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# Climate Change and Conflict: the Darfur Conflict and Syrian Civil War

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Spring 2020

## **ABSTRACT**

As the impacts of climate change grow more apparent, policy makers and scholars have become increasingly interested in the relationship between climate change and conflict, but their analyses have shown ambiguous results. In this thesis, I analyze this relationship in two cases: the Sudan Darfur Conflict (2003-present) and the Syrian Civil War (2011-present). I argue that climate change functioned as an intermediate variable in each case, influencing other factors known to have contributed to the conflict. I find that climate change would have been unlikely to cause either conflict in isolation. Rather, climate change exacerbated the conflicts by making the factors that led to them more severe.

## **ACKNOWLEDGMENTS**

I would like to express my thanks to Professors Henne, Willard-Foster, and Ergene who generously donated their time reading and commenting on the thesis despite the difficulties associated with teaching during the COVID-19 pandemic. I also would like to thank my parents for their support throughout the project.

## TABLE OF CONTENTS

<b>ABSTRACT.....</b>	<b>i</b>
<b>ACKNOWLEDGMENTS .....</b>	<b>ii</b>
<b>TABLE OF CONTENTS .....</b>	<b>iii</b>
TABLE OF FIGURES AND TABLES .....	iv
<b>INTRODUCTION.....</b>	<b>1</b>
Darfur and Syria.....	1
Difficulties Associated with Studying Climate Change and Conflict .....	3
Significance of Understanding the Relationship.....	3
Organization and Argument.....	4
<b>CHAPTER I: LITERATURE REVIEW .....</b>	<b>5</b>
Introduction.....	5
Current Interpretations of the Climate Change – Conflict Relationship.....	5
A New Path of Study .....	12
<b>CHAPTER II: METHODOLOGY .....</b>	<b>14</b>
Methodology Review .....	14
Climate Change as an Intermediate Variable.....	16
Framework .....	18
<b>CHAPTER III: THE DARFUR CONFLICT.....</b>	<b>21</b>
Introduction.....	21
Evidence of Climate Change .....	26
Climate Change to Conflict .....	29
The Role of Other Factors.....	34
Conclusion .....	38
<b>CHAPTER IV: THE SYRIAN CIVIL WAR .....</b>	<b>40</b>
Introduction.....	40
Evidence of Climate Change .....	44
Climate Change to Conflict .....	51
The Role of Other Factors.....	57
Conclusion .....	62
<b>CHAPTER V: ANALYSIS.....</b>	<b>64</b>

Review .....	64
Case Study Findings .....	65
The Case for Climate Change as an Intermediate Variable .....	70
<b>CONCLUSION .....</b>	<b>73</b>
<b>BIBLIOGRAPHY .....</b>	<b>75</b>

## TABLE OF FIGURES AND TABLES

<b>Figure 2.1 Causal Pathways from Climate Change to Conflict.....</b>	<b>17</b>
<b>Figure 3.1 Map of Darfur within Sudan.....</b>	<b>22</b>
<b>Table 3.1 Conflict in Darfur (1930-2000).....</b>	<b>30</b>
<b>Figure 3.2 Seasonal Pastoral Migration Routes in Darfur.....</b>	<b>31</b>
<b>Figure 4.1 Map of Syria.....</b>	<b>41</b>
<b>Figure 4.2 Rainfall Anomalies in Syria (2006/7 to 2008/09).....</b>	<b>45</b>
<b>Figure 4.3 Perceptions of Climate Change among Syrians.....</b>	<b>47</b>
<b>Figure 4.4 Percentage of Syrians who Suffered Economic Consequences from Climate Change.....</b>	<b>53</b>
<b>Figure 5.1 Interacting Causal Pathway to Conflict in Darfur.....</b>	<b>67</b>
<b>Figure 5.2 Interacting Causal Pathway to Conflict in Syria.....</b>	<b>69</b>
<b>Table 5.1 Strength of Factors Leading to Conflict.....</b>	<b>70</b>

## **INTRODUCTION**

Within the last twenty years, many intrastate conflicts have proliferated across the Middle East, Africa, and Asia. But as intrastate conflicts such as the Darfur Conflict and the Syrian Civil War continue to make headlines, a less visible phenomenon is preparing to alter the trajectory of future conflicts. Climate change has become an increasingly salient issue in recent years. Despite the attention climate change has been getting by the mainstream media, policy makers, and activists, its effects, both in the present and the future, are largely unknown. The effects of climate change on conflict, in particular, are puzzling. Policy makers and scholars have become increasingly aware of the risks involved with climate change and conflict. While policy makers have been quick to make connections between the two, scholars are more conservative in their assessments of the relationship. There there has been a great wealth of literature on the relationship between climate change and conflict in recent years, but scholars have yet to reach any definitive answer. Can the relationship between climate change and conflict be determined? This thesis seeks to address this question and determine the degree to which climate change interacts with conflict.

### **Darfur and Syria**

Among policy makers and scholars, there are two cases that consistently appear in discussions on climate change and conflict, the Sudan Darfur Conflict (2003-present) and the Syrian Civil War (2011-present). The Darfur Conflict began with small-scale armed disputes between “Arab” nomadic tribes and African settled agriculturalists over access to water and arable land in Darfur, a semi-arid region in the west of the country. It would soon evolve into a conflict with organized rebel groups opposing the Sudanese Arab-supremacist government, and Arab militias, many of

which committed genocidal campaigns against African tribes with the support of the al-Bashir regime. The conflict continues today but to a much more limited degree.

Prior to the conflict, increasing desertification and a severe drought pushed Arab pastoral tribes south to seek water and grazing land for their herds. This brought them into conflict with the African settled communities who were also struggling because of the drought. Many credit the desertification and drought to climate change. If climate change led to the migration of the nomads, surely climate change must have contributed to the conflict.

The Syria case emerged in a completely different political environment. The Syrian Civil War has its roots in widespread protest movements against the al-Assad regime throughout the country's cities. This was inspired in part by the success of the Arab Spring movements in Tunisia and Egypt, but it was the corruption of the Syrian government and their poor economic policies that drove many to protest. These protests were brutally suppressed. In response to these atrocities, a myriad of rebel groups with contrasting aims and international supporters rose against the government, beginning the Syrian Civil War. The conflict is ongoing, but the dynamics of the war has shifted significantly from year to year.

It is possible that climate change had a role to play in this conflict as well. Like in Darfur, a devastating drought appeared in Syria, threatening the livelihoods of many Syrians in rural areas, especially in the northeast of the country, during the late 2000s. Many affected Syrians had no choice but to migrate to cities to seek employment and better their living conditions. These migrants exacerbated many economic stressors already present in the cities such as unemployment, the result of the Syrian government's liberalization of the economy. Many of these migrants were also upset with the government's poor response to the drought. The al-Assad regime invested heavily into water and rural infrastructure, but the waterworks were poorly



managed and unsustainable. As a result, the irrigation network of Syria was unable to mediate the effects of the drought because of Syria's already significant water stress.

### **Difficulties Associated with Studying Climate Change and Conflict**

Studying the relationship between climate change and conflict presents some challenges. For one, the causes of conflict are multidimensional and nuanced, even without the presence of climate change, and cannot be attributed to one variable. There is a consensus among scholars that climate change does not directly affect conflict. It can influence other, more well-defined, triggers of conflict, however. The nature of such an indirect relationship would be difficult to determine, as shown above. In order to determine the influence of climate change on conflict, it is necessary to understand the many causal pathways to conflict for each case. Another challenge in connecting climate change to conflict is that the effects of climate change cannot be easily discerned. For instance, a drought may be caused by changes in climate, but also through weather anomalies and cyclical events or even human interference. In order to determine any relationship between climate change and conflict, the presence and effects of climate change must be verified.

### **Significance of Understanding the Relationship**

Regardless of these problems, it is important to develop an understanding of the relationship between climate change and conflict. There are some important policy implications here. A solid theoretical understanding could provide valuable insight into the potential conflict triggers influenced by climate change. This would help identify risk factors for conflicts in regions particularly vulnerable to climate change or unable to effectively mitigate its negative consequences. Secondly, policy makers are quick to warn of the dangerous possibility that climate change could increase the risk of conflict, while academia has yet to reach a consensus.

Understanding the relationship could prove whether policy makers are right to be concerned and if measures should be taken. Lastly, the effects of intrastate conflicts are often not restricted to their original countries. The Syrian Migrant Crisis, terrorist attacks, and fluctuations in the supply and price of oil for instance, have their roots in the Syrian Civil War, a conflict often attributed in part to climate change. Preventing or mitigating conflicts with can prevent spillover and the implications of the conflict on people's livelihoods and safety.

### **Organization and Argument**

In the next section, I will review the existing literature on the climate change – conflict relationship, determine the general trends, and describe how my thesis will prove a unique contribution to the literature. In the methodology section, I will explain the basis for my case study selection and present my own model for analysis. I will argue that climate change functions as an intermediate variable, indirectly contributing to conflict through its influence on other variables, while being mediated by state capability and economic strength. In the two case studies, the Sudan Darfur Conflict and the Syrian Civil War, I will provide an overview of the causal pathways from climate change to conflict as well as from traditional factors to conflict. I will then analyze whether the conflict would have occurred with only the presence of climate change or if the presence of traditional factors were required for the conflict to begin. This analysis will allow me to conclude whether climate change served as an intermediate variable. In the next and last section, I will compare the findings from my two case studies and determine the degree to which climate change functioned as an intermediate variable in in each case.

## **CHAPTER I: LITERATURE REVIEW**

### **Introduction**

The field of conflict studies has been especially interested in the effects of climate change in recent years. Even though the environmental threats of climate change are clear, scholars do not yet understand how it interacts with conflict. An understanding of the relationship between climate change and conflict could provide insight into other causal pathways to conflict. It could explain how past conflicts may have been shaped by climate change and the scope to which climate change can affect conflicts in the future. Answers to these questions are especially valuable as they can be applied to prevent or mitigate future conflicts. As such, this new niche within conflict studies is clearly an important topic to study. Unfortunately, scholars studying the climate change-conflict relationship have not been able to reach any clear conclusions on the nature of the relationship.

In this section, I will briefly review the current understandings of the relationship between climate change and conflict among scholars and identify the current trends in the literature. There have already been considerable efforts in reviewing the contemporary literature on climate change and conflict. As such, I will analyze a sample of works I find to best represent the literature as a whole. I will conclude by arguing how my thesis will provide a unique contribution to this increasingly crowded field.

### **Current Interpretations of the Climate Change-Conflict Relationship**

The current limited understanding of the climate change-conflict relationship makes it difficult to summarize the general trends of the literature. Works within the field are highly nuanced, dependent on context, or draw different conclusions from similar data. These complications are

exacerbated by the vast diversity and novelty of methods used. In response, scholars have produced a sizable number of comprehensive reviews that illustrate the inconclusiveness of the literature. The number of reviews, however, is reaching a saturation point. In 2017, Tobias Ide in a review of the research methods used in climate-change studies found that 18% of the literature was composed of solely theoretical works or literature reviews, the second most popular type of analysis after large-N statistical analysis.<sup>1</sup> This is a rather high percentage for this type of study. It is important that new studies in the field of climate change – conflict studies do not rely on literature reviews and instead adopt more empirical methods of analysis. As such, instead of conducting another review of the literature at large, I will conduct a metanalysis of the existing body of literature reviews and discuss the different conclusions they provide. With these conclusions, I will identify three different understandings of climate change within the literature: climate change as a threat multiplier, climate change as a conditional and interacting factor, and climate change as an insignificant factor.

### ***The Indirect Nature of Climate Change***

There is currently little consensus among scholars on the nature of the climate change-conflict relationship. Sakaguchi, Varughese, and Auld in a 2017 study find inconclusive evidence for the presence of a relationship between climate change and conflict within the literature. According to their analysis, 62.3% of studies find a positive relationship between the two variables, 34.8% present neutral findings, and just 2.8% find a negative relationship.<sup>2</sup> The

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<sup>1</sup> Thomas Ide, “Research Methods for Exploring the Links between Climate Change and Conflict,” edited by Timothy Carter, Domain Editor, and Mike Hulme, *Wiley Interdisciplinary Reviews: Climate Change* 8, no. 3 (2017): 3, <https://doi.org/10.1002/wcc.456>.

<sup>2</sup> Kendra Sakaguchi, Anil Varughese, and Graeme Auld, “Climate Wars? A Systematic Review of Empirical Analyses on the Links between Climate Change and Violent Conflict.” *International Studies Review* 19, no. 4 (May 2017): 634, <https://doi.org/10.1093/isr/vix022>.

authors, however, stress that the articles within their study present their findings differently and employ a considerable diversity of research methods. Further, they find that the majority of studies consider the relationship to be indirect. While a few studies argue that climate change can have a direct influence on violence, most believe that climate change operates on conflict through a “complex set of mediating and/or interacting variables.”<sup>3</sup> The definition of these interacting and mediating variables, however, are often unclear, and are not well supported by empirical evidence.<sup>4</sup>

Koubi also presents a complicated picture of the literature. Like Sakaguchi et al., she finds that a majority of climate change – conflict literature finds a positive relationship and one that is indirect, operating through climate change’s effects on socio-political and economic factors.<sup>5</sup> Koubi finds little evidence within the literature of a direct connection between the two phenomena. She also emphasizes that the relationship must continue to be studied with an awareness of its indirect nature. Otherwise, climate change may be given too much credence compared to other more significant factors. In this vein, Koubi argues that while there may not be a direct connection between climate change and conflict, the literature generally defines climate change as a “threat multiplier.”<sup>6</sup> As a threat multiplier, climate change does not cause conflict, but it does increase the propensity for conflict in vulnerable areas, i.e. areas in which the dependent political and socio-economic factors are present.

Mach et al. surveyed scholars of the climate change-conflict relationship to determine the different understandings of the relationship. According to the results of the survey, most scholars

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<sup>3</sup> Ibid., 624, see also 630-1.

<sup>4</sup> Ibid., 641.

<sup>5</sup> Vally Koubi, “Climate Change and Conflict,” *Annual Review of Political Science* 22 (2019): 343–60, <https://doi.org/10.1146/annurev-polisci-050317-070830>.

<sup>6</sup> Ibid., 355.

agree that climate change is likely to increase the risk for conflict, but other factors are believed to be much more significant.<sup>7</sup> Therefore, climate change *is* a threat multiplier, but one with limited influence. The experts cited four influential factors that contribute to conflict: “low socioeconomic development, low capabilities of the state, intergroup inequality [...] and recent history of violent conflict.”<sup>8</sup> These factors would fit into the general categories of socio-political and economic factors that Koubi identified in her study. These are not climate factors, or even generic geographical factors, but they can be influenced in some way by climate change that may contribute to conflict. Still, while the experts surveyed do not believe climate change is a major contributor to conflict, it was cited as the factor they were most uncertain about.<sup>9</sup>

### ***Criticism of Climate Change as a Threat Multiplier***

Other scholars disagree with the threat multiplier dynamic. Salehyan would agree with the consensus found in the Mach et al. study that the relationship between climate change and conflict is not direct. In contrast, however, he finds that climate change is only likely to influence conflict *only* if certain existing socio-political and economic conditions are present.<sup>10</sup> According to Salehyan, not only are these factors more important than climate, they are also necessary for climate change to have any real impact. The influence of climate change on conflict is manifested only in its interactions with other variables.<sup>11</sup> Barnett and Adger reach a similar conclusion. They write that “climate change will not undermine human security or increase the

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<sup>7</sup> Katharine J. Mach et al., “Climate as a Risk Factor for Armed Conflict,” *Nature* 571 (2019): 195, <https://doi.org/10.1038/s41586-019-1300-6>.

<sup>8</sup> *Ibid.*, 194.

<sup>9</sup> *Ibid.*, 195.

<sup>10</sup> Idean Salehyan, “From Climate Change to Conflict? No Consensus Yet,” *Journal of Peace Research* 45, no. 3 (2008): 318, <https://doi.org/10.1177/0022343308088812>.

<sup>11</sup> *Ibid.*

risk of violent conflict in isolation from other important social factors.”<sup>12</sup> In their article they find that climate change increases the chance of conflict by affecting natural resource distribution, state capacity, and the general wellbeing of citizens, but *only* in cases where these factors are already at risk.<sup>13</sup>

Critics of the threat multiplier dynamic also believe it has potential for abuse. In his article, Salehyan suggests that scholars may erroneously attribute conflict to climate change when the conflict was actually caused by government abuse or poor public resource management.<sup>14</sup> Salehyan stresses that scholars must make sure to distinguish exogenous climate factors from the influence of governments. Otherwise, the rhetoric surrounding climate change may enable decisionmakers to avoid responsibility “for civil wars and grave human rights violations.”<sup>15</sup> This sentiment is shared by Gleditsch and Nordås. They write that the conversation around climate change and conflict may be manipulated by governments and rebel militant groups to shift accountability for their actions from themselves to “developed countries and their greenhouse gas emissions.”<sup>16</sup> Selby and Hoffmann also express concern. They argue that the security narrative around climate change and conflict may become “self-fulfilling,” being used as a rhetorical device to legitimize government-sanctioned violence.<sup>17</sup>

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<sup>12</sup> Barnett, Jon, and W. Neil Adger. “Climate Change, Human Security and Violent Conflict.” *Political Geography* 26, no. 6 (2007): 644.

<sup>13</sup> *Ibid.*, 646-651.

<sup>14</sup> Salehyan, “From Climate Change to Conflict?,” 317.

<sup>15</sup> *Ibid.*

<sup>16</sup> Nils Petter Gleditsch and Ragnhild Nordås, “Climate Change and Conflict: A Critical Overview,” *Die Friedens-Warte* (2010): 7-24, accessed September 14, 2020 from [www.jstor.org/stable/23773941](http://www.jstor.org/stable/23773941).

<sup>17</sup> Jan Selby and Clemens Hoffmann. “Introduction: Rethinking Climate Change, Conflict and Security,” *Geopolitics* 19, no. 4 (2014): 754, <https://doi.org/10.1080/14650045.2014.964866>.

The potential to abuse the discourse around climate change and conflict narrative is strengthened because of its prevalence in policy circles.<sup>18</sup> Many policy makers believe climate change is a threat multiplier that will cause or worsen conflicts around the world. This rhetorical argument has been often repeated by American defense agencies and officials, the U.N., various NGOs, and relevant agencies of countries including the United Kingdom and Germany.<sup>19</sup> In their frequent use of a climate change – conflict connection adds legitimacy to the claim, even when other factors are more significant. As the connection becomes more and more legitimate, it will increasingly be applied erroneously and labeled a force majeure, allowing governments a new rhetorical device to escape responsibility.

In addition to its potential for abuse, Abrahams and Carr argue that the threat multiplier narrative will lead to poor policy. It suggests that the relationship between climate change and conflict is “unidirectional” and does not inform policy makers about the temporal and spatial dynamics of climate change.<sup>20</sup> According to Abrahams and Carr, climate change can operate on conflict in other, less obvious directions. They specifically cite two other possible directions in their article: the potential for climate change mitigation to exacerbate conflict, and the potential for peacebuilding.<sup>21</sup> These other directions are often unappreciated by scholars. It is prudent to recognize other directions through which climate change may operate on conflict.

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<sup>18</sup> Daniel Abrahams and Edward R. Carr, “Understanding the Connections Between Climate Change and Conflict: Contributions from Geography and Political Ecology,” *Current Climate Change Reports* 3, no. 4 (2017): 234, <https://doi.org/10.1080/14650045.2014.964866>.

<sup>19</sup> Gleditsch and Nordås, “Climate Change and Conflict: A Critical Overview,” 9-10; Selby and Hoffmann, “Introduction: Rethinking Climate Change, Conflict and Security,” 747, 749-50.

<sup>20</sup> Abrahams and Carr, “Understanding the Connections Between Climate Change and Conflict,” 239.

<sup>21</sup> *Ibid.*



### ***Skeptical Works***

Some works are even more skeptical, arguing that the role of climate change is essentially insignificant, indeterminable, or devoid of any evidential support. Gleditsch and Nordås, argue that while climate change is surely going to negatively affect the security of “already vulnerable societies and weak governments,” the literature presents “little if any solid evidence” of the existence of a causal relationship between climate change and conflict, including through both direct and indirect means.<sup>22</sup> In a 2013 study, Gleditsch along with Theisen and Buhaug, reach the same conclusion. They admit that climate change is likely to reduce the wellbeing of many people in vulnerable areas, but they struggle to find evidence that it will lead to conflict.<sup>23</sup> Selby and Hoffmann on the other hand take a firmer stance. They argue that the threat multiplier narrative is “Malthusian” in nature, and informed by assumptions and environmental determinism, rather than empirical data.<sup>24</sup> These skeptical arguments have merit, but the absence of evidence should not discourage future research in the field. The nature of climate change and conflict remains inconclusive but further studies into this complicated relationship can make it clearer.

### ***Summary***

This is only a small sample of the many works within the literature. Nonetheless, this sample reveals the extent to which scholars are divided about the nature of the climate change-conflict relationship. There seem to be two distinct factions present, as well as a smaller group of skeptical studies. The first faction argues that climate change has an indirect influence on

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<sup>22</sup> Gleditsch and Nordås, “Climate Change and Conflict: A Critical Overview,” 18.

<sup>23</sup> Ole Magnus Theisen, Nils Petter Gleditsch, and Halvard Buhaug, “Is Climate Change a Driver of Armed Conflict?,” *Climatic Change* 117, no. 3 (2013): 622-3, <https://doi.org/10.1007/s10584-012-0649-4>.

<sup>24</sup> Jan Selby and Clemens Hoffmann. “Introduction: Rethinking Climate Change, Conflict and Security,” 748.

conflict, as a sort of threat multiplier. Conflict is more likely in the presence of climate change, and the existence of certain socio-political and economic factors make conflict even more likely. The other faction dismisses the threat multiplier position. They argue that climate change only has an impact in cases when certain sociopolitical and economic conditions are met. In these cases, climate change has an interacting effect on other variables that contribute to conflict. Lastly, there are a few works that are more skeptical, doubting whether climate change is even a pertinent factor in relation to conflict.

Despite their differences, the two major factions would agree on three points. First, the influence of climate change on conflict is not that significant, although many acknowledge that its significance may change as the effects of climate change intensify. Second, climate change operates on conflict indirectly through its effects on other socioeconomic and political factors. And third, the mechanisms through which climate change interacts with conflict are inconclusive and complicated. These three points suggest a limited consensus among scholars, but there are still fundamental disagreements on the nature of the climate change-conflict relationship. As more works populate this nascent field, and better research methods are discovered and utilized, we may find a consensus develop on one of these positions, or even on a completely unexplored conclusion.

### **A New Path of Study**

My thesis will prove a unique contribution to the literature in three ways. First, most studies focus on whether climate change causes conflict. While I will address this question, I will also examine how climate change can exacerbate conflict when other factors are known to cause the conflict in isolation from climate change. Secondly, most qualitative studies address a single case of conflict. In order to gain a broader understanding of the climate change-conflict relationship, I

will be conducting a comprehensive comparative analysis of two cases within the Middle East and North Africa (MENA), the Darfur Conflict in Sudan and the Syrian Civil War. These two cases have attracted a lot of interest among scholars, but I could not find any works comparing the two qualitatively. Even with the recent interest, MENA is a region that is underrepresented in the climate change-conflict literature, especially when compared to global, African, and Asian studies.<sup>25</sup> Lastly, I will be considering climate change an intermediate variable, which indirectly affects conflict by influencing external factors while being mediated by the present socioeconomic, geographic, and political conditions of the case. Many scholars inadvertently adopt this idea, but do not reduce it into a theoretical framework. In my thesis, however, I will explain how climate change operates theoretically as an intermediate variable. This will be explained further in the following section.

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<sup>25</sup> Sakaguchi et al., "Climate Wars? A Systematic Review of Empirical Analyses on the Links between Climate Change and Violent Conflict," 639. Note: In the review, the African category does include North Africa but most of the literature analyzed is limited to cases within sub-Saharan Africa. The authors do define the Middle East as a distinct region apart from Asia.

## **CHAPTER II: METHODOLOGY**

In this section, I will present my methodology for analyzing the relationship between climate change and conflict in Darfur and Syria. First, I will briefly review how conflict scholars have analyzed the climate change-conflict relationship through a wide assortment of data collection methods and theoretical frameworks. I will then describe how I will approach the relationship, with climate change functioning as an intermediate variable. Afterward, I will clarify why I chose my case studies and explain how they will be conducted. I will then delineate the causal pathways to conflict that will be explored in the thesis. Lastly, I will produce a framework for a final comparative analysis to develop a unique theoretical framework for understanding the relationship.

### **Methodology Review**

The literature on the relationship between climate change and conflict applies an impressive variety of robust theoretical frameworks, and quantitative and qualitative methods. In a broad sense, contemporary research designs on climate change and conflict can be divided into the following three categories: large-scale quantitative studies with a global perspective,<sup>26</sup> reviews of existing literature,<sup>27</sup> and local case studies.<sup>28</sup> The preference for most scholars is quantitative studies, often taking the form of large n-statistical analyses. In 2017, Tobias Ide, in a review of the research methods used by climate change – conflict researchers, found that large n-statistical

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<sup>26</sup> See Guy J. Abel, Michael Brottrager, Jesus Crespo Cuaresma, and Raya Muttarak, “Climate, Conflict and Forced Migration,” *Global Environmental Change* 54 (2019): 239–49, <https://doi.org/10.1016/j.gloenvcha.2018.12.003>.

<sup>27</sup> See Vally Koubi, “Climate Change and Conflict,” *Annual Review of Political Science* 22 (2019): 343–60, <https://doi.org/10.1146/annurev-polisci-050317-070830> or Kendra Sakaguchi, Anil Varughese, and Graeme Auld, “Climate Wars? A Systematic Review of Empirical Analyses on the Links between Climate Change and Violent Conflict,” *International Studies Review* 19, no. 4 (May 2017): 622–45, <https://doi.org/10.1093/isr/vix022>.

<sup>28</sup> See Jan Selby and Clemens Hoffmann, “Beyond Scarcity: Rethinking Water, Climate Change and Conflict in the Sudans,” *Global Environmental Change* 29 (2014): 360–70, <https://doi.org/10.1016/j.gloenvcha.2014.01.008>.

analysis made up 60% of the literature between 2007 and 2015 while qualitative studies only make up 9% of the literature within the same time frame.<sup>29</sup> It is noteworthy that a considerable portion of the existing literature is composed of literature reviews. 18% of the literature analyzed in Ide's review was composed of solely theoretical works or literature reviews, the second most popular type of analysis after large-N statistical analysis.<sup>30</sup> This is a rather high percentage for this type of study. It is important that new studies in the field of climate change – conflict studies do not rely on literature reviews and instead adopt more empirical methods of analysis.

Qualitative cases studies make up a small minority of the works on climate change and conflict, only 9%,<sup>31</sup> but can be a powerful tool for testing the relationship. As I will be using case studies for my analysis, I will go into more detail on how they are typically conducted within the field of climate change – conflict studies. Ide argues that most case studies adopt a similar format. First, the causal pathways to conflict are analyzed through process tracing. According to George and Bennett, “[t]he process-tracing method attempts to identify the intervening causal process – the causal chain and causal mechanism – between an independent variable (or variables) and the outcome of the dependent variable.”<sup>32</sup> This is a powerful method for analyzing such a complicated, indirect, and non-linear relationship as climate change and conflict, and is especially useful for comprehensive within-case studies. The exploration of the causal chain or pathway allows for the presentation of a more straight-forward linear narrative.<sup>33</sup> Then the relationships between all the variables can be explored and contextualized into “broader socio-

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<sup>29</sup> Tobias Ide, “Research Methods for Exploring the Links between Climate Change and Conflict.” Edited by Timothy Carter, Domain Editor, and Mike Hulme, *Wiley Interdisciplinary Reviews: Climate Change* 8, no. 3 (2017): 3, <https://doi.org/10.1002/wcc.456>.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Alexander L. George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge, Mass.: MIT Press, 2005), 206.

<sup>33</sup> Ide, “Research Methods for Exploring the Links between Climate Change and Conflict,” 3.

political structures,” showing how the variables do not act in isolation from one another and explain how local context matters for each case.<sup>34</sup>

### **Climate Change as an Intermediate Variable**

How do scholars define the relationship between climate change and conflict? It may be expected that climate change would be an independent variable, but this is not the case. In a 2017 literature review of 69 peer-reviewed articles, Sakaguchi, Varughese, and Auld find that most climate change – conflict scholars agree that climate change cannot be interpreted as a single independent direct cause of conflict.<sup>35</sup> Climate change acts upon conflict indirectly through its influence on a suite of variables dependent to the case. It varies the dependent variable (i.e. conflict) through its effects on independent variables, that in turn influence the dependent variable. The effects of climate change can also be “mediated” by socioeconomic and geographic conditions in cases such as favorable socioeconomic conditions, state capacity, or geography.<sup>36</sup> The indirect nature of climate change, in addition to its potential to be mediated, led Feitelson and Tubi to define climate change as an “intermediate variable” in their 2017 study on climate change and conflict in the Euphrates and Jordan basins.<sup>37</sup> Arguably most works on climate change and conflict recognize climate change as an intermediate variable but do not refer to it as such. This is the nomenclature that will be adopted for this thesis.

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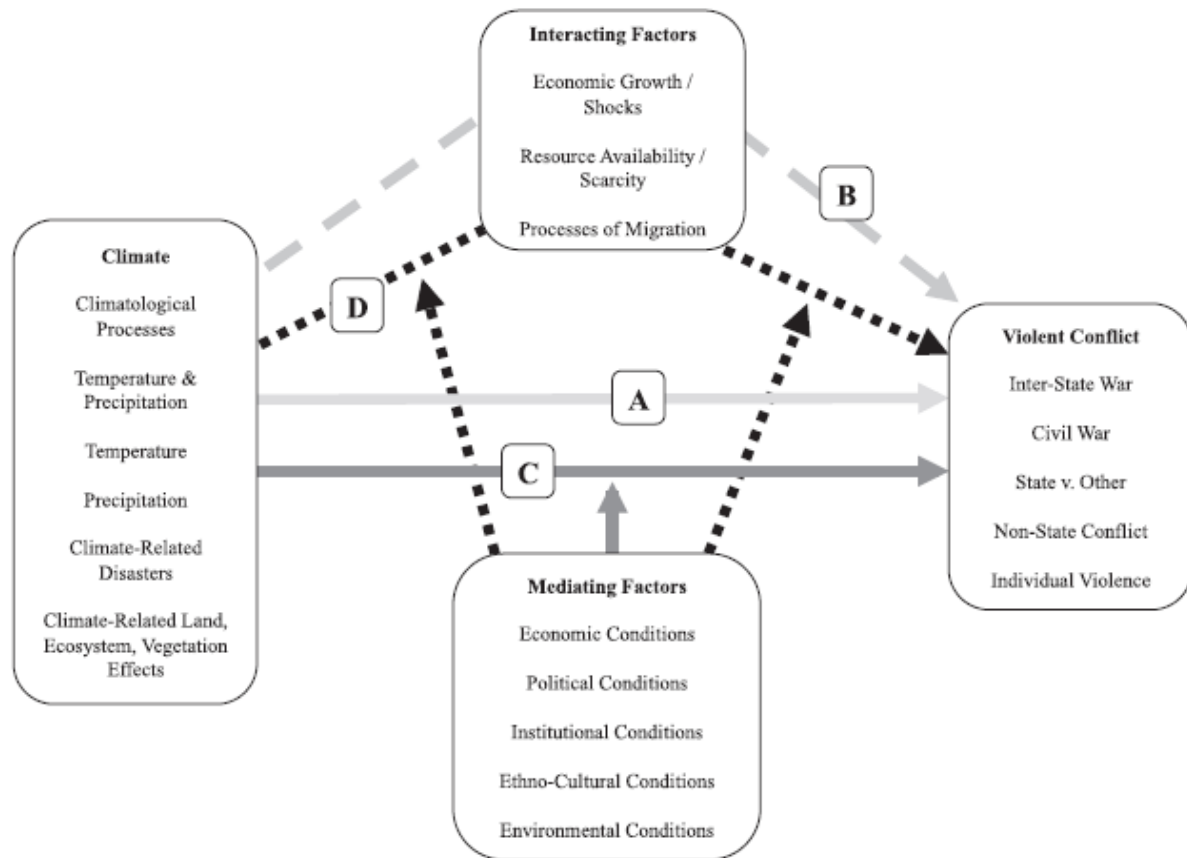
<sup>34</sup> Ibid.

<sup>35</sup> Kendra Sakaguchi, Anil Varughese, and Graeme Auld, “Climate Wars? A Systematic Review of Empirical Analyses on the Links between Climate Change and Violent Conflict,” *International Studies Review* 19, no. 4 (May 2017): 624, <https://doi.org/10.1093/isr/vix022>.

<sup>36</sup> Ibid., 631.

<sup>37</sup> Eran Feitelson and Amit Tubi, “A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East,” *Global Environmental Change* 44 (2017): 41. <https://doi.org/10.1016/j.gloenvcha.2017.03.001>.

Figure 2.1 Causal Pathways from Climate Change to Conflict



Source: Sakaguchi et al. (2017), 631.

Intermediate variables operate within causal pathways. Within studies on climate change and conflict, Sakaguchi et al. find that causal pathways come in four forms: direct, interacting, mediating, and a combination of mediation and interacting.<sup>38</sup> The above figure from their article illustrates these pathways succinctly. The direct path (A) envisions climate change as having a direct effect on conflict. Very few studies use this method and this path has largely been discredited among scholars. In an interacting path (B), climate change operates on conflict through its influence on other variables such as economic factors and migration. The mediation path (C), as explained above, suggests that the effects of climate change can be mediated by

<sup>38</sup> Sakaguchi et al., "Climate Wars? A Systematic Review of Empirical Analyses on the Links between Climate Change and Violent Conflict," 630-631.

external factors. Lastly, climate change can have an effect on variables within the interacting path, while also being mediated by other factors (path D). The variables that climate change affects, or that mediate climate change, are all specific to the context of the case.

Defining climate change as an intermediate variable is similar to defining it as a threat multiplier, but they are not the same. The intermediate variable framework is more closely aligned to the critical scholarship examined in the literature review. Climate change is likely to increase the effects of conflict, but it often requires other traditional factors to be present such as economic troubles or poor state capacity. Not only do these factors increase the risk, their presence may also be necessary for climate change to have any effect. The threat multiplier narrative ignores this possibility in favor of a more simplistic and digestible model. It suggests that climate change may play a role more significant than traditional factors. Furthermore, the narrative suggests that climate change is a causative factor, rather than an interacting one. Generally, it has been largely used a vague policy term, rather than an accurate model of the climate change-conflict relationship.

### **Framework**

In my thesis, I will treat climate change as an intermediate variable that may influence the propensity for conflict and exacerbate or prolong existing conflicts. As Sakaguchi et al. find, many climate change – conflict scholars treat climate change as an intermediate variable, but they do not define it as such nor explain how it operates theoretically. I will explain how climate change operates on conflict through its influence on independent variables in the interacting path. My two case studies do not find evidence that climate change was being mediated by any factor, so I will not be adopting the mediation or combinatory paths in my analysis. This does not mean



that these two paths should be discredited, rather it shows how the context of each case matters for determining the relationship between climate change and conflict.

### *Case Studies*

I will be conducting two case studies in my thesis, the Sudan Darfur conflict (2003-present) and the Syrian Civil War (2011-present). These selections were made based on their comparative potential and their frequent use among scholars and policy makers. These two cases have both resulted in conflict, but they are differentiated by geography, political and socioeconomic conditions, and climate change sensitivity. These differentiations suggest that climate change may have affected the causal pathways to conflict in unique ways for each case. Within the case studies, I will use process tracing to track the influence of climate change on independent variables within the intermediate path. By following the interacting path, I can prove climate change influenced conflict if it varied factors in in the intermediate path known to contribute to the conflict.

### *Comparative Analysis*

In my analysis, I will use the ““controlled comparison”” method outlined in George and Bennet’s book on case study methodology<sup>39</sup> As stipulated by this method, the dependent variable, i.e. conflict, is consistent across all cases while the independent variables (i.e. causal pathways to conflict) are different.<sup>40</sup> The presence of climate change is held consistent as well. All my cases have resulted in conflict, but undoubtedly climate change has influenced the causal pathways to the conflicts in different ways. Through a comparison of my case study findings, I

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<sup>39</sup> George Andrew Bennett, *Case Studies and Theory Development in the Social Sciences*, 81.

<sup>40</sup> Ibid.

will be able to determine what effects, if any, climate change has on factors within the causal pathways, and if climate change has stronger relationships with any factor in particular.

## **CHAPTER III: THE DARFUR CONFLICT**

### **Introduction**

During the 1980s, the Darfur region of Sudan experienced two major events that would shape the region in the coming decades. The first was a devastating drought and subsequent famine between 1980 and 1985. As a result of increasingly arid conditions in Darfur's pastures, the region's ethnically Arab pastoral groups were forced to migrate their herds south to find food and water.<sup>41</sup> These nomadic groups encroached on cropland owned by settled African agriculturalists who were also suffering from the drought. In order to protect their land, crops, and water supplies, the settled agriculturalists took up arms against the nomads.<sup>42</sup> This conflict would foreshadow the one in 2003 that is the focus of this case study. The second event was a military coup led by a Sudanese officer, Omar al-Bashir in 1989. Al-Bashir would assume the title of President of Sudan until he himself was ousted in a coup in 2019. Al Bashir's regime heavily favored ethnic Arabs in Darfur and supported Arab nomadic groups in their conflicts over land with the African agriculturalists.<sup>43</sup>

In 2003, rebel groups in Darfur organized in protest of Al-Bashir's support of the Arabs. By this time, other environmental pressures again forced Arab nomadic groups to compete with settled African agriculturists for land, food, and water. The nomadic "Arabs" and the settled

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<sup>41</sup> Charles-Édouard de Ramaix, "Migration and Relief Action in Drought-Affected Darfur," in *The State of Environmental Migration* 2010, eds. François Gemenne, Pauline Brücker and Joshua Glasser, Geneva: International Organization for Migration (2010): 78.

<sup>42</sup> Balgis Osman-Elasha, et al., "Adaptation Strategies to Increase Human Resilience against Climate Variability and Change: Lessons from the Arid Regions of Sudan," *AIACC Working Papers* 42 (October 2006): 31. [http://www.start.org/Projects/AIACC\\_Project/working\\_papers/working\\_papers.html](http://www.start.org/Projects/AIACC_Project/working_papers/working_papers.html).

<sup>43</sup> Jeffrey Mazo, "Chapter Three: Darfur: The First Modern Climate-Change Conflict," *The Adelphi Papers* 49 no. 409 (2009): 78, <https://doi.org/10.1080/19445571003755538>.

“Africans” would weaponize their differences, learning to see each other as competitors for life’s most basic necessities: food and water. To counter the African rebel groups, many Arabs from nomadic tribes organized themselves into hostile bands. In addition to combatting the rebels, Arab militias have committed atrocities on African settlements. The most notorious of such militias, is the Janjiweed, a paramilitary group that was supported in part by the sympathetic al-Bashir regime. The Janjiweed have been the vanguard in a campaign of ethnic cleansing against the African population. The conflict is not limited to conflict between Arabs and Africans,

Figure 3.1 Map of Darfur (highlighted) within Sudan



Source: Wikipedia, 2011.

however. Many Arab pastoral groups have also targeted other Arab tribes in their competition for land and resources.<sup>44</sup> The same applies to some African settled communities.<sup>45</sup>

Many scholars in recent years have discounted the ethnic factors behind the conflict, instead focusing on the role of environmental factors and climate change. The main issue of contention is the ethnic identity of the Alvarez notes that the Arab tribesman are not really Arab and there is no true racial distinction between the two groups.<sup>46</sup> Instead, the pastoral tribesman are Africans who have undergone a process of Arabization. According to Abouyoub, reducing the conflict to an ethnic rivalry simplifies the history of the region in favor of a convenient and easily understandable narrative.<sup>47</sup> Instead, Alvarez and Abouyoub suggest that we approach the conflict from the angle of environmental factors and climate change.

Many scholars have argued that the inhabitants of Darfur are especially vulnerable to environmental fluctuations. Across Sudan, agriculture is a large industry. In 2010, agricultural work represented around 80% of the country's total workforce.<sup>48</sup> In the region of Darfur, with its chronic and debilitating droughts, the threat to agriculture is especially pronounced. The threat is compounded by a noticeable trend throughout the region of decreasing and more variable annual rainfall. In addition to water scarcity, Darfur is also experiencing an increasing loss of arable and pastoral land to desertification and deforestation. Many scholars like Abouyoub and Alvarez have attributed these factors to conflict, but it is not clear if they have been caused or intensified

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<sup>44</sup> Andrew J. Plowman, *Climate Change and Conflict Prevention: Lessons from Darfur* (Washington D.C.: National Intelligence University Press, 2014): 37.

<sup>45</sup> United Nations Environment Programme, *Sudan Post-Conflict Environmental Assessment* (Nairobi: United Nations Environment Programme, 2007): 82.

<sup>46</sup> Alex Alvarez, *Unstable Ground: Climate Change, Conflict, and Genocide* (Lanham, MD: Rowman & Littlefield Publishing Group, 2017):108.

<sup>47</sup> Younes Abouyoub, "Climate: The Forgotten Culprit. The Ecological Dimension of the Darfur Conflict," *Race, Gender & Class* 19, no. 1/2 (2012): 151. <https://www.jstor.org/stable/43496864>.

<sup>48</sup> Christian Webersik, *Climate Change and Security: A Gathering Storm of Global Challenges* (Santa Barbara: Praeger, 2010): 40.

by climate change. What is apparent, however, is that environmental degradation and resource scarcity has had a significant effect on the displacement of the Darfurian population, and on their ability to survive.

The potential climate change dimensions of the conflict have not been ignored by the international community. In June of 2007, the Secretary General of the United Nations, Ban Ki Moon, authored an op-ed in the *Washington Post* titled, “A Climate Culprit in Darfur.”<sup>49</sup> In his piece, Moon first announced that an agreement had been reached among Sudanese President Omar al-Bashir and the U.N. to establish a U.N. peacekeeping mission in the war-torn region of Darfur. Delivering this promising news was not the only goal of Moon’s editorial, however. He also took the opportunity to make a bold argument. Climate change was partially to blame for the genocide and armed conflict in Darfur. To support his claim, Moon cited the increased aridity of sub-Saharan Africa and recent long-lasting droughts. These devastating environmental disturbances, Moon argued, led to conflict for food and water among the settled and pastoral communities in the region.

In that same month, the United Nations Environmental Programme (UNEP) published a report, *Sudan: Post-Conflict Environmental Assessment*, that presented a more nuanced version of Moon’s argument. The report detailed how climate change, natural disasters, and anthropogenic environmental degradation have affected the conflict in Darfur. In regard to climate change specifically, the report cited desertification and declining precipitation as key contributing factors.<sup>50</sup> Unlike Moon, however, the report does not argue that climate change

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<sup>49</sup> Ban ki Moon, “A Climate Culprit in Darfur,” *Washington Post*, June 16, 2007, <https://www.washingtonpost.com/wpdyn/content/article/2007/06/15/AR2007061501857.html>.

<sup>50</sup> United Nations Environment Programme, *Sudan Post-Conflict Environmental Assessment*, 9.

caused the Darfur conflict. Rather, the conflict was caused by a host of sociopolitical and economic factors in which climate change only had an interacting role.

Since the conflict began, at least 2.7 million people have been displaced.<sup>51</sup> The number of dead remains highly disputed, ranging from the Sudanese Government's conservative, and probably falsified, estimate of 10,000, to the United Nations' estimate of 300,000,<sup>52</sup> to numbers exceeding 400,000.<sup>53</sup> Mortality figures, however, often include the number of people who have died of malnutrition or disease, so they are not representative of deaths stemming directly from violence.<sup>54</sup> Regardless, the amount of suffering has been truly devastating. Now in 2020, with the Darfur conflict seeming to approach its end, it is necessary to develop an understanding of the conflict's causal pathways in order to develop a capacity to prevent a similar tragedy in the future. Whether climate change could be a causal factor is an important question in developing such an understanding.

With the evidence currently available, it cannot reasonably be concluded that the Darfur conflict was caused by climate change. What is evident, however, is that climate change has functioned as an intermediate variable. As an intermediate variable, climate change has not had any significant direct effect on the Darfur conflict, but it has indirectly affected the conflict by exacerbating other drivers, in this case: climate change-induced water scarcity/surplus, arable land scarcity/surplus, and internal population displacement. When considered in addition to the other causal pathways that led to the conflict, anthropogenic environmental degradation, ethnic

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<sup>51</sup> "Security Council Stresses Need of 'Sustainable Solutions' for Millions Displaced in Darfur," UN News, United Nations, January 31, 2018, accessed February 14, 2020 from <https://news.un.org/en/story/2018/01/1001711>.

<sup>52</sup> "Darfur Conflict," Thomson Reuters Foundation, July 31, 2014, accessed February 14, 2020 from <https://web.archive.org/web/20150524045929/http://www.trust.org/spotlight/Darfur-conflict>.

<sup>53</sup> The upper range from Olivier Degomme and Debarati Guha-Sapir, "Patterns of Mortality Rates in Darfur Conflict," *The Lancet* 375 (2010): 298, [https://doi.org/10.1016/s0140-6736\(09\)61967-x](https://doi.org/10.1016/s0140-6736(09)61967-x).

<sup>54</sup> Degomme and Guha-Sapir estimate 80% of these casualties are the result of disease and malnutrition. "Patterns of Mortality Rates in Darfur Conflict," 297.

tensions, and government abuse, climate change as an intermediate variable intensified rather than caused the Darfur conflict.

## **Evidence of Climate Change**

### ***Declining Rainfall and Increasing Temperatures***

The evidence for the presence of climate change in Sudan, and Darfur specifically, is robust, being a subject of study since at least the late 1970s. Eldrege et al. argue that Sudan has experienced a statistically significant reduction in rainfall since 1966 in the important growing months of July, August, and September.<sup>55</sup> While these are older findings, they are corroborated by a report published in 2011 by the United States Geological Service (USGS) in cooperation with USAID. The report finds that rainfall during summer months in Sudan's western and southern regions have declined by ten to twenty percent.<sup>56</sup> The United Nations Environmental Programme (UNEP) finds that this decline is irregular and most prominent in the regions of Kordofan and Darfur. In the province of North Darfur alone, precipitation has decreased by 30% over 80 years.<sup>57</sup> UNEP also finds that air temperatures in Sudan have risen by more than one-degree Celsius on average.<sup>58</sup>

The decline in precipitation has in turn led to deforestation. Although much of Sudan's deforestation can be attributed to human activity, the UNEP report finds that precipitation decline has pushed the outer limit of many tree species 50 to 200km southward.<sup>59</sup> Combined, reduced precipitation and deforestation have contributed to another problem, desertification. The

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<sup>55</sup> Eldrege, Nicholds, Abdalla, and Rydjeski, "Changing Rainfall Patterns in Western Sudan," 52.

<sup>56</sup> Christopher Funk, Gary Eilerts, Jim Verdin, Jim Rowland, and Michael Marshall, "A Climate Trend Analysis of Sudan," United States Geological Survey Factsheet, 2011-3072, 201. <https://doi.org/10.3133/fs20113072>.

<sup>57</sup> United Nations Environment Programme, *Sudan Post-Conflict Environmental Assessment*, 84.

<sup>58</sup> *Ibid.*

<sup>59</sup> *Ibid.*, 210.



report finds that the border between the semi-desert and the desert in Sudan has moved between 50 to 200 kilometers southward since the 1930s.<sup>60</sup> All three of these factors, reduced precipitation, deforestation, and desertification, have limited agricultural productivity, grazing potential for pastoral animals, and the water supply. As such, the factors outlined in these studies prove worrisome for Sudan's food security.

### *Climate Change-induced Droughts?*

Sudan's increasingly precarious food security is further threatened by periodic droughts, but while there may seem to be a connection between declining rainfall and these droughts, they cannot be easily attributed to climate change. The Sahel region has increasingly been subject to varying precipitation levels from year to year.<sup>61</sup> In Sudan this problem is especially acute as rainfall in the country varies between periods of little and heavy rainfall in a generally unpredictable fashion.<sup>62</sup> In order to connect drought to climate change, it needs to be determined whether the frequency and severity of Sudan's droughts have increased over time. As of writing, there have not been any robust studies linking Sudan's droughts to climate change. Even in the UNEP report where drought and climate change are often mentioned in tandem, drought is treated as a separate entity from climate change and climate change-induced precipitation decline and temperature increase.

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<sup>60</sup> Ibid., 9.

<sup>61</sup> Ibid., 61.

<sup>62</sup> Sumaya Ahmed Zakieldeem, *Adaptation to Climate Change: A Vulnerability Assessment for Sudan* (London: International Institute for Environment and Development, Gatekeeper Series 42, 2009), 4. <https://pubs.iied.org/14586IIED/?k=Sudan>.

### *Anthropogenic Environmental Degradation*

While there is support for the presence of climate change in Sudan and Darfur, it is important to recognize that other environmental changes may not be the result of climatic processes. Environmental degradation and the mismanagement of resources and land, for instance, is a large problem attributed to human activity. Writing in 1978, Ibrahim argues that this environmental degradation has accelerated the effects of desertification in western Sudan. According to Fouad, environmental degradation in western Sudan has taken many forms, including deforestation, overgrazing, excessive cultivation, poor water management, and irrigation projects.<sup>63</sup> The evidence presented in the UNEP report supports Fouad's argument, but at a broader regional scale.<sup>64</sup> This environmental degradation component makes it even more difficult to distinguish between climate change and human activity. Both the evidence and the nonevidence of climate change should be recognized before moving forward to the connections between conflict and climate change in Darfur.

### *Discussion*

Climate change in Sudan and Darfur has clearly had significant effects on the environment, but there are some problems to consider. While there is a large amount of evidence to suggest that Rainfall is slowly declining across the country and has been for decades, the evidence for temperature increase is more limited. Secondly, I could not find any studies scientifically connecting Sudan's droughts to climate change, meaning I cannot prove they are related, only suggest a connection. Despite this, it is clear climate change is having significant

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<sup>63</sup> Fouad Ibrahim, "Anthropogenic Causes of Desertification in Western Sudan," *GeoJournal* 2, no. 3 (1978): 244, <https://doi.org/10.1007/bf00208640>.

<sup>64</sup> United Nations Environment Programme, *Sudan Post-Conflict Environmental Assessment*, 63.

effects on the environment with increasing desertification and deforestation. It is necessary to understand, however, that some of this desertification and deforestation is not due to climate change but to anthropogenic environmental degradation caused by resource mismanagement and overexploitation. This makes it more difficult to distinguish the effects of climate change from other forms of human activity. With the information presented in this section, I can conclude that climate change has had an impact on Darfur by decreasing rainfall levels and accelerating desertification and deforestation, but I cannot connect climate change to Sudan's droughts.

### **Climate Change to Conflict**

Conflict between Arab and African tribes in Darfur has not been typical for the majority of the 20<sup>th</sup> century. What then, could have caused the devastating conflict between the two groups that began in 2003? There are two possible culprits here. The first is climate change. As evidenced in the previous section, climate change has jeopardized the availability of water and arable land in both the northern and southern regions of Darfur. Evidence shows that the scarcity of these two resources have accelerated the migration of pastoral Arab tribes to the south. If the scarcity of these resources and the accelerating migration of Arab tribes are linked to conflict, then it can be argued that climate change has contributed. The other, is that the Arab-supremacist Sudanese government of Omar al-Bashir that emerged in 1989 has had a role to play in enabling the conflict. There is evidence to support both of these arguments, but as I will argue both cannot be considered causative factors. Rather, climate change functioned as an intermediate variable as an intensifying, rather than a causative factor.

## *A History of Migration*

Table 3.1 shows that the conflicts between African tribal groups in Southern Darfur since the beginning of the 19<sup>th</sup> century have often occurred over water and grazing rights. The table also suggests the occurrence rate of these conflicts have been increasing. This increasing rate could be attributed to the increasing effects of climate change on Darfur which have increased resource strain in the region. Conflict between Africans and Arabs, however, has not been

Table 3.1 Conflict in Darfur (1930-2000)

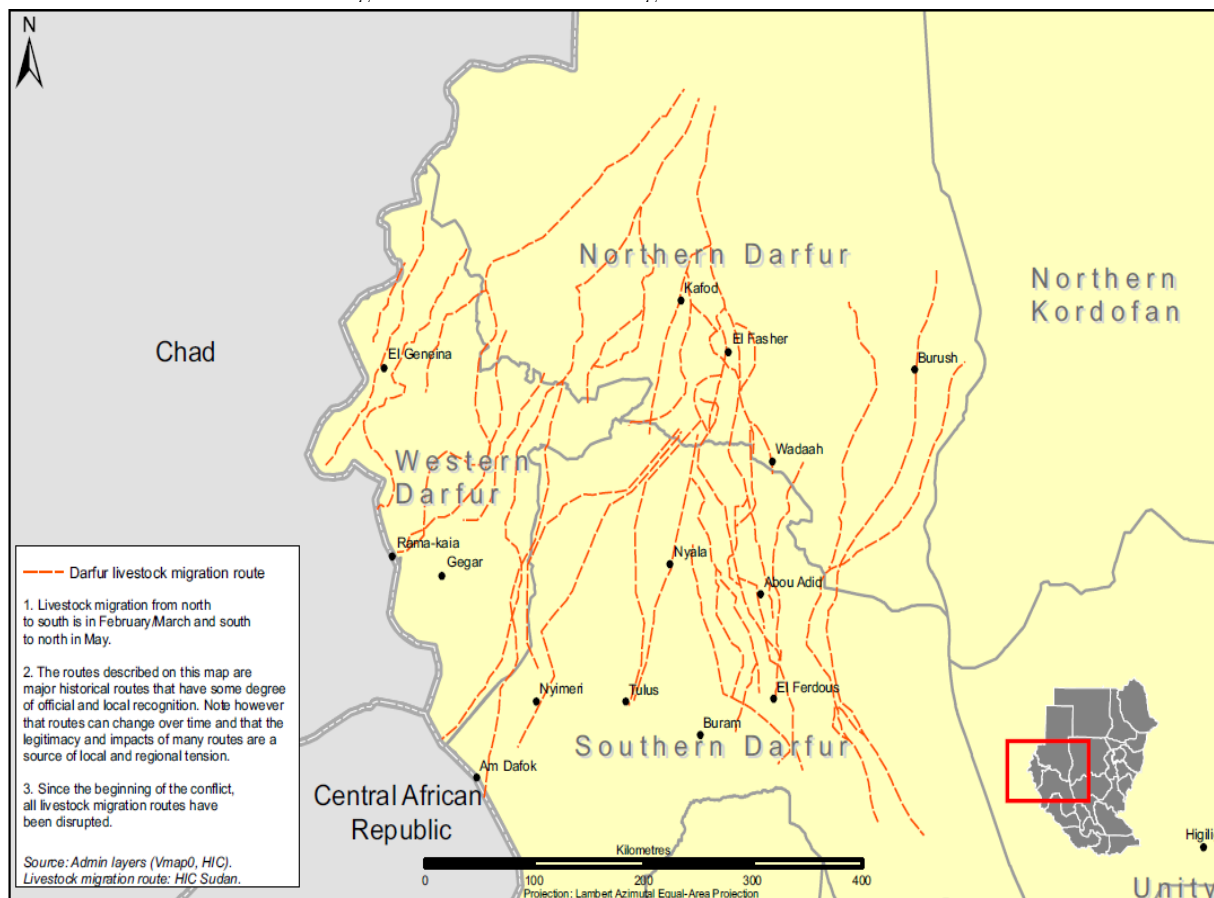
No.	Tribal groups involved	Year	Main cause of conflict
1	Kababish, Kawahla, Berti and Medoub	1932	Grazing and water rights
2	Kababish, Medoub and Zyadiya	1957	Grazing and water rights
3	Rezeigat, Baggara and Maalia	1968	Local politics of administration
4	Rezeigat, Baggara and Dinka	1975	Grazing and water rights
5	Beni Helba, Zyadiya and Mahriya	1976	Grazing and water rights
6	Northern Rezeigat (Abbala) and Dago	1976	Grazing and water rights
7	N Rezeigat (Abbala) and Bargo	1978	Grazing and water rights
8	N Rezeigat and Gimir	1978	Grazing and water rights
9	N Rezeigat and Fur	1980	Grazing and water rights
10	N Rezeigat (Abbala) and Bargo	1980	Grazing and water rights
11	Taisha and Salamat	1980	Local politics of administration
12	Kababish, Berti and Zyadiya	1981	Grazing and water rights
13	Rezeigat, Baggara and Dinka	1981	Grazing and water rights
14	N Rezeigat and Beni Helba	1982	Grazing and water rights
15	Kababish, Kawahla, Berti and Medoub	1982	Grazing and water rights
16	Rezeigat and Mysseriya	1983	Grazing and water rights
17	Kababish, Berti and Medoub	1984	Grazing and water rights
18	Rezeigat and Mysseriya	1984	Grazing and water rights
19	Gimir and Fallata (Fulani)	1987	Administrative boundaries
20	Kababish, Kawahla, Berti and Medoub	1987	Grazing and water rights
21	Fur and Bidayat	1989	Armed robberies
22	Arab and Fur	1989	Grazing, cross-boundary politics
23	Zaghawa and Gimir	1990	Administrative boundaries
24	Zaghawa and Gimir	1990	Administrative boundaries
25	Taisha and Gimir	1990	Land
26	Bargo and Rezeigat	1990	Grazing and water rights
27	Zaghawa and Maalia	1991	Land
28	Zaghawa and Mararait	1991	Grazing and water rights
29	Zaghawa and Beni Hussein	1991	Grazing and water rights
30	Zaghawa, Mirra and Birgid	1991	Grazing and water rights
31	Zaghawa and Birgid	1991	Grazing and water rights
32	Zaghawa and Birgid	1991	Grazing and water rights
33	Fur and Turgum	1991	Land
34	Zaghawa and Arab	1994	Grazing and water rights
35	Zaghawa Sudan and Zaghawa Chad	1994	Power and politics
36	Masalit and Arab	1996	Grazing, administration
37	Zaghawa and Rezeigat	1997	Local politics
38	Kababish Arabs and Midoub	1997	Grazing and water rights
39	Masalit and Arab	1996	Grazing, administration
40	Zaghawa and Gimir	1999	Grazing, administration
41	Fur and Arab	2000	Grazing, politics, armed robberies

Source: UNEP (2011), 82.

common. In fact, the first documented conflict between an African tribe and the Northern Arabs was in 1989, when Arabs and the Fur competed over “grazing and cross-boundary politics.” From 1989 to 2000, there have been four conflicts between Arabs and African tribes, one in 1994, two separate conflicts in 1996, and one in 2000. Each conflict, although different in nature, has been over grazing and water and land rights to some extent. The 2003 conflict is a continuation of this trend but with a considerably larger scale and scope.

The migration of northern pastoral groups to the south of Darfur is not a new phenomenon nor dependent on the presence of climate change. On the contrary, the migration of Arab nomadic tribes to the south is a common occurrence with a regular annual schedule. During dryer periods, the Sahara expands to vulnerable grazing land in the north. In response, Arab pastoral groups migrate south to find more suitable land for their herds.<sup>65</sup> The migration occurs during the dryer parts of years as well as during times of abnormal aridity.<sup>66</sup>

Figure 3.2 Seasonal Pastoral Migration Routes in Darfur



Source: UNEP (2011), 188.

<sup>65</sup> Alvarez, *Unstable Ground: Climate Change, Conflict, and Genocide*, 110.

<sup>66</sup> United Nations Environment Programme, *Sudan Post-Conflict Environmental Assessment*, 186.

### *Recent Changes*

These migrations are usually tolerated by African agricultural communities in the wetter south, but when the scale and duration of the migration increase, competition between the groups often occur for increasingly scarce land and water resources.<sup>67</sup> As evidenced by the conflicts emerging from the drought of the 1980s, competition is exacerbated when Southern Darfur is also going through a period of dryness.

Clearly, the relationship between water, arable land, and the displacement of peoples are all related in this case. The forces of climate change caused an increasing lack of water and arable land in northern Darfur. This pressured Arab pastoral groups to migrate to the wetter south. The pastoralists, without the ability for their herds to graze, encroached on settled cropland for food and water,<sup>68</sup> which led to competition with the African agriculturalists, who themselves were struggling with food and water supplies. This competition exacerbated existing tensions in the region, making the environment more prone to violent conflict. Ultimately, this competition would contribute to the 2003 Darfur conflict.

Some scholars have questioned the veracity of the connection of the scarcity of water and arable land to conflict in Darfur. In a 2008 study, Kevane and Gray argue that there was no noticeable decline in precipitation in Darfur in the years prior to the 2003 conflict and thus no connection between the scarcity of water and conflict<sup>69</sup> Brown's 2010 study supports this argument. He observes an increase in vegetation cover from 1981 to 2006 in Western and Northern Darfur, suggesting that there is no relationship, or perhaps a negative relationship

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<sup>67</sup>de Ramaix, "Migration and Relief Action in Drought-Affected Darfur," 80.

<sup>68</sup> United Nations Environment Programme, *Sudan Post-Conflict Environmental Assessment*, 86.

<sup>69</sup> Michael Kevane and Leslie Gray, "Darfur: Rainfall and Conflict." *Environmental Research Letters* 3, no. 3 (2008): 8-9, <https://doi.org/10.1088/1748-9326/3/3/034006>.

between vegetation cover and conflict.<sup>70</sup> In contrast, de Juan 2014 argues that in regions with an increased availability of water and vegetation, conflict is both more likely and intense.<sup>71</sup> Selby and Hoffmann 2013 also find evidence for a connection between the abundance of water and conflict in Sudan.<sup>72</sup> How do we make sense of this? There are a few possibilities. The first is that the presence or scarcity of water or vegetation is not a good predictor of conflict. The second is that areas of water abundance could be perceived by the belligerents of the conflict as valuable pieces of land worth fighting over. Lastly and most convincingly, there may be another non-environmental force at work that is enabling the conflict.

### ***Discussion***

This leaves a confusing picture of the impacts of climate change on the Darfur conflict. There is a large amount of evidence which suggests that climate change taking the form of desertification and water scarcity led to an increased migration of pastoral Arab nomadic groups to southern Darfur where they encroached on the land of African agriculturalists. Meanwhile, a smaller body of evidence suggests that the scarcity of water and arable land may have no connection to the conflict, and that it is the abundance of those resources that have a connection. The migration component of the conflict is clear and well-supported, but the degree to which the conflict between the Arabs and Africans is over the scarcity of water and arable land is in doubt. It is evident that climate change interacted with different variables connected to conflict to different degrees, operating as an intermediate variable. In this case, the effects of climate

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<sup>70</sup> Ian A. Brown, "Assessing Eco-Scarcity as a Cause of the Outbreak of Conflict in Darfur: a Remote Sensing Approach," *International Journal of Remote Sensing* 31, no. 10 (May 2010): 2518-19, <https://doi.org/10.1080/01431161003674592>.

<sup>71</sup> Alexander de Juan, "Long-Term Environmental Change and Geographical Patterns of Violence in Darfur, 2003–2005," *Political Geography* 45 (2014): 22, <https://doi.org/10.1016/j.polgeo.2014.09.001>.

<sup>72</sup> Jan Selby and Clemens Hoffmann, "Beyond Scarcity: Rethinking Water, Climate Change and Conflict in the Sudans," *Global Environmental Change* 29 (2014): 360, <https://doi.org/10.1016/j.gloenvcha.2014.01.008>.

change led to migration, which in turn led to the competition for water and arable land. This competition whether it was over a scarcity or an abundance of water and land resources, led to conflict between the African agriculturalists and Arab nomads.

### **The Role of Other Factors**

If climate change is not the prerequisite for the Darfur conflict, then what is? Here it is necessary to examine the origins of the conflict more closely. There are three causal pathways to consider here. The first two deal with the influence of the government. The first causal pathway is the lack of institutional infrastructure and government mediation of conflicts in tribal lands. Without the necessary infrastructure and government mediatory presence, tribes felt justified to resolve conflicts extrajudicially. The second is the distribution of wealth in Sudan. The wealth of the Sudanese government came mostly from oil extraction and was not equally distributed among the many disparate regions and ethnicities of Sudan. One area that was left out was Darfur and the Africans who lived there. The third causal pathway takes the form of the ethnic tensions between Arabs and Africans, and the role of the Sudanese government in exacerbating them.

### ***The Role of the Government***

During the 1970s, the Sudanese government under Jafaar al-Nimeiry reworked the many local tribal administrations within Sudan to have them operate under the Sudanese government. His government ended rule by local chiefs and broke up local tribal courts.<sup>73</sup> By the time, Omar al-Bashir took power and instituted his National Islamic Front government, the traditional way for tribes to manage their territory and arbitrate disputes was already significantly disrupted, causing a great amount of confusion.<sup>74</sup> To make matters worse, the Sudanese government did not

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<sup>73</sup> Mazo, "Darfur: The First Modern Climate-Change Conflict," 77-78.

<sup>74</sup> Abouyoub, "Climate: The Forgotten Culprit," 154.



put in place adequate legal and judicial infrastructure in tribal regions to replace what was lost.<sup>75</sup> When conflicts over water and land among tribes in Darfur emerged, there was no government-sanctioned legal remedy. The only way to resolve these conflicts was through extrajudicial violence.<sup>76</sup> Because of this, there was no way for the Sudanese government to mediate the conflict before it began.

The second thing to consider is the economy and distribution of wealth within Sudan. The economy of Sudan is primarily agricultural, with about 80% of the workforce in agricultural jobs.<sup>77</sup> Since the 1990s, however, the Government of Sudan has prioritized the extraction of oil for its income. The result of this focus on oil exports has made Sudan one of the fastest growing economies in Africa.<sup>78</sup> The distribution of this wealth, however, has not been equal. The failure to invest some of this wealth into regions occupied by Africans in Darfur was a major contributing factor why African rebels took up arms against the Sudanese government.<sup>79</sup> Webersik argues that the dependence on oil exports and the unequal distribution of wealth has enabled conflict across Sudan.<sup>80</sup> The Sudanese Government operates as a sort of rentier state. Its dependence on natural resources (i.e. oil) means it does not need to be accountable to the public as they are not being taxed and it does not offer as many public goods compared to other states with more robust and equitable economies.<sup>81</sup> Further, the oil economy allows the Sudanese government the financial resources necessary to “start or sustain conflicts.”<sup>82</sup> Without the need for tax contributions, the Arab-supremacist government of al-Bashir could safely combat its own

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<sup>75</sup> Ibid.

<sup>76</sup> Plowman, *Climate Change and Conflict Prevention: Lessons from Darfur*, 57.

<sup>77</sup> Webersik, *Climate Change and Security*, 40.

<sup>78</sup> United Nations Environment Programme, *Sudan Post-Conflict Environmental Assessment*, 20.

<sup>79</sup> Alvarez, *Unstable Ground*, 110.

<sup>80</sup> Webersik, *Climate Change and Security*, 41.

<sup>81</sup> Ibid., 41-42

<sup>82</sup> Ibid., 41.

citizens without economic consequences. In this case, the citizens that al-Bashir targeted were the African natives of Darfur.

### *Factionalism*

The final piece of this puzzle is the ethnic dimension of the conflict. As explained previously, the nomadic pastoral groups native to the north of Darfur consider themselves to be “Arab,” while the agriculturalists to the south consider themselves to be “African.” This ethnic divide, however, is superficial at best. In reality, both of these groups, no matter their asserted identities, are Africans.<sup>83</sup> The distinction is political, not ethnic. There is also no apparent sectarian divide as both groups are Muslim, but it is important to note that both groups adhere to different cultural traditions.<sup>84</sup> Despite this, a narrative has emerged in Western media of the importance of this ethnic dimension. Many scholars have criticized this narrative when approached in isolation, but when in combination with other factors, this dynamic has had a significant impact in prolonging the conflict.

With all three of these pieces in mind, a picture of the government’s role in the conflict can be formed. Since al-Bashir took power, African Darfurians have rightly accused him and his National Islamic Front regime for favoring Arabs during disputes over water and land.<sup>85</sup> In 2000, parts of *The Black Book: Imbalance of Power and Wealth in Sudan* were published and distributed among Africans in Darfur.<sup>86</sup> The document revealed the extent to which the National Islamic Front and its officials were corrupt and how Darfur was being ignored as a target of government investment. Although the book was directed at a broader audience of Sudanese

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<sup>83</sup> Abouyoub, “Climate: The Forgotten Culprit,” 151.

<sup>84</sup> Alvarez, *Unstable Ground*, 109.

<sup>85</sup> Mazo, “Darfur: The First Modern Climate-Change Conflict,” 78.

<sup>86</sup> Alvarez, *Unstable Ground*, 110-111.

Africans, it resonated especially with Darfurian Africans who felt marginalized when compared to their Arab peers. The distribution of the book accelerated African-led rebel movements that protested the treatment of Africans in Darfur. These rebel groups soon began to target military installations in Darfur. The Sudanese government, fearful that a conflict in Darfur would resemble the intractable conflict in South Sudan, recruited local Arab tribesman to put down the rebels. Instead of focusing on just the rebels, however, the government and Arab militias, including the notorious Janjiweed, attacked civilian targets. They engaged in a terrifying campaign of ethnic cleansing, mass rape, and the indiscriminate destruction of African villages. Alvarez writes that many Arab tribesman participated in the Sudanese Government's campaign of ethnic cleansing because of the struggle for land and water onset by climate change. By eliminating African villages and their inhabitants, Arabs could acquire water and arable land for themselves and their herds. Their "genocidal impulse" came not from hate but from competition over resources.<sup>87</sup>

### *Discussion*

Both the government and factionalism had large roles to play in the Darfur Conflict, and to a larger degree than climate change, but would the conflict still have originated without the influence of climate change? I would argue yes. Although the climate change-intensified migration of Arab tribes led to violence between the two groups, it was the influence of the government and their support of the Janjiweed that turned small skirmishes into large-scale organized violence. It is important to recognize these two factors, as without them the conflict would not have become as big as it did. Climate change's influence as an intermediate variable

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<sup>87</sup> Ibid., 113-114.

intensified the conflict by increasing migration to the region, exacerbating tensions between the two groups.

### **Conclusion**

The evidence gathered in this case presents a complicated picture of the causal pathways behind the Darfur conflict. It is clear that climate change played a role, but is that role insignificant when compared to the role of the government? I argue that the role played by climate change is that of an intermediate variable. Climate change affected three factors that contributed to conflict: the availability of water, the availability of arable land, and the displacement of peoples. In this case, all three of these factors are linked to each other. The lack of water and arable land drove Arab nomadic groups to southern Darfur in great numbers, causing competition over increasingly scarce resources stemming from population stresses and the effects of climate change.

The role of the government is also important here. The failure of the government to administrate Darfur and invest in its African population led to the formation of rebel African groups. In order to combat these groups, the Sudanese Government financed and supplied Arab militias that engaged in a campaign of geocide against the African civilian population. Arabs were encouraged to participate in the conflict to acquire water and arable land that was becoming increasingly scarce as a result of climate change. Many cite ethnic tensions between Africans and Arabs as another factor behind the conflict. The evidence suggests, however, that the conflict was in reality a political and economic one. The extermination of “undesirable” Africans in favor of the Arab nomadic population was more of a crime of opportunity for the Sudanese Government, than the primary driver behind the conflict. It is unclear if the Arab tribesman

would have participated in the conflict without the competition over resources caused by climate change.

The evidence in this case suggest that both climate change-linked factors and non-climate change-linked factors have had a contributing role to play in the conflict. The question is whether the conflict would have occurred with just one group of factors. I argue that conflict would be unlikely to occur when just considering climate change. While competition for land and water may have led to some conflict, most of it would be small-scale skirmishes. The influence of the government and their support of militia groups was the primary driver for a violent, large-scale, and organized campaign of violence between the Africans and Arabs. Therefore, while climate change may not have caused the conflict, it did exacerbate it.

## **CHAPTER IV: THE SYRIAN CIVIL WAR**

### **Introduction**

In the late 2000s, Syria experienced a severe and unprecedented drought. The exact time range of the drought is disputed, beginning in either 2006 or 2007 and ending in either 2008 or 2009,<sup>88</sup> and some even claim the drought reemerged in 2011.<sup>89</sup> Therefore, this thesis will refer to the drought hereafter as the late 2000s drought. Regardless of its duration, the drought had severe impacts on the livelihoods of millions of people in Syria, especially in the northeast of the country, home to much of Syria's agricultural base.<sup>90</sup> The effects of the drought were too much for many rural Syrians, and upwards of 60,000 families<sup>91</sup> migrated to nearby cities to seek employment and better living conditions. The mass migration coupled with severe economic problems and mismanagement by the Assad regime led to unrest among many city dwellers. The initially peaceful protests were suppressed violently by the Syrian Government, ultimately leading to the organization of rebel groups and the beginning of the Syrian Civil War.

Some scholars have attempted to link the late 2000s drought to climate change, but this is a difficult task. There is evidence of declining rainfall and increasing temperatures over a period of decades in Syria, although some of the evidence remains disputed. This is not enough to prove that the drought was caused by climate change, but the unprecedented severity and length of the drought suggests that climate change has at least intensified the drought. While scholars debate

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<sup>88</sup> Jan Selby, Omar S. Dahi, Christiane Fröhlich, and Mike Hulme, "Climate Change and the Syrian Civil War Revisited," *Political Geography* 60 (2017): 234, <https://doi.org/10.1016/j.polgeo.2017.05.007>.

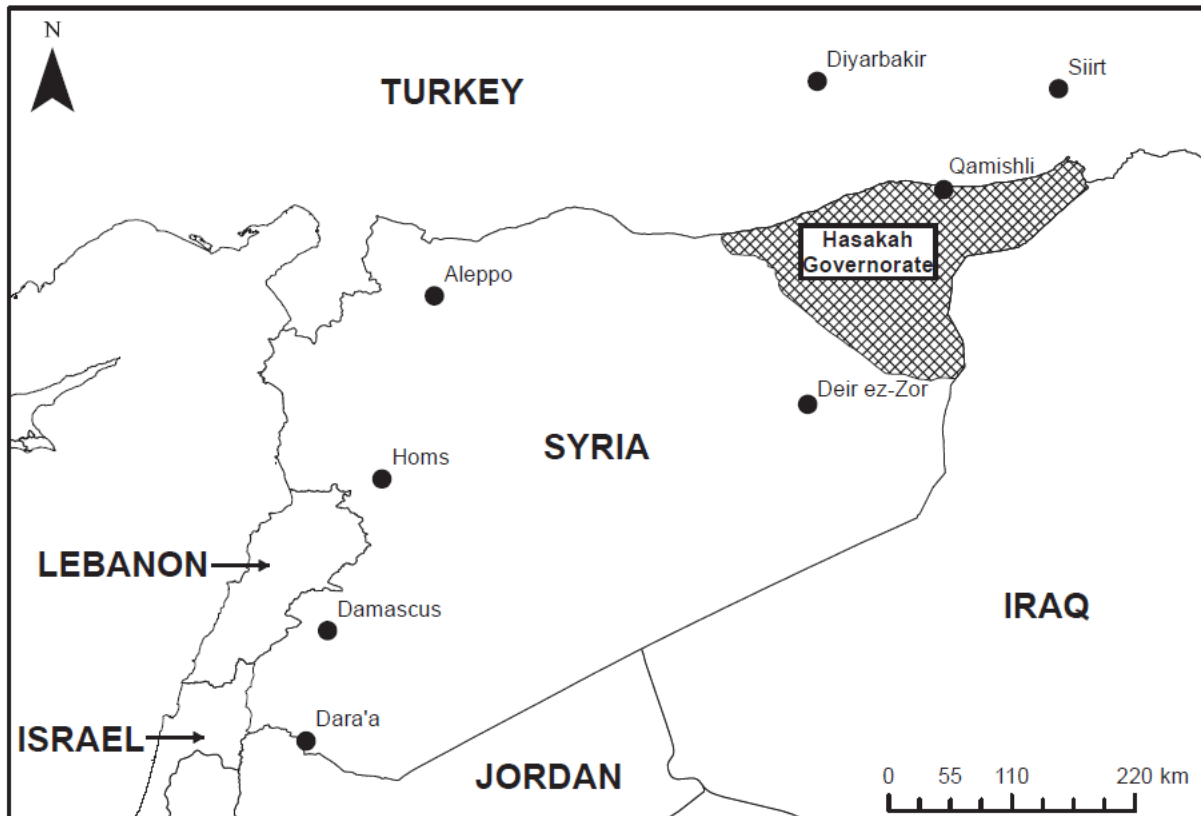
<sup>89</sup> Peter H. Gleick, "Water, Drought, Climate Change, and Conflict in Syria," *Weather, Climate, and Society* 6, no. 3 (2014): 334, <http://www.jstor.org/stable/24907379>.

<sup>90</sup> John Waterbury, "The Political Economy of Climate Change in the Arab Region," *Arab Human Development Report Research Series*, United Nations Development Project 2013, 29, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.363.5511&rep=rep1&type=pdf>.

<sup>91</sup> Selby et al., "Climate Change and the Syrian Civil War Revisited," 239.

the causes of the drought and the extent to which climate change has impacted Syria, there is widespread consensus among ordinary Syrians that climate change is negatively affecting their livelihoods.<sup>92</sup>

Figure 4.1 Map of Syria (northeast region highlighted)



Source: Selby et al., "Climate Change and the Syrian Civil War Revisited" (2017), 235.

Despite the ambiguity, policymakers across the globe were quick to connect the conflict to climate change in a strikingly similar fashion to the Darfur crisis. In the United States, President Obama, Secretary of State John Kerry, Governor Martin O'Malley, and Senator Bernie Sanders have all made remarks connecting climate change and the late 2000s drought to the unrest in Syria that led to the civil war.<sup>93</sup> Similar remarks have been made by international organizations

<sup>92</sup> Quentin Wodon, Andrea Liverani, George Joseph, and Nathalie Bougnoux, eds, *Climate Change and Migration Evidence from the Middle East and North Africa*, Washington, DC: World Bank (2014): 9, 12, <http://documents.worldbank.org/curated/en/748271468278938347/Climate-change-and-migration-evidence-from-the-Middle-East-and-North-Africa>

<sup>93</sup> *Ibid.*, 232.

such as the United Nations, Governmental Bodies, NGOs, think tanks, and activists.<sup>94</sup> including the Syrian representative of the Food and Agriculture Organization (FAO) who described the drought as a ““perfect storm”” in combination with Syria’s economic stressors in inciting unrest.<sup>95</sup> Often, the term “threat multiplier” is used by policy makers, such as by the CNA Military Advisory Board, suggesting that climate change increased the propensity for conflict in Syria.<sup>96</sup>

Climate change and the late 2000s drought does not tell the whole story, however. It is also necessary to consider the role of the Syrian government, and in order to understand that some more context must be presented. In 1970, Hafez al-Assad took power in a coup in Syria. Coming from a rural background, he focused development efforts on rural areas and agriculture, and brought education, water, and electricity to the rest of the country.<sup>97</sup> Despite these positive developments, his regime was marked by violent crackdowns and corruption.<sup>98</sup> After al-Assad’s death in 2000, his son, Bashar al-Assad took power. Despite initially signaling willingness to reform, Bashar generally maintained the status quo, but did take steps to liberalize and diversify the economy. He shifted focus away from the rural areas his father prioritized toward urban centers, in order to diversify the economy and develop a more mature service sector.<sup>99</sup>

The rapid liberalization of Syria’s economy came at a cost. During the drought of the late 2000s, many of the rural areas deprioritized by Bashar al-Assad’s regime suffered. In March of 2011, protests erupted in Dar’a, a city in a poor agricultural region in the south of the country, over government corruption and abuse in addition to the failures of the regime to address

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<sup>94</sup> Ibid.

<sup>95</sup> Gleick, "Water, Drought, Climate Change, and Conflict in Syria," 334.

<sup>96</sup> Selby et al., "Climate Change and the Syrian Civil War Revisited," 232.

<sup>97</sup> Jody M. Prescott, *Armed Conflict, Women and Climate Change* (Abingdon: Routledge, 2019), 73.

<sup>98</sup> Ibid.

<sup>99</sup> Ibid.



economic woes felt by ordinary people. These protests, inspired by the success of the Arab Spring in Tunisia and Egypt, were brutally repressed and soon spread to nearby cities. These protests and frustrations throughout the country would eventually erupt into the Syrian Civil War.

The Syrian Civil War is much more well known in the West than the Darfur Conflict, dominating news headlines for much of the early 2010s. A truly devastating conflict, it has led approximately 5.6 million refugees to leave the country, 6.2 million people to be displaced internally within Syria, and at least 560,000 people dead.<sup>100</sup> Despite diminishing news coverage, the conflict is still ongoing in 2020, and the dimensions of the conflict continue to evolve. The complexity and dynamic nature of the conflict make it difficult to provide an overview of the evolution conflict. Instead this chapter will focus on how climate change may have had an impact on the conflict's origins.

The evidence presented in this chapter suggests that climate change has operated as an intermediate variable in this case. Instead of a direct connection between climate change and conflict, climate change influenced conflict by interacting with a suite of other variables that are widely believed to be connected to the conflict, in this case: migration, poor rural and water infrastructure, and urban pressures. The influence of climate change was not mediated significantly by other factors because of the weakness of the Syrian economy and failures of the state to address these economic woes and a poor water infrastructure network.

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<sup>100</sup> "Syria Regional Refugee Response," Operational Portal: Refugee Solutions, UN Refugee Agency, March 12, 2020; [https://data2.unhcr.org/en/situations/syria#\\_ga=2.245654852.176437928.1523643313-212092299.1523478943](https://data2.unhcr.org/en/situations/syria#_ga=2.245654852.176437928.1523643313-212092299.1523478943); "Internally Displaced People," UNHCR Syria, UN Refugee Agency, accessed March 22, 2020, <https://www.unhcr.org/sy/internally-displaced-people>; "Syria: 560,000 Killed in Seven Yrs of War," Syrian Observatory for Human Rights, December 12, 2018, <http://www.syriahr.com/>.

## Evidence of Climate Change

### *Declining Rainfall and Increasing Temperature*

When compared to the Darfur case, the evidence for climate change in Syria is more limited, but there has been increasing study within recent years. The late-2000s drought has been of special interest to many researchers. In a 2018 study of gauging stations across Syria, Alkhalaf et al. reported a noticeable downward trend of seasonal rainfall during the from 1991 to 2009 in regions across the country.<sup>101</sup> In some regions, however, seasonal rainfall, especially during the dry seasons increased.<sup>102</sup> These inconsistencies may be a product of the limited time frame of the study, but it is more likely due to the climatic variations across the country. The severity of the drought is highlighted within by the figure below which shows that a large majority of cities throughout the country experienced negative rainfall anomalies from 2006/07 to 2008/09. Figure 4.2 shows that Aleppo had the highest positive anomaly with 18%, Lattakia had the lowest negative anomaly with -1% and Al-Rakka had the highest negative anomaly with -36%.<sup>103</sup> Regardless of any contradiction, any change in the norm can prove disruptive to people's livelihoods and agricultural yields.

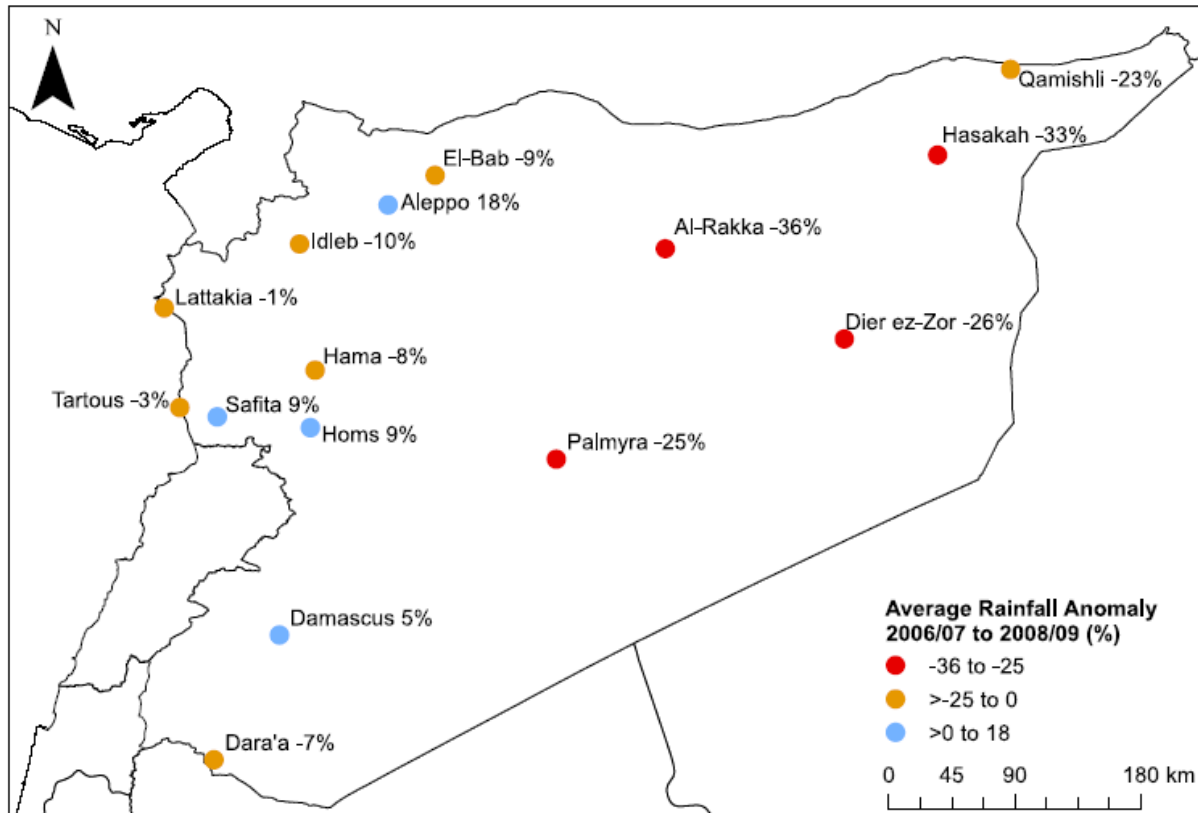
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<sup>101</sup> Ibrahim Alkhalaf, Tatiana Solakova, Martina Zelenakova, and Ibrahim Gargar, "Recent Climate Change in Syria: Seasonal Rainfall and Climatology of Syria for 1991-2009," *Selected Scientific Papers - Journal of Civil Engineering* 13, no. 1 (2018): 96.

<sup>102</sup> *Ibid.*, 94.

<sup>103</sup> Selby et al., "Climate Change and the Syrian Civil War Revisited," 237.

Figure 4.2 Rainfall Anomalies in Syria (2006/7 to 2008/09)



Source: Selby et al., "Climate Change and the Syrian Civil War Revisited" (2017), 237.

Temperature increase, however, has been consistent in its upward trend throughout Syria. In a study of the Middle East region at large, Jallo found that temperature has been increasing by  $0.0036^{\circ}\text{C}$  per year.<sup>104</sup> This trend is consistent and seems to correlate with the increasing levels of carbon dioxide atmospheric concentration. These findings are corroborated by Waha et al. who note that the average temperature in MENA has increased by  $0.2^{\circ}\text{C}$  every decade from 1961 to 1990, and this rate has since accelerated.<sup>105</sup> This is a significant increase for a thirty-year period. Waha et al.'s study had a larger scope than Jallo, including North Africa in the analysis,

<sup>104</sup> Nada I. B Jallo, "Evidence of Climate Change in The Middle East," *Journal of Asian Scientific Research* 3, no. 12 (2013): 1155.

<sup>105</sup> Katharina Waha, Linda Krummenauer, Sophie Adams, Valentin Aich, Florent Baarsch, Dim Coumou, Marianela Fader, et al., "Climate Change Impacts in the Middle East and Northern Africa (MENA) Region and Their Implications for Vulnerable Population Groups," *Regional Environmental Change* 17 (2017): 1625.

so these findings can be difficult to compare. Even so, these studies show a significant increasing temperature trend throughout the Middle East. If the average annual temperature in the Middle East has increased, surely it would have increased in Syria as well. This assumption is verified to a limited extent by Lelieveld et al. who find that the temperature in Damascus has increased by .4°C every decade since 1951.<sup>106</sup> Syria is a country with varying climates, so a temperature anomaly in one city in one region is not too telling. There needs to be more research on annual rainfall and temperature in Syria at a country rather than regional scale. Kelley et al., hereafter K2015, however, believe that there is enough evidence within the literature to support the argument “that [these] long term trends in precipitation and temperature [in Syria] are a consequence of human interference with the climate system.”<sup>107</sup>

Another important source is the perception of the Syrian people of the effects of climate change. Of course, this information is not as reputable as statistical studies and may be based on inaccurate assessments or personal biases. Still, these perceptions can inform us of changes that statistical studies may have missed or not have thoroughly studied. The comprehensive 2014 World Bank report on climate change and migration in MENA provides a comprehensive view of the perceptions of climate change across Syria. In a survey conducted in 2011, the World Bank found that an overwhelming percentage of Syrians, 99.6% said that they have noticed rainfall to be more erratic, and all Syrian respondents said that the rainy seasons starts later, ends earlier, and is shorter.<sup>108</sup> They have also noticed more frequent droughts. This study suggests a

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<sup>106</sup> J. P. Lelieveld, Hadjinicolaou, E. Giannakopoulos, J. Chenoweth, M. El Maayar, C. Giannakopoulos, C. Hannides, et al., “Climate Change and Impacts in the Eastern Mediterranean and the Middle East,” *Climate Change* 114 (2012): 678, <https://doi.org/0.1007/s10584-012-0418-4>.

<sup>107</sup> Colin P. Kelley, Shahrzad Mohtadi, Mark A. Cane, Richard Seager, and Yochanan Kushnir, “Climate Change in the Fertile Crescent and Implications of the Recent Syrian Drought,” *Proceedings of the National Academy of Sciences* 112, no. 11 (2015): 3245, <https://doi.org/10.1073/pnas.1421533112>.

<sup>108</sup> Wodon et al., *Climate Change and Migration: Evidence from the Middle East and North Africa*, 9.

consensus among Syrian households that climate change is affecting the country, primarily through an increase in temperature and a decrease in rainfall. This survey data does not prove the presence of climate change in Syria but such an overwhelming consensus in climate change perception should not be ignored in analysis.

Figure 4.3 Perceptions of Climate Change among Syrians (Percent)

	Algeria	Egypt, Arab Rep.	Morocco	Syrian Arab Republic	Yemen, Rep.	All
<b>Changes reported by a majority of households</b>						
Rain more erratic	81.69	43.63	91.06	99.63	71.64	77.52
Temperature is hotter	82.90	40.63	69.79	100.00	68.53	72.37
Less rain	81.81	20.50	48.86	100.00	81.59	66.57
Land is dryer	64.53	13.75	73.00	98.25	74.63	64.84
Less fertile land	52.99	12.38	79.65	94.63	71.52	62.24
Rainy season starts later	51.91	12.13	71.40	100.00	67.16	60.53
Rain season is shorter	55.52	13.25	64.63	100.00	67.79	60.24
More frequent droughts	56.24	16.50	59.26	100.00	63.43	59.09
More diseases in animal and livestock	52.20	23.38	58.86	91.75	61.07	57.45
More insects and pets in crops	38.47	18.50	71.36	92.38	60.82	56.31
Less water in boreholes, rivers, lakes, or streams	50.07	11.38	64.64	90.00	64.43	56.11
More air pollution	36.07	23.25	71.15	83.00	64.43	55.59
More frequent crop failure	41.66	21.00	65.93	87.00	61.19	55.36
Rainy season end earlier	39.17	15.13	54.34	99.75	61.57	54.00
More frequent livestock loss	47.61	17.50	56.13	88.13	52.99	52.47
More soil erosion	29.64	12.63	75.26	91.13	53.48	52.43
<b>Changes reported by a minority of households</b>						
More frequent sand storms	50.68	10.25	36.72	99.50	45.77	48.58
Temperature is colder	54.07	27.75	34.54	73.75	42.79	46.58
More water pollution in rivers, lakes, sea, or streams	20.14	18.75	65.53	47.00	41.67	38.62
Deforestation and less trees	39.62	13.00	37.32	68.63	34.33	38.57
Less fish in rivers, lakes, or sea	1.20	12.38	38.54	36.00	35.07	24.65
More frequent rainstorms	21.23	9.75	59.38	0.13	16.92	21.48
More rain	15.08	20.75	51.99	—	17.54	21.07
More frequent floods	17.80	3.50	58.24	—	7.59	17.42

Source: Wodon et al. (2014), 9.

### *A Climate Change-intensified Drought*

The late 2000s drought is likely reflected in the responses to the 2011 World Bank survey. This drought had a significant effect on the northeast of Syria, a major agricultural region, because of its extended length and severity. According to K2015 this drought is unprecedented in its scope and impact. Could the severe nature of the drought then mean it could be attributed to climate change? In the previous chapter on Darfur, I warned about the use of drought as such a measure because of its unpredictable nature. K2015 argue, however, that the unprecedented length and severity of the drought are unmistakably attributed to climate change. They write that, “[m]ultiyear droughts occur periodically in the [Fertile Crescent] due to natural causes, but it is unlikely that the recent drought would have been as extreme absent the century-long drying trend.”<sup>109</sup> They conclude that the drought would not have been as severe if not for these temperature and rainfall trends. Cook et al. reach a similar conclusion. According to their model, there is a 98% chance that 1989 to 2012 was the driest fifteen-year period since 1500 C.E.<sup>110</sup> It is possible that this is an especially severe anomaly of course, but the research suggests that the Syrian drought of the late 2000s was caused or at least exacerbated by climate change.

This is not to say there has not been criticism of this claim. As many have noted, “drought is not an exceptional phenomenon” in Syria.<sup>111</sup> In a 2017 article by Selby et al., “Climate Change and the Syrian Civil War Revisited,” hereafter S2017, the authors are highly critical of the K2015 study which argued that the late 2000s Syrian drought is undeniably

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<sup>109</sup> Kelley et al., “Climate Change in the Fertile Crescent,” 3245.

<sup>110</sup> Benjamin I. Cook, Kevin J. Anchukaitis, Ramzi Touchan, David M. Meko, and Edward R. Cook, “Spatiotemporal Drought Variability in the Mediterranean over the Last 900 Years,” *Journal of Geophysical Research: Atmospheres* 121, no. 5 (April 2016): 2071, <https://doi.org/10.1002/2015jd023929>.

<sup>111</sup> Francesca de Châtel, “The Role of Drought and Climate Change in the Syrian Uprising: Untangling the Triggers of the Revolution,” *Middle Eastern Studies* 50, no. 4 (2014): 522, <https://doi.org/10.1080/00263206.2013.850076>.

attributed to climate change. They criticize K2015 for making specific claims about Syria when their study broadly covers the “Fertile Crescent” region.<sup>112</sup> They also point to the fact that many studies use different time frames for the duration of the drought. K2015, for instance, refer to the drought lasting different periods of time throughout the paper.<sup>113</sup> These first two criticisms are fair. It is not appropriate to make specific claims about one country in a regional study, and the length of the drought should be held consistent. S2017’s next claim, however, is not as adequately supported. They argue that there is not enough evidence for “multi-decadal drying either in the Fertile Crescent region as a whole, or in northeast Syria, specifically.”<sup>114</sup> This claim is refuted by much of the literature already covered, and this article seems to be an outlier in this regard. Even if there is not enough evidence for a multi-decadal drying trend, the unusual severity of the drought should still be considered as a possible consequence of climate change.

S2017 received some significant pushback for the arguments laid out in their article. In a response to the critique they received in the article, Kelley et al. wrote that they found nothing to refute the argument that climate change played a contributing role in the conflict within S2017. They disagree that there is no evidence of a multidecadal drying trend, and argue that the Syrian drought of the late 2000s is consistent with models of anthropogenic climate change, and the findings presented in the general literature.<sup>115</sup> They also argue that the chance of eight out of twelve of their monitoring stations showing evidence of drying is less than one in eight.<sup>116</sup> Gleick, whose 2014 article was similar to K2015’s in its argument and was also criticized by

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<sup>112</sup> Selby et al., “Climate Change and the Syrian Civil War Revisited,” 234.

<sup>113</sup> Ibid.

<sup>114</sup> Ibid., 235.

<sup>115</sup> Colin Kelley, Shahrzad Mohtadi, Mark Cane, Richard Seager, and Yochanan Kushnir, “Commentary on the Syria Case: Climate as a Contributing Factor,” *Political Geography* 60 (2017): 245, <https://doi.org/10.1016/j.polgeo.2017.06.013>.

<sup>116</sup> Ibid., 246.

S2017, replied to the article as well, arguing that S2017 ignored the influence of temperature, which also has a drying influence, in their definition of the drought.<sup>117</sup> Selby et al. responded to both of these criticisms in a short rejoinder. They argue that the question at issue here is not whether climate change had an impact on the Syrian drought, it is the extent to which climate change affected the drought, which they believe to be very little, and they find that such influence would be impossible to prove.<sup>118</sup>

### *Discussion*

When compared to the evidence for Darfur the evidence of climate change's effects in Syria is more limited. The body of literature generally focusses on drying trends in the region and the late-2000s Syrian drought. Future sources should expand their scope and consider other timeframes and elements of climate change in Syria. Furthermore, many of the works that do have information on Syria only give the country a cursory glance within a larger study of the region. The World Bank study is useful here because it suggests that the effects of climate change in Syria may be underappreciated by scholars. There is near universal consensus among Syrian respondents that the country is becoming hotter and dryer. Such a consensus suggests that more attention should be given to studying the effects of climate change in Syria specifically. With the limited information presented in this section, I can conclude that climate change has had an impact on Syria, and that the drought was intensified by climate change, but the other degrees to which climate change has affected the country remains uncertain.

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<sup>117</sup> Peter H. Gleick, "Climate, Water, and Conflict: Commentary on Selby Et Al. 2017," *Political Geography* 60 (2017): 249, <https://doi.org/10.1016/j.polgeo.2017.06.009>.

<sup>118</sup> Jan Selby, Omar Dahi, Christiane Fröhlich, and Mike Hulme, "Climate Change and the Syrian Civil War Revisited: A Rejoinder," *Political Geography* 60 (2017): 253, <https://doi.org/10.1016/j.polgeo.2017.08.001>.



## Climate Change to Conflict

As with Darfur, it is impossible to connect climate change to the Syrian Civil War directly. Instead, climate change functioned as an intermediate variable, interacting with other factors known to cause the conflict, and with its influence mediated by the present socioeconomic conditions in Syria. The causal pathway from climate change to conflict in Syria within the literature is often presented in three parts. Climate change to drought, drought to migration, and migration to conflict.<sup>119</sup> The question of whether climate change caused the drought remains a contested debate, but the literature presented within the last section seems to present a clear picture that it at least exacerbated the severity and length of the drought. By intensifying the late 2000s drought, climate change indirectly led to conflict in Syria by affecting the livelihoods of rural people, causing them to migrate to cities. Demographic and economic pressures manifested as complaints against the state, inciting protests and the subsequent government crackdown and civil war.

### *The Effects of the Drought*

The drought caused a mass disruption of agriculture within Syria. Many countries within MENA rely on agriculture for income and food and this is especially true for Syria.<sup>120</sup> Agriculture is a large part of the Syrian economy, with 40% of workers being represented in the industry.<sup>121</sup> Agriculture makes up a large part of Syria's land as well. 44% of Syrians live in rural

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<sup>119</sup> Tobias Ide, "Climate War in the Middle East? Drought, the Syrian Civil War and the State of Climate-Conflict Research," *Current Climate Change Reports* 4 (September 6, 2018): 352, <https://doi.org/10.1007/s40641-018-0115-0>.

<sup>120</sup> Waha et al., "Climate Change Impacts in the Middle East and Northern Africa (MENA)," 1624.

<sup>121</sup> Alex Alvarez, *Unstable Ground: Climate Change, Conflict, and Genocide* (Lanham, MD: Rowman & Littlefield Publishing Group, 2017), 94. The author did not specify if this statistic came from before the war, but it would be safe to assume so given the mass disruption the war has had throughout the country.

areas,<sup>122</sup> and a third of the land in Syria is cultivated.<sup>123</sup> With this significant dependence on agriculture for the economy and the livelihoods of over a third of its population, Syria is particularly vulnerable to the effects of drought.

This vulnerability is compounded by Syria's poor water resources and infrastructure. With less than 1% of its water supplies composed of freshwater, Syria faces significant water stress.<sup>124</sup> Agriculture is responsible for 90% of water usage.<sup>125</sup> Considering that 30% of Syria's land is irrigated,<sup>126</sup> a lack of water resources would significantly affect agricultural production. Furthermore, 75% of Syria's crops are dependent on rainfall, meaning that any significant drop in annual precipitation would be devastating.<sup>127</sup>

The late 2000s drought had profound impacts on the Syrian people and caused a massive decline in wheat production in northeastern Syria.<sup>128</sup> 1.3 million Syrians were severely affected by the drought and around 800,000 "lost their entire livelihood, with small-scale farmers and herders being particularly affected."<sup>129</sup> After an especially poor harvest between 2007 and 2008, Syria had to import wheat for the first time in fifteen years.<sup>130</sup> The severe drop in food production led to malnutrition and disease for many Syrians affected by the drought.<sup>131</sup> The

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<sup>122</sup> Zahra Tayebi and Lilyan E. Fulginiti, "Agricultural Productivity and Climate Change in the Greater Middle East," paper prepared for presentation at the Southern Agricultural Economics Association's Annual Meeting (San Antonio, Texas, February 6-9 2016): 3, <https://ideas.repec.org/p/ags/saea16/230019.html>.

<sup>123</sup> Wodon et al., *Climate Change and Migration: Evidence from the Middle East and North Africa*, 54.

<sup>124</sup> Mostafa K. Tolba and Najib W. Saab, eds., *Arab Environment Climate Change: Impact of Climate Change on Arab Countries* (Beirut: Arab Forum for Environment and Development, 2009): 65,

<https://www.unenvironment.org/resources/report/arab-environment-2-impact-climate-change-arab-countries>

<sup>125</sup> Ibid.

<sup>126</sup> World Bank. *Improving Food Security in Arab Countries* (Washington D.C.: World Bank, 2009), 35.

<http://documents.worldbank.org/curated/en/195841468046455493/Improving-food-security-in-Arab-countries>.

<sup>127</sup> Tolba and Saab, *Arab Environment Climate Change: Impact of Climate Change on Arab Countries*, 80.

<sup>128</sup> Prescott, *Armed Conflict, Women and Climate Change*, 73.

<sup>129</sup> Wodon et al., *Climate Change and Migration: Evidence from the Middle East and North Africa*, 55.

<sup>130</sup> Eran Feitelson and Amit Tubi, "A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East," *Global Environmental Change* 44 (2017): 44, <https://doi.org/10.1016/j.gloenvcha.2017.03.001>.

<sup>131</sup> Ibid.

United Nations estimated that in 2010, 3.7 million Syrians would be food insecure as a result of the drought.<sup>132</sup> Husbandry was affected too; 85% of local livestock in the region were lost.<sup>133</sup>

The 2011 World Bank survey is particularly illuminating on the effects of the drought on people's lives. According to the report, around 20% of Syrian respondents lost income, 87% lost crops, and 17% lost livestock due to environmental change.<sup>134</sup> This change is not specified to be from the drought, but the statistics from the report in the previous section on Syrians' perceptions of climate change point to such a connection (e.g. higher temperature, less rain, and more frequent droughts).<sup>135</sup>

Figure 4.4 Percentage of Syrians who Suffered Economic Consequences from Climate Change

	Country					All
	Algeria	Egypt, Arab Rep.	Morocco	Syrian Arab Republic	Yemen, Rep.	
Lost income	58.11	8.25	44.90	19.50	52.11	36.59
Lost crops	58.48	28.63	38.00	87.00	60.95	54.62
Lost livestock or cattle	31.21	3.75	26.92	17.00	38.18	23.43
Less fish caught	0.00	0.88	14.77	1.50	25.75	8.60
	Quintiles					All
	Q1	Q2	Q3	Q4	Q5	
Lost income	46.37	44.14	43.21	29.25	20.72	36.59
Lost crops	58.12	61.96	62.13	49.42	42.10	54.62
Lost livestock or cattle	23.81	25.19	30.11	23.17	15.23	23.43
Less fish caught	9.51	10.27	8.90	9.65	4.69	8.60

Source: Wodon et al. (2014), 12.

<sup>132</sup> "Report of the Special Rapporteur on the Right to Food on his Mission to Syria (29 August - 7 September 2010)," United Nations Human Rights Council, January 27, 2011, <https://reliefweb.int/report/syrian-arab-republic/report-special-rapporteur-right-food-olivier-de-schutter-addendum>, 4.

<sup>133</sup> Waterbury, "The Political Economy of Climate Change in the Arab Region," 29.

<sup>134</sup> Wodon et al., *Climate Change and Migration: Evidence from the Middle East and North Africa*, 22.

<sup>135</sup> *Ibid.*, 9.

### *Drought-induced Migration*

These economic hardships were so severe that many rural Syrians chose to migrate. 85.25% of Syrian respondents in the 2011 World Bank survey reported that some people had to leave their households in order to cope, only 2.63% of respondents reported they had people move in.<sup>136</sup> 160 villages in the northeast of Syria were abandoned.<sup>137</sup> Of all migrant respondents, 14.9% reported the need to escape drought as their first reason to migrate, and 13.17% reported it their second reason.<sup>138</sup> When combined, 28.07% of migrant respondents reported drought as a reason to migrate. The more significant concern expressed in the survey, however, was employment. 41.47% reported migrating to pursue employment as their first reason, and 16.41% reported it was their second (57.88% combined). 27% reported migrating because of a lack of employment at their point of origin as their first reason, and 41.47% reported it as their second (68.47% combined).<sup>139</sup> While employment was a larger concern among migrants, there was still a significant proportion (i.e. 28.07%), who cited the need to escape drought.

The migration numbers within Syria during the time of the drought are under debate. Gleick writes that 1.5 million people migrated to cities and camps around cities such as Aleppo, Damascus, Dar'a, and Deir ez-Zour, but he does not specify the timeframe nor a source for this number.<sup>140</sup> This thesis will coopt the United Nations estimate that 29,000-30,000 families migrated in 2009, and 50,000 migrated in 2010 (79,000-80,000 in total).<sup>141</sup> In addition to the internally displaced Syrians and a large urban growth rate of around 2.5% a year, there were also

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<sup>136</sup> Ibid., 26.

<sup>137</sup> Waterbury, "The Political Economy of Climate Change in the Arab Region," 29.

<sup>138</sup> Ibid., 181.

<sup>139</sup> Ibid.

<sup>140</sup> Gleick, "Water, Drought, Climate Change, and Conflict in Syria," 334.

<sup>141</sup> "Report of the Special Rapporteur on the Right to Food on his Mission to Syria," 5.

between 1.2 to 1.5 million Iraqi refugees who escaped the Iraq War from 2003 to 2007.<sup>142</sup> With all of these factors considered, the urban population in Syria increased from 8.9 million in 2002 to 13.8 million in 2010,<sup>143</sup> a 55% increase in just 8 years. These numbers are significant, but also include some years before the drought began, i.e. 2002-2005. This could mean that in addition to the mass immigration of Iraqi refugees there is an economic trend unrelated to the drought that was driving some of this migration such as the lack of employment opportunities in rural areas.

### ***Migration to Conflict***

According to Reuveny, when a large number of migrants come to cities it may cause economic and demographic pressures leading to conflict.<sup>144</sup> The mass migration to urban areas put pressure onto cities who were already burdened by poor governance and economic hardships.<sup>145</sup> Many, but not all, of these migrants were displaced by the drought and were seeking employment opportunities. Making matters worse, migrants often lived in poor conditions and had trouble acquiring work. According to Feitelson and Tubi, "[m]any of the migrants settled in illegal tent camps with limited access to infrastructure. Facing high rates of unemployment and receiving little or no aid from the Syrian Government, these cities and towns became the center of the developing unrest and the seedbeds of the Syrian civil war."<sup>146</sup> The unrest was not expressed between the locals and the migrants like in the Darfur case, rather the unrest was targeted at the al-Assad regime.

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<sup>142</sup> Kelley et al., "Climate Change in the Fertile Crescent," 3242.

<sup>143</sup> Feitelson and Tubi, "A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East," 44.

<sup>144</sup> Rafael Reuveny, "Climate Change-Induced Migration and Violent Conflict," *Political Geography* 26 (2007): 659, <https://doi.org/10.1016/j.polgeo.2007.05.001>.

<sup>145</sup> Guy J. Abel, Michael Brottrager, Jesus Crespo Cuaresma, and Raya Muttarak, "Climate, Conflict and Forced Migration," *Global Environmental Change* 54 (2019): 241, <https://doi.org/10.1016/j.gloenvcha.2018.12.003>.

<sup>146</sup> Feitelson and Tubi, "A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East," 44.

There were smaller protests in other major cities against the Syrian government, but the first major protest, and the catalyst that began the road to civil war, was in Dar'a.<sup>147</sup> Dar'a is a city in a poor agricultural region in the south of Syria. The Dar'a governorate was severely affected by the drought and many Syrians fled the region's countryside to seek employment in the main city.<sup>148</sup> Driven by government abuse, corruption, and mismanagement of water resources, peaceful protest movements began in the city.<sup>149</sup> Many of the protestors, specifically young men, were particularly upset by the government's response to the drought and desired radical change to a government that was failing them.<sup>150</sup> The government responded harshly, only fomenting more dissent among the protestors. Soon after, the protests in Dar'a would spread to other cities in Syria, beginning a rapid descent into civil war.

### ***Discussion***

It is already clear from this section that the drought does not provide a full picture of the origins of the conflict. For one, the drought also affected other countries in the region "such as Iraq, Israel, Jordan, Lebanon, and Palestine, and Iraq," but these countries did not see conflict nor mass migration stemming from the drought.<sup>151</sup> Although, the drought did lead many Syrians to migrate, it was not the primary reason for the majority of migrants; it was the search for employment that drove most to migrate. In addition, the responses to the 2011 World Bank survey do not suggest that the drought led to significant conflict for water or land like in Darfur. Only 0.38% of respondents reported conflict over land and livestock, and 1% over water.<sup>152</sup> And in the cities, conflict did not emerge between the original denizens and the migrants, it emerged

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<sup>147</sup> Prescott, *Armed Conflict, Women and Climate Change*, 76.

<sup>148</sup> Francesca de Châtel, "The Role of Drought and Climate Change in the Syrian Uprising," 524-525.

<sup>149</sup> *Ibid.*

<sup>150</sup> Alvarez, *Unstable Ground: Climate Change, Conflict, and Genocide*, 94.

<sup>151</sup> Francesca de Châtel, "The Role of Drought and Climate Change in the Syrian Uprising," 522. Iraq, of course, was already a country at war with an insurgency, but this conflict cannot be connected to the drought.

<sup>152</sup> Wodon et al., *Climate Change and Migration: Evidence from the Middle East and North Africa*, 26.

between an increasingly disgruntled populace and the government. In order to proceed, it will be necessary to consider how other non-climate change factors influenced the conflict. From the information presented in this section alone, there is not enough evidence that climate change was a major contributor, but perhaps it interacted with other variables in some way to bring about the conflict.

### **The Role of Other Factors**

Climate change does not provide the full picture for the conflict. The drought may have led some Syrians to migrate, but the grievances they expressed in their protests were not exclusively related to the drought. Here, climate change functioned as an intermediate variable, interacting with other factors present in Syria at the time to make a poor economic situation even worse. Mediating factors that would limit climate change and the drought's effects such as the strength of the government and economy did not have a strong effect. In this case, climate change had a stronger effect than it would have in countries with a more stable economy and political environment such as in Turkey.

### ***Poor Rural and Water Infrastructure***

The first factor to consider is the role of deteriorating rural and water infrastructure in the regions affected by the drought. Notably, there were precarious conditions in these regions even before the drought. The northeast of Syria, the region most severely affected by the drought, was impoverished with diminishing water resources.<sup>153</sup> This was the result of poor planning by the government and a profligate use of water for agriculture. The al-Assad regime pursued ambitious waterworks projects to expand the irrigation potential of Syria's agricultural regions. The

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<sup>153</sup> Francesca de Châtel, "The Role of Drought and Climate Change in the Syrian Uprising," 522.

northeast, the “breadbasket” of Syria and a source of oil, was a favored target of these state development projects.<sup>154</sup>

The Syrian government chose to pursue these projects not to the benefit of the local populace. Instead, it sought opportunities to profit in the short-term while risking water security in the long term.<sup>155</sup> This came at a significant cost to rural Syrians. According to Ward and Ruckstul, as a result of state irrigation projects, “agricultural value added rose by 9 [percent] [between 2001 and 2007], but agricultural employment dropped by a third.”<sup>156</sup> Further they find that “half a million jobs were lost in the agricultural sector over the same period, a reduction of 10 [percent] of the total labor force.”<sup>157</sup> The construction of the Tishrin Dam on the Euphrates river provides another example. Those living in the dam area were forced to leave their homes in 1999 and migrate to the nearby city of Damascus and its surroundings, instilling anti-sentiment government in those displaced.<sup>158</sup> The livelihoods of rural people further deteriorated after the cancellation of food and fuel subsidies in 2005, raising agricultural costs, unemployment, and food insecurity.<sup>159</sup> This was part of the effort to liberalize Syria’s economy and transition priority to the service sector.<sup>160</sup>

Despite all these irrigation projects, Syria was facing a water shortage problem even before the drought. Many aquifers across the country had been quickly exhausted, including one of the largest karst springs in the world, the Ras al-Ain springs on the border with Turkey in

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<sup>154</sup> Ibid.

<sup>155</sup> Christopher Ward and Sandra Ruckstuhl, *Water Scarcity, Climate Change and Conflict in the Middle East: Securing Livelihoods, Building Peace* (London: I. B. Tauris, 2020), 80-81.

<sup>156</sup> Ibid., 81.

<sup>157</sup> Ibid.

<sup>158</sup> Ibid., 80.

<sup>159</sup> Feitelson and Tubi, “A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East,” 43.

<sup>160</sup> Prescott, *Armed Conflict, Women and Climate Change*, 75.



2001.<sup>161</sup> Syria's water network provided 19.2 billion cubic meters of water a year, but the renewable supply was only 15.2 billion cubic meters.<sup>162</sup> Syria's eastern steppe has also been also subject to desertification because of overgrazing, the result of the collapse of traditional pastoral practices following the nationalization of the steppe in 1958.<sup>163</sup> And despite all of these irrigation measures, much of the country still relied on traditional and unpredictable flood irrigation.<sup>164</sup> As a result these largescale and wasteful development projects found themselves significantly strained during the late 2000s drought. The government originally ignored the water crisis, but soon turned to the United Nations for aid but received very little.<sup>165</sup> The al-Assad regime would soon blame climate change in an effort to relieve themselves of responsibility, and they did not take significant steps to alleviate the situation.<sup>166</sup> Even if the Syrian government did intervene, however, it would have likely been for naught, as it could not mitigate the damage of the drought with the water supply so stressed. Without the possibility of mitigation, those severely affected by the drought had no choice but to migrate to cities in search for employment and food security.

### *Urban Pressures*

The exact number of Syrians who fled to cities as a result of the drought is uncertain. In the S2017 article, Selby et al. argue that the displacement numbers are lower than the 1.5 million people claimed by some.<sup>167</sup> The authors favor a United Nations estimate of 40,000-60,000 families.<sup>168</sup> It is difficult to compare the two figures, however, because the number of individuals

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<sup>161</sup> Francesca de Châtel, "The Role of Drought and Climate Change in the Syrian Uprising," 532.

<sup>162</sup> Ward and Ruckstuhl, *Water Scarcity, Climate Change and Conflict in the Middle East*, 82.

<sup>163</sup> Feitelson and Tubi, "A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East," 43.

<sup>164</sup> Gleick, "Water, Drought, Climate Change, and Conflict in Syria," 334.

<sup>165</sup> Feitelson and Tubi, "A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East," 44.

<sup>166</sup> Ward and Ruckstuhl, *Water Scarcity, Climate Change and Conflict in the Middle East*, 81.

<sup>167</sup> Selby et al., "Climate Change and the Syrian Civil War Revisited," 238.

<sup>168</sup> *Ibid.*, 239.

within each family is not specified. Even so, it is highly unlikely that the average rural Syrian family is composed of an average of 25 people.

S2017 also claims that the dramatic economic changes in Syria as result of Bashar al-Assad's liberalization campaign caused the mass migration to occur before the drought began.<sup>169</sup> In addition to inflation and other economic woes, the end of essential subsidies, and the prioritization of urban development drove many rural Syrians to migrate to cities.<sup>170</sup> Between 2000 and 2005, approximately 135,000 rural Syrians migrated to cities each year.<sup>171</sup> They also cite that seasonal migration occurred in large numbers before the drought, but it should be noted that temporary migration is not the same nor has the same economic effects as permanent migration. According to Selby et al., the drought may have exacerbated permanent migration, but not to a significant degree.<sup>172</sup>

Even without an influx of migrants, Syria's cities were facing severe problems. According to Abel et al., Syrian cities were experiencing, "[r]apid growing population, overcrowding, unemployment and increased inequality."<sup>173</sup> There was an increasing urban-rural divide, and Syria's poor were unable to keep up given the economic liberalization and the corruption of the elite.<sup>174</sup> These circumstances already provided a framework for discontent and anti-government sentiment. The pressures from migration would have intensified these frustrations, perhaps intensifying the revolutionary zeal of the initial protestors.

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<sup>169</sup> Ibid., 238

<sup>170</sup> Ibid. 238.

<sup>171</sup> Ibid.

<sup>172</sup> Ibid., 239.

<sup>173</sup> Abel et al., "Climate, Conflict and Forced Migration," 239.

<sup>174</sup> Ward and Ruckstuhl, *Water Scarcity, Climate Change and Conflict in the Middle East*, 80.

### *Factionalism*

There is not too much to discuss when it comes to sectarian or ethnic factionalism as it seems to not have had a major effect on the origins of the conflict. Jody Peterson notes the long history of sectarian violence and divide in Syria as well as the al-Assad regime's preferential treatment of the Alawites, a sect of Shi'a Islam which the al-Assad family belongs to.<sup>175</sup> Syria is a majority Sunni country. Despite this, I did not encounter information within the literature on tensions between Iraqi refugees and Syrians, migrants and residents, or between religious groups that would catalyze conflict. There was, however, long standing resentment toward Alawites because many senior members of the Syrian government belonged to the sect, including the security forces chief of Dar'a at the time of the original protests.<sup>176</sup> In this way, however, it was more of a class divide than a religious one, with poor Syrians against the elites of the Syrian government. Factionalism would play a much larger role as the conflict progressed into civil war with the splintering of rebel factions and the rise of the Islamic State, but it was not much of a factor before then.

Another point of note regarding factionalism is that the northeast of Syria, where the drought hit the hardest, is home to the majority of Syria's Kurdish population. Traditionally, the Kurds have been an oppressed minority within Syria and antagonistic to the al-Assad regime. They have been a prominent faction in the civil war with a fluctuating degree of control over Syria's northeast. It is possible that Kurdish migrants to Syrian cities were responsible for some of the early unrest, expressing feelings that their plight was being ignored by the Syrian government. This could have fueled desire for an armed rebellion.

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<sup>175</sup> Prescott, *Armed Conflict, Women and Climate Change*, 75.

<sup>176</sup> *Ibid.*, 75-76.

## ***Discussion***

These factors in isolation, with the exception of factionalism, provide enough impetus for unrest in Syria even without climate change or a severe drought. The case illustrates how climate change is an intermediate factor that, under the right conditions, can expediate and intensify conflicts. While the conflict would have likely occurred without the drought, the number of migrants that the drought produced increased the number of people who were discontent with the Syrian government, exacerbating the unrest. There are also some other factors that played a role and should be considered. Jody Prescott notes the importance of social media as an organizing tool and the rhetorical and financial support of rebel groups by international actors.<sup>177</sup> The context of the Arab Spring is important as well, as the protests may not have occurred if they were not inspired by the events in Tunisia and Egypt.

## **Conclusion**

Compared to Darfur, the Syrian case is simpler in that the presence of climate change does not seem to be as important for the Syrian conflict, which would have still occurred even without the climate change-intensified drought. It was the wasteful short-term water infrastructure planning of the Syrian government, mismanaged economic transition, and urban pressures that enabled the conflict. The presence of climate change and the drought only made these frustrations more intolerable, expediting and intensifying the early unrest.

Bearing this in mind, it is evident that in this case climate change has functioned as an intermediate variable, interacting with the above factors and ultimately making each issue worse. The climate change-intensified drought exposed the faulty irrigation projects of the al-Assad regime and Syria's water stress. Furthermore, the government's failure to mitigate the drought

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<sup>177</sup> Ibid., 81.

impoverished countless Syrians and drove them to migrate to cities. Meanwhile, the liberalization of the Syrian economy put priority on urban areas at the expense of necessary rural infrastructure, and urban pressures were heightened when the large numbers of rural Syrians affected by the drought arrived in cities, exacerbating the existing demographic and economic problems within Syria's urban areas. Syria's inadequate adaptability to the drought because of the government's poor planning and the country's economic woes meant that the effects of the climate change-intensified drought were not mediated.

If conflict emerged at some point, even without the presence of climate change, it cannot be concluded that climate change was a threat multiplier for this case. Climate change did not increase the chance for conflict. It was bound to happen at some point; the ingredients for conflict were already present. Instead, climate change interacted with these ingredients, exacerbating them and, perhaps, causing the conflict to happen sooner than it would have otherwise.

## **CHAPTER V: ANALYSIS**

This work has reviewed the effects of climate change on conflict through an analysis of two case studies, the Darfur Conflict and the Syrian Civil War. In this section, I will compare my findings from the two case studies in order to determine to what extent climate change operated as an intermediate variable. Furthermore, I will determine which factors played the most influential role in each case. I will argue that both of these cases would have still occurred without the presence of climate change. The presence of climate change, only exacerbated the conflicts, making them more severe at onset. I will then discuss a few alternative explanations of the climate change-conflict relationship and explain how they are not applicable to these cases.

### **Review**

In general, scholars have approached the climate change-conflict relationship in three ways. The first way is to treat climate change as having an indirect effect on conflict as a threat multiplier. Scholars who approach climate change as a threat multiplier argue that climate change can and will increase the propensity for conflict in vulnerable areas. A second approach is to dismiss the threat multiplier narrative while maintaining an indirect connection between climate change and conflict. These critical scholars argue that climate change only affects conflict when certain socioeconomic conditions are met such as high unemployment, existing ethnic tensions, and so on. The third approach is to doubt the significance of any relationship between climate change and conflict. These skeptical scholars do not deny that climate change may have an impact on conflict, but they believe the relationship to be insignificant or indeterminable.

In my thesis, I have adopted a modified version of the critical approach, climate change as an intermediate variable. This is an idea adopted from Sakaguchi et al. and Feitelson and Tubi

that argues that climate change affects conflict through three different causal pathways: direct, interacting, and mediating.<sup>178</sup> The only causal pathway pertinent to my cases studies was the interacting pathway. Through this pathway, climate change affected conflict indirectly through its influence on relevant independent variables such as economic factors or migration. Unlike the threat multiplier narrative, the intermediate variable framework suggests that climate change's effects on conflict is not as significant compared to other factors, and that conflict is unlikely to occur with the presence of climate change in isolation.

## **Case Study Findings**

### *Darfur*

The Sudan Darfur conflict provides only fair evidence for climate change as an intermediate variable. The conflict would have still occurred even without the presence of climate change. There are multiple factors to consider that may have contributed to the conflict including, climate change, shortages of water and arable land, anthropogenic environmental degradation, migration, government preference of Arab nomadic groups, and ethnic divisions between Arab and African tribes. Evidence for the presence of climate change within Darfur specifically, is fairly strong, but more research should be done. While there is evidence for decreasing rainfall, increasing temperatures, and accelerating desertification, there are no studies connecting climate change to the devastating droughts that precluded the conflict in Darfur. It should also be noted, however, that anthropogenic environmental degradation stemming from mismanagement and

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<sup>178</sup> Kendra Sakaguchi, Anil Varughese, and Graeme Auld, "Climate Wars? A Systematic Review of Empirical Analyses on the Links between Climate Change and Violent Conflict," *International Studies Review* 19, no. 4 (May 2017), <https://doi.org/10.1093/isr/vix022>; Eran Feitelson and Amit Tubi, "A Main Driver or an Intermediate Variable? Climate Change, Water and Security in the Middle East," *Global Environmental Change* 44 (2017).

overexploitation of land also contributed to desertification and a shortage of water and arable land. The environmental degradation did not act alone, however. Climate change made these existing problems much more severe.

Climate change affected conflict indirectly through its influence on two factors, competition for water and arable land and migration. While climate change is not proven to have an effect on the drought that precluded the conflict, it surely made the effects of the drought more intolerable for the Arab nomads. Increasing temperatures, accelerating desertification, and decreasing rainfall was already presenting a challenge for both African and Arab tribes. In response to the drought, many African tribes were forced to migrate south to find water and favorable grazing land for their herds. This put them in conflict with the settled Arabs who were also finding water and arable land increasingly scarce.

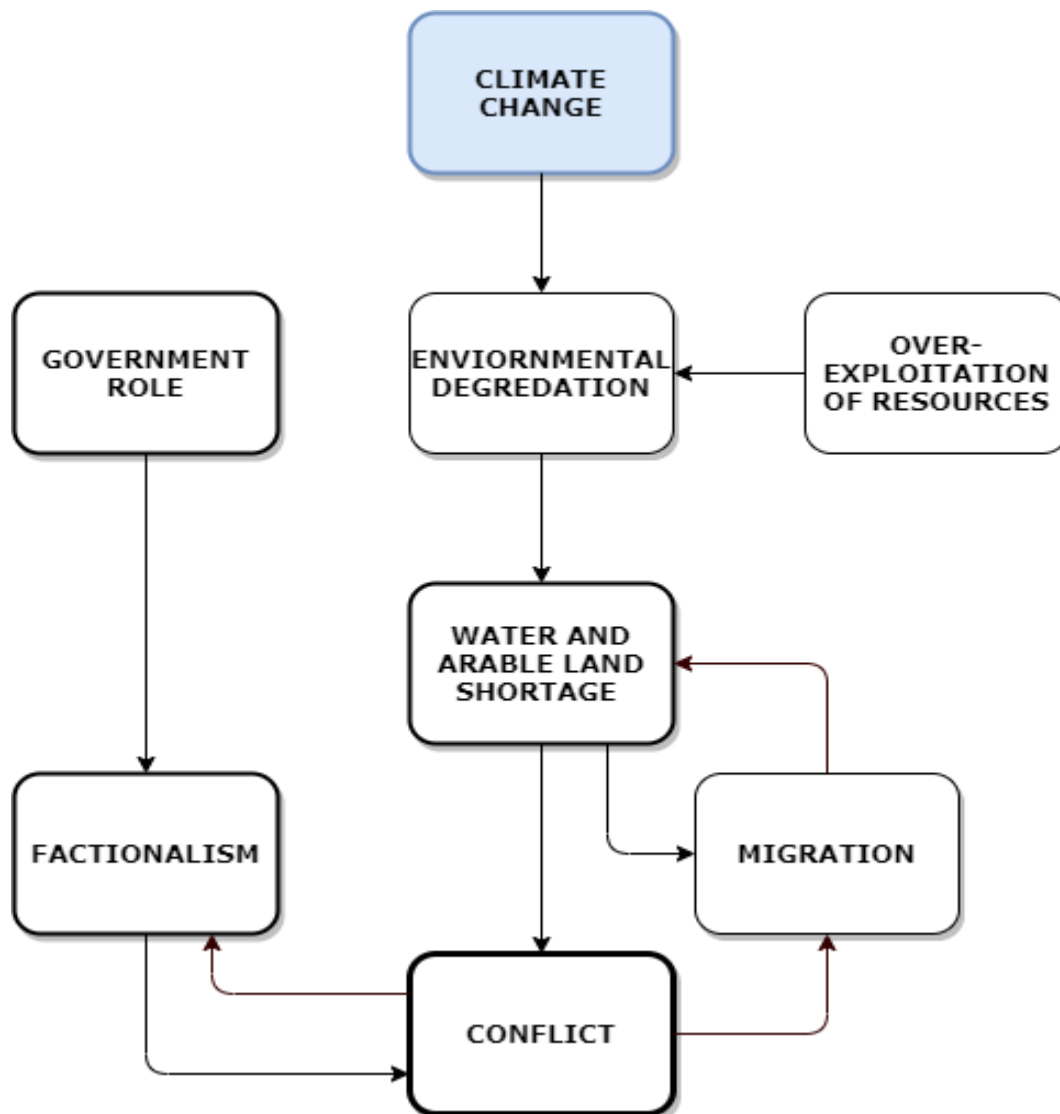
Unfortunately, climate change's influence on the conflict could not be mediated. First, Darfur was already highly vulnerable to the effects of climate change because of its location in a semi-arid climate. Anthropogenic environmental degradation made the region even more vulnerable. Second, the Sudanese government did not have a significant presence in Darfur before the conflict. There were no legally sanctioned methods to resolve conflicts, only through tribal negotiation or conflict could problems be resolved.

Regardless of the effects of climate change, the ensuing skirmishes between the Arabs and Africans would not evolve into the grand scale of the conflict involving genocidal campaigns and government-financed militia groups were climate change the only factor. It is also necessary to consider the role of the Arab-supremacist Sudanese government under Omar al-Bashir. The al-Bashir regime refused to invest in the Darfur region because of its African population, despite the regime's recent wealth from oil extraction. This caused discontent among Africans in the



region who felt they were being excluded in favor of the Arab population. This gave way to a factional dispute. The divide between Arabs and Africans in Darfur is not ethnic – it is political. After the publication of the *Black Book*, many Africans organized into rebel groups. In response, the government supported Arab militia groups, including the Janjiweed, and endorsed their campaign of ethnic cleansing, mass rape, and the destruction of villages. Arab militiamen did not participate in this campaign because of a hatred of Africans, however. The goal was to acquire the arable land and water the Africans once owned.

Figure 5.1 Interacting Causal Pathway to Conflict in Darfur



It is apparent that the conflict would have occurred without the presence of climate change. Settled Africans would eventually revolt against the oppressive al-Bashir regime that excluded them in favor of Arabs for economic investment and dispute resolution. This was the most influential factor that contributed to the onset of the conflict. Instead of causing the conflict, climate change exacerbated it by accelerating desertification and reducing rainfall leading to the permanent migration of Arab groups south. This increased the number of Arabs that could be recruited into pro-Arab militias, as well as the competition for resources that justified the destruction of villages.

### *Syria*

Like Darfur, the Syrian Civil War also only provides fair evidence for climate change as an intermediate variable, and the conflict would have still occurred without the presence of climate change. In this case, the factors that may have contributed to the conflict include, climate change, environmental degradation, government mismanagement of water resources, economic woes, and migration. Evidence for the presence of climate change within Syria is only fair, but in contrast to Darfur, climate change's connection to the drought has been demonstrated. Even still, the body of research remains small. More studies should be conducted on climate change in Syria specifically, instead of a Middle East or MENA regional context. Anthropogenic environmental degradation played a role as well, but mostly from government mismanagement of water resources, which will be discussed separately.

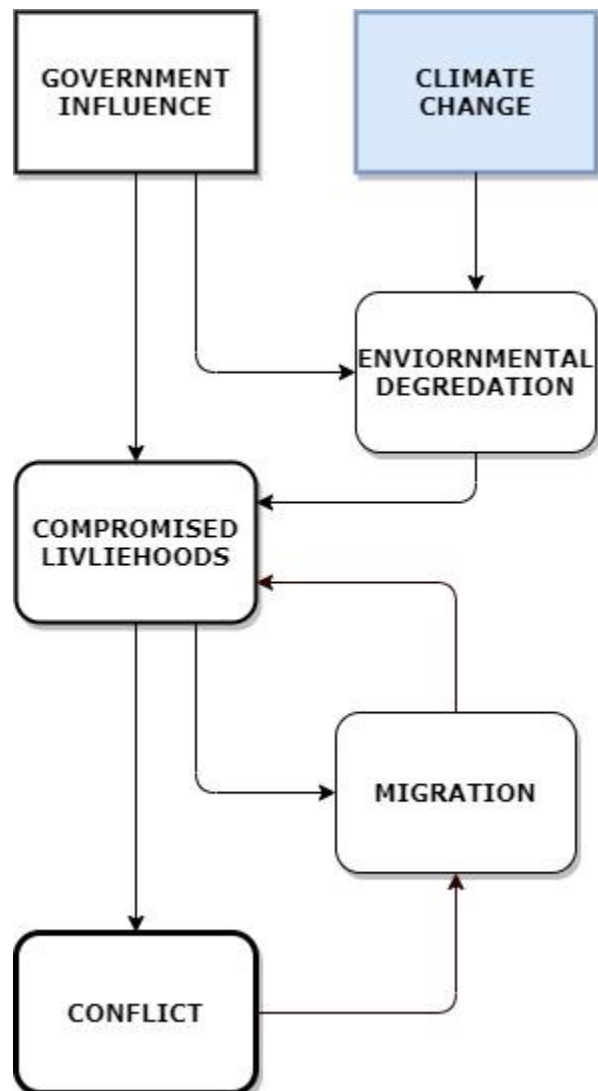
Climate change affected conflict indirectly through its influence on two factors, compromised livelihoods, and as in Darfur, migration. The climate change-intensified drought had significant impacts on the livelihoods of many Syrians in rural regions, especially the northeast. Many Syrians had no choice but to migrate to urban areas in order to seek employment

and better living conditions. The mass migration of rural Syrians to Syria's cities exacerbated economic pressures in urban areas such as mass unemployment, the result of failed liberalization policies. The failure of the government to address the drought and remedy the economy led many Syrians to believe the al-Assad regime had failed them, causing them to protest. These protests would be brutally suppressed by the regime. In response, rebel groups would form in armed opposition to the Syrian government.

Like in Darfur, climate change's influence on the conflict could not be mediated. This was because of the poor rural and water infrastructure implemented by the Syrian government.

Water was already in short supply before the drought because of poor planning and overexploitation. The Syrian government could not alleviate the drought because of the water stress. As with Darfur, the presence of climate change was not necessary for the conflict to begin. There are many more factors to consider in this case, all of them related to government mismanagement of resources and the economy. Therefore, the most influential factor in this case was the role of the government. The al-Assad regime's liberalization plans ushered in an economic downturn that would have surely lead Syrians in cities to revolt regardless of the climate change-intensified migration. There were already

Figure 5.2 Interacting Causal Pathway to Conflict in Syria



enough problems that the Syrian government failed to properly address. And as many scholars have recognized, there was already large-scale migration from rural areas to the cities, in addition to the migration of about 1.5 million Iraqi refugees. All of the ingredients for unrest were already present, and the Arab Spring provided the catalyst for the protests to begin. Interestingly, factionalism was not a major issue for the beginning of the protests, even considering that most Syrians from the northeast are ethnically Kurdish. Factional divisions become more apparent as the conflict devolved into civil war. Instead of causing the conflict, climate change exacerbated it by increasing the number of migrants and Syrians disillusioned with the government, making urban pressures more severe and increasing the number of potential protestors.

Table 5.1 Strength of Factors Leading to Conflict, Coded as Weak, Fair, or Strong

Case	Presence of Climate Change	Climate Change to Conflict	Other Factors to Conflict	Would Conflict Occur with Climate Change in Isolation?
Darfur	Strong	Fair	Strong	Possibly, but to a limited degree
Syria	Fair	Fair	Strong	No

### **The Case for Climate Change as an Intermediate Variable**

What do these findings mean for the climate change-conflict relationship? It is clear that climate change does not have a direct connection to intrastate conflict. Rather, it has an indirect connection, operating on conflict through its influence on other variables. Climate change has functioned as an intermediate variable to a fair degree in both cases. Excluding climate change from the causal pathway does not significantly alter the independent variables, or factors that led to the conflict in either case. Instead, climate change exacerbated the conflicts, making the factors that contributed to the conflict more severe. With the current severity of climate change, I

do not expect it to be an important factor for any other past and present conflict. As the impacts of climate change grow more severe with time, however, this may change.

The mediating causal pathway is absent in both cases, but these were cases in which conflict was present. By analyzing cases that did not lead to conflict, the influence of the mediating pathway would be clearer. In these cases, mediating factors such as a strong economy, high state capacity, and community adaptability, may mean that conflict influenced by climate change may never occur.

Climate change is unlikely to cause conflict in isolation. In one case, Darfur, it is possible that the presence of climate change in isolation would have led to conflict between the Arab and African tribes. The resulting conflict, however, would be at a significantly diminished scale because of the lack of participation from the government. This does ignore, however, the anthropogenic environmental degradation in Darfur and the role it played in accelerating desertification.

### *Alternative Explanations*

Is there any validity to other explanations for the relationship between climate change and conflict? There are four explanations to consider here. The first is whether climate change can cause conflict directly. These cases provide no evidence for this; climate change is entangled into a complicated interacting causal pathway, dependent on varying the independent variables to affect the conflict. The second is that climate change is a threat multiplier. This idea holds that climate change will increase the propensity for conflict in vulnerable regions. As demonstrated in these two cases, however, climate change only contributed to conflict to a limited degree, and it is unlikely climate change would lead to conflict in isolation from other external factors. The third explanation, the critical explanation, posits that climate change can only influence

conflict if certain socioeconomic and political conditions are met. Put in another way, climate change can only affect conflict in the absence of a mediating causal pathway, or at least only when a weak mediating causal pathway is present. The two cases, here, do not have mediating causal pathways, and did influence conflict. It is impossible to prove this explanation with these two cases though, because there is no case that did not lead to conflict to test against. Lastly, the fourth explanation, the skeptical explanation, argues that the relationship between climate change and conflict is indeterminable or essentially insignificant. Through process tracing, I was able to prove that climate change had some influence on the two conflicts, disputing this argument.

## **CONCLUSION**

Scholars have wrestled with the climate change – conflict question for decades now but have failed to establish a consensus. This thesis has sought to contribute to the debate by making the case for defining climate change as an intermediate variable. By defining climate change this way, we can understand how climate change influences conflict indirectly through its effects on factors known to contribute to the conflict. We can also understand how climate change can be mediated by the present socioeconomic, political, and geographic conditions of each case. The cases I have analyzed show that climate change can influence conflict, but only to a limited degree. It is unlikely in either case that climate change would have led to conflict in isolation from external factors. Climate change can exacerbate conflicts, however, by making the factors that contribute to conflict more severe.

Policy makers would be wise to recognize how the relationship between climate change and conflict is more complex than many assume. The evidence presented in this thesis suggests that climate change is not a threat multiplier. Conflicts in vulnerable areas can happen even without the presence of climate change, and other traditional factors play a considerably larger role. This is not to suggest that climate change should be ignored, however. In fact, as the climate change grows more severe, so will its effects on conflict. Rather, climate change should be considered with a more nuanced approach, with a consider how it operates within interrelated causal pathways that are context dependent. The rhetoric of policy makers should change to reflect this consideration. Otherwise, abusive regimes may use the public rhetoric surrounding climate change to evade responsibility to their citizens. We only need to look to the al-Assad regime of Syria for a recent example of this.

Climate change is the crisis of our time, but its effects are not yet fully known to us. Its effects on conflict, in particular, are considerably enigmatic. It is important to understand the climate change-conflict relationship in order to understand how conflicts begin and are shaped by climate change. This is an unprecedented factor in recorded history and has significant potential to affect conflict through the economy, resource shortages, and the devastation of livelihoods. If we do not understand how climate change influences conflict, we cannot understand how conflicts develop in the era of climate change. This understanding is necessary for policymakers to prevent and mediate conflicts. In this thesis, I have attempted to provide a theoretical framework to develop such an understanding.



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