

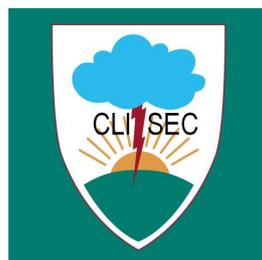


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*Climate Change:  
Source of Conflict or Promoter of Cooperation?*

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# **Climate Change: Source of Conflict or Promoter of Cooperation?**

## How to Sort Arguments in the Debate on Climate Change and Intrastate Violent Conflict

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Since 2007, the interest in environmental conflicts experienced a renaissance and inspired discussions about violent conflicts induced by climate change. This article argues that existing classifications summarizing the various positions regarding a possible nexus between climate change and intrastate violent conflict are incomplete, particularly those referring to the distinction between neomalthusians and cornucopians. By reviewing main theoretical arguments and latest empirical evidence, a comprehensive new typology is developed which distinguishes between three perspectives, each providing a different answer to the question whether climate change is a (potential) source of violent conflict onset: (a) The Climate Conflict perspective claims that climate change increases the risk for violent conflict onset, while (b) the Social Conflict perspective states that climate change is mostly unrelated to the outbreak of violence. Finally, (c) the Environmental Peace perspective suggests that environmental problems, resource scarcity and natural disasters - which can all be exacerbated by climate change - may provide opportunities for cooperative behavior. Especially this last perspective has so far neither been coherently portrayed nor received adequate attention in the literature. There is empirical evidence supporting each of the three perspectives, so the central question of future research should not be whether climate change will stimulate more violent conflict (or intergroup cooperation), but rather under which conditions the claims of the different perspectives are valid.

**Key words:** violent conflict, climate change, resource scarcity, environmental peacebuilding, disaster diplomacy

### **1 Introduction**

The world is facing several large trends at the beginning of the 21<sup>st</sup> century. One is climate change, and for different scenarios it is estimated to raise the global mean temperature by 1.8 up to 4 degrees until end of the 21st century compared to end of the 20<sup>th</sup> century, with the higher end of this range being more likely (IPCC 2007). The negative consequences of climate change include, inter alia, changed precipitation patterns, melting glaciers, rising sea level, worsening conditions for agriculture and more frequent natural disasters (IPCC 2007). Another major trend

is the rising importance of intrastate vis-à-vis interstate conflict (Themnér/Wallensteen 2011). This paper explores the interrelations between these two important developments by asking the question: Is climate change a source of intrastate violent conflict onset, or can it even be considered as a promoter of cooperation<sup>1</sup>? The focus on intrastate violent conflicts is also justified by the wide consensus in the literature that climate (or environmental) change is unlikely to cause violent conflict between states (Barnett 2003; Gleditsch 2012)<sup>2</sup>.

Before proceeding, some basic definitions should be spelled out. A conflict exists when the incompatible expectations of at least two social groups meet and become manifest (Bonacker 2009: 184). In a violent conflict both actors use a certain amount of direct physical violence against humans in order to enforce or articulate their expectations. For the sake of simplicity, we speak of “conflict” when we mean “violent conflict” in the following. In line with this definition and the large majority of studies, we focus on conflicts between at least two social groups in this article. We thus leave out forms of violence carried out by or directed against individuals. A factor, situation or development is termed conflictive, conflict-relevant or a source of conflict if it can be considered as a root cause, a trigger or an enabling condition of conflicts. However, a conflict is the product of multiple factors, so there is usually not *one* single source of violence (Hagmann 2005; Schreiber 2012).

In a similar manner, the term resource refers to renewable natural resources if not otherwise stated, since the literature on environmental/climate change and conflict focuses exclusively on the scarcity of renewable natural resources (e.g. soil, water, pasture).

This article will proceed as follows: First, some well-established classifications of the various positions concerning climate change-induced conflicts are introduced and criticized (2). In the following section (3), a more comprehensive classification will be presented, distinguishing between the Environmental/Climate Conflict (3.1), the Social Conflict (3.2) and the Environmental Peace (3.4) perspective. Especially the later one is often ignored in the literature and comprehensively portrayed for the first time by this article. We review the main theoretical arguments and latest empirical evidence concerning environmental respectively climate change-induced conflicts provided by all three perspectives in order to answer the main question of this paper. Particularly section 3.3 examines the increasing number of large-N studies which have been conducted in order to support the Climate Conflict or the Social Conflict perspective. Finally, a conclusion is drawn and some directions for future research are suggested (4).

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<sup>1</sup> See Dalby et al. (2009) and Rønnfeldt (1997) for a history of the research field and references to older key texts on the issue.

<sup>2</sup> There exists, however, some noteworthy research on climate change interstate conflict (e.g. Gartzke 2012; Link et al. 2012).

## 2 Classifying Positions Regarding the Climate-Conflict-Nexus

The most widely used way to sort the different positions regarding the connection between environmental problems, resource scarcity and conflicts is the differentiation between (neo-)malthusian and cornucopian positions (e.g. Theisen/Brandsegg 2007: 4f.; Urdal 2008: 592f.). This distinction suffers from various problems. First, in his 1798 essay, Thomas Malthus considered the discrepancy between the linear growth of agricultural output and the exponential growth of human populations as the cause for human misery and conflict (Malthus 1992). Within the discussion about the climate-conflict-nexus, however, climate change and not population growth is the possible source of resource scarcity (and violence). Consequently, many studies on this topic do not consider population issues at all or only as one of many relevant factors. Moreover, Malthus assumed a deterministic connection between population growth, resource scarcity and misery. In contrast, many environmental conflict scholars underscore the importance of institutions and human agency, therefore dismissing any deterministic connections. Bächler (1998: 32) already claimed<sup>3</sup>:

„However, passing the threshold of violence definitely depends on *sociopolitical* factors and not on the degree of environmental degradation as such. Critical sociopolitical factors include the lack of institutional capacities for peaceful conflict settlement, the readiness and/or capacity of authorities and leaders to organize and mobilize collective actors, the (mis-)perception of alternatives to resorting to violence, the preferences and opportunities of actors, and actor limitations.”

The label “cornucopian” greatly reduces the range of arguments criticizing the environmental/climate conflict thesis. Cornucopianism refers, broadly speaking, to positions claiming that societies can adapt to resource shortages or that crucial resources are not getting scarce (Lomborg 2001b; Simon 1981). However, most criticism of a connection between climate/environmental change and conflict accepts that resources are getting scarcer and there are limits to adaptation. This criticism rather points to the lack of consistent theory and empirical evidence as well as the need for further methodological elaboration (see sections 3.2 and 3.3). Finally, the simple distinction between neomalthusian and cornucopian positions ignores other crucial positions in the debate, namely the one put forward by Environmental Peace scholars (see section 3.4).

Other attempts to classify positions regarding the environment-conflict-nexus (e.g. Floyd 2008; Kahl 2006: 4-25; WBGU 2008: 25-30) either term positions according to key authors (Homer-Dixon, de Soysa etc.), institutions (Toronto Group, PRIO etc.), academic disciplines (neoclassical economics, political ecology etc.), or a combination of these categories. All of these classifications do neither enlighten the broader lines of thought which compete in the discussion nor do they

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<sup>3</sup> There exist more deterministic positions (e.g. Kaplan 1994; Welzer 2008), but they are not much considered by the scientific literature and therefore not discussed in this article.

cover all of the key perspectives existing in the field of research. In the next section, we will therefore introduce a more comprehensive classification of positions which is intended to overcome these shortcomings in order to come closer to an answer to the question whether climate change will lead to more conflict or more cooperation.

### **3 Will Climate Change Breed More Violence? Three Main Perspectives of the Debate**

The typology developed in this part of the article is based on a comprehensive reading of classical texts and latest research. The debate about a possible climate-conflict-nexus will be arranged along three main lines of thought, namely the Environmental/Climate Conflict, the Social Conflict and the Environmental Peace perspective.

#### *3.1 Environmental/Climate Conflict*

There is a significant overlap of research on environmentally-induced and on climate change-induced conflicts. This is neither surprising nor contradictory since climate change manifests itself mainly in environmental changes. The main argument of this perspective can be summarized as follows: Environmental change – and therefore climate change as well – causes scarcity of resources, a higher frequency and/or intensity of natural disasters (e.g. storms, floods) and migration. It is therefore an important factor for the onset of conflicts. However, environmental change is neither a necessary nor a sufficient condition for and often not even the most important source of violence. The most likely forms climate change-induced conflicts will take are small-scale, subnational conflicts in poor, undemocratic regions with a history of violence and a low climate change-related adaptive capacity.

##### *3.1.1 Environmental Conflict*

Since they constitute the basis of the research on the climate-conflict-nexus, six main causal paths suggested to connect resource scarcity and conflicts are presented first. The pathways can coincide and even interact:

- a) **Need:** When people absolutely lack the means to sustain their own livelihoods, they may resort to violence in order to capture the necessary resources for survival from other groups (Kaplan 1994). This argument is not very popular in the environmental conflict literature, maybe because one can raise serious doubts about (a) whether people would wait that long with capturing resources and/or (b) the ability of emaciated individuals to engage in organized violence (Barnett 2000).
- b) **Grievance:** Another line of argumentation contends that resource scarcity will reduce the well-being of individuals either directly or via reduced economic growth (Stern 2006).

Homer-Dixon/Blitt (1998) argue that absolute deprivation (people are worse off than before) and – more important – relative deprivation (people are worse off than other groups or than they expect) provide strong motives for people to fight privileged groups or the government. The same natural disasters and resource scarcities leading to deprivation often also undermine the capabilities of the state (see below), thus facilitating the grievances of the people about a lack of support by state institutions. Similarly, resource scarcity can lead people to migrate, causing tensions about scarce resources or identity conflicts in the receiving area (Reuveny 2008).

- c) Opportunity: This style of argumentation can be traced back to the work of Fearon/Laitin (2003: 76), who state:

“Surely ethnic antagonisms, nationalist sentiments, and grievances often motivate rebels and their supporters. But such broad factors are too common to distinguish the cases where civil war breaks out.”

Consequentially, researchers should focus on the opportunity structure aggrieved individuals and groups face when they want to engage in conflict. Environmental change plays a twofold role here (Homer-Dixon/Blitt 1998; Kahl 2006; Miguel et al. 2004): First, environmental change weakens the state, and a weak state will be an easier target for rebel groups or be less able to prevent intercommunal violence. Environmental change also reduces (via its negative impact on economic growth) tax revenues and increases (via damages caused by disasters) the amount of money which must be spent on infrastructure and disaster relief. In addition, resource scarcity may lead to intra-elite competition. Second, environmental change reduces recruitment costs for fighters. If resource scarcity and natural disasters lead to lower yields and lower incomes, the opportunity costs for people to join a conflict group decline. Moreover, in times of external threats such as resource scarcity, group coherence tends to get stronger which facilitates recruitment. Finally, since resources that become scarce often increase in value, they can be used as selective incentives by elites in order to attain allies and stimulate conflict.

- d) Insecurity: The “State Failure Hypothesis” developed by Kahl (2006: 44) claims that there might be another connection between the weakening of states, resource scarcity and conflicts. If a state fails, a fundamental insecurity (“security dilemma”) between various social groups arises due to the lack of a neutral authority setting and implementing binding rules. If such a situation coincides with resource scarcity, all social groups face incentives to change the destabilized order to their favor in order to acquire more of the scarce resources. Since all groups know about these incentives, they will (independent

from their own ambitions) distrust other groups, further intensifying the climate of insecurity and making preventive strikes or the rapid escalation of single violent acts more likely (see Schilling et al. 2011 for an example).

- e) Incentive: Climate change might also have positive effects in some regions, such as more precipitation (e.g. in East Africa) or a prolonged growing season due to higher temperatures (IPCC 2007: 47-49). This might lead to an abundance of resources, which in turn provides incentives for groups to capture these resources violently. In the context of pastoralist societies in Kenya, for instance, it is argued that more intense rainfalls are associated with inter alia a higher availability of healthy cattle. This provides neighboring groups with an incentive to steal the cattle violently (“raiding”), while in times of rainfall scarcity, raiding does hardly pay off due to a lack of healthy cattle (Adano et al. 2012; Schilling et al. 2012). But this argument about the abundance of natural resources as an incentive for violence is also used by the Environmental Peace perspective (see section 3.4).
- f) Aggression: Several studies in social psychology indicate “that in many settings hot temperatures cause increases in aggression” (Anderson 2001: 37). According to this logic, heat causes more anger, animosity and a higher readiness for vengeance on the individual level, which may escalate into conflicts via spirals of violence or a higher readiness to fight (Anderson/DeLisi 2011; Fritsche et al. 2012). These arguments only gained minor attention in the broader research on climate change and conflict so far since it is completely unclear if and under which conditions an increase in individual aggression transforms into a higher likelihood for inter-group conflict onset

One apprehension often articulated by environmental conflict scholars is that resource scarcity may lead to conflicts while conflicts themselves exacerbate environmental problems (UNEP 2009), therefore leading to a vicious cycle.

Most of the works concerning the environment-conflict-nexus mention several intervening variables and context factors that make their claims more precise. An extended debate of this issue is not possible here. However, Carius et al. (2006) collected 73 incidences of environmental conflicts taking place between 1980 and 2005<sup>4</sup>. They found the following context factors to be especially relevant for environmental conflict onset:

- Unequal distribution of power and resources as well as corruption.
- Government failure and no adequate decentralization of competences.
- Already existing social, political and cultural tensions and insecurity.
- Insecurity of livelihood and poverty.

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<sup>4</sup> Including 25 inter-state and 17 non-violent conflicts.

- Population pressure and multidimensional migration.
- Problematic socio-demographic structures or trends.
- Unequal possession of and access to land as well as natural and common-pool resources.
- Inadequate land use systems and technologies.

### *3.1.2 Climate Conflict*

Mostly from 2007 on, many of the basic arguments of environmental conflict scholars were adopted by the fast growing research on the climate-conflict-nexus (Brauch 2009). Barnett/Adger (2007), for example, convincingly connect “grievance” with “opportunity” arguments. They suggest that environmental degradation caused by climate change undermines human security, therefore raising grievances and lowering opportunity costs for violent behavior. This is particularly the case for poor areas with low capacities for adaptation and a strong dependence on natural resources.

There is wide agreement in the literature on three particular conflict constellations which could be induced by climate change (Scheffran/Battaglini 2011; Theisen et al. 2013; WBGU 2008):

- a) Resource scarcity: Climate change can, for instance, reduce food production through higher temperatures, changed rainfall patterns and more (severe) natural disasters. Indeed, a large number of studies confirm the link between food insecurity and the occurrence of conflict (e.g. Arezki/Brückner 2011; Pinstrup-Andersen/Shimokawa 2008; Rowhani et al. 2011; Smith 2013). Furthermore, climate change is likely to cause increasing water scarcity in some regions due to the melting of glaciers, changing rainfall patterns and increasing evaporation. This could in turn raise needs, grievances, opportunities and insecurities, thus eventually leading to violence. A typical type of conflict which could be exacerbated by dwindling food and water resources is farmer-herder violence in Sub-Saharan Africa (Njiru 2012).
- b) Increasing intensity and/or frequency of natural disasters: Using a combination of grievance-, opportunity- and insecurity-based arguments, Bhavnani (2006: 38) illustrates the mechanisms connecting natural disasters to conflict:

„Natural disasters in general contribute to conflict because they create competition for scarce resources, exacerbate inequality with the unequal distribution of aid, change power relationships between individuals, groups, and the organizations that serve them, and can create power vacuums and opportunities for warlords to usurp power.“

Hydro-meteorological disasters are especially conflictive if the government is identified as responsible for inadequate prevention, emergency relief or reconstruction measures (Goldstone 2001).

- c) Environmentally induced migration: Resource scarcity, natural disasters or a rising sea level can act as push factors for people to migrate to other places. In the receiving areas, competition for scarce resources or ethnic and political tensions between newcomers and longer-time residents have under certain circumstances the potential to be a source of conflict (Reuveny 2007). Refugee camps may also provide good opportunities to recruit fighters (Salehyan/Gleditsch 2006). If Diasporas are an important factor in stimulating conflict in their homelands because they provide various forms of financial and organizational support (Smith 2007), climate change induced migration may also raise the conflict risk of outsending areas – a hypothesis hardly considered so far.

All dynamics are to a large extent influenced by several natural, economic, political, social and cultural scope conditions which cannot be fully discussed within this paper (Scheffran et al. 2012c; WBGU 2008).

Another important aspect is that not only climate change itself, but also attempts to mitigate or adapt to climate change can be conflictive (Scheffran et al. 2012a). Mitigation policies can stimulate conflicts through, for instance, the cultivation of biofuels or a rise of the price of fossil fuels (which can in turn increase food prices) (Nordås/Gleditsch 2007). Examples of conflictive adaptation measures include adaptation funds, which can be used as sources of financing by rebels or repressive regimes, and an increase of irrigation agriculture leading to conflicts with parties located downstream at the same river (Tänzler et al. 2010). To avoid these problems, concepts of conflict-sensitive climate adaptation have been developed (Yanda/Bronkhorst 2011). However, since little research has been conducted on these issues, well founded claims cannot be made yet.

### *3.2 Social Conflict*

Proponents of the Social Conflict perspective argue that climate change is no or only a marginal source of conflict. They suggest that the evidence in favor of a climate-conflict-nexus is scientifically unfounded and rather speculative. Rather, social factors, such as a medium level of democracy, low economic growth or poverty, are the relevant drivers of conflict onset. The Social Conflict perspective raises doubt about the theoretical plausibility of, the methodology underlying and the empirical evidence supporting the Climate Conflict perspective.

#### *3.2.1 Theoretical Plausibility*

Many authors criticize environmental and climate conflict scholars for underestimating or at least undertheorizing the role of social factors like institutions, culture or regime type. According to them, these scholars suggest a too direct or deterministic link between environmental change and

conflict (Barnett 2003; Hartmann 2010). Especially remarkable is the lack of attention given to the local actor's perceptions as well as to local conflict regulation mechanisms and institutions governing the access to natural resources (Hagmann 2009; Martin 2005; Timura 2001). From a political ecology perspective, Peluso/Watts (2001) argue that (the perception of) resource scarcity is always produced by and embedded into complex local and global relations of power, production, accumulation, commodification and culture, which are hardly taken into account when environmental conflicts are analyzed.<sup>5</sup>

Barnett (2000) argues that Homer-Dixon (in accordance with the majority of studies concerning the climate-conflict-nexus) only shows how environmental change leads to poverty and underdevelopment, but fails to specify the mechanisms that cause such a situation (which is very common in large parts of the world) to cross the threshold to violence. Another common argument put forward against climate change-induced conflicts is that they simply do not pay. Other responses to resource scarcity (such as increased imports, more efficient irrigation systems or desalination) are much more cost-efficient and less dangerous for participating individuals (Goldstone 2001; Salehyan 2008).

### *3.2.2 Methodology*

This line of argumentation contends that most studies confirming the Environmental/Climate Conflict perspective are methodologically unsound. Gleditsch (1998), for instance, points out that the existence of an environmental-conflict-link is often only supported by the anecdotal evidence of singular cases (but see Schwartz et al. 2000 for a discussion of this objection). In a similar manner, de Soysa (2000) criticizes that these case studies rely on statements made by the conflict actors themselves, who try to frame their actions in terms of grievance about resource scarcity and environmental discrimination, even if they are motivated by voracity for power or wealth.

On the other hand, claims of large-N studies about the conflictivity of land degradation or food insecurity often suffer from serious endogeneity problems since these conditions can also be the result of – or indicators for – the existence of conflict, poverty or poor governance (Bernauer et al. 2010). Furthermore, Benjaminsen (2008) raises an interesting point by claiming that many studies arguing in favor of an environment-conflict-nexus use out-dated or inadequate environmental data. For instance, most of the large-N studies claiming a significant correlation between land degradation and conflict use the Global Assessment of Soil Degradation (GLASOD) to operationalize their independent variable. But GLASOD is based solely on the view of around 250 different experts who do not use consistent definitions.

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<sup>5</sup> But notice that Peluso/Watts have been criticized for portraying the findings of proponents of the Environmental Conflict perspective as simpler than they actually are (Homer-Dixon 2003).

Going beyond the critique of specific methods, Gleditsch (1998) argues that most models developed by environmental conflict scholars are overly complex and impossible to test. This claim is still valid for many theoretical approaches emphasizing the conflict relevance of climate change (e.g. Barnett/Adger 2007; WBGU 2008). Matthew and his colleagues (2002) criticize scholars claiming an environment-conflict-nexus for examining too short time periods, because resource-related violence could only be an episode in a larger process of (positive) societal transformation (e.g. democratization, decentralization).

### *3.2.3 Empirical Evidence*

The most important claim of the Social Conflict perspective is that so far there is no convincing empirical evidence confirming that environmental and climate change make conflict onset more likely (Theisen et al. 2013), which stands in contrast to some well established social, economic and demographic factors rising the risk of conflict onset (Dixon 2009; Hegre/Sambanis 2006). As a contrast to the bulk of case studies linking environmental degradation to conflict onset, there are also many cases in which resource scarcity and natural disasters were either epiphenomenal to the conflict (Bobrow-Strain 2001; Hagmann 2009; Turner 2004; Verhoeven 2011), did induce improved resource management and cooperation patterns (Juul 2005; Slettebak 2012) or did (as for example in North Korea or Malawi) simply not coincide with conflict (Barnett 2000). Even studies designed to find a connection between averse climatic changes and conflict are often unable to confirm such a link (Koubi et al. 2012; Theisen et al. 2011). In a similar fashion, Buhaug et al. (2008: 5) make us aware of the fact that

“the many processes associated with global warming, which have truly started to appear only over the last fifteen years, have occurred during a time when we have witnessed a dramatic reduction in the frequency and severity of armed conflict.”

Regarding climate-change induced migration, several authors doubt that it will be a source of conflict. First of all, the links between climate change and migration are much more complex and ambiguous than initially thought (Warner 2010). In addition, environmental change (in contrast to civil war or state failure) is likely to cause migration of people that are not powerful enough to engage in systematic violence, lack weapons and organizational structures as well as contract to violence entrepreneurs and are not pursuing conflictive agendas (Gleditsch et al. 2007; Raleigh et al. 2008).

Finally, some of the objections formulated against the environmental conflict thesis by the already mentioned cornucopian authors need to be mentioned. Lomborg (2001a, 2001b) and Ausubel (1998) claim that essential renewable and non-renewable resources are not getting scarce. But even if certain resources get scarce once, this will lead to technological innovation,

substitution or increasing imports (Simon 1981, 1989). However, the cornucopian perspective ignores that there are physical and technological, but also political and cultural limits to climate change adaptation, especially in marginalized and resource-poor regions which are prone to conflict anyway (Adger et al. 2009; World Bank 2013). So although it cannot be denied that some regions (especially in the Global North) are less vulnerable and more resilient to the negative impacts of climate change, the cornucopian arguments in general are much weaker than other points raised by the Social Conflict perspective.

*3.3 Climate Conflict vs. Social Conflict: Assessing the Quantitative Evidence*

As already indicated, the existing case studies provide no clear picture whether climate change will lead to more conflict onset or not. But what about quantitative large-N studies?

Most authors choose higher temperatures, reduced precipitation or increased rainfall variability as the independent variable, which has the advantage of being exogenous to local socio-economic factors. Table 1 summarizes the large-N studies on the climate-conflict-nexus which are covering more than one country and appeared in the peer-reviewed literature. As can be seen, there is no consensus about the conflict relevance of higher temperatures, reduced precipitation or a higher number of extreme rainfall events (including droughts and heavy rainfall events). The results for lower availability of freshwater, climate-related disasters and deforestation are similarly inconclusive. This picture does not change if we take out the studies against which major objections were put forward (marked italic), namely those of Hauge/Ellingsen (1998) and Burke et al. (2009) (Buhaug 2010; Theisen 2008).

Only the conflictivity of land degradation seems to be nearly consensual, since five out of seven studies agree on that point. But one should be cautious about this finding, given the fact that most of these studies (Esty et al. 1999, Hauge/Ellingsen 1998, Raleigh/Urdal 2007, Theisen 2008) use the methodologically questionable GLASOD data. Furthermore, Fearon (2010) and Urdal (2005) find no correlation between cropland scarcity per capita and conflict. This may be a more appropriate operationalization since resource scarcity is the supposed mediating mechanism between land degradation and conflict while even a high level of land degradation per se might be unproblematic if the affected area is sparsely populated.

<b>Consequence of climate change</b>	<b>Conflictive<sup>6</sup></b>	<b>Non-conflictive</b>
Higher temperatures	<i>Burke et al. (2009)<sup>a</sup></i> Hsiang et al. (2011) <sup>d</sup> O’Loughlin et al. (2012) <sup>c</sup>	Buhaug (2010) <sup>a</sup> Koubi et al. (2012)

<sup>6</sup> This means that the respective study found at least one link between environmental change and conflict onset, even if the relationship is weak, indirect or dependent on scope conditions.

Reduced precipitation	Fjelde & van Uexkull (2012) <sup>b</sup> Hendrix & Glaser (2007) <sup>b</sup> Hendrix & Salehyan (2012) <sup>a</sup> Miguel et al. (2004) <sup>b</sup> Raleigh & Kniveton (2012) <sup>c</sup>	Buhaug (2010) <sup>a</sup> Buhaug & Theisen (2012) <sup>a</sup> Brückner & Ciccone 2010 <sup>b</sup> <i>Burke et al. (2009)<sup>a</sup></i> Koubi et al. (2012) Nel & Righarts (2008) O'Loughlin et al. (2012) <sup>c</sup> Theisen et al. (2011) <sup>a</sup>
More rainfall extremes	Hendrix & Salehyan (2012) <sup>a</sup> Raleigh & Kniveton (2012) <sup>c</sup>	Koubi et al. (2012)
Lower availability of freshwater	Gizelis & Wooden (2010) <i>Hauge &amp; Ellingsen (1998)</i> Raleigh & Urdal (2007)	Hendrix & Glaser (2007) <sup>b</sup> Theisen (2008)
Land degradation	Biermann et al. (1998) Esty et al. (1999) <i>Hauge &amp; Ellingsen (1998)</i> Raleigh & Urdal (2007) Theisen (2008)	Hendrix & Glaser (2007) <sup>b</sup> Rowhani et al. (2011) <sup>c</sup>
Climate-related natural disasters	Besley & Persson (2011) Drury & Olson (1998) Hsiang et al. (2011) <sup>d</sup> Nel & Righarts (2008)	Bergholt & Lujala (2012) Omelicheva (2011) Slettebak (2012)
Deforestation	Esty et al. (1999) <i>Hauge &amp; Ellingsen (1998)</i>	Theisen (2008)

*italic* Major objections are raised against this study.

<sup>a</sup> Focuses only on Africa.

<sup>b</sup> Focuses only on Sub-Saharan Africa.

<sup>c</sup> Focuses only on parts of East Africa.

<sup>d</sup> Focuses only on countries affected by El Niño/Southern Oscillation (ENSO).

**Table 1: Overview about large-N studies concerning climate change-induced conflicts**

There are no quantitative studies about the climate-migration-conflict-nexus, presumably because of inadequate or incomplete data (Reuveny 2008). There are furthermore some studies which claim a strong and direct link between colder temperatures and war for long historical periods prior to the industrial age (e.g. Tol/Wagner 2010; Zhang et al. 2007). But these studies focus on wars in the pre-industrial and pre-globalization era and are therefore only of limited relevance for the research on intrastate conflicts in the present and future.

Explanations for the mixed empirical evidence provided by large-N studies point to important methodological deficits, such as the lack of adequate data (e.g. on low level conflicts) or a missing theoretical framework addressing the challenging questions of feedback loops, causality chains and the endogeneity of factors (Kahl 2006: 58-60; Scheffran et al. 2012b; Simons/Zanker 2012).

### 3.4 Environmental Peace

The Environmental Peace perspective suggests that environmental problems are – under certain circumstances – not sources of conflict, but chances and even catalysts for cooperation between groups. The underlying assumption is that even hostile parties may work together if they face a

common threat of resource scarcity or hydro-meteorological disasters affecting the well-being of each group. This cooperation can prevent the outbreak of hostilities and – in the best case – increase mutual trust, thus eventually transforming the (adverse) identities of the groups involved. There are some hints in the peer-reviewed quantitative literature that environmental degradation and natural disasters are indeed positively correlated with peace (defined as the absence of violence) (see table 2). However, caution is necessary because of the limits of quantitative work (see above) and since there has been no explicit test of the premises of the Environmental Peace perspective in large-N studies so far.

Buhaug (2010) <sup>a</sup>	The incidence of major civil wars is higher in years following an unusually wet period.
de Soysa (2002a, 2002b)	Land scarcity shows stronger correlations with the existence of peace than with the existence of civil war.
Esty et al. (1999)	Soil degradation that is neither severe nor occurs at a rapid rate lowers the risk of (violent) state failure events.
Hendrix & Glaser (2007)	A low availability of freshwater per capita reduces the risk of civil war onset.
Hendrix & Salehyan (2012) <sup>a</sup>	Instances of political conflict increase in drier-than-usual years.
Raleigh & Kniveton (2012) <sup>c</sup>	Drier than usual years experience a lower frequency of conflict events.
Rowhani et al. (2011) <sup>c</sup>	Higher ecosystem productivity correlates with more armed conflicts.
Slettebak (2012)	Climate-related natural disasters reduce the risk for civil war onset.
Urdal (2005)	Land scarcity tends to reduce the risk of civil war onset.

<sup>a</sup> Only valid for Africa.

<sup>c</sup> Focuses only on parts of East Africa.

**Table 2: Large-N study findings supporting the Environmental Peace perspective**

If these arguments hold true, climate change can promote more positive intergroup relations through growing environmental problems that increase the likelihood for cooperation. Two distinguishable research traditions put forward this kind of argumentation, namely environmental peacebuilding and disaster diplomacy. A third, rather different line of argumentation within the Environmental Peace perspective suggests that climate change, resource scarcity and migration might prevent conflict onset through its positive effects.

### *3.4.1 Environmental peacebuilding*

Since the authors cited have, at least to some extent, very different understandings of their subject-matter, a rather wide definition will be used here: Environmental peacebuilding encompasses all forms of cooperation on environmental issues which simultaneously aims at or de facto achieves the transformation of relations between hostile parties towards peaceful conflict resolution. At the beginning, the relevant literature focused solely on interstate relations (e.g. Conca/Dabelko 2002), but more recent contributions confirm the (potential) importance of

environmental peacebuilding dynamics at the intrastate and local level (Conca/Wallance 2012; Dama 2009).

The conceptualization of the process of environmental peacebuilding itself remains disputed in the literature, but there seems to be some implicit convergence towards a three-stage model (Lejano 2006; UNEP 2009):

- a) Cooperation about environmental issues: This form of cooperation is usually quite rational for all parties since they are ecologically interdependent and can profit from addressing shared environmental problems. The joint management of a shared water resource, for example, helps to avoid its depletion, especially during droughts (FoEME 2007: 35-49). Environmental cooperation can be initiated by political or economic elites (top down) as well as by the civil society (bottom up) (Conca/Dabelko 2002).
- b) Spill-Over: Once cooperation is established, two kinds of spill-over effects can occur: Either the cooperation creates stronger interdependence, which makes further cooperation desirable (rationalist/functionalist perspective), or cooperation creates mutual trust and understanding, motivating the parties to deepen or broaden their cooperation (culturalist perspective) (Ali 2007; Carius 2006).
- c) Transformation of values, perceptions and identities: In the last (more ideal-typic) stage, environmental peacebuilding and subsequent cooperation improve the strategic climate between parties or even stimulate “post-Westphalian” relations. While indicators for an improved strategic climate include higher levels of trust and mutual understanding, “post Westphalian” relations are expressed by various societal linkages and the (partial) development of a common identity (Conca 2002).

It should be noted that the process of environmental peacebuilding can also fail at the initial or before entering the second respectively third stage, with the potential to frustrate and alienate hostile groups even further. The symbolic embedment of natural resources in contradictory narratives and identities, the ignorance of the needs of local inhabitants as well as trade-offs between ecological conservation and economic utilization are, among others, critical obstacles to local environmental peacebuilding processes (Conca/Wallance 2012; Green 2010; Mason et al. 2009). But the literature has also identified various factors supporting environmental peacebuilding, such as the existence of NGOs working on the respective environmental issue or a sufficient supply of financial and human resources (Carius 2006; Feil et al. 2009; Wolf et al. 2005). In addition, Harari/Roseman (2008) argue that environmental problems own some attributes that eminently suit them as platforms for cooperation. They are, for instance, long-term, cross political borders and constitute a common threat to several groups.

### 3.4.2 *Disaster diplomacy*

Disaster diplomacy is quite similar to environmental peacebuilding but considered as a separate field of research in the literature<sup>7</sup>. Going back to Durkheim (1979) who claimed that social integration tends to rise in the wake of a disaster, it deals with the question whether disaster-related activities can induce cooperation between enemy groups (Kelman 2006: 215). So far, the various works on this puzzle have produced four major findings (Kelman 2006; Le Billon/Waizenegger 2007):

- a) Disasters can catalyze or support already existing diplomacy between conflicting parties, but do not create completely new cooperation. The impacts of the Indian Ocean Tsunami 2004 in Aceh, for example, were prompted by increased international attention as well as instances of solidarity and even cooperation between combatants and supporters of the Free Aceh Movement and the Indonesian government. It thus supported the already ongoing peace negotiations (Gaillard et al. 2008).
- b) Disasters are relevant catalysts for diplomacy and negotiations in the short term (several weeks till months), while in the long term, other factors (level of trust, conflictive memories etc.) are far more important.
- c) Disasters might have no relevant impact on relations or can even increase tensions between groups. For instance, the same Tsunami that catalyzed cooperation in Aceh had an escalating effect on the civil war in Sri Lanka because tensions about the distribution of aid erupted and both parties perceived the other side as weakened (so there seemed to be a window of opportunity for military offensives).
- d) The cooperation-stimulating effect of disasters depends on several scope conditions, such as the existence of informal networks (of NGOs, scientists etc.) between both parties (Kelman 2012: 102-109; Renner/Chafe 2007)

Altogether, it seems that natural disasters are creating opportunities for diplomatic exchanges and mutual understanding, but only for a short period of time and in settings which are supportive of more cooperative relations anyway. Instances of successful disaster diplomacy, such as the end of the civil war in Aceh, are consequentially contrasted by a larger number of examples for failed disaster diplomacy (Kelman 2012).

All in all, the existing empirical evidence – a couple of case studies (many of them conducted at the international level) and some incidental statistical findings – is far too small to make general

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<sup>7</sup> There is no clear distinction between environmental peacebuilding and disaster diplomacy. Disaster diplomacy tends to be more concerned with high-level political (respectively diplomatic) interactions after a comparatively fast and large-scale environmental change, while environmental peacebuilding focuses on broader interactions and relations between parties to avoid or respond to (the danger of) slow-onset or long-term environmental change. However, with regard to the concrete scholarly work, the border between these two fields seems to be blurred.

claims about links between environmental degradation or natural disasters and cooperation, especially vis-à-vis the findings presented by the Environmental/Climate Conflict perspective. Despite their relevance, environmental peacebuilding and disaster diplomacy are under-investigated fields of research, so not much well-founded knowledge is available yet<sup>8</sup>.

### *3.4.3 Positive effects of climate change, resource scarcity and migration*

As already discussed above, climate change will also have several positive consequences in some regions, such as more rainfall and a prolonged growing season. If one follows the argument of resource scarcity as a source of conflict (which is of course at odds with the environmental peacebuilding and disaster diplomacy literature), then climate change is likely to reduce the susceptibility of these regions to conflict onset (Nordås/Gleditsch 2007: 634).

But even the adverse effects of climate change, namely natural resource scarcities and migration, can reduce the risk of violent conflict onset. Within the civil war literature, the argument that resource abundance provides incentives and financial opportunities to engage in conflict is quite prominent Collier/Hoeffler (2004). Most of these studies confirm this link only with regard to non-renewable resources, such as oil or diamonds, which are hardly influenced by climate change (Lujala 2010; Ross 2004). However, recent works on pastoralist conflicts in Kenya state that violent raids are more likely during unusually wet periods respectively in periods of water and pasture abundance (Schilling et al. 2012; Theisen 2012). Adano et al. (2012: 71) explain this finding by a combination of incentive- and opportunity-arguments:

“The animals are stronger and fatter then, and the vegetation and surface water are more readily available, which is necessary during a long trek away from the area where the raid took place. The vegetation is also thicker, which makes it easier to hide after an attack [...] rain washes away tracks, which increases the chance of escaping.”

Furthermore there are some culturally inscribed rules within pastoralist societies to cooperate in harsh times of drought (Bogale/Korf 2007). These findings are confirmed by other authors with regard to Ethiopia (Suliman 1999), Uganda (Eaton 2008) and East Africa in general (Raleigh/Kniveton 2012)<sup>9</sup>. But not only resource scarcity, but also migration caused by sea-level rise and natural disasters might have favorable effects (Black et al. 2011). These include the transfer of knowledge, technology and remittances to the outsending region (Scheffran et al. 2012d) as well as economical and cultural benefits for the receiving area (Gleditsch et al. 2007: 5). So if resource scarcity lowers incentives and opportunities for violence and activates cultural patterns of cooperation, while migration can benefit the outsending and receiving regions, then

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<sup>8</sup> See [www.disasterdiplomacy.org](http://www.disasterdiplomacy.org) for recent developments in the field.

<sup>9</sup> It should be acknowledged, however, that especially the works of Raleigh/Kniveton (2012) and Schilling (2012), but also of Hendrix/Salehyan (2012) find evidence for a higher conflict risk in drier-than-usual years, too. They therefore only provide limited support to the environmental peace perspective.

this might be another reason to refer to climate change as a potential promoter of cooperation. This should not be read, however, as a praise of climate change, since it will very likely have huge negative impacts on the livelihoods of millions of people. Also, we are currently not able to determine whether and when the predominance of non-violent interactions is caused by cooperation in the face of common environmental challenges (environmental peacebuilding/disaster diplomacy) and when by reduced incentives and opportunities for starting a conflict (positive effects approach).

#### 4 Conclusions

This paper developed a comprehensive new typology of the various arguments regarding the climate-conflict-nexus by reviewing the state-of-the-art as well as the classical literature on the issue. According to the three perspectives identified, climate change

- will increase the risk of conflict onset (Environmental/Climate Conflict).
- is mostly unrelated to the outbreak of conflict (Social Conflict).
- provides opportunities for peaceful cooperation and/or reduces the incentives and opportunities for violence (Environmental Peace).

Up to date, there is no convincing evidence to claim supremacy of one perspective over all others, although the Environmental/Climate and Social Conflict perspectives have gained significant attention from the scientific community. The realization of the forecasts of each perspective depends on a host of scope conditions and intervening variables which are not fully understood yet. Therefore, this paper concludes that climate change is neither a source of conflict nor a promoter of cooperation *per se*. The impacts of climate change will be different in various regions, depending on the political, social, economic, cultural, historical and environmental circumstances characterizing the specific area. Therefore, research on the climate-conflict-nexus would benefit from climbing down the ladder of abstraction, not asking *whether* climate change will cause more conflict (or cooperation), but *under what conditions* the claims of the three perspectives identified above hold true.

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