A critical assessment of the link between climate change and violent conflict in the context of sub-Saharan Africa

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The case of Darfur

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COMPULSORY DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

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ABSTRACT

Up until the beginning of this century climate change was mostly seen as an environmental issue, although, the issue of violent conflict has been linked to natural resources before. However, in the last decade the focus has increasingly shifted to connecting climate change with, in particular, human security. In contrast to previous debates, contemporary discussions put emphasis on the impacts that climate change has on human lives. Yet, it is not uncontroversial to what extent environmental degradation as well as carbon dioxide emission based economies play and have played an accelerating role. But even if 'climate change sceptics' or 'climate change deniers' question the credibility of climate change the reports by the Intergovernmental Panel on Climate Change (IPCC) present a solid base for the international climate debate which is accepted and supported by the majority of academic experts. Nonetheless, there is significant ambiguity about what the negative consequences of climate change could pose on peaceful human co-existence. In 2007, specifically, it was brought to public attention that the effects of a warming climate, such as more intense storms, floods and droughts have severe impacts on the human-wellbeing, especially in more vulnerable areas of the globe. Experts even claimed that, in many parts of the world, climate change would cause dramatic impacts in the form of violent conflicts due to the decrease of drinking water, fertile soil as well as food. Entire states might be weakened and societies could collapse which might lead to severe consequences for conflict resolution institutions and mechanisms, human security as well as migration.

However, findings regarding the impacts of climate change on violent conflict are highly controversial and sometimes even contradictory. One reason for that could be that the physical effects of climate change are limited to date. Furthermore, as studies from the 1990s on the consequences of environmental change have shown, it is difficult to disconnect the environmental factor from other societal and political influences that lead to conflict.

This thesis explores the politically charged issue as well as academically controversial link between climate change, as one of the environmental changes, and violent conflict by providing a conceptual assessment of the two different bodies of literature, namely the literature on violent conflict and the climate change literature, before examining available literature on the connection of the two phenomena. Finally, the case study of Darfur is analysed with regards to the often misused term *climate war* in order to conclude that violent conflicts are caused by multiple factors which should not be oversimplified and therefore cannot be traced back to purely environmental reasons.

Therefore, the central research questions addressed in this thesis are: what do scholars say about the connection between climate change and violent conflict? Can climate change and its repercussions be seen as a *threat multiplier* in unstable and therefore vulnerable societies? And can the Darfur conflict be described as one of the first *climate wars*?

ABBREVIATIONS

Ch4	Methane
CO2	Carbondioxide
EU	European Union
FFP	Fund For Peace
GHG	Greenhouse gas emissions
GSDRC	Governance and Social Development Resource Centre
HIIK	Heidelberger Institut für Internationale Konfliktforschung
IASC	Inter-Agency Standing Committee
IPCC	Intergovernmental Panel on Climate Change
ICF	Islamic Charter Front
JEM	Justice and Equality Movement
NIF	National Islamic Front
SLM/A	Sudan Liberation Movement/Army
SPLM/A	Sudan People's Liberation Movement/Army
WBGI	The World Bank Governance Indicators
UN	United Nations
UNEP	United Nations Environmental Program
UNFCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNSC	United Nations Security Council
UNHCR	United Nations High Commissioner for Refugees
WHO	World Health Organization
WBGU	Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen

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CHAPTER ONE: INTRODUCTION

1.1. RESEARCH TOPIC

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1.2. STATEMENT OF THE PROBLEM

Up until the 21st century climate change was mostly seen as an environmental issue, although, the issue of violent conflict has been linked to natural resources before[1]. However, in the last decade the focus has increasingly shifted to connecting climate change with, in particular, human security[2], which embraces in its broadest sense more than the absence of violence. Human rights as well as good governance are crucial to guarantee human security[3] . In contrast to previous debates, contemporary discussions put emphasis on the impacts that climate change has on human lives. Yet, it is not uncontroversial to what extent environmental degradation as well as carbon dioxide emission based economies play and have played an accelerating role[4]. But even if 'climate change sceptics' or 'climate change deniers' question the credibility of climate change the reports by the Intergovernmental Panel on Climate Change (IPCC) present a solid base for the international climate debate which is accepted and supported by the majority of academic experts[5]. Nonetheless, there is significant ambiguity about what the negative consequences of climate change could pose on peaceful human co-existence[6]. In 2007, specifically, it was brought to public attention that the effects of a warming climate, such as more intense storms, floods and droughts have severe impacts on the human-wellbeing, especially in more vulnerable areas of the globe[7]. Experts even claimed that, in many parts of

[1] Cf. Zhang, D. D. et al. (2007): Global climate change, war, and population decline in recent human history. Proceedings of the National Academy of Sciences of the United States of America.
[2] Cf. Barnett, J. (2001): The meaning of environmental security: Ecological politics and policy in the new security era. Zed Books. London.
[3] Comission on Human Security (2003); UNDP (1994a).
[4] Cf. Brzoska, M. et al. (2012): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.
[5] Ibid.
[6] Ibid.
[7] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland.

the world, climate change would cause dramatic impacts in the form of violent conflicts due to the decrease of drinking water, fertile soil as well as food. Entire states might be weakened and societies could collapse which might lead to severe consequences for conflict resolution institutions and mechanisms, human security as well as migration. At the same time one of the prognosis was that climate change could trigger a fight between states over both costs and potential benefits of climate change[8]. A powerful example was set by Albert Arnold (Al) Gore Jr. in 2007 who received the Nobel Peace Prize for the documentary 'An inconvenient truth' and for his political action with regards to climate change, together with the IPCC for its "outstanding scientific work"[9]. The Nobel Committee inter alia argued that "global warming not only has negative consequences for 'human security', but can also fuel violence and conflict within and between states […]The consequences are most obvious, however, among the poorest of the poor, in Darfur and in large sectors of the Sahel belt, where we have already had the first 'climate war'"[10].

However, from a conflict studies point of view every single statement above is arguable[11]. Findings regarding the impacts of climate change on violent conflict are highly controversial[12] and sometimes even contradictory[13]. One reason for that could be that the physical effects of climate change are limited to date[14]. Furthermore, as studies from the 1990s on the consequences of environmental change have shown that it is difficult to disconnect the environmental factor from other societal and political influences that lead to conflict[15]. In addition, scholars use different measures and methods to prove their argument. To simplify the matter, those scholars can be divided into two groups. The first group points out the empirically proven evidence in order to provide information on and/or support the link between climate change and human security. Preferably, those scholars use statistical analysis and comparative case studies. The second group, on the other hand, refers to the plausibility of assumptions

[8] Ibid.

[9] Cf. Presentation Speech by Professor Ole Danbolt Mjøs, Chairman of the Oslo, 10 December 2007, https://www.nobelprize.org/nobel_prizes/peace/laureates/2007/presentation-speech.html, accessed 1 December 2017.

[10] Ibid.

[11] Cf. Webersik, C. (2010): Climate Change and Security: A Gathering Storm of Global Challenges. ABC-CLIO. Santa Barbara.

[12] Cf. Burke, M. B. et al. (2009): Warming increases the risk of civil war in Africa, in: Proceedings of the National Academy of Sciences USA, No.49, p 20670-20674.

[13] Cf. Buhang, H. (2010): Reply to Burke et al.: Bias and climate war research, in: Proceedings of the National Academy of Sciences USA, No.51, E186-E187.

[14] Cf. Brzoska, M. et al. (2012): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.

[15] Ibid.

based on historically unique and rapid changes in the climate. Their arguments are based on individual case studies which provide a plausible connection between environmental changes and violent conflict[16]. But not only are the research methods and measures controversial when it comes to linking climate change to violent conflict, it is also questionable what the meaning and outcome of such connection could be and should be directed to.

According to Floyd (2010) it is easy to see that the intense warnings from a decade ago were primarily used as a means to an end, namely to change the United States (US) climate policy[17]. Moreover, it is questionable how legitimate it is to admonish of a danger which is based on a substantial amount of uncertainty. That itself, could be seen as dangerous since connecting the climate change debate solely to security issues could lead to choosing wrong responses for climate problems which might militarize danger prevention methods. Is it in fact reasonable to force conflict researchers, who are already working with multiple conflict influencing factors, to analyse such speculative relationships[18]? However, at the same time, it would also be irresponsible to ignore climate change in the conflict debate since it is the biggest and possibly most relevant environmental change that humankind has been challenged with[19].

It is now widely accepted that the main cause of global warming, the increase of the earth's average atmospheric temperature, and thus climate change can be traced back to human activity[20]. The amount of carbon dioxide, the crucial component of the greenhouse gas which causes global warming, is primarily produced from the combustion of carbonaceous fossil fuels in order to generate energy. The current amount is higher than it has been in the last eight centuries. In fact, the trend shows an increase in the amount of carbon dioxide. The IPCC predicts, given that no effective counter-measures are undertaken, a temperature increase of up to 6.4°C by 2100. Contemporary studies show that greenhouse gas emissions are already causing permanent and intensive changes in our environment. Scientists have warned that climate change does not happen gradually, instead abrupt and irreversible climate change impacts can be the consequence once a certain temperature increase is exceeded. This tipping

[16] Ibid.

[17] Cf. Floyd, R. (2010): Security and the Environment: Securitization theory and US environmental security policy. Cambridge University Press. Cambridge.

[18] Cf. Brzoska, M. et al. (2012): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.

[19] Ibid.

[20] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland

point could not only affect the adaptation potential of human society but also human security and therefore people's lives[21].

Thus, over time, given rising contemporary awareness, it broadened and shifted its focus to become an issue in political and social debates at both, national and international levels. Effects are widely spread, although the chain of causation might not always be visible in the first place. Environmental mechanisms, ecosystems, as well as cultural implementation and adaption to nature are linked and interconnected too closely and are too complex to reduce climate change to a regional or national issue. There is international consensus in the field of academia and politics with regards to two fundamental prevention strategies. Firstly, it is necessary to avoid a dangerous and uncontrollable climate change in order to prevent potential violent conflict. Secondly, conflict prevention needs the development and implementation of climate change adaptation strategies as the consequences of climate change can already be seen[22].

Nevertheless, alarmist prognoses as well as transforming climate change into a pure security threat should be avoided; nor should climate change in that matter be denied or trivialized. Therefore, the central research questions addressed in this thesis are: what do scholars say about the connection between climate change and violent conflict? Can climate change and its repercussions be seen as a "threat multiplier" in unstable and therefore vulnerable societies? And can the Darfur conflict be described as one of the first "climate wars"?

1.3. LITERATURE REVIEW

A preliminary review of the available literature has indicated that studies have been undertaken to examine the linkage between climate change and violent conflict. This thesis focuses on the politically charged issue as well as academically controversial link between climate change and violent conflict by providing a conceptual assessment of the two different bodies of literature, namely the literature on violent conflict and the climate change literature, before examining available literature on the connection of the two phenomena. Finally, the Darfur conflict is analysed with regards to the often misused term "climate war" in order to conclude

[21] Ibid.

[22] Cf. Brzoska, M. et al. (2012): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.

that violent conflicts are caused by multiple factors which should not be oversimplified and therefore cannot be traced back to purely environmental reasons.

In this thesis the term climate change is referred to as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods"[23] as defined in Article 1 of the United Nations Framework Convention on Climate Change (UNFCC). As mentioned above, the IPCC report from 2007 received a lot of international attention due to its alarming prognosis. According to the report there is evidence that global warming has already affected the climate worldwide as "[m]ountain glaciers and snow cover on average have declined in both hemispheres. The maximum areal extent of seasonally frozen ground has decreased by about 7% in the Northern Hemisphere since 1900, with decreases in spring of up to 15%. Temperatures at the top of the permafrost layer have generally increased since the 1980s in the Arctic by up to 3°C"[24]. In addition, "[t]here is observational evidence of an increase in intense tropical cyclone activity in the North Atlantic since about 1970, and suggestions of increased intense tropical cyclone activity in some other regions where concerns over data quality are greater. Multi-decadal variability and the quality of the tropical cyclone records prior to routine satellite observations in about 1970 complicate the detection of long term trends in tropical cyclone activity"[25]. Furthermore, droughts, excessive rainfall and floods are likely to contribute to human insecurity. Current estimations suggest that over 300 million people have already been affected by climate change. Those effects include the risk of violent conflict due to climate change impacts[26].

Conflicts per se are inevitable and a necessary by-product of social change, however, it is a question of *how* they are handled and resolved[27]. In order to examine the connection between climate change and violent conflict the latter also needs to be clarified. When speaking of *violent conflict* in this thesis it will be referred to *political violent conflict* which the World Health Organization (WHO) defines as a form of *collective violence.* The WHO understands collective violence as "the instrumental use of violence by people who identify themselves as members of a group – whether this group is transitory or has a more permanent identity –

[23] United Nations Framework Convention on Climate Change (1992), Article 1.

[24] IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland.

[25] ibid.

[26] Cf. ibid.

[27] Cf. Ropers, N. (2002): Friedensentwicklung, Krisenprävention und Konfliktbearbeitung. Technische Zusammenarbeit im Kontext von Krisen, Konflikten und Katastrophen. GIZ. Wiesbaden

against another group or set of individuals, in order to achieve political, economic or social objectives"[28]. It can take on various forms such as "[w]ars, terrorism and other *violent political conflicts* that occur within or between states"[29] as well as "[s]tate-perpetrated violence such as genocide, repression, disappearances, torture and other abuses of human rights"[30] and "[o]rganized violent crime such as banditry and gang warfare"[31]. There are several definitions of *violent conflict*, many of which are controversial. The Heidelberger Institut für Internationale Konfliktforschung (HIIK) suggests the following definition for *political conflict*:

"[A] political conflict is a perceived incompatibility of intentions between individuals or social groups. Such an incompatibility emerges from the presence of actors who communicate and act with regard to certain objects. These actions and communications are known as measures, while the objects form the issues of positional differences. Actors, measures, and issues are the constitutive attributes of political conflict"[32].

The institute further analyses the concept of intensity and distinguishes between different levels of violent conflict, such as violent crisis, limited war, and war[33]. These relevant terms will be clarified in chapter three of this thesis. Furthermore, the different causes for violent conflict will be examined. According to the Governance and Social Development Resource Centre (GSDRC) those causes can be divided into political and institutional factors, identity politics, socioeconomic factors, and resource and environmental factors which include climate change, environmental insecurity and resource scarcity[34].

In addition, Homer-Dixon argues that three particular sets of theories with regards to violent conflict are of importance. Firstly, frustration-aggression theories which "suggest that people become aggressive when they feel frustrated by something or someone they believe is blocking them from fulfilling a strong desire"[35]. Secondly, group-identity theories which "aim to explain the way groups reinforce their identities and the 'we-they' cleavages that often result"[36]. Lastly, he claims that "[s]tructural theories, which are often grounded in the assumptions of micro-economics and game theory, explain conflicts arising from the rational calculations of

[28] Krug, E.G. et al. (2002): World report on violence and health. Geneva, World Health Organization.
[29] Ibid.
[30] Ibid.
[31] Ibid.
[32] Heidelberger Institut für Internationale Konfliktforschung (2011), https://www.hiik.de/de/methodik/, accessed 3 December 2017.
[33] Cf. Ibid.
[34] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham.
[35] Homer-Dixon, T. F. (1999): Environment, Scarcity and Violence. Princeton University Press. Princeton.
[36] Ibid.

actors in the face of perceived external constraints"[37] before he links violent conflict to environmental factors as well as climate change[38].

Whether environmental degradation and resource scarcity can lead to violent conflict has been discussed for decades. In fact, the connection between environmental change and violent conflict has already been investigated in the 1990s, albeit without significant and empirically robust findings that could prove a causal relationship[39]. Thus it can be assumed that environmentally induced conflicts are caused by a complex interdependency of different factors as well as amplifying effects that vary in different contexts. This complex interdependency of multiple different causes and influential factors has therefore led to a lot of criticism on the prognosis of environmental conflicts[40]. All in all, the current state of knowledge about the linkage between drastic environmental change and violent conflict can still be described as unsatisfactory[41]. With regards to prevention strategies it is also assumed that the probability of a violent escalation strongly depends on the different societies' climate vulnerability as well as their adaptation abilities and the capacities of their social and political institutions[42].

Nevertheless, a substantial amount of the literature has drawn a connection between climate change and violent conflict, however, as previously mentioned, empirical evidence is limited and circumstantial. Several reports by the IPCC[43], the World Health Organisation (WHO)[44], and the United Nations Environmental Program (UNEP)[45], for example, indicate the severe effects of climate change on humankind. It is suggested that those findings must be included in order to prevent violent conflict[46]. At the same time, many scholars, such as Homer-Dixon

[37] Ibid.
[38] Cf. ibid.
[39] Cf. Brzoska, M. et al. (2012): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.
[40] Cf. Carius, T./ Tänzler, D. (2009): Ökologische Friedensentwicklung auf dem Prüfstand, in: Wissenschaft&Frieden, No.2, p36-39.
[41] Cf. Brzoska, M. et al. (2012): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.
[42] Cf. Scheffran, J. (2008): Ein Klima der Gewalt? Das Konfliktpotential der globalen Erwärmung, in: Wissenschaft&Frieden, No.4, p49-53.
[43] Cf. IPCC (2014): Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland
[44] Cf. WHO (2003): Climate change and human health. Risks and responses, accessed 20 October 2017.
[45] Cf. UNEP (2015): Climate Change and Human Rights, accessed 4 October 2017.
[46] Cf. Webersik, C./Levy, M. (2016): Reducing the risk of conflict recurrence: The relevance of natural resource management, in: Bruch, C./Muffet, C./Nichols, S.S. (2016) (ed.): Governance, Natural Resources, and Post-Conflict Peacebuilding. New York: Routledge.

and Blitt (1998)[47] as well as Gleditsch (2012)[48], reasonably argue that there is no direct link between climate change and violent conflict, instead it is rather an indirect causal relationship while other factors are the main causes. Nevertheless, they also agree that natural resource scarcity, which is said to be worsened by climate change, can help to generate instability which then might lead to cases of violent conflict[49].

Jürgen Scheffran (2012) provides a critical overview of climate change induced security threats by presenting potential stress factors that are caused by climate change. He discusses environmental change and its impacts on conflict risks before focusing on specific vulnerable regions[50]. Many studies predict dramatic climate change consequences, however, Scheffran argues that the causal relationship between climate change and violent conflict is not understood sufficiently yet. More significant data and methods are needed. He also concludes that a theory based concept is necessary in order to test those complex connections[51].

Moreover, Bruch et al. (2016) focus on recent and comprehensive studies on violent conflict in vulnerable societies relating to natural resources and environmental change[52]. Despite the wealth of sources on the connection between climate change and human security, violent conflict as well as health, literature is patchy when specifically trying to emphasize *significant empirical evidence* that proves the development of violent conflict due to climate change.

The case of Darfur has been described as one of, if not the first, so-called 'climate war'[53]. This thesis discusses whether that term is justified or strikingly oversimplified. A closer look at its conflict history and the circumstances shows plausibly that the war in Darfur would have also emerged without climate change as an influential factor[54]. And in reverse, scholars argue that climate change impacts alone would have not been enough to cause such escalation[55].Thus it is arguable to claim that the conflict in Darfur can be understood as a 'climate war'. Yet, it cannot be denied that climate science has identified the African continent as one of the most

[47] Cf. Homer-Dixon, T./Blitt, J. (1998): Ecoviolence: Links among environment, population and security. Rowman&Littlefield. Oxford.

[48] Cf. Gleditsch, N. P. (2012): Whither the weather? Climate change and conflict, in: Journal of Peace Research, Vol.49, Issue 1, p3-9.

[49] Ibid.

[50] Cf. Scheffran, J. (2012): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung, in: Brzoska, M. et al. (eds.): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.

[51] Ibid.

[52] Cf. Bruch, C. et al. (2016): Governance, Natural Resources, and Post-Conflict Peacebuilding. Routledge. New York.

[53] Cf. Schreiber, W. (2012): Darfur-der erste Klimakrieg?, in: Brzoska, M. et al. (eds.): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.

[54] Ibid.

[55] Ibid.

vulnerable areas to climate change[56]. Additionally, many African societies suffer from multiple conflict causing influences, such as inequality, poverty, and a lack of functioning political and legal structures[57]. In this thesis the focus therefore lies on sub-Saharan Africa and specifically on the case of Darfur as it is said to be a proven example of possible future scenarios in Africa.

1.4. RESEARCH METHODOLOGY

A review of the literature relating to climate change as well as violent conflict has been undertaken. Moreover, case studies and examples of the link between climate change and violent conflict have been examined. Relevant research papers and peer reviewed academic articles are available online and through publications by suited academic journals and other publications. In addition, reports by the IPCC, WHO, UNEP and other United Nations Organizations are taken into consideration. A substantial amount of academic analysis and empirical research has been done in each of the two separate fields of research. However, there is relatively limited empirical interdisciplinary research that explores the relationship between climate change and violent including as well as its *direct* link. A limitation of this thesis is that the connection can only be made *indirectly*.

1.5. STRUCTURE OF THE THESIS

The thesis is presented in six chapters.

Chapter 1: Introduction

The introduction sets out the problem statement and research question. It includes an overview of the literature to contextualize the research and evidence which reflects the significance of the issue. This chapter also sets out the research methodology, including the limitations to the

[56] Cf. Basedau, M./ Leidreiter, A. (2012): Der Klimawandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?, in: Brzoska, M. et al. (eds.): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.
[57] Ibid.

thesis and a chapter outline. Definitions of key terms are also provided, such as climate change and violent conflict.

Chapter 2: Anthropogenic Climate Change

The second chapter assesses and contextualizes the research as well as presents the research findings with regard to the anthropogenic climate change, such as causes and predicted impacts.

Chapter 3: Violent Conflict

This chapter provides an analysis of violent conflict as well as the causes and influencing factors based on the existing literature. This includes, but is not limited to, poverty and low incomes, crime, intergroup inequalities as well as demographic factors. Environmental factors are only discussed briefly since chapter four examines those risk factors in more detail before linking them to the issue of climate change.

Chapter 4: Linking Climate Change and Violent Conflict

This chapter examines the literature on the link between climate change and violent conflict. The main focus lies on for the thesis relevant risk factors, such as natural resource dependence as well as environmental change and natural resource scarcity. Thus, the connection, yet mostly indirect, between climate change and violent conflict is made by showing whether a changing climate can be seen as a "threat multiplier" in vulnerable societies. However, the lack of sufficient and significant empirical research is also emphasized.

Chapter 5: Climate Change and Violent Conflict in sub-Saharan Africa

Chapter five particularly focuses on sub-Saharan Africa by first presenting findings on the impacts of climate change on the continent before examining the available empirical evidence on violence caused by climate change in the region; as an example of Darfur is analysed by critically presenting the influencing factors as well as necessary background information on the infamous conflict. This chapter argues that the case of Darfur cannot be described as a so-called 'climate war' although climate plays an important role. However, reducing the war in Darfur to a single cause is misleading and an oversimplified approach.

Chapter 6: Conclusion

The final chapter concludes that certain areas and countries are vulnerable in several ways, i.e. to climate change and to violent conflict, whereby the combination increases their vulnerability. Finally, it is summarised that the consequences of climate change may be seen as contribution to the development of violent, however, the link can only be made indirectly. Furthermore, it is shown that in cases, where the connection seems to have been proven, other causative factors need to be taken into consideration. Such factors include political instability, socioeconomic disparities and poverty, high unemployment, authoritarian regimes, violation of human rights and other manifestations of social injustice. The case of Darfur delivers proof for that. Thus, it is necessary to collect more significant evidence and undertake further studies in order to create the necessary framework before providing interventions and policies for a possible solution.

CHAPTER TWO: ANTHROPOGENIC CLIMATE CHANGE

When the IPCC published its fourth assessment report in 2007 climate change gained an immense amount of public attention[58]. Since then, the quality of data as well as evidence has continued to improve with every report and it can be assured now that there are significant climate science data available[59]. According to the IPCC "[c]limate change […] refers to any change in climate over time, whether due to natural variability or as a result of human

[58] Cf. Fuchs, A. (2010): Klima und Gesellschaft., in: Voss, M. (eds.): Der Klimawandel. Sozialwissenschaftliche Perspektiven. VS Verlg, Wiesbaden, p47.

[59] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p33f.

activity"[60], therefore it is also referred to as anthropogenic climate change. The United Nations Framework Convention on Climate Change takes it a step further and defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods"[61]. The following chapter is based on that definition.

2.1. CURRENT OBSERVATIONS

2.1.1. CHANGES IN CLIMATE

Global warming can be observed through the increase of the temperature in the air and oceans, the melting of ice and snow, as well as the rising sea level[62]. According to the data collected between 1906 and 2005 there has been an average temperature increase of 0.74° C[63]. In its Synthesis Report *Climate Change 2014*, IPCC stated that the average surface temperature of our planet has already increased by 0.85°C in the last century, which is again an increase since the report in2007[64]. This development has been the trend for the last two decades while the last ten years have, according to the latest report, provided the warmest temperatures since the start of temperature recordings[65]. In parts, there are obvious regional developments that differ from the global trend: on the one hand, the temperature increase in the northern hemisphere is more radical, i.e. the temperature in the arctic region is in fact twice as high as the global trend, while on the other hand, continents heat up faster and more intensely than the ocean[66].

Although it is arguable to blame single extreme weather events on climate change in general, it can be said with 80% certainty that particular events, such as the heat wave in Russia in 2010 as well as the drought in the US in 2012 which affected nearly 60% of the country, can be traced back to climate change[67]. In addition, scientists could prove with 90% certainty that the

[60] Ibid.

[61] United Nations Framework Convention on Climate Change (1992), Article 1.

[62] Cf. Reusswig, F. (2010): Klimawandel und Gesellschaft. Vom Katastrophen- zum Gestaltungsdiskurs im Horizont der postkarbonen Gesellschaft., in: Voss, M. (eds.): Der Klimawandel. Sozialwissenschaftliche Perspektiven. VS Verlag, Wiesbaden, p47.

[63] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p34.

[64] ibid., p4.

[65] Ibid.

[66] Ibid.; p35.

[67] Cf. Harmeling, S. (2011): Global Climate Risk Index 2012. Who suffers most from extreme weather events? Weather related loss events in 2010 and 1991 to 2010. Germanwatch, Bonn, p7.

time period between 1950 and 2000 has been the warmest in at least 500 years for the Northern hemisphere[68].

Moreover, precipitation patterns have changed due to global warming. Those changes differ regionally, as well. Since a warmer atmosphere can absorb more water, the risk of more intense precipitation as well as longer dry periods increase[69]. Between 1900 and 2005 more and stronger rainfall could be observed in North and South America, central Asia, and Northern Europe; whereas there had been a decrease of precipitation in Southern Africa, the Sahel zone, the Mediterranean, and parts of Southern Asia[70].

2.1.2. IMPACTS

The above presented climatic changes have already caused severe and diverse impacts. In the last century sea level has in total risen by 15 to 20cm; and the pace at which this happens only increases. This can be traced back to the thermic expansion of water as well as the increase of additional meltwater while it has been the highest increase in the last thousand years[71].

Since 1978 available satellite data have proven the decrease of ice and snow coverage in many areas. There has been 2.7% less ice per decade in the arctic, Greenland, as well as the Antarctic. Seasonal frost in the Northern hemisphere as well as the arctic permafrost has melted rapidly and had a negative impact on indigenous peoples[72].

The observed changes in the climate have already led to more extreme weather events, such as more intense tropical storms due to higher temperatures of the atmosphere and ocean, severe floods caused by heavy rainfall and sea level rise, and more extreme heat waves. At the same time, poorer countries are more vulnerable to those changes as the Climate Risk Index shows[73].

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[68] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p35.

[69] Cf. CNA (2007): National Security and the Threat of Climate Change. The CAN Corporation, Alexandria, p56.

[70] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p35.

[71] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p35.

[72] Cf. Fuchs, A. (2010): Klima und Gesellschaft., in Voss, M. (eds.): Der Klimawandel. Sozialwissenschaftliche Perspektiven. VS Verlag, Wiesbaden, p41.

[73] Cf. Harmeling, S. (2011): Global Climate Risk Index 2012. Who suffers most from extreme weather events? Weather related loss events in 2010 and 1991 to 2010. Germanwatch, Bonn, p6.

However, even in countries with better adaptation mechanisms extreme weather events can have severely negative effects, including impacts on human health. An estimated number of 55.000 people died in summer 2010 due to the heat wave in Russia. In 2003 the European heat wave caused the death of approximately 30.000 to 50.000 people[74]. Infamous storm 'Katrina' is also said to be a consequence of climate change[75].

The IPCC estimates that up to 250 million people on the African continent alone will be affected by floods until the year 2050, depending on the previous grade of destruction due to climate change[76]. Such destructions refer to access to water, food security and locally produced goods. Although studies do not offer coherent estimations, it can be expected, that Africa, even if we choose to trust the more convenient projected outcomes, is characterised by its vulnerability. Especially, the sahelzone, the coastal areas in Eastern Africa, landscapes with big lakes as well as dry landscapes are vulnerable for damage and destruction due to relatively low economic strength and low capability of adaption[77]. One of the visible effects are, for example, migration from rural areas causing urbanisation and social problems in major cities. Cities that are located close to river mouths present another problem. If, for example, the sea level rise increases by one meter in Gambia, its capital city, Banjul, will literally be submerged[78].

Nomadic shepherds in Eastern Africa belong to the groups that are most at risk. Pastoral farming has always suffered under difficult circumstances: little rain and little vegetation. Thus the natural environment as well as its habitants have adapted to the dry climate. Here adjustments to the lack of water are essential for the survival. When a drought damages a clan, neighbours help by lending livestock for breeding purposes[79]. There are approximately 50 million members of nomadic shepherd clans in the sub-Saharan region who are witnessing the change of rainfall intensity as well as frequency which also affects the vegetation. Extreme changes in the weather lead to a decreasing amount of pasture grounds and waterholes[80].

Furthermore, impacts on biological and physical systems can be observed due to the changes in temperature. Several glacial lakes have grown while other waters suffer from negative

[74] Cf. German Advisory Council on Global Change (WBGU) (2007): Climate Change as a Security Risk. Earthscan, London, p60.

[75] Cf. CNA (2007): National Security and the Threat of Climate Change. The CAN Corporation, Alexandria, p58.

[76] cf. Rathgeber, T. (2009): Klimawandel verletzt Menschenrechte. Über die Voraussetzungen einer gerechten Klimapolitik, Heinrich Böll Stiftung, p.25.

[77] ibid., p.26f.

[78] ibid., p.26.

[79] ibid., p.28.

[80] ibid., p.26.

impacts on their water quality. Additionally, biological processes in flora and fauna have shifted seasonally and geographically[81].

2.2. CAUSES OF CLIMATE CHANGE

The current average temperature of the planet is +15° C. The reason for that is the so-called 'greenhouse-effect', which on the hand is absolutely natural and necessary as the average temperature would otherwise be -18° C[82]. The mentioned effect is caused by the so-called 'greenhouse gas' in the atmosphere which is light-permeable for sunrays while impermeable for the long-wave heat rays coming from the planet; this causes a temperature increase of the atmosphere[83]. The most important greenhouse gases are carbon dioxide (CO2), methane (CH4), nitrous oxide (N20), halogenated hydrocarbons, and water vapour which all differ with regards to their characteristics and durability[84].

However, the connection between emissions and greenhouse gas is not linear but dynamic since the marine and terrestrial biosphere, specifically in the form of oceans and forests, absorbs carbon dioxide as part of the carbon cycle[85]. On top of that, so-called aerosols, which are mixtures of solid and liquid suspended particles and gas, such as organic carbon dioxide, carbon black, sulphate, dust, and nitrate, have a cooling effect and thus an impact on precipitation[86]. This natural greenhouse effect has been intensified since the industrial revolution and its accompanied greenhouse gas emissions (GHG). Between 1970 and 2004 alone, the human induced greenhouse gas emissions had increased by 70%[87]. This has also

[81] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p37.

[82] Cf. Rahmstorf, S. (2009): Die globale Erwärmung., in: S. Böhler et al. (eds.): Jahrhundertproblem Klimawandel. Forschungsstand, Perspektiven, Lösungswege. Wochenschau Verlag, Schwalbach, p19.

[83] Ibid.

[84] Ibid.

[85] Cf. Reusswig, F. (2010): Klimawandel und Gesellschaft. Vom Katastrophen- zum Gestaltungsdiskurs im Horizont der postkarbonen Gesellschaft., in: Voss, M. (eds.): Der Klimawandel. Sozialwissenschaftliche Perspektiven. VS Verlag, Wiesbaden, p78.

[86] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p40.

[87] Ibid.

been the trend in the recent past. While the annual growth rate between 1990 and 2000 was only 1%, it had increased to an average of already 3.4% between 2000 and 2010[88].

Moreover, science has determined that the global atmospheric concentration of human induced greenhouse gas has exceeded the natural amount of the last 650,000 years by far[89]. This increase could be traced back to activities related to the generation of energy, the industrial as well as agricultural sector, and transportation[90]. With approximately 77%, CO2 is the largest component of all anthropogenic, i.e. human induced, greenhouse gases[91]. As stated in 2009, its concentration in the atmosphere has increased by 38% since the beginning of industrialization. Most of the emissions come from using fossil fuels as well as changes in land use, such as deforestation. The increase of methane emissions by 152%, on the other hand, can primarily be traced back to the agricultural sector which is also responsible for the increase of nitrous oxide by 19%[92]. Compared to greenhouse gases, solar activity, with its 5%, has relatively little impact[93].

Taking those data into account while also considering the consequences of such greenhouse gas emissions, the global warming of the last five decades can only be explained with models that include human influence. Thus scientists conclude that, with high probability, manmade emissions outweigh the natural changes of the complex ecological system of the planet and therefore need to be taken into consideration when analysing climate change[94].

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[88] Cf. Reusswig, F. (2011): Klimawandel und globale Umweltveränderungen., in: Groß, M. (eds.): Handbuch Umweltsoziologie. VS Verlag, Wiesbaden, p699.

[89] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p41.

[90] Cf. Stern, N. (2006): Stern Review: The Economics of Climate Change. Executive Summary. Cabinet Office – HM Treasury, Cambridge, p6.

[91] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p42.

[92] Cf. The Government Office for Science (2011): Foresight International Dimensions of Climate Change. Final Project Report. London, p28.

[93] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p43.

[94] Cf. Rahmstorf, S. (2009): Die globale Erwärmung., in: S. Böhler et al. (eds.): Jahrhundertproblem Klimawandel. Forschungsstand, Perspektiven, Lösungswege. Wochenschau Verlag, Schwalbach, p28.

2.3. FUTURE PROJECTIONS

2.3.1. EMISSIONS

Based on different socio-economic, demographic, and technological assumptions it can be predicted how future emissions are connected to changes in climate. These predictions are supported by the fact that all projections from the first IPCC report for the time period between 1990 and 2005 were met[95].

However, there is still some uncertainty with regards to those predictions due to natural climate variability, clouding, aerosols, and so-called feedback processes[96].

Such feedback processes can intensify global warming and can be seen in the form of the reflection of melting snow and ice, methane leaks due to melting permafrost, and decreasing ability of the ocean as well as biosphere to absorb carbon dioxide[97].

Nonetheless, a few general outcomes, relating to changing wind-, temperature-, and precipitation patterns, can be projected, regardless of the intensity of climate change or different future scenarios. According to those projections, the temperature will increase the most in the far Northern parts of the planet, albeit the Amazonas region as well as parts of China will experience drastic warming. There will be more rain in the Northern hemisphere whereas it can be assumed that precipitation will decrease in the Amazonas region, Southern Africa, South East Asia, the Mediterranean, as well as Eastern Australia.

Yet, that does not mean that it will rain in the area the evaporation took place. Globally, however, an increase of rainfall can be expected. Thus, it can be said that there are regional differences regarding the repercussions of climate change[98].

Additionally, predictions, specifically from the middle of the 21st century onwards, differ since the climatic system reacts very slowly and delayed to those changes[99]. Though, it can be expected that, compared to the time period between 1981 and 1999, there will be a temperature increase up to 1.7°C by the year 2040[100].

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[95] Cf. Rahmstorf, S. (2009): Die globale Erwärmung., in: S. Böhler et al. (eds.): Jahrhundertproblem Klimawandel. Forschungsstand, Perspektiven, Lösungswege. Wochenschau Verlag, Schwalbach, p48.

[96] Ibid., p33.

[97] Cf. CNA (2007): National Security and the Threat of Climate Change. The CAN Corporation, Alexandria, p58.

[98] Cf. German Advisory Council on Global Change (WBGU) (2007): Climate Change as a Security Risk. Earthscan, London, p62.

[99] Cf. Schaeffer et al. (2012). Long-term sea-level rise implied by 1.5°C and 2°C warming levels. Nature Climate Change, p2.

[100] Cf. The Government Office for Science (2011): Foresight International Dimensions of Climate Change. Final Project Report. London, p26.

Given the current counter measures, global emissions will increase by another 25% to 90%, depending on the predicted future scenario[101]. Such an increase would lead to further warming and thus to far more drastic impacts than seen in the 20th century[102]. In order to minimize those impacts the concentration of greenhouse gases needs to be stabilized which requires a reduction of emissions[103].

Consequently, referring to the maximum emissions in 2015 for example, emissions should be cut by 50 to 80% by the year 2050[104]. This is only possible if humankind reacts accordingly in the next two decades resulting in the prevention of further negative climate change impacts[105]. The concept of climate sensitivity serves as a crucial predictive value to determine the effect of an increasing carbon dioxide concentration on temperature increase. If doubling the carbon dioxide concentration it can be expected that the average warming will increase by up to 4.5°C[106]. Based on the those projections the IPCC predicts, in an 'optimistic' scenario, a warming between 1.1°C and 2.9°C for the time period between 2090 and 2099, using the time period between 1980 and 1999 as a reference. The worst case scenario on the other hand, would be a temperature increase of 2.4°C to 6.4°C[107]. According to the IPCC such 'pessimistic' projections are based to fairly realistic assumptions as greenhouse gas emissions in the 21st century are even higher than in the theoretical worst case as stated in the third IPCC assessment report of 2001[108]. In order to comprehend the extent of a warming of over 4°C it is worth looking at the last ice age when the average temperature was between 4°C and 6°C *below* the average temperature today[109]. Yet, even if all parties abide by the recommendations and climate protection measures, made at several the United Nations climate conferences and agreements such as the infamous Paris Agreement in 2015 where it states that the aim is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels and

[101] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p48.
[102] Ibid., p49.
[103] Ibid., p74.
[104] Ibid., p75.
[105] Ibid., p83.
[106] Cf. Rahmstorf, S. (2009): Die globale Erwärmung., in: S. Böhler et al. (eds.): Jahrhundertproblem Klimawandel. Forschungsstand, Perspektiven, Lösungswege. Wochenschau Verlag, Schwalbach, p28.
[107] Ibid.
[108] Cf. Reusswig, F. (2011): Klimawandel und globale Umweltveränderungen., in: Groß, M. (eds.): Handbuch Umweltsoziologie. VS Verlag, Wiesbaden, p698.
[109] Ibid.

pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels"[110], it can still be expected that there will be a temperature increase of over 3°C by 2100[111].
Thus, the majority of experts agree that the global warming must not exceed an increase of 2°C[112] so that a "dangerous anthropogenic interference with the climate system"[113] can be prevented. However, this is the first time in at least 100,000 years that mankind has to deal with such a change of climate and consecutively needs to reduce emissions by 80% before 2050 if the target of 2°C should be met[114].

2.3.1. CONSEQUENCES

The knowledge and research on certain important effects due to sea level rise is still limited, albeit growing. Thus, relevant future models focus more on the thermic expansion of the ocean than melting continental mass. However, the melting of those ice caps have a high risk potential which may lead to worse consequences than expected[115].
It is important to bear in mind that "[c]limate models are representations of the climate system based on fundamental physical laws and observations. The climate system is, however, highly complex and there are known uncertainties associated with climate predictions, for example on the future level of GHG emissions; [..] to account for these uncertainties climate scientists present future projections as probabilistic assessments of climate change effects and impacts, covering a range of plausible different future scenarios"[116]. According to the United Kingdom Government Office of Science, "the climate system is slow to respond"[117], especially with

[110] Paris Agreement (2015), Article 2.1 (a).
[111] Cf. Schaeffer et al. (2012). Long-term sea-level rise implied by 1.5°C and 2°C warming levels. Nature Climate Change, p4.
[112] Cf. Reusswig, F. (2010): Klimawandel und Gesellschaft. Vom Katastrophen- zum Gestaltungsdiskurs im Horizont der postkarbonen Gesellschaft., in: Voss, M. (eds.): Der Klimawandel. Sozialwissenschaftliche Perspektiven. VS Verlag, Wiesbaden, p83.
[113] United Nations Framework Convention on Climate Change (1992), Article 2.
[114] Cf. Schaeffer et al. (2012). Long-term sea-level rise implied by 1.5°C and 2°C warming levels. Nature Climate Change, p4.
[115] Ibid.
[116] The Government Office for Science (2011): Foresight International Dimensions of Climate Change. Final Project Report. London, p24.
[117] Ibid.

regards to sea levels which "will continue to rise for far longer"[118] even if greenhouse gas emissions are stabilized[119].

Schaeffer et al. developed a semi-empirical climate model which predicts sea level rise for different future scenarios depending on emissions and temperature. They have established that, even if mitigation targets were met, sea level will rise by 96cm between 2000 and 2100[120]. If the average temperature increase does not exceed 3°C, which requires even stronger mitigation efforts, there will be a sea level rise of approximately 355cm by the year 2300 while projections go up to 500cm[121]. Provided that all emissions were reduced by 2016 sea level would have risen from 59cm in 2100 to 131cm in 2300[122]. It is needless to say that such utopian scenario is not realistic anymore; and probably never was.

Scenarios of drastic sea level rise present challenges to both ecosystems and socioeconomic systems which might result in floods in coastal areas as well as on islands[123]. A sea level rise of only 100cm implies that 20% of Bangladesh would end up under water[124]. Furthermore, the danger of non-linear events and processes, such as the melting of Greenland's ice sheets, is accompanied by even more uncertainty. Some studies predict that a temperature increase of 'only' 3°C might already be accompanied by the radical melting of those ice sheet masses which would then result in an *additional* sea level rise of 700cm over the next few centuries[125]. According to the IPCC, "[l]arge-scale ocean circulation changes beyond the 21st century cannot be reliably assessed because of uncertainties in the meltwater supply from the Greenland ice sheet and model response to the warming"[126], however, scientists argue that "[a]n increase in glacial melt will, in the short term, initially increase river flow, which may bring greater risk of flooding. In the longer term it is likely that there will be an eventual decline in runoff, which

[118] Ibid.
[119] Cf. ibid.
[120] Cf. Schaeffer et al. (2012). Long-term sea-level rise implied by 1.5°C and 2°C warming levels. Nature Climate Change, p2.
[121] Ibid.
[122] Ibid.
[123] Ibid., p4.
[124] Cf. Stern, N. (2006): Stern Review: The Economics of Climate Change. Executive Summary. Cabinet Office – HM Treasury, Cambridge, p7.
[125] Cf. German Advisory Council on Global Change (WBGU) (2007): Climate Change as a Security Risk. Earthscan, London, p61.
[126] IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p75.

may lead to water scarcity in those regions dependent upon glacier-fed rivers, although the potential timescale for this decline is uncertain"[127].

Temperature and precipitation patterns also have an influence on freshwater which means that available freshwater and groundwater in coastal regions might suffer from salinization[128]. Due to stronger evaporation processes, however, it can be assumed that the availability of freshwater will decrease even in regions with high precipitation[129].

After all, current projections are still too uncertain and differ regionally which makes it difficult to plan and implement potential future water management projects[130]. Moreover, an increase of water temperature as well as excessive rainfall may result in poor water quality in many regions[131]. Even regions which are projected to receive less rainfall might experience strong rain due to higher climate variability. At the same time the overall trend may be going towards longer phases of drought[132].

Although there has been a substantial amount of climate research, studies and specifically future climate models show that there is still strong uncertainty about future predictions. However, experts from all disciplines argue that climate change will have severe implications for societies as well economies including water availability, food security, and health[133].

CHAPTER THREE: VIOLENT CONFLICT

3.1. DEFINING VIOLENT CONFLICT

Conflicts per se are inevitable and a necessary by-product of social change, however, it is a question of *how* they are handled and resolved[134]. In order to examine the connection between climate change and violent conflict the latter also needs to be clarified. When speaking of

[127] Juen, I. et al. (2007): Modelling observed and future runoff from a glacierized tropical catchment. Global and Planetary Change, p38.

[128] Cf. German Advisory Council on Global Change (WBGU) (2007): Climate Change as a Security Risk. Earthscan, London, p68.

[129] Ibid., p64.

[130] Ibid., p70.

[131] Ibid.

[132] Ibid., p62.

[133] Cf. The Government Office for Science (2011): Foresight International Dimensions of Climate Change. Final Project Report. London, p26.

[134] Cf. Ropers, N. (2002): Friedensentwicklung, Krisenprävention und Konfliktbearbeitung. Technische Zusammenarbeit im Kontext von Krisen, Konflikten und Katastrophen. GIZ. Wiesbaden.

violent conflict in this thesis it is referred to *political violent conflict* which the WHO defines as a form of *collective violence*[135].

According to Tilly (2003), collective violence can be defined as "episodic social interaction that: immediately inflicts physical damage on persons and/or objects ('damage' includes forcible seizure of persons or objects over restraint or resistance); involves at least two perpetrators; and results at least in part from coordination among persons who perform the damaging acts"[136]. Developing this definition further, the WHO understands collective violence as "the instrumental use of violence by people who identify themselves as members of a group – whether this group is transitory or has a more permanent identity – against another group or set of individuals, in order to achieve political, economic or social objectives"[137]. Violent conflicts can take on various forms such as "[w]ars, terrorism and other violent political conflicts that occur within or between states"[138] as well as "[s]tate-perpetrated violence such as genocide, repression, disappearances, torture and other abuses of human rights"[139] and "[o]rganized violent crime such as banditry and gang warfare"[140]. There are several definitions of *violent conflict*. Many of which are controversial. The HIIK suggests the following definition for *political conflict* first in order to determine *violent political conflict*:

"[A] political conflict is a perceived incompatibility of intentions between individuals or social groups. Such an incompatibility emerges from the presence of actors who communicate and act with regard to certain objects. These actions and communications are known as measures, while the objects form the issues of positional differences. Actors, measures, and issues are the constitutive attributes of political conflict"[141]. The institute further analyses the concept of intensity and distinguishes between non-violent and violent conflict. It also identifies different levels of violent conflict, such as violent crisis, limited war, and war[142]. According to the HIIK, "[a] political conflict is classified as a **violent crisis** when at least one actor uses force *sporadically* against persons – or things in case that physical violence against people is considered acceptable. The applied means and consequences altogether are *limited*"[143], whereas "[a] political conflict is classified as a **limited war** when at least one actor uses force

[135] Cf. Krug, E.G. et al. (2002): World report on violence and health. Geneva, World Health Organization, p215.
[136] Tilly, C (2003): The Politics of Collective Violence. Cambridge University Press. Cambridge, P3.
[137] Krug, E.G. et al. (2002): World report on violence and health. Geneva, World Health Organization.
[138] Ibid.
[139] Ibid.
[140] Ibid.
[141] Heidelberger Institut für Internationale Konfliktforschung (2011), https://www.hiik.de/de/methodik/, accessed 3 December 2017.
[142] Cf. Ibid.
[143] Ibid.

against persons and maybe things in a *distinctive* way. The applied means and consequences altogether are *serious*"[144], and finally "[a] political conflict is classified as a **war** when at least one actor uses force *massively* against persons and maybe things. The applied means and consequences altogether need to be framed as *extensive*"[145].

In this thesis the term *violent conflict* refers to all types of *political violent conflict* as a form of *collective violence* as defined above. In the case of Darfur the type of violent conflict can be classified as the worst type and thus falls under the description *war*, i.e. *armed conflict*, or even *genocide*[146], which will be relevant in chapter five.

The common and historical understanding of war is violence between states, however, its definition is controversial. In order to determine whether a conflict can be described as war or not certain questions need to be answered. Such questions include the amount of deaths the fighting has caused, the period of time in which it has taken place, geographical boundaries, and hostilities[147].

International instruments thus rather use the term *armed conflict* in order to minimize confusion and controversies and "prevent loopholes in the applicability of humanitarian law"[148]. Nonetheless, there is still a variety of armed conflicts, such as so-called *new wars* or *asymmetric wars*, which indicate that there are new types of conflicts that exceed the traditional understanding of armed conflict and involve large-scale human rights violations[149].

As mentioned above the conflict in Darfur is also referred to as *genocide* which, according to the WHO, is "a particularly heinous form of collective violence, especially since perpetrators of genocide intentionally target a population group with the aim of destroying it. Genocide thus has, by definition, a collective dimension"[150]. The term was only legally defined after the Second World War, nonetheless, it has been used to identify conflicts as genocide that had taken place before the Second World War. The horror of the holocaust started the international debate and led to the official definition of genocide in the Convention on the Prevention and Punishment of the Crime of Genocide in 1948 which came into force in 1951. In Article 2 if the Convention genocide is determined as "any of the following acts committed with intent to

[144] Ibid.
[145] Ibid.
[146] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. Ithaka, New York, p91.
[147] Cf. Krug, E.G. et al. (2002): World report on violence and health. Geneva, World Health Organization, p216.
[148] Ibid.
[149] Ibid.
[150] Ibid.

destroy, in whole or in part, a national, ethnical, racial or religious group, as such: killing members of the group; causing serious bodily or mental harm to members of the group; deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part; imposing measures intended to prevent births within the group; forcibly transferring children of the group to another group"[151].

3.2. CAUSES OF VIOLENT CONFLICT

The outbreak of violent conflict is not limited to one single cause but is often based on a combination of factors. There are multiple reasons for violent conflict which do not occur isolated from other influences[152].

In the following, the different causes for violent conflict will be examined briefly. According to the GSDRC, those causes can be divided into political and institutional factors, identity politics, socioeconomic factors, and resource and environmental factors which include climate change, environmental insecurity and resource scarcity[153]. Natural resources and environmental factors, however, are discussed in detail in chapter four as it is the focus of this dissertation.

3.2.1. POLITICAL AND INSTITUTIONAL FACTORS

Weak state institutions are seen as one of the reasons for violent conflict as societies can be fractured if political institutions are not able to manage different group interests peacefully, protect certain groups, or provide opportunities for political participation[154]. There is a degree of consensus among social scientists that there is a connection between levels of democracy and the probability of violent conflict in a society[155]. Stable democracies are able to cope with tensions peacefully whereas authoritarian regimes tend to manage conflict through force and violence.

[151] Convention on the Prevention and Punishment of the Crime of Genocide (1948).
[152] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p.6.
[153] Ibid.
[154] Ibid., p7.
[155] Ibid.

Mainsfield and Synder (2007) also claim that mature democracies lead to a more peaceful world, however, it is questionable whether that is the case during the democratization process[156]. In the transitional phase on the way to democracy states in fact tend to become more aggressive. The conditions need to be ripe to promote democracy, i.e. democratic institutions have to be in place as well as electoral politics have to be introduced in order to reduce the risk of violence[157].

State weakness, which can result in collective fear and uncertainty regarding the future[158] and indiscriminate repression can lead to "the emergence of armed responses by marginalised groups and nationalist, ethnic or other populist ideologies"[159]. Thus states are most vulnerable when going through a transitional phase from autocracy to democracy[160].

Another issue with regards to political and institutional factors are elite power struggles and political exclusion stemming from the legacies of colonialism and liberation struggles in Africa, Asia, South America, and the Middle East, while Sub-Saharan Africa is the most conflict-intensive region in the world[161]. Such legacies include fights over power and land as well as divisive and militarized politics[162]. In some countries post-liberation leaders have sustained these structures and dynamics, "retaining power through neopatrimonial networks, state capture, militarisation and coercion"[163]. According to relevant studies, those leaders have used and maintained ideologies promoting the above mentioned 'us versus them' concept in order to exclude and marginalize certain groups. Moreover, preventing groups from access to state structures while giving privileges to individual leaders, political parties or specific groups leads to the exacerbation of social division and exclusion. This may provide opportunities to excluded leaders to mobilize groups for protests and possibly engage in violence. On the other

[156] Cf. Mansfield, E.D./ Snyder, J. (2007): Turbulent Transitions: Why Emerging Democracies Go to War in the Twenty-first Century, in: Crocker, C./ Hampson, F. O./ All, P. (2007): Leashing the Dogs of War: Conflict Management in a Divided World. United States Institute for Peace. Washington, DC. pp. 161-176.
[157] Ibid.
[158] Cf. Lake, D. A./ Rothchild, D. (1996): Containing Fear: The Origins and Management of Ethnic Conflict. International Security. Vol. 21, No. 2, pp. 41-75.
[159] Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p7.
[160] Cf. Mansfield, E.D./ Snyder, J. (2007): Turbulent Transitions: Why Emerging Democracies Go to War in the Twenty-first Century, in: Crocker, C./ Hampson, F. O./ All, P. (2007): Leashing the Dogs of War: Conflict Management in a Divided World. United States Institute for Peace. Washington, DC. pp. 161-176.
[161] Cf. Lindemann, S. (2008): Do Inclusive Elite Bargains Matter? A Research Framework for Understanding the Causes of Civil War in Sub-Saharan Africa. Discussion Paper, No. 15. Crisis States Research Centre. London School of Economics and Political Science. London.
[162] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p8.
[163] Ibid.

hand, "inclusive elite bargains that seek to address social fragmentation and integrate a broad coalition of key elites can reduce the chances of violent rebellion"[164].

Additionally, corruption and the breakdown in social contract, which is a political theoretical "framework of rules that governs state-society relations and the distribution of resources, rights and responsibilities in an organised society"[165], may also lead to violent conflict. According to Murshed and Tadjoeddin (2009) violent conflict, in fact, requires the failure of social contract or institutional breakdown[166].

It is crucial for a government to spend public revenue, coming from taxes or natural resources, fairly and consider the people's needs. Conflict is less probable if revenue is spent appropriately on the satisfaction of basic needs and social welfare opposed to corrupt and fractional purposes as corruption undermines public trust in government, increases socioeconomic grievances, deters domestic and foreign investment, and worsens in economic inequalities. It is equally important for the state to provide basic services, such as justice and security, to all citizens in order to strengthen state legitimacy and trust in its institutions. Some cases show that ruling parties can resort to violence to stabilize their rule and thus sustain opportunities for corruption which may lead to violent outbreaks by marginalized groups[167].

3.2.2. IDENTITY POLITICS

Group-identity theories "aim to explain the way groups reinforce their identities and the 'we-they' cleavages that often result"[168]. Those theories are based on social psychological theories and include intergroup conflicts that involve nationalism, ethnicity, and religion[169]. It can also result from a sense of and need for "camaraderie or 'we-ness' that can be satisfied in a group when it discriminates against or attacks another group"[170].

[164] Ibid., p9.
[165] Ibid.
[166] Cf. Murshed, S. M./ Tadjoeddin, M. Z. (2009): Revisiting the Greed and Grievance Explanations for Violent Internal Conflict. Journal of International Development, Vol. 21, no. 1, pp. 87-111.
[167] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p8.
[168] Cf. Homer-Dixon, T. F. (1999): Environment, Scarcity and Violence. Princeton University Press. Princeton, p135.
[169] Cf. ibid.
[170] Homer-Dixon, T. F. (1999): Environment, Scarcity and Violence. Princeton University Press. Princeton, p137.

The so-called group entitlement theory[171] puts more emphasis on ethnic factors. These factors, however, accompany economic and political factors[172]. Ethnic diversity in isolation does seem to be a cause of violent conflict. This would mean that the most war-prone states are the most ethnically diverse, which is not correct[173]. Instead, it could even be that ethnic and religious diversity which reduces the risk of violent conflict[174], "perhaps because it encourages divergent groups to learn the skills of living together despite diversity. When this learning process fails, however, ethnic diversity may turn out to exacerbate conflict and increase the likelihood of serious escalation, precisely because it offers fertile material for political mobilisation"[175].

It is debatable what role exactly identity politics plays in regarding violent conflict. The so-called 'primordialist' argument claims that "ethnic, religious or cultural differences inevitably result in conflict"[176], however, it has been discredited in much of the literature. So-called 'intsrumentalists', on the other hand, argue that identity is a construct and used as means of mobilization[177].

Contemporary scholars attempt to find a balance between the two extremes by arguing that identities and differences based on ethnicity, religion, and culture are not the main causes for conflict, though, if exploited they "provide a system of beliefs and practices that can unite adherents in a community, alter their perception of others and encourage them to take collective action in the name of their group"[178].

Especially, when facing discrimination and exclusion, group identity can become an issue and a crucial factor which may cause groups to resort to violence. That, however, depends on the cohesion within ethnic, religious, and cultural groups. It is believed that weak cohesion within groups reduces the likelihood of such violent mobilization[179].

According to Lake and Rothchild three key factors have to take hold in order to contribute to ethnic violent conflict. Firstly, information failure, i.e. groups or individuals misrepresent or misinterpret information about other groups; secondly, issues of credible commitment take

[171] Cf. Horowitz, D. (1985): Ethnic Groups in Conflict, Berkeley, University of California Press.
[172] Cf. Gurr, T. R. (1995): Minorities at risk: a global view of ethnopolitical conflicts, Washington, D.C., United States Institute of Peace Press.
[173] Cf. Smith, D. (1997): The State of War and Peace Atlas, London & New York, Penguin Books, p30.
[174] Cf. Collier, P. (1999): Doing Well out of War, Paper prepared for Conference on Economic Agendas in Civil Wars, London, April 26–27, 1999.
[175] Smith, D. (2004): Trends and Causes of Armed Conflict. Berghof Research Center for Constructive Conflict Management. Berlin, p.6.
[176] Ibid.
[177] Cf. ibid.
[178] Ibid., p7.
[179] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p12.

place, i.e. groups cannot credibly and reliably assure that they will not break or exploit a mutual agreement; and lastly, security dilemmas, which means that one or more parties in dispute are willing to use pre-emptive force[180]. To support the argument that ethnic diversity alone does not cause conflict, Cocodia (2008) confirms that fairness, justice, external threats, as well as the level of education, determine the probability of violent conflict[181].

Both, dominant as well as marginalized group leaders use identity politics to mobilize their groups in order to articulate discontent and exclusion. Nonetheless, this does not mean that all politics referring to ethnicity or religion promote exclusion or violence. Although identity can contribute to issues of power as well as of grievance, it can also be used peacefully in order to promote inclusion and empowerment through the claiming of rights and citizenship[182].

3.2.3. SOCIOECONOMIC FACTORS

Homer-Dixon suggests "that people become aggressive when they feel frustrated by something or someone they believe is blocking them from fulfilling a strong desire"[183]. Such claims are based on "psychological theories of individual behaviour to explain civil strife, including revolutions, insurgencies, strikes, riots and coups"[184]. The resulting frustration and aggression can be caused by so-called *relative deprivation*[185]. Smith states that "[r]elative deprivation theory offers an explanation that is based on the contrast between groups' expected and actual access to prosperity and power"[186]. In other words, it is relative as it "arises when people perceive a widening gap between the level of satisfaction they have achieved (often defined in economic terms) and the level they believe they deserve"[187]. It is thus a subjective perception and depends on the individuals standards of justice and fairness[188].

[180] Cf. Lake, D. A./ Rothchild, D. (1996): Containing Fear: The Origins and Management of Ethnic Conflict. International Security. Vol. 21, No. 2, pp. 41-75.
[181] Cf. Cocodia, J. (2008): Exhuming Trends in Ethnic Conflict and Cooperation in Africa: Some Selected States. African Journal on Conflict Resolution, Vol. 8, No. 3, pp. 9-26.
[182] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p12.
[183] Homer-Dixon, T. F. (1999): Environment, Scarcity and Violence. Princeton University Press. Princeton, p136.
[184] Ibid.
[185] Cf. Ibid.
[186] Smith, D. (2004): Trends and Causes of Armed Conflict. Berghof Research Center for Constructive Conflict Management. Berlin, p.5.
[187] Homer-Dixon, T. F. (1999): Environment, Scarcity and Violence. Princeton University Press. Princeton, p137.
[188] Cf. ibid.

There is a certain degree of consensus in the literature that inequality *per se*, rather than the extent of inequality, determines the probability of violent conflict. Research has shown that horizontal inequalities, i.e. inequalities related to ethnic, religious or cultural identities, are more likely to result in violence[189]. Specifically, multidimensional horizontal inequalities, may cause conflict by excluding culturally defined groups from multiple spheres, such as justice, security, economic, social, and political domains[190].

It is not rare that different forms of inequalities, exclusion and marginalization interact and exacerbate each other. Accordingly, unequal access to power and decision-making processes can lead to unequal access to natural resources and land, for instance. Exclusion based on social identity, may it be perceived or actual, can result in a strong feeling of collective injustice and increase a group's sense of alienation from the majority of society and therefore cause frustration and resentment. Over time, such tensions can foster group mobilisation and fuel violent conflict[191]. However, such relative deprivation does not only affect excluded and marginalized groups but also the privileged who fear losing their status quo. One of the critical factors which decides whether discontent and resentment turns into violence is the government's response. The states responsibility is then to address exclusion instead of reacting unreasonably to a peaceful protest, for example, in order to prevent violent outbreaks[192].

The best way to do so, according to Cederman et al., is to involve and include former marginalized groups and giving them a real stake in their state's future[193]. Inequality and exclusion as a conflict cause may go hand in hand with the failing of the social contract as mentioned above[194].

Within the socioeconomic factors poverty is a major component, i.e. there is an obvious and clear connection between poverty and violent conflict. Studies show that a substantial amount of conflicts take place in poor countries, however, it is debatable what the direction of causality is. There is evidence that conflict exacerbates poverty; yet most scholars claim that poverty *per se* is rarely a direct cause of conflict. Instead it is mainly relative deprivation that increases the

[189] Ibid.
[190] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p15.
[191] Ibid.
[192] Ibid.
[193] Cf. Cederman, L-E./ Gleditsch, K. S./ Buhaug, H. (2013): Inequality, Grievances, and Civil War. Cambridge University Press. Cambridge.
[194] Ibid.

probability of violent conflict. On the other hand, poverty can certainly contribute or maintain conflict due to its link to the perception of injustices, exclusion, as well as marginalization[195]. Smith (2004) summarizes it as follows: "Poor economic conditions are the most important long-term causes of intra-state armed conflicts today; Repressive political systems are also war-prone, especially in periods of transition; Degradation of renewable resources (specifically soil erosion, deforestation and water scarcity) can also contribute significantly to the likelihood of violent conflict, but are in general not as central to the problem as political and economic determinants; Ethnic diversity alone is not a cause of armed conflict, but parties to a conflict are often defined by their ethnic identities"[196].

Since this dissertation focuses on the link between climate change and violent conflict the causes regarding natural resources and environmental factors are examined in the following chapter in order to draw the connection between the two fields.

CHAPTER FOUR: LINKING CLIMATE CHANGE AND VIOLENT CONFLICT

4.1. ENVIRONMENTAL CHANGE AND VIOLENT CONFLICT

The debate on the link between climate change and violent conflict can be understood as a continuation of the environmental security debate which includes the issue of violent conflict in the context of environmental change[197]. Thus, the following section gives a brief overview of the current relevant findings with regards to environmental conflict.

The possibly most important outcome that has been concluded from existing research is that environmental degradation is generally seen as only one of the contributing factors in a combination of multiple causes of violent conflict. Environmental degradation in itself does not directly result in violence. The deciding factors are primarily of political, social, and

[195] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p15.

[196] Smith, D. (2004): Trends and Causes of Armed Conflict. Berghof Research Center for Constructive Conflict Management. Berlin, p.7.

[197] Cf. Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p17; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p27; Scheffran, J. (2011): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p33.

economic nature, as mentioned in the previous chapter. However, these causes may be influenced or exacerbated by environmental changes[198].

Many scholars, such as Brzoska (2008), point out that it is first and foremost the scarcity of renewable natural resources that plays a role regarding conflict relevant environmental changes. The competition over water, food, as well as land in combination with the already existing probability and risk of conflict may therefore intensify such risks and lead to the outbreak of violent conflict[199]. The scarcity or lack of natural resources can, for example, result in institutional weakness as well social and economic issues which can produce the necessary conditions for conflict[200]. At the same time, social grievances, as a cause of conflict, can lead to unequal access to scarce resources[201].

The unequal distribution of renewable resources, as well as the decrease of quality and quantity of such, may in addition cause migration. However, political, social, and cultural aspects need to be considered, too. Migration, due to environmental change, may then act as a threat multiplier to existing conflicts in the destination region. Consequently, problems caused by contradicting political identities, may be worsened. Additionally, further environmental damage, as well as poverty, can in turn lead to stronger competition over scarce resources[202].

A state's problem solving skills turn out to be a crucial aspect in the case of violent conflict as a consequence of increasing environmental degradation. Whether conflicts can be resolved peacefully is determined by the strength or weakness of state institutions which is why developing countries as well as states in transition phases with weak state institutions are specifically vulnerable and conflict prone to increasing environmental stress[203].

Furthermore, strong state institutions are able to provide peaceful allocation mechanisms to regulate competition of natural resources.If such mechanisms fail and certain groups feel

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[198] Ibid.

[199] Cf. Brzoska, M. (2008): Der konfliktträchtige Klimawandel - Ein Sicherheitsproblem?; in: A. Heinemann-Grüder, A. et al. J. (eds.): Friedensgutachten 2008. Münster, p198f; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p25f.

[200] Cf. Scheffran, J. (2011): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p33.

[201] Cf. Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p10; Homer-Dixon, T. F. (1999): Environment, Scarcity and Violence. Princeton University Press. Princeton, p65f.

[202] Ibid.; Bernauer, T et al. (2012): Environmental changes and violent conflict. Environmental Research Letters, 7(1), p3.;

[203] Cf, Brzoska, M. (2008): Der konfliktträchtige Klimawandel - Ein Sicherheitsproblem?; in: Heinemann-Grüder, A. et al. (eds.): Friedensgutachten 2008. Münster, p200; Waldmann, J. (2011): Frieden und Natur/Umwelt; in: Gießmann, H. J./ Rinke, B. (eds): Handbuch Frieden. VS Verlag. Wiesbaden, p450.

deprived there is a risk for escalating conflicts[204]. Moreover, the legitimacy and governance of a state may be further weakened through environmental degradation and ecological damage and thus result in weak societal resilience[205]. Environmental conflict studies also find that the likelihood of violent conflict between states, due to environmental change, decreases. Instead, there is a relatively high probability of local and scattered low intensity conflicts between groups and communities[206]. It is therefore suggested that there is no direct causal relationship between environmental change, resource scarcity and violent conflict. Nevertheless, it has also been established that that there are complex interdependencies and amplifying components that can, in combination with political and socioeconomic factors, lead to the destabilization of states and societies which are then vulnerable to violent conflict[207]

However, due to primarily qualitative studies of observable violent conflicts over soil degradation, legal land and water issues, as well as environmentally induced migration in the past, it has been shown that there is a strong need for further research in order to comprehend the linkages to a better extent[208]. Due to contradicting quantitative empirical evidence, as well several analytical problems, scholars cannot conclude that there is no correlation between environmental change and violent conflict at all. Thus research needs to take into account that environmental problems can be an indirect conflict cause and therefore exacerbate direct reasons for violent conflict. Furthermore, it should not be ignored that environmental conditions cannot only be examined nationally but also regionally. It is also suggested to include violent conflicts of low intensity as well as conflicts without the participation of the state in future studies[209].

[204] Cf. . Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p14.

[205] Cf. Homer-Dixon, T. F. (1999): Environment, Scarcity and Violence. Princeton University Press. Princeton, p65.; Scheffran, J. (2011): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p33.

[206] Ibid.; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York.

[207] Cf. Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p13.

[208] Cf. Scheffran, J. (2011): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p37.

[209] Cf. Bernauer, T. (2012): Environmental changes and violent conflict. Environmental Research Letters, 7(1), p3.

4.2. 'CLIMATE CHANGE INDUCED' CONFLICT CONSTELLATIONS

The empirically found connections between environmental change and violent conflict are often relatively small, yet the expected repercussions of climate change may result in that such connections become more significant. Currently, climate related relationships are still based on uncertainty as it is not useful to refer to historically empirical analysis[210]. The reason for that is that climate change, according to Scheffran (2011), is mainly a problem of the future whereas there are only data on the past available. Thus the people's and societies' reaction can also not be deducted from historically unique changes in the environment or climate[211].

At the same time the debate on security and peace is fairly new in the climate change context. Thus the process of linking those fields and projection societal risks as a consequence of climate change is only in its early stages. It is important to not jump to conclusions but rather interpret information carefully and not to, despite the limited data, negate or deny a link between climate change and violent conflict[212].

This chapter identifies potential conflict risks due to climate change and illustrates conflict promoting mechanisms. On the other hand, extreme and irreversible consequences of climate change and its tipping point are not taken into consideration since it is too uncertain whether those scenarios will actually occur[213]. Following the findings of environmental conflict studies there is a certain degree of consensus that climate change can be seen as a threat-multiplier which, whilst on its own is not a sufficient cause of violent conflict, is found in a complex combination with other factors[214].

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[210] Cf. Nordås, R./ Gleditsch, N. P. (2005): Climate Conflict: Common Sense or Nonsense? PRIO. Oslo, p5.

[211] Cf. Scheffran, J. (2011): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p39.

[212] Cf. Brzoska, M./ Oels, A. (2011): ´Versicherheitlichung' des Klimawandels? Die Konstruktion des Klimawandels als Sicherheitsbedrohung und ihre politischen Folgen; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p53; Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate
Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p80f; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York.

[213] Cf. Michaelis, N. V. (2011): Klimawandel als Verteilungskonflikt - Gewinner und Verlierer; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p70.

[214] Cf. Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p80f. Washington DC, p80f.

How severe climate and conflict risks are strongly depend on the intensity of climate change and thus the mitigation efforts[215]. In addition, the vulnerability to climate change as well as conflict plays a crucial role, i.e. how strongly affected a region is by climate change. Moreover, a society's stability as well as the ability to adapt to climate change are decisive in order to prevent conflict[216].

At the same time adaptation pressures and other challenges due to climate change impacts can weaken states and make them more vulnerable[217]. Along with the amplifying effect of existing conflict risks water scarcity, conflicts over land, food insecurity, extreme weather events, and climate induced migration can be expected to fuel potential conflict constellations. Climate change can lead to natural resource scarcity which can result in poverty and social tensions and thus increases conflict risks[218].

4.2.1. CLIMATE AND CONFLICT VULNERABILITY

As previously mentioned, the ability to adapt as well as problem solving skills are crucial for affected societies when it comes to dealing with climate change impacts and their resulting challenges in order to prevent violent conflict. In this context adaption can be understood as the capacity to respond to climate induced changes and challenges, as well as to resolve conflict effectively and peacefully[219]. A society's vulnerability as well as adaptive capacity are therefore determined by civil society, institutional and economic factors, such as access to resources, education, information, as well as the stability and effectiveness of state institutions[220].

[215] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p181.

[216] Cf. Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p80f. Washington DC, p78.

[217] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p182.

[218] Cf. Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p15.

[219] Cf. Smith, D./ Vivekananda, J. (2007): A climate of conflict: The links between climate change, peace and war. International Alert. London, p15f.

[220] Cf. Scheffran, J. (2011): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p30.

Furthermore, relevant problem solving skills are negatively influenced by a fragile state with a lack of governance capacities which is why necessary adaptation mechanisms as well as peaceful conflict resolution specifically fails in unstable and less developed countries[221]. In contrast, stable states can handle such challenges better and continue to function under those circumstances. Whereas weak states are characterized by deficiencies when it comes to the state's monopoly on legitimate use of force, the rule of law, or the welfare system including the provision of public goods[222]. Thus bad governance can increase social tensions while the social system of developed countries can absorb insecurities much better[223].

Particularly developing countries struggle with state failure and destabilizing processes since they are overwhelmed with both climate change impacts and conflict risks; additionally, they lack necessary adaptations measures[224]. According to the Fragile States Index (2017) there were 35 countries ranked with *alert*, *high alert*, and *very high alert* in 2017 whereby the majority of these countries can be found on the African continent[225]. Climate change affects already fragile states severely. The insufficient ability to protect its people from climate change impacts puts extra pressure on those countries which may then lead to further destabilization and failure of the state[226]). That way circumstances in certain states can be worsened undermining the legitimacy and stability of the government even further.

Consequently, the risk that existing conflicts may escalate increases which can cause a dynamic in which climate change impacts and conflict risks could amplify and intensify one another[227]. Social exclusion, inequalities, lack of access to the justice system, insufficient inclusion of groups into the political system by providing access to participation can, as established in the previous chapter, also lead to higher conflict vulnerability. On the one hand this may lead to growing inequalities due to different vulnerabilities in social groups as well as different climate change impacts in different regions within one country causing the increase of conflict risks[228]. On the other hand, competition between different groups in society over scarce natural

[221] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p45.
[222] Ibid.
[223] Cf. Smith, D./ Vivekananda, J. (2007): A climate of conflict: The links between climate change, peace and war. International Alert. London, p15f.
[224] Ibid.
[225] Cf. FFP (2017): Fragile States Index 2017. Fund For Peace. Washington DC, p6.
[226] Cf. Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p430.
[227] Cf. Nordås, R./ Gleditsch, N. P. (2005): Climate Conflict: Common Sense or Nonsense? PRIO. Oslo, p10f.
[228] Cf. Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p80f. Washington DC, p85.

resources may increase, which then allows to instrumentalize and exploit the groups' desperation and frustration, due to increasing poverty and inequality in order to recruit and mobilize new members for rebel groups, for instance[229].

Apart from the expected interaction and interdependency of climate change impacts and conflict relevant political as well as societal conditions economic consequences can also suspected. A state's economy appears to be particularly vulnerable if it relies on the agricultural as well as fishery sector since, depending on the extent of climate change, those sectors may be hit the hardest hence significant loss can be expected[230].

Moreover, sea level rise, droughts and extreme weather events can destroy or at least damage the tourist sector and infrastructures[231]. On top of that, the demand for energy may increase in order to provide cooling systems that are needed to cope with temperature increase[232]. These economic consequences can result in higher unemployment and more poverty which may put more pressure the public budget decreasing adaptive capacities, undermining institutional functions and therefore political stability[233].

Furthermore, experts expect climate change impacts to specifically put weaker members of society at risk with regards to human health. This includes higher risks of malaria, cholera, limited access to clean water and food, or direct threats such as heat waves, storms, and floods. If a state cannot provide necessary public health conditions it could cause the breakdown of social contract resulting in higher vulnerability and social instability[234].

In summary, the repercussions of climate change could impact conflict relevant factors such as social, economic, and political conditions; it may also present a threat to human health. It is important to emphasize that weak and unstable states, which may be further weakened by climate change in several ways, play a crucial role regarding the potential outbreak of violent conflict. Hereby, the intensity of climate change impacts, a society's problem solving ability, and the exposure to climate change determines a country's vulnerability.

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[229] Ibd., p5.

[230] Cf. . Michaelis, N. V. (2011): Klimawandel als Verteilungskonflikt - Gewinner und Verlierer; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p72f.

[231] Ibid.

[232] Ibid.

[233] Cf. Barnett, J. & Adger, W. N. (2007). Climate change, human security and violent conflict. Political Geography, 26(6), p643.

[234] Cf. Nordås, R./ Gleditsch, N. P. (2005): Climate Conflict: Common Sense or Nonsense? PRIO. Oslo, p5.

4.2.2. WATER SCARCITY

Water cannot be substituted with anything and is therefore essential for survival. Simultaneously, it is a key resource in the industrial and agricultural sector as well as in private households, however, threatened by overuse, pollution, global overpopulation, and lastly climate change[235].

In 2009 there were 1.1 billion poeple without access to clean drinking water[236] (messner 2009 p170, wbgu p85 2007). The WHO states that in 2015 "[g]lobally, at least 2 billion people use a drinking water source contaminated with faeces"[237].

It can be differentiated between hydrological water scarcity and economic water scarcity. The former refers to the lack of water supply although relevant technologies are available and used efficiently whereas the latter can be traced back to the lack or failure of institutional and financial capacities which affects the access to water (ibid). Hydrological water scarcity can mostly be found in Northern Africa, the Middle East, and Central Asia which will increase due to climate change and probably also affect Southern Africa, Latin America, and small islands[238]. Changing precipitation patterns and increasing precipitation variability also affect water availability. Moreover, water evaporation, caused by higher temperatures, will increase and therefore the amount of available water will decrease. Although there will be an increase in glacial melt and thus river flow leading to greater risk of flooding in the long term it will, however, the runoff is expected to decline and result in water scarcity in the affected regions[239]).

Furthermore, existing water management systems may not be capable to cope with climate change induced changes. On the hand, necessary adaptation measures could fail leading to rapid changes in demand and supply due to insufficient institutional capacities. On the other hand, water management plans could not be executed adequately since past experiences are not reliable and applicable anymore[240]. Water crises leading to conflict are in fact not caused due

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[235] Cf. Fröhlich, C. (2006): Zur Rolle der Ressource Wasser in Konflikten. Aus Politik und Zeitgeschichte, Wasser, (25), p35f.

[236] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p85.

[237] Cf. WHO (2017): Drinking-Water. Fact Sheet; http://www.who.int/mediacentre/factsheets/fs391/en/, accessed on 11/2/18.

[238] Cf. Messner, D. (2009): Klimawandel und Wasserkrisen der Zukunft. Sicherheit und Frieden, 27(3), p165.

[239] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p80f.

[240] Cf. Messner, D. (2009): Klimawandel und Wasserkrisen der Zukunft. Sicherheit und Frieden,

to lack of water but due to failing management thereof which includes effective adaptation. In addition, socioeconomic and political factors as well as societal and political stability crucially determine whether a water crisis turns into a water conflict[241].

Particularly social discrimination regarding access to clean water can exacerbate social conflicts. Such distribution conflicts may take place between social groups and within the business as well as administrative sector[242]. Prompt access denial as a result of privatization and restructuring processes as well as infrastructure projects, such as building dams, can also trigger violence[243].

Since water is indispensable resource and essential for survival it is consequently under threat of politicization. This may either lead to a 'blame game' in order to identify the responsible source for failing water supply or it can worsen tensions between social and ethnic groups due to politically and ideological motivated water distribution[244]. Simultaneously, economies rely on water as a necessary resource for maintenance and development. Accordingly, limited water availability can worsen socioeconomic development as well as the standard increasing tensions within society[245]. Even without taking climate change impacts into account there is a probability of violent protest or conflict which could be observed in India between people in Karnataka and Tamil Nadu where violent conflict over water from the river Kaveri took place in 1991[246]. In Kenya 100 people died following a dispute between two villages over the access to a well in 2005[247].

Although water issues have the potential to cause tensions between states, however, interstate or international water wars due to climate change are unlikely to happen. On the one hand renewable resources such as water are not attractive enough to cause armed conflict for they do not immediately lead to power[248]; on the other hand there has been a certain level of agreement that solutions are more likely to be found through cooperation whereas the costs of war are higher than measures to improve water supply[249]. Therefore conflicts over the usage of

27(3), p167f.

[241] Ibid.

[242] Ibid.; Fröhlich, C. (2006): Zur Rolle der Ressource Wasser in Konflikten. Aus Politik und Zeitgeschichte, Wasser, (25), p30.

[243] Ibid.

[244] Ibid.

[245] Ibid.

[246] Cf. Ratsch, U./ Mège, F. (2008): Heißer Krieg um kühles Nass? Auswirkungen des Klimawandels auf Wasserkonflikte; in: Heinemann-Grüder,A. et al. (eds.): Friedensgutachten 2008. Münster, p225f,

[247] ibid.

[248] Cf. Fröhlich, C. (2006): Zur Rolle der Ressource Wasser in Konflikten. Aus Politik und Zeitgeschichte, Wasser, (25), p33.

[249] Ibid.

border crossing water sources mainly create peaceful and trustworthy agreements as well as fairly resilient collaborations[250]. The 'Indus Water Treaty' of 1960 between India and Pakistan, for example, had survived two wars and several political conflicts without water being exploited as a bargaining chip[251]. The 'Nil Basin Initiative' has also served as proof for collaboration between the ten affected states[252].

4.2.3. FOOD INSECURITY

A changing climate accompanied by extreme weather events can also have negative effects on agricultural productivity and thus affect food security. Environmental degradation, due to desertification, salinization and limited freshwater supply, can create restrictions in the agricultural sector. Furthermore, greater evaporation caused by temperature increase, severe storms and floods, climate induced spread of new germs, as well as a general shift in vegetation periods and precipitation changes can impact crops negatively[253].

Hereby, regional food production specifically depends on soil conditions and the resilience as well as adaptive capacity of the agricultural system. While a moderate temperature increase of 2°C may primarily affect agricultural production in the southern hemisphere, an increase of 4°C could have global impacts[254]. Countries in which the population strongly depends on agriculture are specifically vulnerable to climate change causing soil degradation and declining crops. In many developing countries in sub-Saharan Africa, East Asia, South East Asia and the Pacific region more than half of the population depends on agriculture as the primary sector[255]. Thus, already vulnerable population groups are additionally under threat which can exacerbate and spread poverty[256]. Even entire economies will experience the impacts of decreasing crops. While wealthier societies are more able to compensate production loss it is not possible for

[250] Ibid.
[251] Ibid.
[252] Ibid.; Ratsch, U./ Mège, F. (2008): Heißer Krieg um kühles Nass? Auswirkungen des Klimawandels auf Wasserkonflikte; in: Heinemann-Grüder,A. et al. (eds.): Friedensgutachten 2008. Münster, p225f.
[253] Cf. Burke, M. et al. (2009): Warming increases the risk of civil war in Africa. PNAS, 106(49), p20670f.
[254] Cf. Michaelis, N. V. (2011): Klimawandel als Verteilungskonflikt - Gewinner und Verlierer; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p72f; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p80f.
[255] Ibid.
[256] Cf. Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p80f.

some countries with less capital to import food for lack of purchasing power. That puts such countries at risk as they will feel price fluctuations and dependency even more[257]. Moreover, the building of power plants, as a response to climate change, may compete with food production over land use. As power plants are often more lucrative the lack of food including its price may increase resulting in greater risk of food insecurity[258]. However, stronger competition of scarce resources such as land and food alone does not cause violent conflict. It is primarily the increase of scarcity and not the actual lack of resources that creates social tensions[259]. Further, existing risks of conflict including political, economic, and social factors as well as latent conflicts present key causes for the outbreak of violence[260]. Those risks can be exacerbated by an increasing resource scarcity and therefore lead to a higher probability of conflict. Land degradation or the loss of jobs can threaten livelihoods and therefore worsen people's standard of living[261]. The incline in food prices in combination with existing poverty also puts livelihoods under threat[262].

Furthermore, the potential for escalation is increased by unequal access to scarce resources[263]. Conflicts can also be caused by changes in income and wealth distribution between groups and business sectors, and regions; the reason for that is that some areas and certain ethnic groups will be affected more than others[264]. In addition, people may try to exploit and instrumentalize occurring food crises so that certain groups may be blamed and held responsible for the situation[265].

Again, whether food crises lead to destabilization or even violence crucially depends on the political stability ad governance structures in the relevant country[266]. However, potential

[257] Cf. Burke, M. et al. (2009): Warming increases the risk of civil war in Africa. PNAS, 106(49), p20670f.

[258] Cf. Rudloff, B. (2009): Aufstand der Ausgehungerten. Internationale Politik, (11/12 2009), p38f.

[259] Ibid.; Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p75f.

[260] Cf. Burke, M. et al. (2009): Warming increases the risk of civil war in Africa. PNAS, 106(49), p20670f.

[261] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p205f.

[262] Ibid.

[263] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p99.

[264] Cf. Michaelis, N. V. (2011): Klimawandel als Verteilungskonflikt - Gewinner und Verlierer; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p72f; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p80f.

[265] Ibid.; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p99.

[266] Ibid.; Rudloff, B. (2009): Aufstand der Ausgehungerten. Internationale Politik, (11/12 2009), p38f.

economic loss and damage may weaken states further and affect their problem solving capacities and legitimacy negatively. Increasing fluctuations in price also present political and strategic challenges which bare risks for a state's stability[267].

It is expected that conflicts with regard to land caused by food insecurity will primarily occur on a local level. Violent disputes due to food scarcity may be limited to urban areas[268]. Conflicts over access to land have already led to violence between pastoralists and farmers in north Nigeria, Sudan, and Kenia (Smith & Vivekananda, 2009, S. 9). The next chapter of this dissertation examines the case of Sudan in detail. When the price for agricultural resource increased drastically during the food crisis in 2008 an outbreak of violence could be observed in developing countries killing 60 people in Cameroon, Haiti, Bangladesh and Yemen alone[269].

4.2.4. EXTREME WEATHER EVENTS

Due to climate change more frequent extreme weather events such as tropical storms, floods, landslides and fires are expected. Resulting risks are accompanied by sea level rise and deforestation[270]. In this case a society's vulnerability is also based on the infrastructure, poverty, level of education, economic structure, and density of the population which is why especially poor population groups are at greater risk[271].

Nevertheless, developed countries are also under threat with regards to climate induced catastrophes as shown in 2005 when tropical storm 'Katrina' caused severe problems in New Orleans[272]. At the same time such disasters "harbour the potential to provoke far-reaching social and political changes"[273] and if the political stability and governance structures of a country are normally in good condition there is usually no potential for inner conflict in the case of extreme weather events[274]. Yet natural disasters can still temporarily cause the collapse of state functions on a local level in the case of emergency if necessary conflict resolution mechanism are not in place[275].

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[267] Ibid.
[268] Ibid.
[269] Ibid.
[270] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p99.
[271] Ibid.
[272] Ibid.
[273] Ibid., p103.
[274] Cf. Ibid., p114.
[275] Ibid.

Under those circumstances the destabilization of political systems can be traced back to the lack of sufficient crisis management which can create discontent and frustration in the public[276]. In order for a situation to escalate into violent conflict there need to be existing political tensions and conflicts which may be amplified through additional grievances and the lack of proper crisis management. A disproportional use of force by security services as a reaction to resulting crime, for example, can also play a role (ibid.). If a weak country experiences multiple natural disasters in a row it is specifically prone to a permanent destabilization as observed in Haiti in 2004[277].

Along with that extreme weather events can lead to economic loss, impact water availability as well as agricultural capacity and thus create further conflict factors. Energy supply relevant infrastructures such as power lines oil rigs, for instance, can be damaged and limit, at least in temporarily, reliable energy supply[278]. Finally, extreme weather events can only lead to violent conflict if there is a combination of many factors. On the other hand natural disasters can even contribute to more cooperation between individuals, groups and states. This could also be observed between enemies triggering parties to help each other across border which created new possibilities for peace[279].

4.2.5. MIGRATION

Migration in itself does not have to be a destabilizing factor; in fact, it can rather benefit the immigrants as well as the region they migrate to and migrate from[280]. Countries receiving immigrants can, for example, benefit from sustaining a demographical balance, an incline in labour force, and thus economic development[281].

[276] Ibid.
[277] Ibid.
[278] Cf. Gleditsch, N. P. (2011): Regional Conflict and Climate Change. PRIO. Oslo, p11f.
[279] Ibid.; Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p205f.
[280] Cf. Smith, D./ Vivekananda, J. (2007): A climate of conflict: The links between climate change, peace and war. International Alert. London, p15f.
[281] Cf. Scheffran, J./ Vollmer, R. (2012): Migration und Klimawandel: Globale Verantwortung der EU statt Angstdebatte; in: Schoch, B. et al. (eds.): Friedensgutachten 2012. Münster, p209f.

Besides, emigrants who left their country due to political and social grievance are able to improve their livelihoods (ibid). According to public discussions and the media in developed countries, however, migration is mostly portrayed as a risk for the receiving country[282].

There is only little doubt that migration will increase due to climate change, though, it is only one of the possible coping mechanisms as a reaction to the repercussions of climate change[283]. It is important to mention that current projections cannot provide exact or reliable numbers regarding the extent of climate induced migration. Available data are highly speculative and uncertain and should therefore be interpreted carefully[284].

Environmentally motivated migration caused by extreme weather, environmental degradation, and climate change induced conflicts can be understood as a form of adaptation and the seeking of security and hope for better living conditions[285]. However, due to the fact that 'environmental change' does not pose an officially determined cause for refugees migrants fleeing for environmental reasons are not called refugees. According to the *Convention and Protocol relating to the Status of Refugees* a refugee is defined as "someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion"[286].

Apart from that, climate change related migration does not have to be forced but can also take place voluntarily; it is primarily expected within state boundaries. Thus, the term climate migrant opposed climate refugee appears to be more suitable[287]. Consequently, climate migrants do not enjoy the same protection, according to internatiol law; as refugees[288].

In addition to migration within states it can be expected that people will migrate across borders, but first and foremost within the southern hemisphere[289]. Furthermore, it is predicted that

[282] Ibid.
[283] Ibid.
[284] Ibid.
[285] Ibid.
[286] UNHCR (1951): Convention and Protocol relating to the Status of Refugees, p3.
[287] Cf. Angenendt, S. (2011): Klimaflüchtlinge - ein neues Sicherheitsrisiko?; in: Angenendt, S. et al. S. (eds.): Klimawandel und Sicherheit. Herausforderungen, Reaktionen und Handlungsmöglichkeiten. Nomos. Baden-Baden, p178f.
[288] Ibid.
[289] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p120f.

migration from rural to urban areas will increase[290]. Climate induced migration may only be temporarily and regionally limited which is indicated the emigrants hope to return[291].

Social impacts of climate change, such as the degradation of livelihoods due to climate related environmental changes can motivate people directly or indirectly to leave their habitat[292]). The *nter-Agency Standing Committee* (IASC), the "primary mechanism for inter-agency coordination of humanitarian assistance"[293] and established "in response to United Nations General Assembly Resolution 46/182 on the strengthening of humanitarian assistance[294] identifies the following causes of climate related movement: "hydrometeorological extreme hazard events, [..] environmental degradation and/or slow onset extreme hazard events, […] significant permanent losses in state territory as a result of sea level rise etc., [..] armed conflict/violence over shrinking natural resources"[295]. This implies that climate induced environmental changes can have direct impacts on human lives and their security through sea level rise, extreme weather events, food insecurity or insufficient supply of available drinking water, but also indirect effects due to worse living conditions, land degradation, economic loss and finally violent conflict and therefore contribute to emigration[296].

Looking at the current state of research it is, however, currently not possible to characterize environmentally induced migration as an autonomous cause[297]. Instead, although it can be expected that environmental changes cause stress and increase the pressure to migrate, it takes a multitude of causal factors which contribute to the complex demographical and social phenomenon of migration[298]. This includes a society's adaptive capacities, stability as well as socioeconomic, political, and ethnic conditions[299]. Furthermore, individual factors such the level of education, subjective perception of the situation, social network, and the necessary economic setup for potential migration play a crucial role[300].

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[290] Cf. Smith, D./ Vivekananda, J. (2007): A climate of conflict: The links between climate change, peace and war. International Alert. London, p15f.
[291] Ibid.
[292] Cf. Gleditsch, N. P. (2011): Regional Conflict and Climate Change. PRIO. Oslo, p10.
[293] IASC: https://interagencystandingcommittee.org/, accessed on 10/01/18.
[294] Ibid.
[295] IASC (2008): Climate Change, Migration and Displacement: Who will be affected? Working paper submitted by the informal group on Migration/ Displacement and Climate Change of the IASC, p2.
[296] Cf. Gleditsch, N. P. (2011): Regional Conflict and Climate Change. PRIO. Oslo, p11f.
[297] Ibid.
[298] Cf. Barnett, J. & Adger, W. N. (2007). Climate change, human security and violent conflict. Political Geography, 26(6), p643
[299] Cf. Scheffran, J./ Vollmer, R. (2012): Migration und Klimawandel: Globale Verantwortung der EU statt Angstdebatte; in: Schoch, B. et al. (eds.): Friedensgutachten 2012. Münster, p209f.
[300] Ibid.

However, it is questionable whether climate related migration can be seen as a catalyst for violent conflict. Here too, there is lack of significant empirical evidence and thus too much uncertainty[301]. Although authors like Gleditsch et al. see migration as one of the plausible connections between climate change and violent conflict[302], the relationship can still be described as highly complex while still in need of connecting components such as political and social factors[303].

Even if conflict, due to climate induced migration, is by far not inevitable it, nevertheless, seems possible if migration amplifies existing risks and dynamics. On the one hand, the above mentioned conflict constellations cannot only cause migration but can also be intensified by migration.

That way competition over scarce goods including water, food, land, jobs, living space, and the covering of basic social needs can be exacerbated through migrants[304]. The reaction of the relevant decision makers in the receiving country is thereby crucial.

Whether immigrants are integrated and granted certain rights or discriminated instead as well as held responsible for grievances has a decisive impact on the probability of conflict. This goes hand in hand with the receiving countries capability to adapt to challenges and changing situations as well as its governance capacities and societal stability[305].

Large-scale immigration can intensify ethnic tensions through changes in a countries ethnic makeup causing imbalances and power struggles[306]. Moreover, if there is no acceptance for immigrants, because they may be seen as an additional burden, they could be subject to rejection and the intrumentalization of existing problems[307].

An increase of urbanization also leads to higher vulnerability of economically weaker groups. The likelihood of violent conflict may also incline in urban areas since immigrants are mostly placed in informal settlements surrounding major cities which pose more conflict risks in relatively unprotected areas. Immigration into urban areas puts additional pressure on

[301] Cf. Gleditsch, N. P. (2011): Regional Conflict and Climate Change. PRIO. Oslo, p10.
[302] Ibid.
[303] Ibid.
[304] Cf. Engels, B. (2011): Umweltwandel, Migration und Gewaltkonflikte. Landrechte und politische Instrumentalisierung in der Côte d'Ivoire; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p139.
[305] Ibid.
[306] Cf. Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p80f
[307] Ibid.

unresolved societal issues, social tensions, and infrastructural deficiencies which can lead to violence the destabilization of cities[308].

Studies have shown that the probability of conflict increases when migration happens over a short period of time and in an unorganized manner[309]. With regards to the repercussions of climate change such large-scale migration movements can most likely be expected as a reaction to extreme weather events and climate induced violent conflict. In this case the possibility of violent conflict also depends on the migrants' experiences with violence. Violence in the receiving region seems particularly possible if migrants have experienced violent conflict in the past[310].

CHAPTER FIVE: CLIMATE CHANGE AND VIOLENT CONFLICT IN SUB-SAHARAN AFRICA

5.1. ECOLOGICAL IMPACTS OF CLIMATE CHANGE IN AFRICA

According to available significant evidence, as well as clear prognoses, the African continent, including its ecosystems and population, will be the main victims to climate change[311]. At second glance however, the situation is rather ambiguous. Data quality as well as regional differences complicate the matter. Furthermore, complex interdependencies between climate change and land use systems, food insecurity, health, and the different African ecosystems lead to major gaps in knowledge and necessary information about causes, forecasts, and predictions.

[308] Cf. Cf. Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p30.

[309] Cf. Gleditsch, N. P. (2011): Regional Conflict and Climate Change. PRIO. Oslo, p7.

[310] Ibid.

[311] Cf. Busby, J. W. et al. (2012): Locating Climate Insecurity: Where Are the Most Vulnerable Places in Africa?; in: Scheffran, J. et al. (eds.): Climate Change, Human Security and Violent Conflict. Challenges for Societal Stability. Springer. Heidelberg/Berlin, p463f; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p180; Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.

There is still need for more reliable data and research[312]. Nevertheless, it can be assumed that Africa is particularly vulnerable to negative ecological climate change effects[313].

This section illustrates the forecast for the African continent with regards to temperature increase, sea level rise, precipitation, and extreme weather events. It needs to be considered that projections for precipitation are more difficult to calculate than temperature predictions as precipitation is a result of highly complex physical processes whereas temperature is the result of a relatively simple heat balance[314]. At the same time, there are regional differences. Changes can specifically be seen in climate models regarding regional precipitation scenarios[315]. Climate models also capture extreme weather events, such as tropical storms, less effectively since current climate models have insufficient resolution capacities and the relevant processes are non-linear[316].

Eriksen et al. (2008) estimate an average temperature increase of 0.5°C during the 21st century in Africa. However, variations in different regions show that such averages only say little about regional specific circumstances in different areas. It is projected that countries with access to the Nile will experience a temperature increase of 0.2 to 0.3°C, while Rwanda can expect an increase of 0.7 to 0.9°C[317]. The IPCC on the other hand predicts a global surface temperature increase of up to 4°C for the time period between 2080 and 2099 compared to the period between 1980 and 1999. Further studies point out regional differences and project that northern Africa will experience hotter summers and colder winters while the Sahel zone should expect a general temperature increase of up to 5.4°C[318]. However, scholars and experts agree that there certainly will be a temperature increase in Africa which will have negative impacts[319]. An

[312] Cf. Boko, M. et al. (2007): Africa; in: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, p433f.

[313] Ibid.; Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.

[314] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p55.

[315] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.

[316] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p55.

[317] Cf. Eriksen, S. et al. (2008): Climate Change in Eastern and Southern Africa: Impacts, Vulnerability and Adaptation. Golabl Environmental Change and Human Security. Report: 2008:2. University of Oslo. Oslo.

[318] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p56.

[319] ibid.; Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.

increase of 2°C compared to the pre-industrial area will cause production loss and lead to a stronger dependency on food imports in the entire region[320].

Similarly, sea level rise will affect the continent. As elaborated in chapter two it is projected that even if mitigation targets were met, sea level will rise by 96cm between 2000 and 2100[321]. If the average temperature increase does not exceed 3°C, which requires even stronger mitigation efforts, there will be a sea level rise of approximately 355cm by the year 2300 while projections go up to 500cm[322]. Provided that all emissions were reduced by 2016, sea level would have risen from 59cm in 2100 to 131cm in 2300[323]. It is needless to say that such utopian scenario is not realistic anymore; and probably never was.

Scenarios of drastic sea level rise present challenges to both ecosystems and socioeconomic systems which might result in floods in coastal area of Africa, Asia, as well as on islands[324]. Furthermore, a sea level rise in the Mediterranean Sea, for example, can impact the Nile river delta and salt groundwater reservoirs affecting major parts of the local population and their freshwater supply[325]. Simultaneously, the costs for adaptation can take up between 5 to 10% of the gross domestic product (GDP) and this is extremely problematic for African countries[326]. Additionally, the IPCC projects that sea level rise can result in the decline of mangroves and coral reefs which may have severe negative impacts Africa's fishing and tourist sector[327].

When it comes to precipitation, the long-term forecasts predict a decline in annual rainfall of 10% by 2050 for sub-Sahara Africa as well as a 20% higher risk of cyclones in east Africa[328]. Moreover, increasing dryness in southern Africa, a 7% higher risk of flooding in east Africa, and unpredictable heavy rain fall as well severe storms are likely to occur. This may have dangerous impacts on the affected population, albeit different for each relevant society[329]. However, all affected areas will be forced to adapt effectively. The agricultural sector, in particular, may have to cope with those consequences as 75% of the sector depend on

[320] Ibid.

[321] Cf. Schaeffer et al. (2012): Long-term sea-level rise implied by 1.5°C and 2°C warming levels. Nature Climate Change, p2.

[322] Ibid.

[323] Ibid.

[324] Ibid., p4.

[325] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.

[326] Ibid.

[327] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland.

[328] Ibid.

[329] Ibid.

rainfall[330]. The resulting loss in agriculturally relevant land and harvest potential could compromise food supply and food security strongly whereby food security already poses one of the major issues in Africa[331]. Studies estimate that crop yields decrease by 50% between the year 2000 and 2020[332]. However, the IPCC's data on crop shortfall in Africa are solely based on three northern African states[333]. Generally, there are great contrasts between the seven different climate regions in Africa while there are not enough clear or coherent data[334]. Nonetheless, the so far observed impacts and weather events have caused severe damage in numerous African countries[335]. Thus overall, there is a high probability that climate change will have negative ecological impacts on Africa. The climate of the Sahel is already "perhaps the most dramatic example of climate variability that we have quantitatively measured anywhere in the world"[336]. Africa's geographical circumstances, its dependency on agriculture and fishery, as well as its populous coastal areas make the continent, not only in the Sahel, extremely vulnerable to the negative impacts of climate change even if the extent of such impacts is not clear yet[337].

5.2. CONFLICT RELATED RISKS OF CLIMATE CHANGE IN AFRICA

African countries pose high political as well as socioeconomic risks and thus it is very probable that they will have great difficulty adapting to the repercussions of climate change[338]. As

[330] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.
[331] Ibid.
[332] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland; Boko, M. et al. (2007): Africa; in: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, p433f.
[333] Ibid.
[334] Cf. Brown, O./ Crawford, A. (2009): Climate Change and Security in Africa. A Study for the Nordic-African Foreign Ministers Meeting. International Institute for Sustainable Development. Winnipeg.
[335] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.
[336] Batterburry, S./ Warren, A. (2001): The African Sahel 25 years after the great drought: assessing progress and moving towards new agendas and approaches; in: Global Environmental Change 11 (1), p3.
[337] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.
[338] Ibid.

examined in Chapter 4, conflict studies have identified multiple factors that promote the outbreak of violent conflict[339]. This includes population, low income per capita, low economic growth, weak security and justice systems, dependency on export of natural resources, as well as ethnic diversity[340]. Recent studies suggest that the exclusion of ethnic groups from political participation presents a high conflict risk, for example. This also speaks to the quality of state institutions, such as their legitimacy and efficiency.

It is therefore not hard to see that those risks are predominately illustrated in African countries. Specifically, low income and weak economies that depend on the export of raw materials are typically African phenomena[341]. Thus with regards to climate change impacts those issues are even more alarming. The key problem, however, appears to be the insufficiency or lack of state institutions and governance. The World Bank Governance Indicators (WBGI) show that Africa in general[342] consistently performs worse than other regions. The Fragile State Index supports these findings[343].

In spite of this, it is again important to mention that it is arguably problematic to predict future outcomes based on the recent past and present situation. In particular, warnings regarding the effects of climate change can and perhaps should lead to a response. Despite the importance of adaptation experts need to bear in mind the diversity of the African continent and thus its different needs. Governance capacities and state institutions, for instance, are far more advanced in the southern part of Africa, such as Botswana, South Africa and Namibia, compared to the central, eastern, or western region of the continent. However, there are promising examples even in those areas[344].

[339] Dixon, J. (2009): What Causes Civil War? Integrating Quantitative Research Findings; in: International Studies Review. 11(4), p707f.
[340] Ibid.
[341] Collier, P./ Hoeffler, A. (2002): On the Incidence of Civil war in Africa; in: Journal of Conflict Resolution. 46(1), p13f.
[342] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.
[343] Cf. FFP (2017): Fragile States Index 2017. Fund For Peace. Washington DC.
[344] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.

5.3. EMPIRICAL EVIDENCE

The underlying question is still whether there is in fact significant empirical evidence regarding the link between climate change and violent conflict. The scientific as well as conflict literature offers a wide range of future scenarios and how vulnerable societies, specifically in Africa, can be affected. However, there is still doubt about the exact impacts of climate change as well as the extent and intensity of it, including its consequences for African societies. Yet it is expected that resource scarcity and their degradation, which is predicted to be worsened by climate change, will contribute to the outbreak of violence in Africa significantly. This section as well as the following paragraphs focus on the actual empirical evidence, 'anecdotal' and quantitative, found in the literature before exploring the case of Darfur in detail.

Map of Sudan and South Sudan[345]

According to some 'anecdotal' evidence specific cases have been described as 'climate induced' wars or conflicts. For example, the Tuareg conflict in Mali, Tigray conflict in Ethiopia, and the infamous Darfur conflict in Sudan have been linked to environmental

[345] https://www.oxfamamerica.org/explore/stories/whats-the-difference-between-sudan-and-south-sudan/, accessed on 28 January 2019.

degradation[346]. The conflict in Darfur has even been described as a 'climate war' which is further examined in this chapter.

Before briefly illustrating a few studies and their quantitative evidence, it is crucial to repeat that violent conflict is not caused by a single factor but rather a combination of multiple factors which were clarified in Chapter three.

Africa specific quantitative studies mainly identify low income, dependency on natural resources, and dysfunctional political institutions as risks for violent conflict[347]. In the recent past political exclusion of ethnic groups has been added to the list of risk factors (wimmer 2009). However, this does certainly not mean that environmental factors do not play a role. There is an increasing number of contemporary studies that include ecological factors and their effect on the development of violent conflict in Africa[348].

Quantitative studies, such as Miguel et al. (2004), analyzes the effects of precipitation and determined that little rainfall increases the probability of civil war in Africa significantly[349]. Ciccone (2008) uses the same data and comes to the conclusion that an *incline* in rainfall increases the probability of violent conflict[350]. It is worth mentioning that although the correlation, albeit significant, is not strong[351]. Furthermore, it is based on a 'country-bias' which means entire countries are considered although environmental conditions within one country may differ, especially in large-area states in Africa[352].

Burke et al. (2009) use so-called 'grid cells' in order to examine the same research question. 'Grid cells' are arbitrarily set squares, approximately 50km times 50km, which are used for subnational analyses[353]. Even if the arbitrary determination of 'grid cells' may be criticized it

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[346] Ibid.

[347] Cf. Elbadawi, I./ Sambanis, N. (2000): Why are There So Many Civil Wars in Africa? Understanding and Preventing Violent Conflict. World Bank Policy Research Paper.

[348] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p212.

[349] Cf. Miguel, E. et al. (2004): Economic Shocks and Civil War: An Instrumental Variable Approach; in: Journal of Political Economy. 112(4), p725f.

[350] Cf. Ciccone, A. (2008): Transitory Economic Shocks and Civil Conflict.

[351] Cf. Theisen, O. et al. (2009): Drought, Political Exclusion, and Civil War; prepared for presentation at the conference on 'Climate Change, Social Stress and Violent Conflict: State of the Art and Research Needs. Klimacampus. Hamburg University. Hamburg.

[352] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p212f.

[353] Cf. Burke, M. B. et al. (2009): Warming increases the risk of civil war in Africa, in: Proceedings of the National Academy of Sciences USA, No.49, p 20670-20674; Buhang, H. (2010): Reply to Burke et al.: Bias and climate war research, in: Proceedings of the National Academy of Sciences USA, No.51, E186-E187.

still has got the advantage of not including a political bias[354]. Burke et al.'s results show that a temperature increase of 1°C between 1982 and 2002 had led to a 59% higher probability of "civil war onset" which implies at least 1000 deaths[355]. The authors project that by 2030 civil wars in Africa will increase by 60% while 450,000 additional deaths can be expected[356]. However, this study has been criticized[357] as contextual conditions are not included adequately. Theisen et al. (2009) on the other hand use sub-national 'grid cells' while also taking contextual factors into account. They particularly emphasize the political exclusion of ethnic based on the data from Cedermann et al. (2010)[358]. Theisen at al. come to the result that low rainfall rates or droughts have no systematic effect on the probability of civil war if the marginalization of ethnic groups is taken into account. Nevertheless, the authors conclude that climate change and its repercussions may not increase the probability of civil war but rather have severe impacts on local low intensity conflicts, such as conflicts between herders or farmers. In fact, there have been several deadly disputes in Kenya and in the Sahel which most database do not capture[359]. In summary, so far there is still little evidence that climate change will increase the number of violent conflicts. However, this does not mean it does not contribute as one of the multiple factors. Additionally, new studies and data may justify different outcomes; further it needs to be considered that the link between climate change and violent conflict is not linear, i.e. future climate change effects could be of such high intensity causing a disproportional increase of violence. This may start a so far unknown dynamic.

5.4. THE CASE OF DARFUR

[354] Ibid.
[355] Ibid.
[356] Ibid.
[357] Cf. Buhang, H. (2010): Reply to Burke et al.: Bias and climate war research, in: Proceedings of the National Academy of Sciences USA, No.51, E186-E187.
[358] Cf.Theisen, O. et al. (2009): Drought, Political Exclusion, and Civil War; prepared for presentation at the conference on 'Climate Change, Social Stress and Violent Conflict: State of the Art and Research Needs. Klimacampus. Hamburg University. Hamburg; Cederman, L.-E. et al. (2010): Why Do Ethnic Groups Rebel? New Data and Analysis; in: World Politics 62(1), p87f.
[359] Cf.Theisen, O. et al. (2009): Drought, Political Exclusion, and Civil War; prepared for presentation at the conference on 'Climate Change, Social Stress and Violent Conflict: State of the Art and Research Needs. Klimacampus. Hamburg University. Hamburg.

When the literature refers to 'climate induced' violent conflict Darfur is one of the first examples, if not the most common one. And indeed, it is what comes to mind when linking extreme environmental conditions to violence. As indicated in Chapter one and in the previous section, this thesis explores the war in Darfur as a case study of the causal relationship between climate change and violent conflict. Many scholars as well as public debates and the media often refer to the armed conflict, which escalated into a genocide in 2003, as a so-called *climate war*[360]. However, it is questionable if that term is used adequately as it offers two main problematic implications. On the one hand, violent conflicts can never be traced back to one single cause[361] even if discussions during the Cold War interpreted some armed conflicts as so-called *proxy wars*[362]. In the last two decades various conflicts have been referred to as *oil wars* or *resource wars* and have therefore oversimplified the matter as such terminology does not do the diversity of conflict causes justice[363].

Describing the case of Darfur as a climate war is based on two different trends, albeit occurring at the same time. On the one hand precipitation has decreased since the end of the 1960s in Darfur. On the other hand the number and intensity of armed conflict has increased for the same period of time[364]. In order to examine that correlation this section aims to summarize the conflict history of Darfur.

5.4.1. DARFUR'S CONFLICT HISTORY

The open armed conflict in Darfur began in 2003 when rebels, known as the Darfur Liberation Front (DLF), gained control over parts of the region. In April they attacked military bases in al-Faschir, the capital of the province North Darfur, a direct provocation to the government. The name of the rebel group indicates that there had been tensions between the power centre and its outskirts in the country[365]. Up until colonial times Darfur had enjoyed a special statues as it was only conquered by British troops in 1916. The west of Sudan had been excluded from

[360] Cf. Presentation Speech by Professor Ole Danbolt Mjøs, Chairman of the Oslo, 10 December 2007, https://www.nobelprize.org/nobel_prizes/peace/laureates/2007/presentation-speech.html, accessed 1 December 2017.
[361] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p217.
[362] Ibid.
[363] Ibid.
[364] Ibid.
[365] Ibid.

political participation and power and thus stayed underdeveloped. In contrast to the south, however, the west and east acted accordingly to the major parties in the north[366].

Changing the name from Darfur Liberation Front to Sudan Liberation Movement/Army (SLM/A) points out the connection rebels from the south as part of the Sudan People's Liberation Movement/Army (SPLM/A) who worked together with regime opponents in Darfur to increase the pressure on the government[367]. Hereby rebels from Darfur received support with regards to military and ideological training, yet it can be argued how close exactly the ties between the SLM/A and the SPLM/A were[368]. The SLM/A could particularly identify with SPLM/A's idea of a *New Sudan* which included the establishment of a federal system.

The SLM/A recruits came from mainly two sources: for one, school and university graduates from Darfur who had completed their education in the capital Khartum or in other major cities of west Sudan, however, had to face discrimination with regards to finding employment. Despite the same qualifications graduates from central north Sudan were given preference[369]. Secondly, the SLM/A was able to organize experienced militants who had fought in local militias. In Darfur such militias had gained increasing importance for the past decades and progressively formed a division between 'Arabic' versus 'African' groups whereas specifically the term 'Arabic' is based on cultural rather than ethnic aspects[370]. The SLM/A was made up of three major ethnic groups: the Fur, the Masalit, and the Zaghawa. The opposing militia named, *Dschandscjawid*, consisted of 'Arabic' herders from multiple different ethnic groups. Later that year the *Justice and Equality Movement* (JEM) entered the conflict whose leaders were mainly from the ethnic Zaghawa. It is important to mention that JEM is in fact affiliated with the Muslim brotherhood, although it has been denied by the militant group[371].

Armed conflicts are not a new phenomenon in Darfur, however, there has been an incline in the number of intense conflicts since the 1960s and again since 1987[372]. At the same time, there was no obvious pattern with regards to a conflict trend between 'Arabic' and 'African' as it is the current distinction in the war. Up until 1990 the armed disputes had taken place in South Sudan where fights took place between nomadic herders, primarily consisting of stealing kettle and camels while there were also disputes between settled farmers and herders. The conflict

[366] Ibid.
[367] Cf. Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York; Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London.
[368] Ibid.
[369] Ibid.
[370] Ibid.
[371] Cf. Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York.
[372] Ibid.

issue of the latter was mainly related to land use[373]. However, two conflicts stand out. On the one hand, the so-called war between 'Arabs' and the Fur from 1987 to 1989 causing thousands of deaths and thus more than the total number of violent conflicts had caused until the start of the war in 2003[374]. Furthermore, the battles escalated into a war over territorial conquests while ethnic prejudices formed the conflict further[375].

The second severe conflict took place between 'Arabs' and Masalit from 1995 to 1999. Here too, with a number of approximately 700 victims, it was more deadly than most of the past conflicts. In this case the government supported the 'Arabic' party which is of significant relevance for the further development of the conflict. Such support included but was not limited to the provision and delivery of weapons. Additionally, this particular conflict can be characterized as the beginning of the organization Dschandschawid[376], even certain militias had appeared under that name before.

Sudan's political situation is shaped by a shift from elected governments to militant regimes. For a long time the parliament was dominated by two parties which both originated from the Muslim brotherhood and were each led by a single family. Darfur's elections had always been dominated by the Umma party, however, a split within the party into two wings led to the inner ethnic distinction between 'Arabs' and 'Africans' prior to the elections of 1968 which was also reflected with regards to the voters[377]. This development was stopped due to a military coup d'état in 1969[378]. During the mid-1980s the military regime, led by Dschafar al-Numeiri, was put under increasing pressure which the regime tried to solve through the politics of regionalization and declared different regions, such as Darfur, as its own Province. Nevertheless, this tactic still caused more turmoil Darfur. Where there were traditional systems in place disputes would now be handled by the regional administration. For one, land rights were changed causing issues between settled farmers and nomadic herders. When fighting over land use the former referred to traditional/ customary law whereas the latter referred to public law[379]. Furthermore, the regional administration started to interfere more often when conflicts arose giving less room for traditional justice systems and conflict resolution mechanisms; such

[373] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p217.
[374] Cf. Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York.
[375] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London.
[376] Cf. Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York, p61f.
[377] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London, p59.
[378] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p222.
[379] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London, p78.

'new' forms of conflict resolution did not pose a real alternative to customary measures[380]. Darfur was the only region which was not governed by someone from the region. Only after protests hat taken place the first local governor was appointed[381]. Another severe consequence of the political regionalization was the permanent and rising competition over vacancies within the regional administration[382]. After the overthrow of Numeiris in 1986 and with a new government in power this competition was even more intensified. In 1987 for the first time a new movement with the name *Arab Gathering* criticized the alleged discrimination of 'Arabs' in Darfur and demanded privileges instead[383]. Towards the end of the 1980s muslim brothers increased their activities in the north and primarily focused on the ideological distinction of 'Arabs' versus 'Africans'[384]. Up until then the Muslim brotherhood was represented by the *Islamic Charter Front* (ICF) and later on the *National Islamic Front* (NIF), a relatively small party. Yet, it was represented disproportionally in parliament due to an exception in the Sudanese electoral law which allowed the military, administrative, as well as educational elite to elect additional representatives besides regular elections[385]. In 1989 another military coup d'état put an end to this parliamentary phase and made the Muslim brothers the decisive force in Sudan[386]. In the following years during the 1990s 'Arabs' were openly preferred and privileged in Darfur. This was possibly connected to the conflict in South Sudan. In order to prevent attacks from the SPLM/A 'Arabic' militias were placed on the border between Darfur and South Sudan. From the mid-1990s such 'Arabic' militias were directly supported by the government[387]. Along with further regionalization processes Darfur was divided into three provinces in 1994. As a primary result the 'African' Fur lost their relative majority in the Darfur population despite being the strongest ethnic group in the region[388]. When in 1999 the central government was split between president Omar al-Bashir and the Muslim brotherhood leader Hassan al-Turabi, who was also popular with 'Non-Arabs' in Darfur, tensions among the ethnic groups in Darfur intensified[389]. It's worth mentioning that former Muslim brotherhood

[380] UNEP (2009): From Conflict to Peacebuilding. The Role of Natural Resources and the Environment, p83.
[381] Cf. Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York, p68.
[382] Ibid.
[383] Ibid.
[384] Ibid.
[385] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London, p56.
[386] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p222..
[387] Cf. Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York, p61f.
[388] Ibid.
[389] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p222.

supporters were also responsible for the so-called *Black Book* which documented the dominance of the 'Arabic' population compared to all other groups in Sudan[390].

Another crucial reason for the armed conflict in Darfur can be traced back into 1960s when the first Chadian rebel group was founded in Darfur[391]. That group, such as later Chadian rebels, used Darfur as an exile. In 1991 the Chadian president, Idris Déby, managed to get into power while staying in Darfur. There are two reasons why Darfur was involved in the conflicts in Chad. Firstly, the border between Chad and Sudan separated the settlement areas between multiple ethnic groups[392]; a phenomenon that is not new to the African continent. In the case of the Darfur war this specifically refers to the Zaghawa which is also the ethnic group that Déby belongs to. Parts of the Chadian Zaghawa fled from the war in Chad while others escaped the drought in the early 1970s, all finding refuge in Darfur[393]. Secondly, the political relations between Chad and Sudan were often strained so that over time different Sudanese governments supported different Chadian rebels[394]. Those tensions were put under even more stress when Libya intervened, marching through Darfur, to fulfil their interests in Chad, which included territorial interests regarding the Azouazou strip as well as the establishment of an Arabic-Islamic government[395]. In order to accomplish that Libya's President Muammar Gaddafi formed a Islamic Legion which was meant to promote Islamification and Arabization in African states. Militants for the Islamic legion were mainly mobilized from Sudan and Chad followed by supporting them with weapons[396].

However, Libya did not only use Sudan to intervene in Chad but also had the opportunity to influence Sudanese politics by providing exile to the Sudanese political opposition throughout the several military coup d'états. This allowed Gaddafi to get closer to his ideological dream of the 'Islamification' and 'Arabization' of Africa[397].

5.4.2. CLIMATE CHANGE IN DARFUR

[390] Ibid.
[391] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London, p60f.
[392] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p222.
[393] Ibid.
[394] Ibid.
[395] Ibid.
[396] Ibid.
[397] Ibid.

Darfur's conflict history has also been shaped by its history of severe droughts in 1913, 1940, 1973, and 1984 although the first half of the 20th century had started off with an unusual amount of rainfall, specifically in the 1950s and 1960s[398]. However, the following two decades were characterized by long period of drought before the climate became wetter again[399].

During the actual droughts there were only limited armed disputes[400]. The years after that, yet, displayed a certain form of banditry consisting of kettle and camel theft among herders whereas the droughts of 1973 and 1984 caused conflicts different from the traditional pattern[401].

The distribution of relief supplies was now substantially influenced by political decisions. In the beginning of the 1970s the Chadian government was distributing food and supplies form other countries, however, with insufficient support for the north followed by thousands of Chadians migration to Sudan and complicating the situation in dry Darfur even further[402].

In the mid-1980s it was clearly the Sudanese government that was responsible for the problems with regards to dealing with the repercussions of the drought as it simply denied the fact that there was a drought in Darfur[403]. When the situation became more intense and the government in Khartum finally responded it was incapable to distribute relief aid effectively. This presented another opportunity for Libya to expand its influence in Sudan by supporting the distribution of food and other aid in Darfur[404].

The main reason why the current war in Darfur has been labelled as a climate war probably lies in the above-mentioned correlation between the decrease in precipitation and the increase of conflicts from the 1970s to the 1990s. The literature has described the case of Darfur as one of the first examples for ecologically induced conflicts[405]. The debate on the link between climate change and the conflict in Darfur was rekindled in 2007 when Faris' article with the title *The Real Roots of Darfur* was published by *The Atlantic*[406]. Up until then the media had primarily referred to the war as conflict between 'Arabs' and 'Africans'. Faris on the other hand puts emphasis on a conflict between settled farmers and nomadic herders[407]. However,

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[398] Ibid.
[399] Ibid.
[400] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London, p78.
[401] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p225f.
[402] Burr, J. M. (2006): Darfur. The Long Road to Disaster. Princeton, p93.
[403] Cf. Prunier, G. (2005): Darfur. The Ambiguous Genocide. Cornell University Press. London, p73.
[404] Ibid., p76.
[405] Cf. Suliman, M. (1996): War in Darfur or the Desert versus the Oasis Syndrome; in: Bächler, G./ Spillmann; K. R. (eds): Environmental Degradation as a Cause of War. ENCOP Vol. II. Chur und Zürich, Rüger, p145f.
[406] Cf. Faris, S. (2007): The Real Roots of Darfur; in: The Atlantic Monthly, p67.
[407] Ibid.; Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York, p61f.

unlike de Waal, he identifies the above mentioned decrease in precipitation as a direct cause for the increase in violent conflicts since the 1980s[408].

Furthermore, former UN Secretary- General Ban Ki-moon links food and water scarcity to the conflict in Darfur, along with that "the violence in Somalia grows from a similarly volatile mix of food and water insecurity. So do the troubles in Ivory Coast and Burkina Faso"[409]. He literally refers to Faris claiming that "[i]t is no accident that the violence in Darfur erupted during the drought. Until then, Arab nomadic herders had lived amicably with settled farmers. A recent Atlantic Monthly article by Stephan Faris describes how black farmers would welcome herders as they crisscrossed the land, grazing their camels and sharing wells. But once the rains stopped, farmers fenced their land for fear it would be ruined by the passing herds. For the first time in memory, there was no longer enough food and water for all. Fighting broke out. By 2003, it evolved into the full-fledged tragedy we witness today"[410]. In the same year Albert Arnold (Al) Gore Jr. in 2007 received the Nobel Peace Prize for the documentary 'An inconvenient truth' and for his political action with regards to climate change, together with the IPCC for its "outstanding scientific work"[411]. The Nobel Committee inter alia argued that "global warming not only has negative consequences for 'human security', but can also fuel violence and conflict within and between states […]The consequences are most obvious, however, among the poorest of the poor, in Darfur and in large sectors of the Sahel belt, where we have already had the first 'climate war'"[412].

Welzer (2008) has examined the link between climate change and conflict in a broader sense while also referring to Darfur[413]. According to the author "there have been conflicts for seventy or more between Darfur's settled farmers ('Africans') and nomadic herdsmen ('Arabs'), but they have become increasingly severe as a result of soil erosion and greater livestock numbers"[414]. Along with naming the disastrous droughts and its social impacts throughout the

[408] Ibid.

[409] Ki-Moon, B (2007): http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html, accessed 15/1/2018

[410] Ibid.;Cf. Faris, S. (2007): The Real Roots of Darfur; in: The Atlantic Monthly, p67.

[411] Cf. Presentation Speech by Professor Ole Danbolt Mjøs, Chairman of the Norwegian Nobel Committee, Oslo, 10 December 2007, https://www.nobelprize.org/nobel_prizes/peace/laureates/2007/presentation-speech.html, accessed 1 December 2017.

[412] Ibid.

[413] Cf. Welzer, H. (2008): Climate Wars. Why people will be killed in the twenty-first century. Polity Press. Cambridge, p63.

[414] Ibid.

20th century he concludes that "we see quite clearly that climate-induced changes were the starting point for the conflict"[415].

Nonetheless, the argumentation that climate change alone is the actual cause for the violent conflict in Darfur poses weaknesses. When Faris criticizes the term 'ethnic conflict' for reducing a conflict to one single cause, he in fact commits the same mistake by emphasizing that climate change as one factor[416]. Furthermore, he tends to idealize the relationship between farmers and herders prior to the drought of the 1980s: "[u]ntil the rains began to fail, the sheikh's people lived amicably with the settled farmers. The nomads were welcome passers-through, grazing their camels on the rocky hillsides that separated the fertile plots. The farmers would share their wells, and the herders would feed their stock on the leavings from the harvest. But with the drought, the farmers began to fence off their land—even fallow land—for fear it would be ruined by passing herds. A few tribes drifted elsewhere or took up farming, but the Arab herders stuck to their fraying livelihoods—nomadic herding was central to their cultural identity"[417]. This reference also provided the ground for Ban ki-Moon's statement[418].

Although Welzer bases his argumentation on a longer analysis of Darfur's conflict history he, despite identifying multiple influencing conflict factors, surprisingly and uncritically still comes to the conclusion that climate change was the key factor for the escalation[419]. He, too, underestimates Darfur's long conflict history as well as the several political changes and challenges for the country. The reason why people increasingly started taking up arms in the last three decades cannot solely be traced back to environmental reasons. Instead the escalation, worsened by the increasing distribution of weapons and thus a greater number of deaths, should be seen as a result of a complexity of multiple factors[420].

Several scholars and organizations define conflicts that are substantially influenced by environmental degradation, the destruction of natural resources, and climate change, as 'environmentally induced' conflicts which, just like that, takes away the multi-layered complexity of violent conflict. Taking this into account the number of environmental conflicts since the 1980s shoots up drastically[421].

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[415] Cf. Ibid.

[416] Cf. Faris, S. (2007): The Real Roots of Darfur; in: The Atlantic Monthly, p67.

[417] Ibid.

[418] Ibid.; cf. Ki-Moon, B (2007): http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html, accessed 15/1/2018.

[419] Cf. Welzer, H. (2008): Climate Wars. Why people will be killed in the twenty-first century. Polity Press. Cambridge, p70f.

[420] Cf. Flint, J/ de Waal, A. (2008): Darfur. A Short History of a Long War. Zed Books. London/New York, p45.

[421] Cf. Welzer, H. (2008): Climate Wars. Why people will be killed in the twenty-first century. Polity Press. Cambridge, p70f; Cf. Suliman, M. (1996): War in Darfur or the Desert versus the Oasis Syndrome; in: Bächler, G./

Determining one single factor as the cause of violent conflict is simply not valid and can lead to a trivialization of violent conflict. Nevertheless, it cannot be denied that environmental factors, including climate change, have an influence, may it be direct or indirect, on society and can definitively contribute or even intensify violent conflict[422].

A closer look at Darfur's history of conflict and escalation shows plausibly that the war in Darfur would have also emerged without climate change as an influential factor[423]. As a result, in reverse, scholars argue that climate change impacts alone would have not been enough to cause such escalation[424]. Instead, the contribution of other key factors, such as the politicization of major parts of the population along with the ethnic aspect of 'Arabic' versus 'African', the availability and accessibility of weapons, as well as Libya's political influence decisively characterizes the war in Darfur. Thus labelling the conflict in Darfur as a so-called 'climate war' is not justified.

However, it is questionable whether the situation in Darfur, even if not entirely a 'climate war', can serve as a proven scenario for future predictions in Africa. Despite the WBGU's identifying "three major areas in which climate change is expected to cause critical developments, namely the depletion of freshwater resources, the impairment of food production, and an increase in weather extremes. Also, as an indirect consequence of these developments, migration may increase in the affected regions"[425], such information has to be examined carefully since there is still great uncertainty as to what extent migration and other societal impacts will take place.

CHAPTER SIX: CONCLUSION

In conclusion, this dissertation has pointed out that in contrast to previous debates, contemporary discussions put emphasis on the impacts that climate change has on human lives. Yet, it is controversial to what extent environmental degradation as well as climate change play

Spillmann; K. R. (eds): Environmental Degradation as a Cause of War. ENCOP Vol. II. Chur und Zürich, Rüger, p145f; Cf. Faris, S. (2007): The Real Roots of Darfur; in: The Atlantic Monthly, p67.

[422] Ibid.

[423] Cf. Schreiber, W. (2011): Darfur-Der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p227.

[424] Ibid.

[425] WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p77.

a role in the specific context of violent conflict[426]. Reports by the IPCC present a solid base for the international climate debate which is accepted and supported by a majority of academic experts[427]. Nonetheless, there is significant ambiguity about what negative consequences climate change could pose for peaceful human co-existence[428].

In 2007, specifically, it was brought to public attention that the effects of a warming climate, such as more intense storms, floods and droughts have severe impacts on the human-wellbeing, especially in more vulnerable areas of the globe[429]. Experts even claimed that, in many parts of the world, climate change would cause dramatic impacts in the form of violent conflicts due to the decrease of drinking water, fertile soil as well as food. Entire states might be weakened and societies could collapse which might lead to severe consequences for conflict resolution institutions and mechanisms, human security as well as migration[430]. However, from a conflict studies point of view every single statement above is arguable[431]. Findings regarding the impacts of climate change on violent conflict are highly controversial[432] and sometimes even contradictory[433].

When the IPCC published its fourth assessment report in 2007 climate change gained an immense amount of public attention[434]. Since then, the quality of data as well as evidence has continued to improve with every report and it can be assured now that there are significant climate science data available[435].

It is now widely accepted that the main cause of global warming and thus climate change can be traced back to human activity[436]. The amount of carbon dioxide, the crucial component of

[426] Cf. Brzoska, M. et al. (2012): Klimawandel und Konflikt. Versicherheitlichung versus präventive Friedenspolitik? Nomos. Baden-Baden.
[427] Ibid.
[428] Ibid.
[429] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland.
[430] Ibid.; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York.
[431] Cf. Webersik, C. (2010): Climate Change and Security: A Gathering Storm of Global Challenges. ABC-CLIO. Santa Barbara.
[432] Cf. Burke, M. B. et al. (2009): Warming increases the risk of civil war in Africa, in: Proceedings of the National Academy of Sciences USA, No.49, p 20670-20674.
[433] Cf. Buhang, H. (2010): Reply to Burke et al.: Bias and climate war research, in: Proceedings of the National Academy of Sciences USA, No.51, E186-E187.
[434] Cf. Fuchs, A. (2010): Klima und Gesellschaft., in: Voss, M. (eds.): Der Klimawandel. Sozialwissenschaftliche Perspektiven. VS Verlg, Wiesbaden, p47.
[435] Cf. IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland, p33f.
[436] Ibid.

the so-called greenhouse gas which causes global warming, is primarily produced from the combustion of carbonaceous fossil fuels in order to generate energy. The current amount is higher than it has been in the last eight centuries. In fact, the trend shows an increase in the amount of carbon dioxide. The IPCC predicts, given that no effective counter-measures are undertaken, a temperature increase of up to 6.4°C by 2100. Contemporary studies show that greenhouse gas emissions are already causing permanent and intensive changes in our environment. Scientists have warned that climate change does not happen gradually, instead abrupt and irreversible climate change impacts can be the consequence once a certain temperature increase is exceeded[437].

However, specifically future climate models show that there is still strong uncertainty about future predictions although there has been a substantial amount of climate research. Nevertheless, experts from all disciplines argue that climate change will have severe implications for societies as well economies including water availability, food security, and health[438]. Those factors may contribute to the development of violent conflict[439].

Conflicts in general are inevitable and a necessary by-product of social change, however, it is a question of *how* they are handled and resolved[440].It cannot be stressed enough that the outbreak of violent conflict is not limited to one single cause but is often based on a combination of factors. There are multiple reasons for violent conflict which do not occur isolated from other influences[441]. GSDRC, those causes can be divided into political and institutional factors, identity politics, socioeconomic factors, and resource and environmental factors which include climate change, environmental insecurity and resource scarcity[442].

Chapter three focused on the violence literature and has illustrated that weak state institutions are seen as one of the reasons for violent conflict as societies can be fractured if political

[437] Ibid.

[438] Cf. The Government Office for Science (2011): Foresight International Dimensions of Climate Change. Final Project Report. London, p26.

[439] Ibid.; IPCC (2007): Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A.(eds.)]. IPCC, Geneva, Switzerland; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York.

[440] Cf. Ropers, N. (2002): Friedensentwicklung, Krisenprävention und Konfliktbearbeitung. Technische Zusammenarbeit im Kontext von Krisen, Konflikten und Katastrophen. GIZ. Wiesbaden.

[441] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p.6.

[442] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p6.

institutions are not able to manage different group interests peacefully, protect certain groups, or provide opportunities for political participation[443]. There is a degree of consensus among social scientists that there is a connection between levels of democracy and the probability of violent conflict in a society[444]. Stable democracies are more able to cope with tensions peacefully whereas authoritarian regimes tend to manage conflict through force and violence.

With regards to identity aspects of conflict causes it is important to note that politics referring to ethnicity or religion promote exclusion or violence. Although identity can contribute to issues of power as well as of grievance, it can also be used peacefully in order to promote inclusion and empowerment through the claiming of rights and citizenship[445].

Furthermore, it is not rare that different forms of inequalities, exclusion and marginalization interact and exacerbate each other. Accordingly, unequal access to power and decision-making processes can lead to unequal access to natural resources and land, for instance. Exclusion based on social identity, may it be perceived or actual, can result in a strong feeling of collective injustice and increase a group's sense of alienation from the majority of society and therefore cause frustration and resentment. Over time, such tensions can foster group mobilisation and fuel violent conflict[446]. However, such relative deprivation does not only affect excluded and marginalized groups but also the privileged who fear losing their status quo. One of the critical factors which decides whether discontent and resentment turns into violence is the government's response. The states responsibility is then to address exclusion instead of reacting unreasonably to a peaceful protest, for example, in order to prevent violent outbreaks[447]. Moreover, there is an obvious and clear connection between poverty and violent conflict; yet most scholars claim that poverty *per se* is rarely a direct cause of conflict. Instead it is mainly relative deprivation that increases the probability of violent conflict. On the other hand, poverty can certainly contribute or maintain conflict due to its link to the perception of injustices, exclusion, as well as marginalization[448].

All these aspects play a crucial role for the development of violent conflict. The focus of this dissertation, however, are environmentally, and thus climate change, related conflict risks. This has been examined in its own chapter. Generally, the debate on the link between climate change

[443] Ibid., p7.
[444] Ibid.
[445] Cf. Haider, H. (2014): Conflict: Topic Guide. Revised edition with B. Rohwerder. GSDRC, University of Birmingham. Birmingham, p12.
[446] Ibid.
[447] Ibid.
[448] Ibid.

and violent conflict can be understood as a continuation of the environmental security debate which includes the issue of violent conflict in the context of environmental change[449].
Environmental degradation is mostly seen as only one of the contributing factors in a combination of multiple causes of violent conflict. Environmental degradation, in itself, does not directly result in violence. The deciding factors are primarily of political, social, and economic nature, as examined in chapter three of this dissertation. However, these causes may be influenced or exacerbated by environmental changes[450].

The empirically found connections between climate change and violent conflict are often relatively small, yet due to the expected repercussions of climate change such connections may become more significant. Currently, climate related relationships are still based on uncertainty as it is not useful to refer to historically empirical analysis[451].
At the same time the debate on security and peace is fairly new in the climate change context. Thus, the process of linking those fields and projection societal risks as a consequence of climate change is only in its early stages. It is important to not jump to conclusions but rather interpret information carefully nor should, despite the limited data, a link between climate change and violent conflict be negated or denied[452].
In addition, the vulnerability to climate change as well as to conflict plays a crucial role. Moreover, a society's stability as well as the ability to adapt to climate change are decisive in order to prevent conflict[453].

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[449] Cf. Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p17; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p27; Scheffran, J. (2011): Globaler Klimawandel und Gewaltkonflikte: Befunde und Perspektiven der Friedens- und Konfliktforschung; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p33.
[450] Ibid.
[451] Cf. Nordås, R./ Gleditsch, N. P. (2005): Climate Conflict: Common Sense or Nonsense? PRIO. Oslo, p5.
[452] Cf. Brzoska, M./ Oels, A. (2011): ´Versicherheitlichung' des Klimawandels? Die Konstruktion des Klimawandels als Sicherheitsbedrohung und ihre politischen Folgen; in: Brzoska, M. et al. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos. Baden-Baden, p53; Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate
Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p80f. Washington DC; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York.
[453] Buhaug, H. et al. (2010): Implications of Climate Change for Armed Conflict; in: Mearns, R./ Norton, A. (eds.): Social Dimensions of Climate Change. Equity and Vulnerability in a Warming World. The World Bank, Washington DC, p78.

At the same time adaptation pressures and other challenges due to climate change impacts can weaken states and make them more vulnerable[454]. Along with the amplifying effect of existing conflict risks water scarcity, conflicts over land, food insecurity, extreme weather events, and climate induced migration can be expected to fuel potential conflict constellations. Climate change can lead to natural resource scarcity which can result in poverty and social tensions and thus increases conflict risks[455].

As established in chapter five, the African continent including its ecosystems and population will be the main victims to climate change[456]. Furthermore, African countries pose high political as well as socioeconomic risks and thus it will very probable that they will have great difficulty to adapt to the repercussions of climate change[457]. Despite the importance of climate change adaptation experts need to bear in mind the diversity of the African continent and thus its different needs.

In summary, so far there is still little evidence that climate change will increase the number of violent conflicts. However, this does not mean it does not exacerbate or contribute to violent conflict as one of the multiple factors. Additionally, new studies and data may justify different outcomes; further it needs to be considered that the link between climate change and violent conflict is not linear, i.e. future climate change effects could be of such high intensity causing a disproportional increase of violence. This may start a so far unknown dynamic.

Finally, a closer look at Darfur's history of conflict and escalation shows plausibly that the war in Darfur would have also emerged without climate change as an influential factor[458]. And, in reverse, scholars argue that climate change impacts alone would have not been enough to cause

[454] Cf. WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p182.

[455] Cf. Smith, D./ Vivekananda, J. (2007): A climate of conflict: The links between climate change, peace and war. International Alert. London; Breitmeier, H. (2009): Klimawandel und Gewaltkonflikte. Deutsche Stiftung Friedensforschung, Osnabrück, p15; Dröge, S. (2011). Der Klimawandel und seine Auswirkungen auf Ressourcen; in: Mildner, S. A. (eds.): Konfliktrisiko Rohstoffe? Herausforderungen und Chancen im Umgang mit knappen Ressourcen. SWP, Berlin: SWP, p170f.

[456] Cf. Busby, J. W. et al. (2012): Locating Climate Insecurity: Where Are the Most Vulnerable Places in Africa?; in: Scheffran, J. et al. (eds.): Climate Change, Human Security and Violent Conflict. Challenges for Societal Stability. Springer. Heidelberg/Berlin, p463f; WBGU (2007): Welt im Wandel: Sicherheitsrisiko Klimawandel. Springer. Berlin/Heidelberg/New York, p180; Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p203f.

[457] Cf. Basedau, M./ Leidreiter, A. (2011): Der Klimwandel als Ursache von zukünftigen Kriegen im subsaharischen Afrika?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p205f.

[458] Cf. Schreiber, W. (2011): Darfur- der erste Klimakrieg?; in: Brzoska, M. (eds.): Klimawandel und Konflikte. Versicherheitlichung versus präventive Friedenspolitik?, Nomos, Baden-Baden, p218f.

such escalation. Instead, the contribution of other key factors, such as the politicization of major parts of the population along with the ethnic aspect of 'Arabic' versus 'African', the availability and accessibility of weapons, as well as Libya's political influence decisively characterizes the war in Darfur[459]. Following this, it is argued that labelling the conflict in Darfur as a so-called 'climate war' is not justified.

In short, the little amount of data exposes the lack of research in the interdisciplinary filed of climate change and violent conflict causes too much uncertainty in order to come to unambiguous conclusions, let alone recommendations. This thesis has clarified that a link can be made between climate change and violent conflict. However, from available data it is not strong or direct enough to reduce violent conflict to a mono-causal issue or the term 'climate war', which implies exactly that. By doing so a violent conflict gets rather oversimplified thus 'climate war' is not a justifiable description. However, it would be irresponsible to ignore climate change in the conflict debate since it is the biggest and possibly most relevant environmental change that humankind has been challenged with[460]. Nevertheless, alarmist prognoses as well as transforming climate change into a pure security threat should be avoided; nor should climate change in that matter be denied or trivialized.

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[459] Ibid.
[460] Ibid.

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