Immanent Disaster: An examination of Climate Change in Turkana

by

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Chapter 1: Introduction

I introduce my thesis argument in this chapter and explain the significance of my research. This chapter will mainly familiarize my readers with existing approaches and frameworks to the climate-conflict debate by assessing a somewhat brief literature review. It will also introduce the plan of this paper by briefly mentioning the research design for this paper.

Chapter 2: Trends Across Africa And Theories of Climate and Violent Conflict

This chapter is an expansion of the literature review as it unpacks theories behind the climate-conflict in the context of Sub-Saharan Africa. Therefore, it will explore the global picture of this debate and regional conflict trends and give explanations for these trends. Some of the explanations include; the Convergence theory, the Environmental security theory, and a Political ecology theory or an institutionalist approach to the climate conflict debate. I will finish these chapter by explaining my theory and what it adds to the existing scholarship.

Chap 3: Methodology, Findings, Analysis, and Discussion

In this chapter, I will examine data on climate variability in northern Kenya-Turkana, central Kenya, Dodoma, and Morogoro from Tanzania, in relation to armed conflict in those particular regions. I will then analyze findings from these data and discuss what they mean for the climate conflict debate. I will explain in detail my research methods and the steps I undertook in this chapter. After analyzing the different
variables (climate change, armed conflict, prior history of violence, and government exclusion), I will conclude this chapter by showing how they converge to produce catastrophic impacts upon context.

Chapter 4: Conclusion, Policy Implications, and Room for Further Research

This final chapter emphasizes my thesis argument by highlighting how the convergence approach demonstrates a pathway to armed conflict via climate change. This discussion will also involve policies that can be undertaken by government to lessen the dangers posed by climate change to most-at-risks regions. These policies are mainly designed for Kenya because that is not only my target country, but also due to the fact that I am more aware of the measures already being taken by the Kenyan government and therefore comprehend that a baseline already exists on where the policy conversation can start.
Map 1-This is the map of the study area, which is represented by the yellow color within the two countries. The underlined areas (with blue) are the specific case study areas.
Introduction

Economic, social, and political factors drive conflict in Sub-Saharan Africa and most of the world. Yet the way in which each of these variables interacts to shape conflict outcomes varies across different geographic and political spaces. Governance plays a big role in creating institutions, therefore, weak institutions are associated with weak governance amongst other factors. When a country is poorly governed and lacks the institutions or capacity to respond to climate-related disasters, conflict might break out as one of the social responses to climate change (Detges, 2017; Ide et al., 2014; O’Loughlin et al., 2012; Raleigh & Kniveton, 2012; Theisen, 2012). Weak governance can also facilitate resource grabs at such vulnerable times that might stir grievances leading people to mobilize for violent actions (Homer-Dixon., 1999). Some scholars also claim that poverty can lower people’s capacity to respond to climate shocks especially when they depend on renewable resources and a weak national economy (van Baalen & Mobjörk, 2017). On the other hand, other scholars argue that climate change promotes environmental degradation which advances scarcity, thus threatening human security (Homer-Dixon., 1999; Kahl, 2006; Raleigh, 2010). Other scholars argue that ethnic fractionalization is a key factor in shaping conflict dynamics between groups (Schleussner, Donges, Donner, & Schellnhuber, 2016). These economic and socio-political factors increase the exposure and vulnerability of many sub-Saharan African countries to climate change, since most of them have weak governance, poor national economies, and are ethnically fractionalized (Baalen and Mobjork 2016): The International Panel on Climate Change (IPCC), other respectable authorities, and a few scholars have classified sub-
Saharan Africa as one of the most vulnerable regions to climate variability (Intergovernmental Panel on Climate, 2014; Joubert, 2010; Pachauri et al., 2014).

Certain scholars claim that sub-Saharan Africa is particularly vulnerable to climate change because most of its population depends on land for its living (Parenti, 2011). For instance, more than 75 percent of the Kenyan population relies on agriculture for its living and the agricultural sector accounts for more than a fourth of Kenya’s Gross Domestic Product (Future, 2018). Over-reliance on land and subsistence farming makes majority of Sub-Saharan Africans vulnerable to extreme climate variability, which is manifested differently across the continent. In East Africa, climate change is expected to manifest through droughts and erratic rainfall (O’Loughlin et al., 2012; Raleigh & Kniveton, 2012). Additionally, Kenya borders the Horn of Africa, which is considered to be one of the planet’s most volatile and vulnerable regions to armed violence (Solomon et al., 2018). East Africa’s vulnerability to both conflict and climate change effects has led several scholars to investigate whether there is a link between climate change and increased armed conflict in the region (Kahl, 2006; Parenti, 2011; Raleigh, 2010; Witsenburg & Adano, 2009).

On the other hand, there are other scholars who take a critical view when it comes to linking climate change and conflict. In fact, some suggest that scientific research on climate and conflict to date has produced mixed and inconclusive results (H. Buhaug et al., 2014). They claim that it is too deterministic to argue that climate change causes or increases levels of violence and suggest that we must identify other social or political factors that have a more direct effect on violent conflict. I examine how existing studies link climate change and conflict and answer the following
questions: Is there direct or indirect causation between climate change and conflict? Are there existing conditions that increase the effects of climate change on the incidence or onset of violent conflict? One of the main challenges in identifying the link between violent conflict and climate change is determining whether conflict is the result of climate effects or whether it is due to independent effects of factors such as ongoing war or historical grievance. Rather than argue that climate change predicts conflict, I hypothesize that in regions neglected by their governments, in addition to facing a recent and continued history of violent conflict, effects of climate change will intensify the probability of having armed conflict, and hence, we should predict a greater level of overall causalities (i.e. civilian deaths) compared to regions that have similar significant climate change effects but lack a similar history of violence and government neglect issues.

In answering these questions, I add to the debate a unique methodological approach by focusing on the convergence of climate change, existing conflict and government exclusion. My thesis treats climate change as an “exogenous shock” in regions that have been experiencing ongoing political violence and armed conflict. Therefore, I aim to address three related questions: 1) Does climate change create independent and observable effects on the level of physical violence in Kenya and Tanzania? 2) How do other political and socio-economic factors interact with climate change to mitigate or exacerbate conflict outcomes? And finally, 3) what role does exclusion by the government play in this climate-conflict link? I argue that
anthropogenic\(^1\) climate change will intensify armed conflict in conflict-prone regions that have been historically marginalized and excluded by their governments using the case study of Northern Kenya.

I analyze this climate-conflict nexus using qualitative comparative analysis (QCA) and a quantitative analysis of two regions in both Kenya and Tanzania to demonstrate that climate change acts as a threat multiplier to regions with a history of violence and the presence of conflict-triggering conditions such as government neglect. I compare Kenya and Tanzania because they have so many similarities such as similar climate change vulnerabilities, conflict-triggering conditions such as poverty and share similar colonial experiences. However, conflict dynamics vary significantly both within and between each country and that is why I use a paired case comparison of regions within both countries. I use Turkana (Northern Kenya) and Nyeri (Central Kenya) in the case of Kenya, and in the case of Tanzania: Dodoma and Morogoro. When it comes to my observable factors, Northern Kenya serves as my “positive case study” while Central Kenya serves as my “negative case” as it tests negatively for recent history of violence and government exclusion. On the other hand, both Dodoma and Morogoro serve as negative cases because they test negatively for both predictors of armed conflict and for the outcome of interest. However, all these regions share a similarity in that they are all experiencing some sort of climate variability. Moreover, climate changes in both countries are somewhat similar. I find that conflict-prone regions that have been marginalized historically

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\(^1\) Anthropogenic means caused by human activity. So anthropogenic climate change refers to changes in the climatic system due to human activity.
have a greater vulnerability to violence as a result of the interaction of climate change and other socio-political factors such as neglect by their governments. I support my argument using recent literature and through an analysis of climate and armed conflict data in the period between 1997 and 2017. My thesis therefore examines both qualitative and quantitative discourse on the climate-conflict debate.

Most scholars concur that climate change is not expected to produce full-scale civil wars; instead they associate it with low intensity armed conflict (Halvard, Tor, Espen, & Ole Magnus, 2015; Nordås & Gleditsch, 2007). Thus, my definition of armed conflict in this project considers factors such as the intensity of conflict. I define armed conflict as any sort of deliberate violent interaction between state actors such as the military and non-state actors or amongst non-state actors such as militia gangs and civilians that is carried out with a sustained level of intensity resulting in multiple casualties of more than 20 deaths. The conflict could be organized, partially organized, or sporadic, but also largely involving arms or modern weaponry. I examine pastoralist groups such as the Turkana and Pokot, since they have a historically violent past because of their cattle rustling/raiding culture amongst other economic and social political reasons, and also due to the fact that climate change immensely affects their entire livelihood as they depend on rain to grow pasture in order to feed and provide water to their cattle. They also earn a livelihood by trading their cattle, so a drought would also affect their economic power. Climate change therefore renders such communities extremely vulnerable, because it minimizes their already-scarce resources, which worsened by an unresponsive government to their
needs.² Hence, considering that these communities still have weapons from their raiding activities and their warring neighbors, as will be explained in detail in the next chapter, it is probable to predict intense armed conflict.

I use climate change and climate variability almost interchangeably to investigate environmental changes related to the climate. This broad definition is consequent of the fact that the majority of the literature on Africa looks at climate variability instead of climate change (Witsenburg & Adano, 2009). I define climate variability as short-term changes and fluctuations in rainfall and temperatures. For climate change, I employ the IPCC definition; “a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer” (Intergovernmental Panel on Climate, 2014). Therefore, in my analysis, I will be referring to the long-term changes in rainfall and temperatures in the case study areas between 1997-2017.

Extensive literature on the security implications of climate change and whether it increases armed conflict has been carried out by several scholars (Barnett & Adger, 2007; Halvard Buaug, 2009-2012; Halvard et al., 2015; Seter, 2016). However, little has been written on the context (s) under which the climate-conflict nexus would occur. Now that most scholars have answered the question of whether

² Most pastoralist communities live in arid or semi-arid areas, because they used to be always on the move (in the past but now they have been forced to settle due to modernization) and so they never secured the most arable lands, which are claimed by agricultural communities. Most governments, including the Kenyan government, look at pastoralist communities as a nuisance, so they never cater to their needs. Most pastoralists live as second-class citizens in their own countries.
there is a link between climate change and conflict, the next step is to investigate the background or backgrounds, which could potentially incite conflict after the effects of climate change have been felt. My thesis answers this question of where or under what context could climate change likely increase the risk or the chances of armed conflict by investigating factors that could provide a pathway for a catastrophic convergence. Thus, I continue the climate-conflict debate by investigating conditions where that link would possibly work (areas with prior history of conflict) and what political factor (government exclusion) would exacerbate the convergence of this interaction. I define government neglect or government exclusion as the lack of representation of a community on national level politics, lack of basic infrastructure in a particular community, and a general public sentiment that the government disregards one’s community. Government exclusion therefore provides a key pathway through which climate can exacerbate the effects of climate change, as grievances can easily be formed around sentiments of neglect. To sum up my thesis argument; the negative effects of climate change will exacerbate conflict in conflict prone regions that simultaneously experience marginalization from their governments.

The significance of my Thesis

This study is significant and relevant to our society because of the enormous and undisputable risk imposed by climate change, which should definitely be an everyday discussion that is not only debated within scientific halls. People need to understand the climate change phenomena in order to find effective ways to adapt, mitigate its effects, and create structures that can withstand climate-related disasters.
According to a Swedish Government study, “There are 46 countries—home to 2.7 billion people—in which the effects of climate change interacting with economic, social, and political problems will create a high risk of violent conflict” (Vivekananda, 2008). Governments need this information too to make sufficient and practical policies with regard to responding to climate change and the security concern imposed by climate change. Moreover, this study can enable us to understand spatial distribution of violence in East Africa, that is partially based on certain socio-political factors that breed violence, and this can help us predict events such as civil conflicts and migration patterns.

Contrastingly, the climate-conflict debate has been criticized for lack of adequate theoretical and methodological frameworks, in addition to producing disparate and inconclusive results (Halvard et al., 2015; Ide et al., 2014; Meierding, 2013; Salehyan, 2008; Seter, 2016). My thesis will address some of this criticism by moving beyond the monocausal argument associated with the climate-conflict relationship. I complicate my argument by producing a convergence theory that studies how the interaction of climate change effects with other factors can indirectly increase the chances or frequency of armed conflict. I also carry out an empirical analysis of the case study areas by evaluating statistical findings by reputable sources using R computing and graphing programming language. This methodological framework will ensure accuracy in findings and hence more convincing results. By employing the paired case comparison, I aim to reduce problems of generalization seen in the focus of large-scale armed conflict cases. In the Kenyan paired-case approach, I isolate Northern Kenya as a large scale armed conflict study, thus
enabling me to theorize a more precise social outcome of armed conflict in the face of government neglect and adverse climate change (Halvard et al., 2015). Hence, my thesis also adds a recent and unique methodological approach to the enormous climate-conflict research. My general approach thus aims to handle some of the criticism thrown towards the climate-conflict debate in a factual manner.

My thesis also follows an interdisciplinary approach as it examines the histories of conflict and governance for each of my case study regions. It also analyzes the relative capacity of the Kenyan and Tanzanian State to economically handle the changes in the climate. I also use social theory to investigate how inter-ethnic relationships influence the risk of violence and the ordinary life led in the paired cases’ societies. Finally, I briefly consider the role played by neoliberal economics in the state’s ability to intervene and respond to climate changes.

Therefore, my thesis is multidisciplinary project as it encapsulates the main social sciences: history, government, and economics. Furthermore, it uses both qualitative and quantitative approaches, thus addressing previous critiques that have been presented by scholars who felt that the climate-conflict scholars failed to combine quantitative and qualitative research.

**Existing Theories/Frameworks**

As mentioned earlier, there is extensive literature mostly in the form of journal articles studying the association between climate change and conflict (H. Buhaug et al., 2014; Gemenne, Barnett, Adger, & Dabelko, 2014; Nordás & Gleditsch, 2007; J. Scheffran, Schilling, & Link, 2009; van Baalen & Mobjörk, 2017; Vivekananda, 2008), to name a few. In this section, I discuss key theoretical
frameworks that have been proposed by scholars to link climate change and conflict. Most of these theories are not exactly situated in discourse because this field is relatively new and key concepts keeps shifting. Therefore, some of these theories are based upon my interpretations of available literature and what has been consistently written about. However, they all have similarities in that they emphasize on the effect of factors such as poverty, environmental degradation, weak governance, land pressures, and ethnic fractionalization to link climate change and conflict. I will also briefly highlight scholars who have disputed the existence of a link between climate change and conflict or certain aspects of the debate. By analyzing existing literature, I hope to demonstrate that my thesis adds to the climate-conflict debate by contributing an additional theoretical framework to understand how changes in the climate exacerbate armed conflict.

a) Environmental security theory

The environmental security theory is a large school of thought that uses environmental lens to discuss the effects of climate change on conflict. This is an actual theory largely discussed in discourse. It views the destruction of natural habitats, depletion of water, resources, and land, amongst other environmental-related degradation as sources of scarcity and food and water insecurity. Clionadh Raleigh defines this school of thought by stating, “it assigns a primary role to ecological causes in conflict and focuses mainly on resource scarcity” (Raleigh, 2010). Food and water insecurity, in addition to resource scarcity, might induce conflicts when people are forced to fight over the remaining scarce resources (Barnett & Adger, 2007; Detraz & Betsill, 2009; Eriksen & Lind, 2009; Halvard et al., 2015; Homer-Dixon,
Most of these scholars are influenced by Neo-Malthusian ideologies, which argue that “enormous demographic and economic changes have combined to place severe pressures on both the natural environment and the world’s poor, lowering the quality of life for millions and threatening the political stability of many developing countries” (Kahl, 2006).

However, the difference between environmental security theorists and Neo-Malthusian proponents is the angle taken by the environmental security proponents. The environmental security literature privileges the physical environment as a driver of conflict risk (Raleigh, 2010). It is therefore characterized by ecological marginalization and rapid population growth as major catalysts in inciting violence (Homer-Dixon., 1999; Kahl, 2006), as these factors somehow affect the physical environment. Moreover, unlike the Neo-Malthusian concept, the environmental security theory does not paint a doomsday scenario. The more relevant theory for my review is the environmental security theory which bases climate related conflict causal mechanisms on environment-related activities.

Neo-Malthusians on the other hand incorporate several elements in their theory such as; rate of population growth and size, economic decline, and poor governance, amongst other reasons. Colin Kahl states that the Neo-Malthusian perspective is derived from Thomas Malthus’, An Essay on the Principles of Population, which argues that the growing population growth will eventually exceed the earth’s carry capacity. Kahl explains, “In the contemporary period neo-Malthusians argue that enormous demographic and economic changes have combined
to place severe pressures on both the natural environment and the world’s poor, lowering the quality of life for millions, and threatening the political stability of many developing countries” (Kahl, 2006) This theory provides a bleak look into the future by focusing on pressures incurred on the land by growing populations, especially in poor communities. Its proponents provide a deprivation hypothesis, which claims that deprivation amongst the poor will develop due to a combination of factors such as population growth, environmental degradation, and imbalanced distribution of natural resources, and this will increase the chances of political turmoil (Kahl, 2006: 9). Additionally, this theory argues that the environmental pressures will also affect the ability of the state in developing countries to respond and manage social conflicts, therefore eliciting mass grievances and conflicts that may exacerbate the risk of violent conflict.

Homer-Dixon is one of the earliest and main proponents of the environmental scarcity debate, which according to him is a matter of the distinction between renewable and non-renewable sources. A non-renewable resource cannot be restored while a renewable source can. The loss or reduction of certain renewable resources such as fresh water largely affects human life because it takes time for such resources to be restored. Renewables are thus the focal point of the scarcity debate. Homer-Dixon wrote, “Severe environmental scarcity can constrain local food production, aggravate the poverty of marginal groups, spur large migrations, enrich elites that capture resources, deepen divisions among social groups, undermine a state’s moral authority and capacity to govern” (Homer-Dixon., 1999). The effects of the afore-
mentioned consequences of environmental scarcity issues are long term and could result in violence when people violently act on their grievances.

Despite its convincing argument, the environmental security theory has been largely criticized for various reasons. They include: demographic and environmental determinism which exaggerates the causal factors, the difficulty faced by individuals who try to organize violence around a collective action, and the under-theorizing of intervening variables such as social/political factors that contribute to violence (Kahl, 2006). I agree with the idea that this theory is deterministic point because I believe that there are always underlying factors influencing an outcome and therefore we cannot overlook or under-theorize their contribution in producing the aftermath.

b) Convergence theory

This school of thought find the effects of climate change on conflict to be generated my multiple factors instead of a monocausal or direct effect of climate change. It therefore provides a general perspective, whereby scholars attribute the association between climate and conflict to a convergence of several factors (Joubert, 2010; Morland, 2017; Parenti, 2011; Jürgen Scheffran, Ide, & Schilling, 2014; Jürgen Scheffran et al., 2012). Each of these scholars uses distinct pathways to explain these interactions. However, the baseline of their argument is that climate change is not a lone actor in causing armed conflict, but rather a single factor in a myriad of factors that collaborate to cause or increase conflict. I saw the term convergence being used by several scholars and decided to group their arguments under this convergence theory. Therefore, there isn’t an established convergence theory in literature, however, a few scholars’ arguments point at a convergence of socio-economic and
political factors with climate change to influence the occurrence or escalation of conflict

Scheffran et al. (2014) designed visual images that show the causal links between climate change, environmental stress, human needs, and societal consequences. According to them, climate change increases environmental degradation and resource scarcity, thus causing socio-economic stress due to events such as shortage of resources, migration, food, and water insecurity, weakening of institutions, health issues, and economic degradation, amongst other factors (Jürgen Scheffran et al., 2014). Figure 1 below demonstrates this theory by illustrating how changes in the climate system produce changes in precipitation and temperature that affect the environmental system, which subsequently affects human needs and values, thus provoking a social response. As explained by Scheffran et al. (2014) and IPCC 2007, the significance of climate change in this equation is the degree to which it affects the other systems. The question of degree can be referred back to Hsiang et al.’s (2013) standard deviation measure of climate change on rainfall and temperature and on conflict, mentioned earlier.
The Tropic of Chaos, by Christian Parenti, was the first book I read about the catastrophic convergence of poverty, violence, and climate change. This book also helped shape my thesis idea. In the book, Parenti argues that climate change will collide with political, economic, and environmental disasters to produce catastrophic results, meaning problems will compound and amplify each other, by expressing one through another (Parenti, 2011). He claims that as climate change takes place, different problems stemming from poverty and weak political structures will reinforce each other and produce an explosive mix, which will probably manifest through violence. He uses several cases from all the world to explain his argument. One of the examples he uses to back up his argument is the case of northern Kenya. He explains that the Turkana people have been pushed south by recent severe droughts, hence forcing them to herd their cattle close to their historical enemies and neighboring tribe, the Pokot. Due to scarcity of water and grass, most cattle die, hence causing the young men from both communities to raid their neighbors in order to replenish their
stock (Parenti, 2011). This has resulted in many deaths, including the death of Ekaru Lorman, a Turkana pastoralist who had been killed during a cattle raid by the Pokot a day before the author arrived in the area. He discusses the effects of anthropogenic climate change on “the pastoralist corridor.” The pastoralist corridor is the perfect example of a region where different interconnected historical and current factors will produce disastrous effects at the dawn of climate change.

Some have criticized the convergence theory for being “too broad,” in the sense that any of the factors listed to work with climate change to trigger conflict could be solely responsible for the violent conflict. My theory falls under this notion of convergence and so I think that one could counter this criticism by establishing a clear pathway/a line of action under which the different factors interact to produce the violent outcome.

c) Political ecology or institutionalist approaches

Another theory supporting the claim that climate change might solidify existing conflict patterns is the theory of political ecology. This theory recognizes that some regions have causal roots for existing conflicts, stemming from ethnic grouping and weak political institutions (Håvard et al., 2016). It considers causal roots of a climate related conflict by looking at “how the politics of resource and risk

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3The pastoralist corridor is the “Region of mountains, savannas, marshes, and deserts straddling the borderland of Kenya, Uganda, Sudan, Ethiopia, and Somalia. Plagued by regular drought and flash flooding, this landscape belongs to well-armed nomadic and seminomadic tribes that live in a delicate balance with each other and their environment. Largely ignored by colonial authorities and modern African states alike, people in this region live much as they always have: cattle are the main economic and cultural center of life. This land is generally too dry to farm but can be grazed.” Christian Parenti, Tropic of Chaos: Climate Change And The New Geography Of Violence, (New York: Nation Books) 2011 page 46
distribution affect political instability and unequal governing processes…political ecology studies reiterate the importance of hierarchical relationships, local land/water access issues, relative economic issues, relative resource use, and ethnic group membership” (Raleigh, 2010). Political ecology theory is a deeper analysis of political factors that have shaped inequality over the years, for instance, how the actions of developed nations partly caused climate change, which now predominantly affects developing nations. Thus, it mainly examines patterns of exploitation and violence through state actors. “For political ecologists, scarcity is an artifact of social interactions within certain international political and economic structures, not as a result of demographic pressures and natural limits” (Kahl, 2006). To political ecologists, armed conflict reflects larger social tensions with different groups (Raleigh, 2010). They are interested in dissecting these social tensions by focusing on the historical and structural origins of scarcity and violence and analyzing the systems currently supporting these structures of oppression. Hence, it is a somewhat holistic theory as it combines systems of governance, economy, and ethnic representation in its examination. However, it is different from the convergence theory because it is more about political institutions, whether from a global perspective or a local perspective, and how they perpetuate social inequalities that generate scarcity and violence.

The following form the key concepts behind political ecology according to Raleigh:

Tracks political and ecological dimensions of vulnerability in marginalized communities assuming that (a) the economically marginalized and politically excluded may reside in less developed and more degraded areas compared to the rest of the state; (b) climate changes and disasters often affect politically periphery
regions hardest, catalyzing regional political tensions (c) existing inequalities can be exacerbated by post-disaster governmental responses and manipulation (Raleigh, 2010).

The economic and political sidelining of certain groups relies on client networks and state capacity. Ethnic groups that are excluded from governance most often times lack powerful patrons to protect them and are therefore more vulnerable to ecological shifts. Catherine Boone discussed the topography of government power and its ability to shape the distribution of public goods, which determine response to climate disasters e.g. poorly constructed roads slow emergency response. Just like Parenti, Raleigh finds pastoralists communities to be at the epitome of marginalization. He gives an example of the Maasai of Kenya as an example of a community affected by the interaction between physical and social vulnerabilities. He writes, “if drought struck large swaths of Maasai and non-Maasai territory, Maasai would be the most vulnerable to severe and crippling economic effects because their ability to withstand disaster is inhibited by forces beyond their control” (Raleigh, 2010). The Maasai and Turkana are both pastoralist groups in East Africa and they both share similar experiences, including marginalization from their governments since colonialism. Pastoralist communities underscore the key concepts conveyed by the political ecology theory, because they are not only systematically and historically marginalized, but they also live on the periphery of the state i.e. in underdeveloped areas.

The political ecology theory is often criticized for absolving the agency of the people involved in these communities. When the problem seems structural and as if it emanates from the top of the institutions, the people’s voice in determining their
destinies is negated. This approach is very top-down and exempts a bottom up approach to addressing climate related conflict. A bottom up approach is also necessary when it comes to thinking about solutions because those are more reasonable than larger state-reliant solutions.

Other Approaches to the Climate-Conflict Link

d) Ethnic Fractionalization

This framework investigates the role played by ethnicity in sparking armed conflict in the wake of climate change in conflict-prone regions. This theory presumes that climate-related disasters will disrupt along ethnic lines because they form a basis for mobilization. These scholars propose that climate-related disasters increase the risk for armed-conflict outbreaks in regions with high ethnic fractionalization (Schleussner et al., 2016). This basically means that in regions where there are a lot ethnic groups or ethnic diversity, there is a high chance of armed conflict breaking when they are faced with adverse climate changes. Their research had two important findings; first, “About 9% of all global armed-conflict outbreaks (21 in total) significantly coincide with a climatological disaster (drought or heat wave) in the same country even without applying a disaster damage threshold. [And second] about 23% of conflict outbreaks in ethnically highly fractionalized countries robustly coincide with climatic calamities” (Schleussner et al., 2016). These findings are in agreement with research conducted by other scholars (De Juan, 2015; Olsson & Siba, 2013; Theisen, 2012), thus establishing a correlation between ethnic fractionalization, climate change, and increased violence.
This theory on its own is not adequate to explain the goings between climate change and conflict. One can only deduce so much from ethnic fractionalization. A country harboring tribal diversity does not mean that chaos will erupt with the slightest long-term change in the climate. It also negates underlying societal issues, such as, how political actors pit tribes against others? This theory also assumes that the actors are irrational actors acting at the whims of a collective action. As a framework, one can clearly see how ethnicity can be used as a tool to mobilize for armed conflict, but on its own, the framework does not incorporate other significant factors that could be substantial in inducing conflict.

**Criticism of the climate-conflict link debate**

Other scholars, on the other hand, oppose the supposed link between climate change and armed conflict. They claim that climate change simply does not cause armed conflict. For instance, Halvard Buhaug states, “Societal actors…do not resort to force in an organized and coordinated fashion only because temperature heats up or rainfall comes in unexpected ways”(Halvard Buhaug, 2016). He goes further to explain that the evidence to support this climate-conflict link is inadequate. Buhaug argues against the notion of climate wars by asserting that climate change does not directly cause violence, though its impacts do. Scholars like him advocate for the concept of climate change as a “threat multiplier”(CNA, 2007) and suggest that only under certain contexts when specific conditions interact with climate change, do the chances of increased armed conflict occur. I think the point of contention between the critics and other scholars is the starting point of their argument. The critics want
climate-conflict proponents to take a deep look back into the historical roots, which sometimes explain causation instead of blaming conflict entirely on climate change or climate change and one other factor. To them, climate change is a recent phenomenon that is only acting on existing social, political, and economic factors to wreak havoc in the society. I am in agreement with some of their critical observations, and that is why my thesis considers the interactions of prior factors and current conditions to examine how they shape the impact of climate change. One of the key points to take from my thesis is the fact that, whether climate changes results in armed conflict mainly depends on the response to the changes. If the existing conditions allow for positive response, then it is unlikely that conflict will follow.

The critiques of this debate also claim that this climate-conflict debate removes agency from the actors shaping the armed conflict events, by attributing armed conflict to climate-related changes (Halvard et al., 2015). These scholars demand accountability from the actors perpetuating armed conflict by assigning individual responsibility. This claim requires scholars to identify the groups or actors causing, participating, instigating, and being affected by the violence. My thesis responds to this critique by identifying pastoralist communities as aggressors or the main groups involved with this particular case, and the government as an enabler of this violence by its neglect of these communities. Nevertheless, it is almost pointless to demand agency from certain communities due to the situation they are placed in by historical, political, and social-economic factors. As explained under the political ecology section, some communities cannot really help their situation and so we should avoid agency fetish and be realistic about what people can or cannot handle.
Method of inquiry and Research design

I will use armed conflict as my dependent variable and climate change as my independent variable. As I mentioned earlier, a region is said to be experiencing armed conflict if the number of deaths resulting from organized and deliberate violent acts exceeds 20 people per year. I use a qualitative comparison of northern Kenya (dry region) and central Kenya (wet region), and Dodoma (dry region) and Morogoro (wet region) in Tanzania to measure for the different variables. These paired case comparisons will enable me to isolate the effects of government exclusion (i.e. political marginalization), manifestations of climate change variability through rainfall and temperature, and the display of armed conflict within each case.
CHAPTER 2: REGIONAL CONFLICT TRENDS EXPLAINED USING CLIMATE-CONFLICT THEORIES

Outline

a) Understanding the Global Picture using Political Ecology theory
b) Convergence theory
c) Environmental security theory
d) My theory
a) Understanding the Global picture using the Political Ecology theory

In this chapter, I further explore the convergence theory, the environmental security theory, and the political ecology theory to explore regional climate and conflict trends in Sub-Saharan Africa. Therefore, this chapter is an expansion of the themes introduced in the literature review discussed in the previous chapter. The chapter analyses climate and conflict trends in Sub-Saharan Africa through an examination of social, economic, and political factors. As implied by the introduction chapter, a lot of studies are in when it comes to establishing a connection between climate change and conflict. Moreover, the studies cover Africa, Eurasia, and the Americas, therefore representing a global perspective of the climate-conflict nexus. According to an analysis of 50 quantitative empirical studies carried out by Hsiang and Burke (2014) there is a “strong support for a causal association between climate variables and conflict or instability…[which was] consistent across regions and time periods, [And] …a ‘remarkable convergence in findings’” (Hsiang & Burke, 2014). Evidence from various studies, with the oldest sample beginning before 8000 BCE and the latest ending in 2010, already confirm that there is a connection between climate change and conflict in regions across the globe, including the Americas, Eurasia and Africa (Hsiang & Burke, 2014).

While this chapter focuses primarily on trends of climate and violent conflict in Sub-Saharan Africa, we can conclude that this phenomenon is not unique to Africa, and that climate change also threatens global security. From another comprehensive synthesis of 60 primary studies on climate change and conflict, Hsiang et al. (2013) found that, “each 1-SD (standard deviation) change in climate toward warmer temperatures or more extreme rainfall increases the frequency of interpersonal violence by 4% and intergroup
conflict by 14% (median estimates)” (Hsiang, Burke, & Miguel, 2013). These statistics were in their first study conducted in 2013, while the 2015 study found that each 1-SD increase in temperature increased the likelihood of interpersonal conflict by 2.4% and intergroup conflict by 11.3% (Burke, Hsiang, & Miguel, 2015). These findings provide a general prediction of how a temperature’s rise affects security universally, except whether the conflict materializes is another inquiry.

The statistic only gives us a numerical prediction without placing it in context with other factors like politics of a country, amongst others. Accepting such a statistic as a general rule is a problem because countries respond to different or even similar situations differently. For instance, it is preposterous to expect the same response to 1-SD increase in temperature in both developed and developing nations. Developed nations are well equipped with effective systems that are put in place to respond to emergencies and long-term climatic changes. An example is America’s response to the recent storms, floods, tsunamis, and hurricanes versus Haiti’s response to the earthquake. I understand that they are different kinds of events but they pose near-similar risks and underline the fact that climate disasters or changes impact nations differently. The state and response of these nations can also be attributed to the political ecology theory, as most developing nations’ environments were depleted by the colonial powers via extreme extraction of natural resources. Thus rendering them weak environmentally and economically by reducing their supply of the natural resources. Additionally, it is possible for a low-intensity conflict to escalate into a large-scale civil war in a developing country because of climate variation (Carleton, Hsiang, & Burke, 2016). For instance, some claim that the Syrian war was partially influenced by climate change. “Severe drought plagued Syria
from 2007-10, causing as many as 1.5 million people to migrate from the countryside into cities, exacerbating poverty and social unrest” (News, 2018). The unrest contributed to the 2011 uprisings that eventually blew up into a fierce confrontation between protesters and the government. The documentary, *Age of consequences* highlighted the role played by global warming in the Syrian war and explained how human actors escalated the situation into a full scale war (Scott, 2017). Human actors exacerbated the war by making sensitive decisions in their political roles, and thus underlining the impact government leaders can make through their response to new conditions. Non-state actors through sectarian groups and regional actors joined the war for different social-economic and political reasons thus aggravating the situation. While conducting my research, I came across concerns that climate change might push authoritarian regimes to use their monopoly of state violence to silence or crash any protests revolving around food and water insecurity. In addition, our coexistence as a global village makes it easy for a conflict situation to affect the whole globe or spread to the neighbors.

b) **Convergence Theory**

Under this theory, I explicate Parenti’s work, which covers a wide range of regions to support his argument. Parenti’s uses several cases from Africa (East African states and Congo), Asia (Afghanistan, Kyrgyzstan, India, and Pakistan), and Latin America (Brazil and Mexico) to argue that there is a catastrophic convergence of already-existing crises of poverty and violence with political, economic, and environmental disasters (Parenti, 2011). I will discuss his writing about Turkana which somewhat serves as a predecessor to my argument. His writing informs my argument and provides plenty of background for my next chapter and for my theory. He talked about cattle and waters wars in northern
Kenya, which he describes as resource conflicts. As discussed in the Introduction chapter, most people who live in the border region of Kenya, Sudan, and Uganda are pastoralists. Their livelihoods are dictated by the upkeep and size of their herds. Harsh environmental conditions force pastoralists to migrate in search of water and pasturelands during the dry season. With limited access to water and competing rights to land, inter-tribal conflict arises when pastoralists from one tribe enter the territory of another (Jonah Leff, 2009).

Unfortunately, in recent years, the drought cycle has intensified, while state failure continues to manifest “through lawlessness, underdevelopment, corruption and lack of basic services. All this is epitomized by northern Kenya’s proliferating gun culture” (Parenti, 2011). Turkana is still faced with underdevelopment characterized by poor infrastructure in the form of bad roads, inadequate healthcare facilities, scarce water sources, and insufficient schools. In fact, UNDP reports that “Turkana has among the highest maternal and infant mortality rates in the country, the lowest school enrolment rates and the lowest life expectancy. Also, the Human Development Index of Turkana is significantly lower than the weighted national average” (UNDP, 2017). When exogenous forces such as climate change interact with the other factors that make Turkana fragile, they create what Parenti refers to a catastrophic convergence. This state can produce debilitating effects for Turkana and her people if detonated by existing triggers of conflict such as existing interethnic clashes. Climate change thus facilitates the transition of Turkana from an acute stage to a chronic one.

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4 Most of Northern Kenya is technically a state of nature, where everyone (including children) are armed with modern weaponry. When travelling there, one has to hire private security to ensure that they are well protected. But even state actors such as police officers are not safe in Turkana and some have lost their lives in the line of duty. Thus, even the police are afraid of doing their job, thus contributing to the state of lawlessness. The high level of insecurity in Turkana stood in the way of my research, as my parents could not let me travel there.
The people of northern Kenya are not only faced with adverse weather conditions, but they also live in a hostile environment riddled with guns. Guns are smuggled in from Somalia and South Sudan, while ammunition is easily available from Uganda (J. Leff, 2009; Parenti, 2011). According to a 2007 study done by the Small Arms Survey on the social impact of small-arms proliferation, epidemic gunplay with both actual and perceived level of insecurity … [was] significantly worse on the Kenyan side of the border than [it was] in South Sudan, which is recovering from a 21-year civil war. Sixty percent of respondents had witnessed a cattle raid, and more than 60-percent said that disarmament would decrease security (Parenti, 2011).

The presence of these arms/weapons exacerbates a situation that is already dangerous. It turns ethnic tensions worsened by negative climatic conditions that increase scarcity of resources into civil wars. In the book, Parenti gives a report of a month of drought-fueled violence in what he terms the land of raiding in late summer 2008. The name refers to the high raiding activity that happens amongst the different neighboring communities that raid each other to replenish their supply of cattle after a drought kills their original stock (Janpeter Schilling, Opiyo, & Scheffran, 2012). Hunger, drought, and the need to increase wealth and the payment of dowries serve as raiding motives amongst the Turkana and Pokot of northern Kenya (Janpeter Schilling et al., 2012). A study by Ember et al. found that livestock-related violence was higher in dry months, drier years, and during months that were drier than expected, between the years of 1998-2009 (Ember, Abate Adem, Skoggard, & Jones, 2012).

The level of conflict in Turkana qualifies to be labeled “civil war/intrastate armed conflict,” because it involves non-state actors and has a level of sustained intensity as shown by the continued killings through the month (Small Arms Survey). Majority of
their weapons are remnants of cold war militarization, and a reminder of the civil wars in Uganda and South Sudan, in addition to existing tensions surrounding land claims (Eaton, 2008; J. Leff, 2009; Mirzeler & Young, 2000; Jürgen Scheffran et al., 2014; J. Schilling, Akuno, Scheffran, & Weinzierl, 2012; Janpeter Schilling et al., 2012). Personal accounts from interviews featuring Turkana people that were included in the book *Unjust Burden* that was recently published by the IRIN association⁵ (a news agency dedicated to reporting on humanitarian crises) match Parenti’s appalling accounts of climatic wars in Turkana, Kenya. The publication emphasizes the role of the ongoing long-term drought in Kenya, which hit Turkana the hardest, and depleted their pasture, water, livestock health, milk, meat, and crop yields.

IRIN’s recent reporting shows the effects in the Kenyan county of Turkana, where more than 90 percent of the 1.3 million inhabitants live in extreme poverty and where a prolonged drought has killed hundreds of thousands of head of livestock by critically reducing the availability of pasture and water (Morland, 2017).

In addition to all these catastrophic encounters, these people lack alternative productive livelihood strategies that can help absorb the shock of their losses. This has been exacerbated by socio-economic marginalization furthered by the government of Kenya, which does not provide basic services to the Turkana people, to the point that the Turkana people cannot seek opportunities beyond pastoralism to adapt to the worsening conditions

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⁵ “IRIN is one of the world’s leading sources of original, field-based journalism about humanitarian crises. Our journalists report from 70 crisis zones around the world about everything from conflict to natural disasters, from migration to pandemics to amplify the voices of those most affected and encourage better responses by the international community. After 20 years as part of the United Nations, we spun off in 2015 to become an independent media non-profit, headquartered in Geneva. Our journalism has prompted public petitions, donations and charity telethons, new aid programmes, debates in local parliament and changes in UN policy” (IRIN, 2017).
surrounding them (Morland, 2017). Most of the personal interviews beseeched the government for help, especially with ways to venture into agriculture. Parenti also attributes the source of government neglect to neoliberal economic policies, which made governments step away from building local infrastructure as a way to push for privatization. The case of Turkana is an obvious display of a catastrophic convergence of both current and past stresses, and their interaction with the changing climate to produce horrific standards of living.

The problem with this convergence theory is that it is somewhat like a kitchen sink. Any of these factors could solely contribute to conflict, without directly linking climate change (H. Buhaug et al., 2014). This critique is valid because without a specific and direct causal link between climate change and conflict, it is hard to explain what exactly is causing what. This is an issue that I will have to deal with, especially in my discussion chapter, but I intend to counter it by finding specific data that shows causation or correlation of the climate-conflict nexus. That is why I also use four case studies to address different variables and deal with any incongruities.

c) The Environmental Security Theory.

A qualitative comparative analysis of 20 conflict cases was carried out by Tobias Ide to find out why conflicts over scarce renewable resources turned violent, and in the 7 that turned violent, he found out that “two structural conditions (negative othering and low power differences) and one triggering condition (recent political change) [were] sufficient for the violent escalation of renewable resource conflict” (Ide, 2015). Structural conditions are preconditions to a violent conflict, while triggering conditions tend to be short-term dynamics. Northern Nigeria, Southern Oromiya in Ethiopia, and Turkana were
some of the places where conflict over scarce renewable sources turned violent. In the case of Turkana and Ethiopia, there are pastoralist communities that have been weakened by the state and which continue to weaken each other via intertribal conflicts. These communities are also faced with other social and economic issues such as: scarcity of land, water, and cattle resources. Though most of their conflicts are inter-tribal, they occasionally fight against the state. Since they bear arms, the state does not always have a monopoly on violence, thus having a low power difference instead of a hard power difference, which would be the case if they are unarmed. Low power differences mean that both actors involved in the conflict have the means of capability and therefore, it would not be easy to take each other down. Meanwhile, hard power difference means that one actor is more capable than the other, and that is normally the case for most groups when going against the state. However, most of these pastoralist groups have had civil wars in the past and still need weapons to protect their cattle. Therefore, they are equipped well enough to impose some damage on the state actors. The conditions in their environment enable the escalation of armed conflict in case of a trigger or a confrontation.

Dixon claims that scarcity can be supply-induced, demand-induced, or structural scarcities. As the names suggest: supply-induced scarcity occurs when the resource portion decreases, while demand-induced scarcity occurs when the resource has to be distributed over a larger population or when demand increases due to events such as migrations into an area. Lastly, structural scarcity occurs when certain groups receive larger portions of the resource while others receive less, due to unequal distribution by the political economy. “The term environmental scarcity, however, allows us to
incorporate in one analysis the three distinct sources of scarcity and to study how they interact with and reinforce each other” (Dixon, 1999). So, they look at environmental scarcity as a whole (a convergence of the three kinds of scarcity), and its link to violent conflict. Resource capture and ecological marginalization also emerge as patterns when the three kinds of environmental scarcity interact.

Resource capture occurs when a fall in the quality and quantity of a renewable resource interacts with population growth to encourage powerful groups within a society to shift resource distribution in their favor. This shift can produce dire environmental scarcity for poorer and weaker groups in the society. Ecological marginalization occurs when unequal resource access joins with population growth to cause migrations to regions that are ecologically fragile, such as steep upland slopes, areas at risk for desertification, tropical rain forests, and peri-urban squatter settlements. High population densities in these areas, combined with a lack of knowledge and capital to protect local resources, cause severe environmental damage and chronic poverty (Homer-Dixon, 1999).

“Resource capture” has manifested on the continent in multiple forms. For instance, as demonstrated by the resource curse, the presence of valuable minerals pushes certain members of a community to rush and try to control them. This has been one of the causes and factors promoting civil wars in Africa in countries such as Liberia, Sierra Leone, and Congo. Some of this resource capture is facilitated by armed groups who are not state actors, while sometimes it is facilitated by the state. For example, the British colonial government in Kenya instituted what they called a “saturation policy” in Northern Kenya, whereby they allowed the frontier wells and grazing lands to be overcrowded by a large migrant population of Somalis and Boranas (local tribe), hoping that the local tribe would fight for their resources and hence prevent any additional incursions of Somalis into the region. However, the Borana could not sustain the pressure and so they moved from Wajir to Moyale. This was a case of resource capture from 1912-1931, because “the migrants had captured the wells and therefore the grazing lands from the residents”
(Homer-Dixon., 1999). This localized example shows the interplay of actors with different capacities enabling a resource capture.

The threat of desertification or droughts amongst other effects of climate change has caused social tensions and led armed groups such as Boko Haram to capture resources, i.e. Lake Chad, and use them to leverage support from local communities. The shrinkage of Lake Chad by 90 per cent (Oba, 2011) can be attributed to factors such as low inflows to the lake, marked reduction of its surface area, and increased climate variability resulting in decreased rainfall (329mm in 1950-71, 207mm in 1972-89, and the Sahelian drought that began with low rainfall in 1972 and 1973 (Piesse, 2017). Thus, climate change has been a major contributor to the shrinkage of the once large lake, from 25,000 km² in 1963 (Lemoalle, 2005).

Lake Chad was considered a large shallow lake until 1973, with 18,000 to 20,000 km² of open waters. It has been regarded as a seasonal wetland since 1976, after the onset of the present dry climatic phase, which started in 1973 in the African Sahel: the inundated areas have seasonally varied between 40 km² in its northern basin(Piesse, 2017).

The shrinkage of the lake from “normal” Lake Chad to “small” Lake Chad has had numerous effects on the communities surrounding it. Some of these effects include migration into the “areas where water allowed for cattle breeding and cultivation. …The result of these migrations toward all the wetlands of the basin has been an increased pressure on the natural resources” (Lemoalle, 2005). Increased pressure on the resource causes what Homer-Dixon refers to as supply-induced scarcity. According to him, migration is one of the social effects that can either single-handedly or in combination with other social effects increase the probability of violence in developing countries. As of 2017, “more than 2.3 million people [were] displaced across the basin with at least seven million at emergency levels of food insecurity” (Lemoalle, 2005, p. 342). This
statement shows that the other social effects described by Homer-Dixon are also very present in the Chad basin. They include:

- constrained agricultural productivity, often in ecologically marginal regions;
- constrained economic productivity, mainly affecting people who are highly dependent on environmental resources and who are ecologically and economically marginal;
- greater segmentation of society, usually along existing ethnic cleavages;
- and, disruption of institutions, especially the state (Piesse, 2017).

However, he adds that scarcity doesn’t work alone to produce these social factors, but instead, it works with factors specific to the place, or rather what he calls “contextual factors.” The Lake Chad basin extends across the boundaries of 8 countries, while the body of water itself lies at the intersection of Chad, Cameroon, Niger, Nigeria (Homer-Dixon., 1999, p. 80). Research demonstrates that the regions surrounding Lake Chad carry plenty of the Homer-Dixon contextual factors. They include: “environmental change, lackluster socio-economic development and a lingering insurgency, which continue to undermine long-term food and water security” (Piesse, 2017). Moreover, increased populations caused by high population growth and seasonal migration (Piesse, 2017) also largely add pressure to the Lake Chad basin. These factors have worked with the aforementioned social effects to exacerbate existing social tensions and in other cases violence.

All these interactions compounded by the existence of non-state armed groups (NSAGs) across the region increases the threat of armed conflict. Non-state armed groups “may challenge the state’s monopoly and its capacity to control violence in part or all of its territory” (Small Arms Survey). Boko Haram is the biggest NSAG in the Lake Chad basin. The problems described earlier act as a driving force to the growth of Boko Haram, as they attract hopeless and frustrated youth, marginalized communities, and the society
at large to turn to non-state actors to provide them with resources since the states does not provide much-needed assistance to the populace. As an example, Nigeria is not physically water stressed but the government does not adequately provide basic needs to the 5.2 million people in North Eastern Nigeria (Piesse, 2017). Boko Haram uses the rhetoric of bringing justice to the poor and improving access to food and water to recruit people and attack those who disagree. “From 2009-2015, there were constant attacks and expansion of capture territories in North-East Nigeria and other parts of the Lake Chad Basin by the terrorists” (Zieba et al., 2017). Their attacks have consequently worsened the food insecurity situation as instability has made farming and other livelihood activities difficult and unreliable. The Boko Haram and Lake Chad case has been used to explain the climate-conflict link in Africa, as it demonstrates how environmental degradation can be worsened by climate change, and how its interaction with other security stressors cause conflict.

Environmental damage can result in reduced agricultural productivity of said lands due to nutrient depletion, erosion, and salinization, amongst other factors. Additionally, reduced agricultural productivity means food insecurity. As implied by the latter part of the above excerpt, most people experiencing environmental scarcity lack the capacity to efficiently respond to it, and so institutional factors largely determine the quality of response to failing agricultural systems. “If institutions fail in Africa, the continent’s vast undeveloped resources of land and water will not be tapped and its agricultural systems will remain grossly inefficient” (Homer-Dixon., 1999). Agricultural shocks are already being witnessed in various parts of the continent, from the water wars in Tunisia, the Cape Town water shortage, crop failures, the Arab Spring, to the protests over food
prices in at least 14 countries on the continent between 2007-2008 (Berazneva & Lee, 2013; Detges, 2017; von Uexkull, 2014; Wellesley, Preston, Lehne, & Bailey, 2017). Although the relationship between food prices, social unrest, and climate change is unclear, (Halvard et al., 2015), scholars have an indirect way to link them. Most argue that food prices serve as a mediating or intervening factor to the climate security nexus. This is because:

a positive feedback exists between food price and violence – higher food prices increase conflict rates within markets and conflict increases food prices; anomalously dry conditions are associated with increased frequencies of conflict; and decreased rainfall exerts an indirect effect on conflict through its impact on food prices (Raleigh, Choi, & Kniveton, 2015).

The theory of environmental security covers a lot of indirect and sometimes direct pathways that could be used to explain the climate-conflict nexus, particularly: scarce renewable resources, food insecurity, resource scarcity, and environmental degradation exemplified by desertification amongst other things. This theory illustrates how climatic systems’ impact on the environment can directly or indirectly trigger armed conflict.

The tables below narrow the focus from the global perspective and the larger Sub-Saharan African continent to East Africa. They analyze some of the social-economic and political conditions that serve as basis for the climate-conflict theories.
### Table 1: Kenyan case studies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Central Kenya-Nyeri</th>
<th>Northern Kenya-Turkana</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Degradation</strong></td>
<td>Declining productivity and declining rain-use efficiency (Dent &amp; Bai, 2006)</td>
<td>12.3% suffered from severe land degradation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>52% suffer moderate land degradation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33% faced slight vulnerability to degradation (UNEP, 2002)</td>
</tr>
<tr>
<td></td>
<td>The GLADA Pilot Study in Kenya predicts that Lake Turkana is going to experience</td>
<td>one of the sharpest declines in net primary productivity (Dent &amp; Bai, 2006)</td>
</tr>
<tr>
<td></td>
<td>one of the sharpest declines in net primary productivity (Dent &amp; Bai, 2006)</td>
<td></td>
</tr>
<tr>
<td><strong>Government Neglect</strong></td>
<td>Well represented in the central government.</td>
<td>Access to natural resources has been a major source of conflict (Detges, 2017; van</td>
</tr>
<tr>
<td></td>
<td>Quality infrastructure through the region.</td>
<td>Baalen &amp; Mobjörk, 2017)</td>
</tr>
<tr>
<td></td>
<td>Turkana has been on the periphery of national politics since independence.</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnic Composition</strong></td>
<td>Predominantly the Kikuyu tribe but there are small tribes associated to</td>
<td>Predominantly Turkana and Pokot tribes but there are about 12 different tribes in the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>region</td>
</tr>
</tbody>
</table>

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6 [https://kenyastockholm.com/2015/03/20/ethnic-breakdown-of-top-appointments-in-uhurus-kenya-shows-kikuyus-top-the-list/](https://kenyastockholm.com/2015/03/20/ethnic-breakdown-of-top-appointments-in-uhurus-kenya-shows-kikuyus-top-the-list/). This link shows an ethnic breakdown of cabinet secretaries (one of the most important offices in the country) and it indicates that majority of appointments by President Uhuru come from central Kenya, but mainly from the Kikuyu tribe.
the Kikuyu living by the Meru, Embu, and Mbeere.

<table>
<thead>
<tr>
<th>Poverty</th>
<th>One of the richest counties in Kenya (Tavneet Suri &amp; Kariuki, 2008)</th>
<th>It is “an economically poor and marginal region, where water, arable land, and pasture are scarce resources” (Witsenburg &amp; Adano, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate variability/change</td>
<td>Increased erratic rainfall</td>
<td>Extreme droughts in the last 40 years (Witsenburg &amp; Adano, 2009)</td>
</tr>
<tr>
<td>Prior conflict</td>
<td>A few of ethnic clashes carried out over the years</td>
<td>Turkana has experienced high-armed conflict historically. The region has the highest number of conflict deaths in the entire country (ACLED, 2018)</td>
</tr>
</tbody>
</table>

Table 2: Tanzanian Case Studies

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dodoma</th>
<th>Morogoro (Tanzania) (Tanzania)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Degradation</td>
<td>Excessive use of charcoal has caused serious environmental degradation according to Dodoma (MWEMBEZI, 2014).</td>
<td>Environmental degradation caused by adverse farming practices and deforestation has reduced crop yields and watercourses have become more seasonal in Morogoro(Paavola, 2008)</td>
</tr>
<tr>
<td>Government Neglect</td>
<td>16/19 ministries have been relocated from Dar Es Salaam</td>
<td>Primary school education, a proper supply of water resources, and a “rich mixture of NGO activities involved in agricultural production</td>
</tr>
</tbody>
</table>
The current president of Tanzania, President Magufuli ordered the government move from the capital of Dar Es Salaam to Dodoma. The movement involved transferring state machinery to Dodoma too.

Dodoma Profile, http://dodoma.go.tz/profile

According to the National Bureau of Statistics Tanzania (NBST) 2002a, 14% of Dodoma households are below the food poverty line or are unable to buy the essential amounts of calories with the resources at their disposal.

<table>
<thead>
<tr>
<th>Ethnic Composition</th>
<th>Ethnically diverse, with 3 main ethnic tribes, and 7 minority tribes include the Maasai, who still lead a nomadic pastoralist life.</th>
<th>Morogoro has 5 main ethnic groups ((URT), 1997)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Poverty</th>
<th>Dodoma has “Unemployment and low levels of income” (MWEMBEZI, 2014)</th>
<th>Mean urban monthly income is about a $1 per day (Paavola, 2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A third of the households suffer from lack of basic needs.</td>
<td></td>
</tr>
</tbody>
</table>

| Climate variability/change | Dodoma is semi-arid regions and it has experienced climate change in the form of erratic rains and frequent famines Sakai 2012; Ndaga 2012; Kalumanga et al. 2014 | “Morogoro region lies between the seasonal rainfall patterns of northern and southern Tanzania…has unimodal rains. Droughts are the most important aspect of climate variability in the Morogoro region” (Paavola 2006: 645) |

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7 The current president of Tanzania, President Magufuli ordered the government move from the capital of Dar Es Salaam to Dodoma. The movement involved transferring state machinery to Dodoma too.

8 Dodoma Profile, http://dodoma.go.tz/profile

9 According to the National Bureau of Statistics Tanzania (NBST) 2002a, 14% of Dodoma households are below the food poverty line or are unable to buy the essential amounts of calories with the resources at their disposal.
| Prior conflict | Low conflict level-ACLED reported 7 incidences of conflict between 1997-2016; and only 2 deaths | Low conflict level-ACLED reported 11 incidences of conflict between 1997-2016. | Interestingly, the last conflict was between a pastoralist and a farmer over grazing rights. |

### a) My Theory

My theory argues that climate change confounds the effects of prior history of conflict and government neglect to increase the probability and intensity of armed conflict in vulnerable regions. Climate change is therefore a third variable in this triad, as it finds an existing association between prior conflict, neglect by the government, and current conflict, and strengthens the relationship to escalate the level or chances of conflict. As you will witness in the next chapter, my methodology makes my theory unique.

### b) Conclusion.

These two theories adequately cover how the continent of Africa is discussed when it comes to the climate-conflict nexus. I intend to contribute to this discussion by providing a methodology that is informed by these theories as underlying factors, while adding a rarely discussed pathway, government neglect, to the analysis. My next chapter will describe my methodology. I will look at my case study data and draw findings that link climate, armed conflict, and government exclusion/neglect.
Chapter 3: Methodology and Findings

1. Introduction

In the previous chapter, I provided a background on the ethnic composition of our case studies, their relationship with the government, and the types of climate variability the regions are experiencing. In this chapter I present evidence for my theory on armed conflict, climate change, and government exclusion by drawing on data from ACLED and NOAA National Centers for Environmental Information (NCEI).

2. Testing the Climate-Conflict Link

What predicts the escalation of armed conflict? Broadly, I argue that climate change affects armed conflict. The effects of climate however, are moderated by two additional factors: 1) the degree of government exclusion and 2) prior history of violence. Where at least one group experiences government exclusion and/or where there is a history of violence, we should expect the climate change to have a much stronger effect on the incidence and armed conflict. I specify these hypotheses below.

Armed Conflict

First, I suggest that regions of a country that have experienced prior political violence should be much more vulnerable to the changing climate and its adverse effects on human life. Hence, I predict the following:

Hypothesis 1a: Climate change will have a positive effect on the level of armed conflicts in regions that also have a prior history of violent conflict.

Hypothesis 1b. Extreme climate changes might predict higher armed conflict regardless of prior violence.
**Government exclusion**

*Hypothesis 2*: Government exclusion will be associated with response to climate change thus influencing the occurrence or frequency of armed conflict.

2a. Specifically, the more neglected a region is, the less it is able to respond to climate change due to lack of resources and facilities, hence worsening tensions that could exacerbate the risk or level of armed conflict. Government exclusion is a moderating variable, as it affects the strength of the impact of changing weather patterns on a community already weakened by a history of conflict.

2b. Lack of government neglect means that a region has adequate infrastructure and facilities to adapt and mitigate effects of climate change, thus reducing tensions among people responding to the changing weather. Therefore, attention from the government is negatively associated with armed conflict.

**The Disastrous Convergence**

*Hypothesis 3*: The more adverse the changes in climate are, in addition to a history of government neglect and conflict, the more disastrous the armed conflict is likely to be.

**Methodology**

Most studies employ the use of statistical analysis and qualitative case studies in their climate-conflict research (Ide, 2017). I used a combination of statistical analysis and case study analysis to substantiate my climate change-conflict nexus theory to highlight how local experiences influences people’s response to climate change. My statistical techniques include the use of multivariate regression to examine the correlation between
armed conflict and rainfall. Erratic or increased rainfall or flooding (Joubert, 2010) in certain regions of East Africa such as central Kenya and reduced rainfall that sometimes indicates drought in places like northern Kenya suggests climate change when observed for a certain period. I used the same time period (1997-2017) for all of my variables because the same time period is a significant component in studies that involve comparisons (Ember & Ember, 2001; Ember, Ross, Burton, & Bradley, 1991). The same time period means that “all the variables for each society are measured for that society’s focal time and place” (Ide, 2017). I used 1997 as the beginning year because the ACLED website, which stands for Armed Conflict Location & Event Data Project did not have data on my case studies prior to 1997.

**Measurement of Key Variables**

**Climate Change:** I measured climate change through the observations of specific weather patterns. After thorough research on different markers of a changing climate, I decided to focus primarily on rainfall i.e. the increase and decrease of rainfall in these regions between 1997-2017. I did not use temperature changes because most of the regions had an average that cut across the years, and so it was difficult to decipher the impact of small changes in temperature. Either way, rainfall is a significant climate variable due to its impact on society, especially those that depend on rain-fed agriculture and pasture (Raleigh & Kniveton, 2012).

**Armed conflict:** I measured armed conflict by subsetting my data to only analyze the number of armed conflict events that were carried out by civilians, state actors such as the
military, and non-state actors such as militia groups or gangs in the regions. Another key
determiner of armed conflict was the number of fatalities, so I considered 20 deaths to be
the average number of deaths per year, and any year with a death toll higher than that was
considered a high conflict year, while anything lower than that was considered a lower
conflict year.

**Government exclusion:** I determined whether a region was excluded or neglected by the
government based on three factors. First, I analyze the degree of political representation
in the central government versus the local level. i.e. by looking at the number of political
leaders one particular community has at the top. This measure is important because
representation gives a voice to the people because the main significant decisions are
made at the top. It is the central government that wields the administrative and policy-
making powers via the executive, legislature, and judiciary (Bagaka, (2009)). Second, I
analyzed the level of development and infrastructure in a region. This provides a proxy
for the government’s attention or concern about a particular region’s wellbeing. I argue
that if a region has basic infrastructure such as good roads, functioning hospitals, and
primary and secondary education schools, this indicates that the government is interested
in the wellbeing of the people in that region. Third, I evaluated the level of public
sentiment around the feeling of neglect or marginalization. If the people feel like the
government has no concern for their region, based on how the government rewards them,
e.g. when the state has a clientele relationship with them and rewards them with
development projects or powerful leadership positions. The public can also feel
neglected if its region lacks basic infrastructure.
Research Design and Measurement.

To test for the effects of each of the above variables, I needed to examine a wide range of areas that are experiencing similar and contrasting effects of climate change but their response to climate change varies in terms of the levels of armed conflicts. I then examined the third variables—government exclusion and prior history of conflict—in the specific areas to analyze a unique pathway that explains how strongly those variables shape the climate change-conflict link. Therefore, my regional comparison comprises of paired cases each from Kenya and Tanzania. In Kenya I used Turkana and Nyeri county, while in Tanzania I used Morogoro and Dodoma districts.

I used the ACLED website to obtain data for armed conflict on my case studies. The “Armed Conflict Location & Event Data Project is a disaggregated conflict collection, analysis and crisis mapping project. ACLED collects the dates, actors, types of violence, locations, and fatalities of all reported political violence and protest events across Africa, South Asia, South East Asia and the Middle East” (ACLED, 2018). I downloaded general data on state violence and conflict for both Kenya and Tanzania. This data had different classes of conflict, ranging from high level conflict to low-level conflict that involved civilians, the state, and non-state actors such as militia gangs.

Measuring climate change is a challenge so I decided to look at rainfall variability using the NOAA National Centers for Environmental Information (NCEI), which was formerly known as the National Climatic Data Center (NCDC). The NCEI stores, monitors, evaluates, and provides open access to historical weather data and information ((NCEI), 2018). I had to work with available regions thus switching regions of interest
for central Kenya because information on the region I was interested in could not be found anywhere. I used this platform to download both precipitation and temperature data on Kenya and Tanzania from 1997-2017. After managing the data and creating visual displays of it, the temperature changes were not extremely significant, so I decided to stick with precipitation across the 20-year period as a measure of climate variability.

There isn’t a standard measure or a qualitative measure of government exclusion, so for my sample, I used the three measures I explained earlier in this chapter as a measure for government exclusion and neglect. I filtered most of my government neglect information for my samples from national newspapers, online articles, unpublished works, and other secondary sources of information.

It is clear that my thesis research follows an interdisciplinary approach, as it employs various ways of finding and analyzing the information. This approach is beneficial because it shows how local experiences influence how people respond to climate change via the qualitative case study that is backed by statistical evidence (Ide, 2017). This approach also enriches our understanding of the topics at hand, as every case study and variable is different, and requires an approach specific to it.

**Coding procedures**

I used the statistical R language to conduct the multivariate regression formula that enabled me to decipher the relationship between rainfall and armed conflict. The coding procedure is available at the Appendix.

**Weather findings.**

**Kenyan case Studies.**
**On temperature**

According to scientists, even a 1° Celsius increase in temperature over a decade is significant (NASA, 1999-2018). Between 1997-2007, Turkana experienced a temperature difference or an increase of 2.47 °Celsius, while Nyeri experienced a temperature change of 0.29 °Celsius in the same amount of time. Clearly, Turkana is warming up more, and if you observe table 1 below, the temperature’s increase was consistent with a steady difference of an average of 1 °Celsius, but that difference dropped to 0.84 °Celsius in 2017 (if you use 1997 as the baseline). Therefore, one can conclude that Turkana is experiencing a positive temperature anomaly. A temperature anomaly is the difference between the average long-term temperature and current temperature, so a positive anomaly is when the current temperature is warmer than the norm, while a negative anomaly is cooler than normal (NASA, 1999-2018).

<table>
<thead>
<tr>
<th>Year</th>
<th>Turkana Mean Temp</th>
<th>Turkana Rainy Days</th>
<th>Turkana No Rainy Days</th>
<th>Turkana Conflict</th>
<th>Turkana Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>84.8</td>
<td>47</td>
<td>251</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>1998</td>
<td>86.03</td>
<td>22</td>
<td>324</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>1999</td>
<td>85.88</td>
<td>14</td>
<td>333</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>2000</td>
<td>86.34</td>
<td>16</td>
<td>335</td>
<td>6</td>
<td>106</td>
</tr>
<tr>
<td>2001</td>
<td>85.32</td>
<td>28</td>
<td>335</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td>2002</td>
<td>85.48</td>
<td>24</td>
<td>335</td>
<td>12</td>
<td>130</td>
</tr>
<tr>
<td>2003</td>
<td>85.84</td>
<td>31</td>
<td>322</td>
<td>13</td>
<td>62</td>
</tr>
<tr>
<td>2004</td>
<td>86.95</td>
<td>16</td>
<td>256</td>
<td>6</td>
<td>64</td>
</tr>
</tbody>
</table>
Table 3. This table summarizes Turkana’s mean temperature, number of precipitation days, and number of days Turkana went without rain in a year from 1997-2017.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean Temp</th>
<th>Precip Days</th>
<th>Rain Days</th>
<th>Days W/o Rain</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>87.64</td>
<td>5</td>
<td>158</td>
<td>7</td>
</tr>
<tr>
<td>2006</td>
<td>87.42</td>
<td>24</td>
<td>299</td>
<td>7</td>
</tr>
<tr>
<td>2007</td>
<td>87.27</td>
<td>22</td>
<td>306</td>
<td>5</td>
</tr>
<tr>
<td>2008</td>
<td>87.99</td>
<td>12</td>
<td>303</td>
<td>6</td>
</tr>
<tr>
<td>2009</td>
<td>88.94</td>
<td>4</td>
<td>280</td>
<td>10</td>
</tr>
<tr>
<td>2010</td>
<td>86.96</td>
<td>17</td>
<td>277</td>
<td>8</td>
</tr>
<tr>
<td>2011</td>
<td>85.31</td>
<td>27</td>
<td>331</td>
<td>8</td>
</tr>
<tr>
<td>2012</td>
<td>84.95</td>
<td>42</td>
<td>318</td>
<td>4</td>
</tr>
<tr>
<td>2013</td>
<td>85.47</td>
<td>39</td>
<td>317</td>
<td>10</td>
</tr>
<tr>
<td>2014</td>
<td>85.77</td>
<td>32</td>
<td>304</td>
<td>5</td>
</tr>
<tr>
<td>2015</td>
<td>86.2</td>
<td>14</td>
<td>284</td>
<td>NA</td>
</tr>
<tr>
<td>2016</td>
<td>86.11</td>
<td>9</td>
<td>228</td>
<td>NA</td>
</tr>
<tr>
<td>2017</td>
<td>85.64</td>
<td>8</td>
<td>220</td>
<td>NA</td>
</tr>
</tbody>
</table>

On precipitation.

The average amount of rainfall in Turkana has decreased over the years, just like that of Nyeri, except Nyeri still has a higher average as illustrated by the table and graphs below. For instance, Turkana received an average of 0.06 inches of rain in 1999 and about 0.018 inches in 2017, which is obviously a big difference in rain fall amounts that could have a huge impact on the people’s livelihoods. Nyeri on the other hand received an average of 0.25 inches in 1997 and 0.10 inches in 2017, which also indicates a decreasing
precipitation. If you observe the columns indicating number of rainy days and number without rainfall in table 3.1, you will notice that Turkana has had more rainless days than days full of rain. In fact, between 1998-2003, Turkana had more than 320 days without rain, which is close to a year of dryness. On the hand, the number of rainy days in Nyeri have also reduced over the years and significantly in the last two years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Nyeri Mean Temp</th>
<th>Nyeri Rainy Days</th>
<th>Nyeri No Rainy Days</th>
<th>Nyeri Conflict</th>
<th>Nyeri Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>64.03</td>
<td>152</td>
<td>136</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1998</td>
<td>64.58</td>
<td>105</td>
<td>140</td>
<td>NA</td>
<td>0</td>
</tr>
<tr>
<td>1999</td>
<td>65.35</td>
<td>44</td>
<td>136</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2000</td>
<td>64.58</td>
<td>9</td>
<td>52</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2001</td>
<td>64.21</td>
<td>120</td>
<td>212</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2002</td>
<td>64.38</td>
<td>137</td>
<td>208</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>64.87</td>
<td>116</td>
<td>168</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>2004</td>
<td>65.36</td>
<td>57</td>
<td>178</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>2005</td>
<td>65.65</td>
<td>91</td>
<td>197</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2006</td>
<td>65.36</td>
<td>155</td>
<td>187</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>2007</td>
<td>64.32</td>
<td>182</td>
<td>174</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>2008</td>
<td>64.52</td>
<td>144</td>
<td>208</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>2009</td>
<td>65.06</td>
<td>120</td>
<td>235</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>2010</td>
<td>64.36</td>
<td>126</td>
<td>183</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>64.48</td>
<td>151</td>
<td>213</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Year</td>
<td>Temperature</td>
<td>Precipitation Days</td>
<td>Number of Days without Rain</td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>--------------------</td>
<td>-----------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>2012</td>
<td>63.95</td>
<td>153</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2013</td>
<td>63.9</td>
<td>161</td>
<td>9</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>2014</td>
<td>64.12</td>
<td>171</td>
<td>4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>64.85</td>
<td>128</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2016</td>
<td>64.35</td>
<td>98</td>
<td>229</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>2017</td>
<td>64.65</td>
<td>67</td>
<td>173</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Table 3. 2: This table shows Nyeri’s mean temperature, number of precipitation days, and number of days Nyeri went without rain in a year from 1997-2017.

The data on the tables is interpreted on the graphs below so that we can identify observable trends over the years. Precipitation was measured using inches. Using a linear graph can easily illustrate the trend and whether the changes are negative or positive.
Graph 3. 1: This graph demonstrates the declining precipitation rate in Turkana and the minimal reduction in Nyeri’s rainfall over the years

**Analysis of weather findings in Turkana and Nyeri**

Climate index is a simple measure of the degree at which practical climate change is happening or the degree to which noticeable changes in the climate are noticeable to the lay person (NASA, 2016). According to the Global Maps of Climate Index, the climate index for Kenya and Tanzania is 1.5 °F or 0.75 °Celsius. This means that climate change will be noticed in these countries as the weather becomes warmer by 0.75 °Celsius. Turkana demonstrates noticeable climate change as its temperature increase exceeds the set climate index.

**Tanzanian Case Studies.**

*On temperature*
The 7 years recorded in the table below do not provide an adequate timeline to claim a temperature trend in both Dodoma and Morogoro; however, it seems as though both regions are experiencing an oscillation of decreasing temperatures. The table starts in the year 2000 because Tanzania does not have conflict data prior to 2000. Thus, since the multivariate regression involved analyzing all the variables together, I had to consider the lack of conflict data for Tanzania, when managing the data. Nevertheless, if you take 2000 to be the baseline, in the year 2016 Dodoma had a -0.42 °Celsius temperature change, while Morogoro’s difference was -0.64 °Celsius. However, the timeline is still not sufficient to claim a negative anomaly.

<table>
<thead>
<tr>
<th>Year</th>
<th>Dodoma Mean Temp</th>
<th>Dodoma Rain Days</th>
<th>Dodoma No Rain Days</th>
<th>Dodoma Conflict</th>
<th>Dodoma Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>74.2</td>
<td>5</td>
<td>20</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>74.09</td>
<td>35</td>
<td>254</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>73.19</td>
<td>53</td>
<td>306</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>73.17</td>
<td>51</td>
<td>312</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>73.62</td>
<td>43</td>
<td>319</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>73.19</td>
<td>62</td>
<td>299</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>74.37</td>
<td>34</td>
<td>318</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>73.78</td>
<td>45</td>
<td>311</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 3.3: This table demonstrates Dodoma’s mean temperature, number of precipitation days, and number of days Dodoma went without rain in a year from 1997-2017.

On Precipitation
Interpretation from both the tables and the graphs, demonstrates that Dodoma’s precipitation rate has reduced over the years though not significantly, while the rate of precipitation in Morogoro seems to be increasing.

<table>
<thead>
<tr>
<th>Year</th>
<th>Morogoro Mean Temp</th>
<th>Morogoro Rain Days</th>
<th>Morogoro No Rain Days</th>
<th>Morogoro Conflict</th>
<th>Morogoro Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>77.27</td>
<td>8</td>
<td>49</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>2010</td>
<td>78.17</td>
<td>46</td>
<td>231</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2011</td>
<td>77.11</td>
<td>97</td>
<td>262</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2012</td>
<td>77.28</td>
<td>69</td>
<td>295</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>2013</td>
<td>77.38</td>
<td>85</td>
<td>278</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2014</td>
<td>76.96</td>
<td>102</td>
<td>257</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>76.93</td>
<td>62</td>
<td>295</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>2016</td>
<td>73.78</td>
<td>69</td>
<td>291</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3. 4: This table shows Morogoro’s mean temperature, number of precipitation days, and number of days Morogoro went without rain in a year from 1997-2017.
Graph 3. 2: These graphs display the declining precipitation rate in Dodoma and the rising precipitation rate in Morogoro over the years.

**Analysis of weather findings in Dodoma and Morogoro**

From the minimal data on Tanzania, it is hard to conclusively say that Tanzania or the specific areas of Dodoma and Morogoro are experiencing adverse climate change. The region experiences a bit of climate variability, but it is not large enough to register anomalies or significantly change lifestyle. However, these findings are in agreement with other scholars studies (Paavola, 2008), which find that extreme rainfall variability is one of the most telling signs of climate change in Morogoro. Despite experiencing its highest and lowest rainfall years for the first time, Morogoro’s mean annual rainfall has decreased since the 1950 (Bryceson, 1990).
Findings for Conflict and Weather Patterns  

a) Kenya Paired Case-Turkana and Nyeri counties

I found that Turkana experiences an increased number of conflicts when there is both high and low rainfall. However, the number of conflicts is significantly higher when the amount of rainfall is really low. The second part of this finding was surprising to me because I did not expect high rainfall to be followed by high levels of conflict. However, other scholars (De Juan, 2015; Witsenburg & Adano, 2009) have found similar occurrences in neighboring regions such as Marsabit, Moyale, and Darfur in Sudan. Some relate this behavior to the fear of the uncertain future. Therefore, most people in these communities get into tensions with their neighbors for hoarding resources when they are plenty. Witsenburg & Adano found that communities were more friendly when they were facing scarcity. Therefore, having more resources when it rains creates an incentive to raid neighboring communities for cattle to serve the future dry times. In the case of Turkana, there is an upward slope in terms of conflict that is related to the lack of rainfall. This means that conflict events appear to be increasing with an increase in the number of days without rainfall. This also means that there are more conflict events when there is a greater number of days without rainfall. Graph 3.3. below illustrates the relationship between conflict and rain in Turkana.
Graph 3.3: This graph demonstrates the relationship between conflict and lack of rain in Turkana. Higher rainfall is associated with high levels of conflict.

As demonstrated by Graph 3.4 below, the relationship between the lack of rainfall and conflict in Turkana is almost similar to the relationship between rain and conflict in Turkana.
Graph 3.4: it demonstrates the relationship between lack of rainfall and conflict in Turkana

When graph 3.4 is interpreted into the scatter plot below (Graph 3.5), it indicates a positive linear relationship between the number of days without rainfall and the number of events of conflicts, that is, more days without rainfall are associated with a relatively high number of events of conflicts, and vice versa. However, in the case of Nyeri, there is no significant relationship between Events of Conflict and Days without Rainfall. The level of armed conflict is low regardless of whether there is a high average of rainfall throughout the year or a low precipitation rate.
Graph 3.5: A positive linear relationship between the number of days without rainfall and the number of events of conflicts in Turkana.

- The line graph below (Graph 3.6) shows a comparison of the events of conflicts in Turkana and Nyeri with regard to rainfall. This graph summarizes the findings for the Kenyan paired cases: armed conflict in Turkana is associated with high and low amounts of rainfall, while armed conflict in Nyeri is neither affected by the presence nor the absence of rainfall.
Graph 3. 6: A summary of the Kenyan Paired Cases findings.

**Tanzanian Paired Cases-Morogoro and Dodoma Districts.**

The graph 3.7 below summarizes the relationship between conflict and weather patterns in the Tanzanian paired case. According to the graph, there is no relationship or it is insignificant.
Graph 3.7: These graphs underline the findings of the Tanzanian Paired Case studies.

**On prior history of conflict for all cases**

In my argument, I considered a community’s history with violence/armed conflict to be a moderator or a confounder in the interaction between climate and conflict. The prior history of a community creates conditions that set the background for the climate-conflict nexus to play out. So as explained in earlier chapters, pre-existing conditions that aided the occurrence of prior conflicts could still exacerbate conflict influenced by climate change if those same conditions still exist.

The fact that there was no conflict data about Dodoma and Morogoro prior to 2000 is proof of Tanzania’s general lack of a violent history. Looking at the number of conflicts that resulted in the highest number of deaths, 2000 marks the year with the highest number of conflict events (with a number greater than 20) in Dodoma, while the rest of
the years are unremarkable in terms of conflict for Dodoma despite slight weather variability. Kenya’s history with conflict was discussed in the Introduction chapter. To summarize the relevant details: Turkana has continually experienced civil conflicts pre-independence and post-independence, while Nyeri’s extreme violent days date back to the struggle for independence in Kenya. Therefore, out of the 4 cases, only Turkana has a violent history of conflict.

Findings on Government exclusion/neglect

As explained earlier, government exclusion was determined on three factors: representation in the central government, development and infrastructure in the region, and public sentiment. I did not include the Tanzanian case studies in this government neglect analysis because they are neglected by their government or not, it will not matter for my analysis, because they already failed in the first hypothesis, so there is no need to proceed to the second hypothesis.

Nyeri County

I found that Nyeri has a lot of representatives in the government. For instance, the third president of Kenya, Mwai Kibaki’s home is located in Othaya town, which is part of Nyeri county. Even the famous Nobel Peace Prize Laureate and great environmentalist, Wangari Maathai hails from Nyeri county. In terms of development, Nyeri very developed in comparison to other counties in Kenya. For example, “As of 2013, there are 584 primary schools and 194 high schools in Nyeri County, serving 145,906 and 47,524 students respectively. The county's Teacher to Pupil Ratio is 1:35 for public primary schools and 1:25 for public high schools” (KenyaInformationGuide, 2015a). Nyeri county also has 4 colleges or training institutes. Education breeds
development and these public schools are built by the government, which shows a concern for the residents of Nyeri county. Nyeri relies on agriculture as the main economic activity. “In 2012, Nyeri farmers earned 2.58 billion in tea bonus payments”(KenyaInformationGuide, 2015a). They also engage in horticultural, dairy farming, and fish farming. Another marker for development is the fact that Nyeri has several hospitals and health centers. When it comes to public sentiment: I did not find any disgruntled Nyeri residents while carrying out my research

**Turkana-Northern Kenya**

On representation in the central government, Turkana has always been on the periphery of national politics since independence. The county lacks main representation in the main positions of power of the Kenya government. When it comes to development, Turkana largely lags behind the rest of the nation. For example, “As of 2013, there [were] 202 primary schools and 19 high schools in Turkana County, serving 122,883 pupils and 40,004 students respectively. The county's Teacher to Pupil Ratio is 1: 51 for public primary schools and 1:28 for public high schools” (KenyaInformationGuide, 2015b). Turkana is the second largest county, yet it has less schools than Nyeri, which is way smaller (3337 square kilometers vs Turkana’s 68, 680 square kilometers). Turkana also has a few high schools and 4 higher institutions of learning, which means that with lack of quality education, the region will continue to stagnate. Turkana has three district hospitals, which also indicates poor health service, as three district hospitals are not enough to serve the second largest county with almost a million plus people. The Turkana are the second largest pastoral community in Kenya after the Maasai, so since their lives revolve around cattle, access to water sources has been a major source of conflict of conflict since the government did not build enough
boreholes as a result of neoliberal policies. Throughout my research, it was obvious that Turkana people feel marginalized by the government. In fact, some Turkana residents have called out the Kenyan government for continually neglecting them all these years, and especially now as it gets drier. In the interviews carried out by *Unjust Burden*, they begged the government to help them transition to farming in order to find new means of livelihood, as it gets unbearable to continue living as pastoralists.

**Explanations/Analysis**

Lack of rainfall is associated with dryness, environmental scarcity, and resource conflicts, hence its correlation with conflict as the impacts of low rainfall cause tensions in the society. Government neglect positively influences this situation as the people who are already experiencing reduced resources due to lack of rainfall do not receive government help to deal with their new scarcity. This was exemplified by the oral interviews documented in the book *Unjust Burden*, which was discussed in the previous chapter. Tensions arising from the fight over the little remaining resources, water, or pasture, might then escalate into violence, especially when people have access to modern weapons from their historical encounters with armed conflict.

On the other hand, it is surprising that people would still fight even when they had resources stemming from abundant rainfall. However, these findings are not rare, as some other scholars such as (Adano, Dietz, Witsenburg, & Zaal, 2012) found that wetter years created favorable conditions for cattle raids in Marsabit—Northern Kenya while (De Juan, 2015) found that high precipitation in Darfur—Sudan was associated with violent conflict. My findings ae thus in agreement with Clionadh Raleigh and Dominic Kniveton.
(2012), who also found that conflict in East Africa arises with extreme rainfall variability (Raleigh & Kniveton, 2012). Some scholars (Ember, Adem, & Skoggard, 2013) associate this concept with fear of loss, which they argue is more motivating in a fight for resources than an actual fight for resources.

Turkana qualified for all the three hypotheses and that is why it is my main positive case study. Its history of violence has influence its response to climate change i.e. cattle raiding in response to drier times and wetter times as well. Or rather, the Turkana people are responding to this new phenomenon the same way they have always led their lives. The situation is exacerbated by the fact that the government does not step in to help them transition into some a lifestyle that adapts to climate changes. Turkana is therefore facing imminent danger because the more adverse the changes in climate are, in addition to its violent history and government neglect, the more disastrous the armed conflict is likely to be.

**Conclusions for this chapter: Why is there conflicting information on the outcomes?**

My findings conflict with many previous studies (O’Loughlin et al., 2012), which find that low rainfall is not associated with increased conflict. These differing findings may be the consequence of different research strategies and sources of data. This also highlights some of the challenges associated with the climate-conflict link. There is little consistency in the findings amongst researchers of this topic. However, the constant finding is that climate change is associated with some sort of conflict and this is exacerbated when certain moderating variables such as government exclusion are put in place. The case of Turkana county answered the three hypotheses, as it demonstrated an
association between climate change and conflict and demonstrated how moderating factors such as a region’s prior history with conflict and government neglect can accelerate or multiply threats resulting from adverse climate change.
My thesis work was partly inspired by my fellow Kenyan and environmental political activist, the 2004 Nobel Laureate Wangari Maathai. Maathai founded the Green Belt Movement in 1977 to tackle deforestation and other social issues by planting trees (Maathai, 2006). During the UN Framework Convention on Climate Change COP15 meeting in Copenhagen, Wangari Maathai said, “Climate change is an issue of security both locally and internationally,” (Maathai, 2009). During her speech, she also emphasized that it was up to the developing world to convince Northern states that the threat of climate change is real, so that they could start taking action against the severity of climate change (Detraz, 2011). Wangari Maathai was ahead of her times as she was able to foresee the dangers associated with climate change. By writing this thesis, I hope to continue Maathai’s legacy by bringing attention to one of the biggest challenges facing our era and especially vulnerable groups. I hope that this awareness will not only prompt the creation of policies which will address the adaptation and mitigation of climate change, but will also encourage leaders and communities to address other pertinent socio-economic and political issues working in conjunction with emerging issues, such as climate change to reduce the quality of life of millions of people.

At the center of my argument is the concept of “convergence.” I have not made a monocausal claim about climate and the rise of armed conflict. Instead, I’ve argued that there is a correlation between climate change effects, the increase of armed conflict, prior history of violence, and government neglect in certain regions. What differentiates those regions from other is the presence of mediating factors which converge with both past and present conditions to produce disastrous effects. As illustrated by my previous
chapters, my thesis focuses on two such factors: government exclusion and prior history of violence. I chose these two factors because I believe that the addition of adverse climate change can create a pathway that could exacerbate armed conflict. These two factors alone render a society less safe, so the addition of climate change multiplies the threat of intensifying conflict. Therefore, climate change can only drive conflict in a society that already had the potential to fall into armed conflict. I provide the examples of Nyeri and Turkana, regions of Kenya that are both experiencing climate variability. However, the ways in which each responds to climate change effects varies markedly. As explained in the previous chapter, the average amount of rainfall might have decreased in Nyeri but the people of Nyeri are relatively immune to such changes in rainfall and are well-protected by the government to cope adequately with any alterations to their society.

I structured my argument under this convergence notion to avoid neglecting other factors or underlying conditions that also need to be addressed. Such factors include the history of tensions in these regions, such as the long history of civil conflict in North Western Kenya, which continues to undermine stability in the region. These conflicts have multiple sources, including ethnic tensions, cattle raiding, and the spillover of conflict from neighboring communities or countries such as South Sudan, Uganda, Ethiopia, and Somalia, which facilitates the flow of arms into already warring communities.

Before we manage climate change or while we are in the process of learning how to live with it, we need to deal with current and past issues that continue to affect the peace and stability of our society. This is because those issues make our societies vulnerable to the occurring changes. As demonstrated in the previous chapters,
communities that have existing tensions such as the Turkana and Pokot do not need another reason to fight. A new reason such as a dried boreholes could easily spark never-ending clashes. When it’s already difficult for two communities to coexist peacefully, effects of climate change exacerbate tension and make cooperation even more difficult.

As I describe in this thesis, I find that Dodoma in Tanzania has moderate changes in the weather compared to that of Turkana, yet it does not have violent reaction partly because a) the climate changes are moderate so not that impactful and b) the communities in Dodoma do not have the same historical tensions or rather, they lack prior history of conflict, so they do not have existing lines where mobilization or actions of violence could easily follow. It is even less of an issue for homogenous communities, such as Nyeri community which is mainly made up of the Kikuyu. Specifically, due to the lower barriers to collective action that scholars associate with spaces of ethnic homogeneity, it makes sense that people are better able to mobilize collectively in the face of climate changes in places such as Nyeri. I discuss the need to further address historical tensions under policy implications. Nevertheless, my thesis demonstrates that when placed in the right historical context and local practices, one can still see a correlation between climate change and increasing armed conflict for communities with a history of conflict.

**Policy implications**

I wrote my thesis not only to analyze how climate change is affecting our society, but also to contribute to the policy-related discussions around how to respond to and manage the effects of climate change. This section will discuss the progress made so far in addressing climate change by the Kenyan government. I focus my policy implications on Kenya because that is my country of my interest and my motherland. However, my
policy recommendations can be adapted to countries with similar structures and issues like those of Kenya.

**The Current Response to Climate Change by the Kenyan government**

During my thesis research, I went to the Climate Change Department (CCD) in Kenya to see their work and interview government officials on the government’s response to climate change. It was clear that the government through this department has done its homework. I met with Peter Omeny, a climate change department official who works in the mitigation department. In our conversation, he spoke to me about some of the signs that the Kenya Meteorological Department (KMD) considers to be the evidence for climate change in Kenya. These include; a rise of extreme rainfall, prolonged dry season, longer droughts duration, and a rise of severe and intense extreme climate patterns. He said that the government has responded to changes in the climate by coming up with a Climate Change Act and a National Climate Change Action plan, which includes all the actions that are required for climate change adaptation e.g. resilience building and response to change extreme events. These actions are mainly sector based, meaning they address key sector areas that largely contribute to emissions of greenhouses such as transport, industrial processes, waste management, and other sectors that could reduce emissions such as forestry, agriculture, land use, and energy use.

Some of the action plans undertaken by the Kenyan government include: the introduction of a Bus Rapid Transport system (BRT) i.e. the Kenyan government wants to do away with the 14-seater minivans or locally referred to as *matatus* and introduce larger carrier buses to transport more people in the Nairobi city hence reducing
emissions, the introduction of a smart agriculture, agro-forestry, which involves combining trees and crops while planting, crop insurance whereby farmers are encouraged to use weather information in farming so in case of crop failure you are compensated. Under the forestry sector- the government is protecting the 5 water towers/water catchment areas under the Kenya Water Towers. They include: Mouth Kenya, Aberdares, the Mau, Cherangany, and Mount Elgon-these areas harbor the major rivers in Kenya. The Kenya Water Towers is a state agency that protects the water catchment areas through reforestation and restorations of degraded land by planting bamboo trees because they purify water. The aim of this agency is to ensure that the water catchment areas are protected to continue providing for eco-system purposes, for instance, the forest absorbs Green houses

When it comes to management of Industrial process, the government has marked the major sources of harmful emissions in the industrial area. For instance, Athi river industrial area has been marked since the five cement processing factories there produce carbon dioxide, sulfur, and nitrous. They have also marked quarry and slaughter-houses, which produce methane and CH4 from urine. Methane is the worst greenhouse gas, because it is reactive and destroys the ozone layer. It also intends to build industries that uses waste to produce energy. Waste adds methane and nitrous gases during its rotting, but the methane can be burnt, and the consequent energy used to turn a turbine. The government of Kenya has also committed to Nationally Determined Contributions (NDCs) under the Paris agreement countries. These are commitments made by countries to reduce climate change i.e. countries commit to reduce greenhouse emissions by 1.5 degrees or below 2 degrees centigrade.
Implementation thus far.

After all the talk about what the Kenyan government will do or plans to do, I had high expectations of policies that would have been carried out so far. However, according to my informer, the only thing they had done so far was build a big wind power farm at Ngong (the biggest is in Marsabit, which is in northern Kenya) and which feeds power to the national grid. That is a big step, however, climate change needs multiple bigger steps and our government needs to act first, instead of waiting for the next election year to fulfil their promises.

During my visits to the CCD and KMD, I also had causal conversations with other officials. One of them casually said, “We are not ready at all for effects of climate change.” According to him, readiness looks like the ability to respond to any unlikely event, however that is not the case in Kenya. He gave an example of the inaction by the government after predictions based on historical data forecasted the occurrence of the last drought. I agree with these officials because every time I hear a Kenyan politician talk about climate change, it is always in futuristic manner, as though climate change is an event of the future. The fact that most of the suggested policies only focus on Nairobi is also problematic, because the areas that will be affected the most climate change, lie on the periphery.

Specific Policies

Based on my findings linking climate and armed conflict, I emphasize the following key point where the Kenyan government should focus its efforts. These include infrastructure development, confronting historical grievances, creating an
emergency fund for climate-related disaster for every county, and creating a think tank that will help us address the effects of climate change in a Kenya-specific way.

*Build infrastructure*

Infrastructure is necessary for the development of a nation, and especially in times of crisis. Strong permanent structures are needed to withstand heavy or extreme weather events. For instance, roads and bridges that do not fall with heavy rains or floods and boreholes and wells that withstand droughts, amongst other structures. Resource distribution should be increased and distributed equally across the nation so that different communities can have access to basic infrastructure. There are parts of Kenya such as Northern Kenya which look different from the rest of the country because they are very underdeveloped. For instance, the standard newspaper recently reported that bad roads and bandits prevent supplies from reaching Turkana people and hence denying the Turkana a decent meal (Omondi, 2017). If the government builds better roads in these areas, emergency response teams and resources would also get to the people quicker than they currently do.

*Address historical tensions*

Historical tensions worsen the effects of climate change because they provide a backdrop under which current tensions can be acted upon. For instance, during dryer months and years, the Turkana and Pokot tend to raid each other more in order to replenish their stock reduced by long droughts. There needs to be some sort of reconciliation process in order to address historical frictions between different ethnic communities. As long as those exist, there will always form a basis for people to mobilize and act violently against one another. One way these reconciliations could happen is
through peace talks and integration activities. I have a friend who has used soccer to try and bring together the Turkana and Pokot communities. Through activities like these, people are forced to debunk stereotypes they have of each other and see the humanity in the Other thus softening their hard stances on one other.

*Create emergency funds and resources for every county*

Another way governments could adequately adapt and mitigate to climate change is by creating emergency funds that are present regardless of the weather. In the ongoing drought in Kenya that began around October 2016, the government was not able to respond in time to some counties. That is how my family and other people from my region lost hundreds of cattle in the 2017 Kenyan drought, despite all the early warning signs.

*Create a think tank that address country-specific climate change problems*

Climate change is a global issue, but the response should be country specific because how it impacts an area depends on the region’s vulnerability and ability to respond suitably to the changes in the climate. Therefore, we need to change our approach by bringing together the best minds in the nation and local communities to design solutions that work for our specific responses to the climate changes in our nation.

*What does my thesis tell us about the broader problem?*

I believe there is a problem with the way scholars focus on climate change and conflict statistics but not necessarily on the lives of millions of people who are actually living in the midst of effects of climate change. In my research, I came across multiple articles
drawing statistics and figures but not telling stories of actual people. Maybe that is part of the research process, but I believe we need to put faces to the numbers of millions of people whose lives are being made worse by climate change.

Questions for further research.

Now that we have recognized the problem, we need to turn our focus to creating and designing solutions. Therefore, more research needs to be done on how to effectively adapt and mitigate to climate change within our capacities. We also need to research on the extent to which our societies can adapt and what can we do in the cases where it is beyond our capacity.


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Appendix.

Appendix 1: Coding Procedures

1. I started by subsetting the data, which basically means cleaning up the data. This process was carried out as per the areas of interests, so in the case of Kenya, I reduced the excel/csv sheets to only include Turkana and Nyeri.

2. This was followed by the classification of events of armed conflicts based on actors. I included both state and non-state actors in my analysis.

3. A key factor in determining the level of conflict was aggregating the number of fatalities, which showed whether a region was facing a high level of conflict or not. I consider twenty deaths to be the average number of deaths, and more than that in a year was defined as high level armed conflict.

4. After compiling my armed conflict data, I went on to aggregate the yearly weather patterns for temperature and rainfall for both Kenya and Tanzania. After recognizing that temperatures across the years had an average that was not so significant, though they appeared to increase by a very small degree, I decided to use precipitation as my measure of weather variability. Furthermore, I do have the necessary scientific knowledge required to properly analyze the nuances in temperatures.

5. After compiling my rainfall and armed conflict data, I created a visualization of the data using graphs in order to clearly see the association between my variables and hence answer my hypothesis. I will use the regional impact graphs as analytical frameworks.

Appendix 2: A mapped distribution of armed conflict in Northern Kenya
Appendix 3: a geographical representation of armed conflict in the rest of Kenya and Northern Kenya?
Source: UCDP/PRIO Armed Conflict Dataset