistent with the current conflict and climate change literature in identifying many low- and lower-middle-income countries as most vulnerable to the climate-conflict nexus. With the exception of Cambodia and Laos, all countries in the climate-conflict nexus are of concern for the international humanitarian community as they have experienced a humanitarian appeal in the past 10 years. This is alarming, given that the overall international humanitarian financial ask has already grown more than 600 per cent over the past decade, and as highlighted by the High-Level Panel on Humanitarian Financing, the global capacity to respond to humanitarian crises is already “overstretched”.

This paper is a preliminary research on identifying countries in the climate-conflict nexus, a critical area with a relatively small and developing literature. The paper partially fills an existing gap in data and provides a new framework to assess future trends of the explosive nexus between climate change and conflict. Its findings aim to spur further debate, discussion and analysis to better understand the risk of climate change-induced conflict.

OCHA’s 2014 flagship policy report, *Saving Lives Today and Tomorrow: Managing the Risks of Humanitarian Crises*, called for a new approach to humanitarian action that places risk management at the core of humanitarian response. This call was further refined in OCHA’s 2015 flagship report, *Leaving No One Behind : Humanitarian Effectiveness in the Age of the*

Sustainable Development Goals. This has now been picked up by the World Humanitarian Summit (WHS) process and has become a key element of the New Way of Working proposed by the UN Secretary-General in his report *One Humanity: Shared Responsibility* and its Agenda for Humanity. This vision cannot be achieved without starting with a sound evidence base of crisis risks that accounts for the compounding effect of conflict and climate change risks. This paper therefore provides a valuable contribution to advancing the vision from the World Humanitarian Summit in practical terms.

Future research could include:

- Analysis of how at-risk countries are currently affected by internal and external conflict.
- Analysis of the scores of neighbouring countries on violence and climate risk in order to assess the risk of contagion and develop a regional or neighbourhood risk profile.
- Understanding of which countries (if any) are likely to benefit from changes in climate and whether this will alleviate conflict stressors.
- Understanding of how climate change will lead to increased forced displacement, taking into consideration the differentiated gender impacts of displacement, especially as it relates to nationality laws, citizenship and identity. For example, Syrian women are not able to pass citizenship to their children, which can lead to Statelessness, as witnessed in Europe with the influx of

Syrian refugees. Over time, marginalization, alienation and a conflicting/loss of identity in turn could increase the risk of vulnerability to conflict.

- Development of an understanding of the limits of resilience with regards to positive peace.
- Analysis of how resource depletion has led to conflict and collapse over the long run (e.g., Tainter's *The Collapse of Complex Societies* or Jared Diamond's work). Develop parallels with the problems that climate change will cause.
- Mapping the systemic mechanisms in which conflict onset occurs in greater detail, rather than via oversimplistic examples, such as resource availability. Other mechanisms include population transfer and increasing food prices.
- Better mapping of which institutions may help to specifically mitigate these shocks and how.

Regarding the RCVI, it may be possible to improve many of the environmental measures⁵ and better understand the trajectory or growth of risks and develop a composite climate change and positive peace index, rather than just correlating the two. The key variable is vulnerability to climate plus “conflict proximity” (Cf. Syria, with limited impact of climate change, exploding into violence). Better data and research in this area can support a variety of high-level policy decisions on how agreed climate finance can help support the countries that are most vulnerable to climate change-induced conflict.

Following the first World Humanitarian Summit, and as a follow-up to the Paris Agreement, the humanitarian community and OCHA in particular must strengthen their engagement with the climate change and continue to lead the work on identifying the nexus between conflict, climate change and humanitarian concerns.

Our world today is at a crossroads. From a humanitarian perspective, this juncture is defined by two “mega-problems”: a seemingly uncontrollable multiplication of violent conflicts in an environment of global insecurity, and the pervasive and growing effects of natural hazards and climate change that are already shaping our present and will shape our future even more.

Antonio Guterres, former UN High Commissioner for Refugees

5. For example, measures of poverty, land tenure /land ownership, existing land degradation and forward looking climate change impact could further improve the index.

Annex 1: Positive Peace Methodology

Table 4: Positive Peace Framework and Indicators

Pillar	Indicator	Description	Source
Well-Functioning Government	Democratic political culture	Measures whether the electoral process, civil liberties, functioning of government, political participation and culture support secular democracy.	EIU
	Judicial independence	Measures the extent to which the judiciary is independent from influences of members of government, citizen or firms.	WEF
	Revenue collection and service delivery	Measures the efficiency of the national tax system and the territorial coverage of public services and utilities.	IPD
Sound Business Environment	Ease of Doing Business Index?	Measures the degree to which the regulatory environment is more conducive to the starting and operation of a local firm.	WB
	Economic Freedom Index?	Measures individual freedoms to and protection of freedoms to work, produce, consume, and invest unconstrained by the state.	HF
	GDP per capita	GDP per capita	WB
Low Levels of Corruption	Factionalised elites	Measures the fragmentation of ruling elites and state institutions along ethnic, class, clan, racial or religious lines.	FSI
	Perceptions of Corruption Index?	Scores countries based on how corrupt the public sector is perceived to be.	TI
	Control of corruption	Captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption.	WB
High Levels of Human Capital	Secondary school enrolment	The ratio of children of official school age who are enrolled in school to the population of the corresponding official school age.	WB
	Scientific publications	Number of scientific publications per 100,000 people.	WB
	Youth Development Index	YDI measures the status of 15-29 year-olds in according to five key domains: Education, Health and Well-being, Employment, Civic Participation and Political Participation.	IEP
Free Flow of Information	Freedom of the Press Index	A composite measure of the degree of print, broadcast, and internet freedom.	FH
	Mobile phone subscription rate	Number of mobile phone subscriptions per 100 inhabitants.	ITU
	World Press Freedom Index	Ranks countries based on media pluralism and independence, respect for the safety and freedom of journalists, and the legislative, institutional and infrastructural environment in which the media operate.	RWB
Good Relations with Neighbours	Hostility to foreigners	Measures social attitudes toward foreigners and private property.	EIU
	Number of visitors	Number of visitors as per cent of the domestic population.	EIU
	Regional integration	Measures the extent of a nation's trade-based integration with other states.	EIU
Equitable Distribution of Resources	Inequality-adjusted life expectancy	The HDI life expectancy index adjusted for inequality scores countries based on both average life expectancy and the degree of inequality in life expectance between groups.	UNDP HDI
	Social mobility	Measures the potential for upward social mobility based on the degree to which either merit or social networks determine an individual's success.	IPD
	Poverty gap	The mean shortfall from the poverty line at \$2 per day PPP (counting the nonpoor as having zero shortfall), expressed as a % of the poverty line.	WB
Acceptance of the Rights of Others	Empowerment Index	An additive index using indicators of freedom of movement, freedom of speech, workers' rights, political participation, and freedom of religion.	CIRI
	Group grievance rating	Measures the extent and severity of grievances between groups in society, including religious, ethnic, sectarian and political discrimination and division.	FSI
	Gender Inequality Index	The Gender Inequality Index (GII) reflects women's disadvantage in three dimensions: reproductive health, empowerment and the labour market.	UNDP HDI

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