Centre of Excellence
Defence Against Terrorism

Climate Change and Terrorism

NATO COE-DAT
Research Project

Elif Çolakoğlu (Türkiye)
Editor

Centre of Excellence - Defence Against Terrorism
Ankara, Türkiye, 2025

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Preface

The Centre of Excellence Defence Against Terrorism (COE-DAT) is pleased to present this book, which explores the complex interplay between climate change and terrorism—one as a direct security threat and the other as a profound factor influencing global stability.

In recent years, climate change has increasingly been recognized as a destabilizing factor that exacerbates existing security threats. Rising temperatures, extreme weather events, resource scarcity, and environmental degradation create conditions that may contribute to political instability, forced migration, and competition over dwindling resources. In parallel, terrorist organizations continuously adapt to shifting geopolitical landscapes, often exploiting vulnerabilities that arise from these environmental changes.

Understanding the intricate relationship between terrorism as a security threat and climate change as a profound impact on global stability is crucial for developing comprehensive and forward-looking strategies. Recognizing this need, COE-DAT initiated a research project to examine how climate-induced factors influence terrorism and to identify potential countermeasures that policymakers and security professionals can employ to mitigate their impact effectively. This book is the result of extensive research and collaboration among experts in security studies, environmental science, and international relations. It provides a multidisciplinary perspective on the evolving nexus between climate change and terrorism, offering insights into how climate-driven stressors may shape terrorist tactics, recruitment, and operations in the coming years.

By fostering discussion and enhancing our collective understanding of these critical issues, we aim to support NATO Allies and Partner Nations in their efforts to develop adaptive and resilient security policies. COE-DAT remains committed to advancing knowledge in this field, contributing to a safer and more secure global environment through research, education, and cooperation.

Halil Sıddık AYHAN
Colonel (TUR A)
Director, COE-DAT

Acknowledgements

Climate change and terrorism are two interconnected global challenges that pose significant risks to security and stability. This project, spearheaded by the Centre of Excellence Defence Against Terrorism (COE-DAT), explores the complex relationship between these critical issues and aims to provide a deeper understanding of their implications for global security.

The primary objective of this book is to analyze the effects of climate change on security, with a particular emphasis on its impact on terrorism. Through the collective expertise and dedication of our contributors, this volume offers valuable insights and actionable recommendations for policymakers and practitioners.

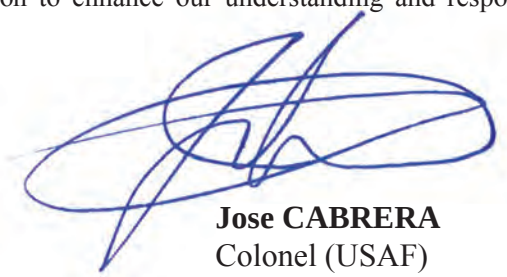
We extend our sincere appreciation to the distinguished group of authors for their invaluable contributions: Dr. Katie Woodward, Dr. Hengameh Irandoust, Lt. Col. Cristian Ciulean (ROAF), Dr. Andrew Sirjoosingh, Assoc. Prof. Dr. İzzet Arı, Assoc. Prof. Dr. M. Cem Oğultürk, Asst. Prof. Dr. Hakan Ömer Tunca, Dr. Çağla Vural, Assoc. Prof. Dr. Senem Atvur, Assoc. Prof. Dr. Ceren Uysal Oğuz, Assoc. Prof. Dr. Sanem Özer, Mr. Stephen Harley, and Res. Asst. Aslıhan Alkanat (Ph.D. Candidate). Their research and dedication have been instrumental in shaping this publication.

We would also like to express our deepest appreciation to Prof. Dr. Elif Çolakoğlu, the editor of this book, for her meticulous guidance and commitment to ensuring the quality and coherence of this work.

A special acknowledgment is due to the Project Director, Lt. Col. Nevzat Tekneci (Turkish Gendarmerie), for his visionary leadership and tireless efforts throughout this project. His coordination and commitment have been crucial in bringing this initiative to fruition.

Additionally, we appreciate the contributions of the Climate Change and Security Centre of Excellence (CCASCOE), which has provided valuable insights through its authored chapters, further enriching the discourse on this critical topic.

This book stands as a testament to the importance of collaboration and research in addressing emerging security threats. COE-DAT reaffirms its commitment to fostering innovation, analysis, and cooperation to enhance our understanding and response to evolving global challenges.



Jose CABRERA
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DISCLAIMER

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Contributors

Project Manager & Editor

Elif Çolakoğlu is Professor of security sciences with the Faculty of Security Sciences at the Gendarmerie and Coast Guard Academy (GCGA), Ankara, Türkiye. She graduated from the Department of Public Administration at Selçuk University (2000) and received her MSc from at the Department of Public Administration of the Social Sciences Institute of the Selçuk University in 2002. From 2002 to 2008, she worked as research and teaching assistant at Ankara University, Faculty of Political Sciences, Department of Political Science and Public Administration, and also earned her PhD Degree. Between the years 2008 - 2018, she worked as an assistant professor in the Department of Public Administration in the Faculty of Economics and Administrative Sciences of the Atatürk University in Erzurum, Türkiye. She worked as a manager in this Faculty for many years after receiving the title of associated professor from the T.R. Inter-University Board Presidency in Ankara, Türkiye. She has been leading the department of public administration for post-graduate programs at the Security Sciences Institute since he joined the GCGA in 2018.

As a visiting scholar, she also studied abroad at the Urban Center on People and the Environment, Institute of Environment (IoE), University of California, Los Angeles (UCLA) in Los Angeles, the USA; the Center for Urban Environmental Reform (CUER), the City University of New York (CUNY) School of Law in New York City, the USA; The Fletcher School of Law and Diplomacy, Tufts University in Boston City, the USA; and the Near East University in Lefkoşa, the Turkish Republic of Northern Cyprus, and took part in international projects in different years. Water, food, climate and energy security which directly linked to environmental security issues, (mass) migration and critical infrastructures, are among her main areas.

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Aslıhan Alkanat works as a research assistant in the Department of Political Science and International Relations at Istanbul Medipol University. She is also a PhD Candidate in the Department of International Relations at Istanbul Medeniyet University, and earned her BA and MA degrees in Political Science and International Relations from Yıldız Technical University. Previously, she worked as a research assistant at several leading think-tanks. Her research interests encompass international security, terrorism, PKK, and diaspora studies. She has published numerous academic articles and book chapters and

[1] The authors are listed in alphabetical order by their last names.

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İzzet Arı currently works at the Social Sciences University of Ankara, Türkiye. He holds a BSc degree in Environmental Engineering from METU, an MSc degree in Environmental Engineering from METU (2010), and Sussex University (UK). He completed his PhD at METU. His research interests include sustainable development, the green economy, climate change policy, renewable energy, and environmental economics. He has authored numerous international scientific publications in the fields of climate change, environmental and energy policy, and the green economy. He has nearly 15 years of experience working in public institutions, including the State Planning Organization, the Ministry of Development, and the Ministry of National Education. Between 2011 and 2018, he contributed to the United Nations on issues related to Agenda 2030, Sustainable Development Goals (SDGs), development finance, and the green economy. He has extensive experience in project management and the preparation of low-emission development strategies and net-zero emissions policy scenarios across various sectors. Since 2007, he has actively participated in UNFCCC climate change negotiations, particularly in the areas of mitigation, carbon pricing and finance.

Senem Atvur is Associate Professor of international relations with the Faculty of Economics and Administrative Sciences at Akdeniz University since 2014. She graduated from the Department of International Relations at the Galatasaray University in 2004. In 2008, she received her master's degree from Department of Public Administration at the Akdeniz University. In 2012, she completed her doctorate in the same department with her thesis titled "The Consequences of Global-Local Social Movements Against Global Water Policies". She conducted her PhD thesis study at the Université de Poitiers in France from 2010 to 2011, and she received a TÜBİTAK scholarship to conduct post-doctoral research at the Coventry University Center for Trust, Peace, and Social Relations in England from 2014 to 2015. She works on environmental policies, climate change and water problems, ecological security, international and regional policies. In addition, she gives lectures such as International Relations Theories, International Environmental Problems, Introduction to International Relations.

Cristian Ciulean is a meteorologist and climate specialist with over 20 years' experience in weather analysis and climate studies. He has worked in operational environments, providing critical support to missions that required accurate weather forecasts and climate insights. His career includes two operational tours in Afghanistan, where he provided vital meteorological support for mission planning and execution under demanding conditions. He has represented Romania at international conferences

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Stephen Harley is a former British Army officer who has latterly worked in Iraq & the pan-Arab region for the US government, in Afghanistan for NATO and in Somalia for the UN and the UK Foreign, Commonwealth & Development Office in the fields of counter-terrorism, Preventing & Countering Violent Extremism (P/CVE) and Strategic Communication. He currently works for the UK Foreign, Commonwealth & Development Office as a consultant with a broad remit of countering the al-Qa'ida linked terror group, al- Shabaab. He has published extensively on Somalia, most recently contributing two articles to the UN's seminal study, 'War and Peace in Somalia: National Grievances, Local Conflicts & al-Shabaab'. He also contributed two chapters to COE DAT's 'Good Practices in Counter-terrorism' on Hard, Soft & Smart Power and Negotiated Settlement in Counter-terrorism. He also covers East African issues for The Economist Group and is a PhD candidate at the University of Strathclyde in Glasgow, writing under the title 'Creative Writing as a Treatment for Post-Traumatic Stress Disorder'. He can be contacted at stephenharley@me.com

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Andrew Sirjoosingh is a defence scientist with Defence Research and Development Canada, a part of the Department of National Defence (DND) of Canada. He has several years of experience with DND, providing operational research support to the Canadian Armed Forces, ranging from quantitative analyses for materiel support to advancing data science/analytics capabilities for the enterprise. In June 2024, he joined the NATO Climate Change and Security Centre of Excellence (CCASCOE) as a part of the Research, Analysis, and Lessons Learned branch. He holds a PhD in Chemistry (physical/theoretical) from the University of Illinois at Urbana-Champaign and originally hails from Ottawa, Canada.

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Çağla Vural is currently a postdoctoral fellow at Akdeniz University, where she is conducting a research project on the impacts of marine invasive alien species in the Eastern Mediterranean on Türkiye's economic, ecological, and human security. Her research areas include international relations theories, environmental security, climate change policies, environmental issues, and waste trafficking. Her work particularly focuses on the security implications of environmental challenges and their connections to global dynamics. She has published numerous articles and book chapters on national and international platforms and presented her findings at scientific conferences. Her research adopts a solution-oriented perspective on complex global issues, offering in-depth analyses of environmental and security policies. In addition to her academic endeavors,

she has participated as a researcher in various projects. Through her interdisciplinary approach, she continues to contribute significantly to the fields of international relations and environmental security.

Katie Woodward is the Deputy Head of Research, Analysis, and Lessons at the NATO Climate Change and Security Centre of Excellence (CCASCOE) in Montreal, Canada. Seconded from the UK's Defence Science and Technology Laboratory (Dstl), where she is a Fellow in Climate Security, she is internationally recognised for her expertise in applying cross-disciplinary methodologies to address complex societal and security challenges. She holds a PhD from the International Centre for Research in Forensic Psychology at the University of Portsmouth, UK, and a BSc in Psychology from the University of Plymouth, UK. Prior to joining CCASCOE, she led and developed the UK's Support and Sustainability Science and Technology Programme, which equips the UK Ministry of Defence with scientific evidence to address climate change challenges and embed sustainability within military operations. Through her leadership of research, academic contributions, and teaching roles, Katie works at the forefront of supporting military and governmental institutions in tackling climate security challenges.

Introduction to Climate Change and Terrorism

Elif Çolakoğlu*

More than ever, climate change is seen as a new, direct, and complex danger to national security. The situation appears to be rather harmful when taking into account its consequences, particularly through catastrophic weather occurrences. As a result, there may be a risk to both the future of humans and our planet. The ecosystem has been damaged by thunderstorms, heat waves, droughts, forest fires, and floods. By way of example, it's obvious that the recent extreme events in Europe, where the climate is changing quickly, are a sign of what's to come with global warming. 32 European nations alone reported 5,582 deaths from floods and 702 deaths from wildfires between 1980 and 2022. Approximately 30% of those living in southern Europe live under constant water stress, and one in eight Europeans currently reside in locations that could flood from rivers. These extreme weather events pose several security hazards and have a significant impact on infrastructures like food distribution systems, energy, water, transportation networks, and sewerage systems. They are becoming more frequent, in particularly in coastal areas. The community living here is exposed to harsher weather conditions, negatively affecting their health. (European Environment Agency, 2024: 105) Especially, the direct and indirect effects of climate change frequently place vulnerable or disadvantaged groups—women, children, indigenous people, the impoverished, and others— (Cappelli, 2023; Islam and Winkel, 2017; Costello *et al.*, 2009; Birkmann *et al.*, 2022: 1181; Leal Filho *et al.*, 2017; National Collaborating Centre for Indigenous Health, 2022) at greater risk. These groups are already more vulnerable to health stressors like extreme heat, floods, poor air quality, and other climate-related events.

On the other hand, long-lasting droughts have impacted the security of millions of people's access to food, water, and sanitary facilities all over the world, and mass migration has been happening for more than ten years. According to the WHO (2024), the Horn of Africa Region, which includes Djibouti, Ethiopia, Kenya, Somalia, South Sudan, Sudan, and Uganda, is experiencing its worst drought in recent memory. The COVID-19 pandemic , years of conflict and instability, rising food prices partly due to the war in Ukraine, and millions of people suffering from acute hunger, are some of the causes of this. Currently, 50.1 million people in the region are estimated to be affected by crisis levels of food insecurity. Of the 11.4 million children under five who are known to suffer from acute malnutrition, 2.9 million are considered to be severely malnourished. Many disease outbreaks, such as those involving cholera, measles, malaria, dengue fever, and diphtheria, are occurring in the region. The frequency of epidemics is rising

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due to many factors, including conflict, drought, flooding, displacement, starvation, and restricted access to healthcare. The tremendous food insecurity that many families face has forced many of them to flee their homes in search of pasture, water, and food for their animals. Large-scale displacement is typically associated with a decrease in sanitation and hygiene. As of December 31, 2023, the region was home to about 24.1 million internally displaced people, refugees, and asylum seekers, of which 14.9 million were relocated internally as a result of conflict and 4.4 million as a result of natural catastrophes such flooding and drought. The countries in the region with the largest numbers of internally displaced people were Sudan, Ethiopia, Somalia, and South Sudan. (World Health Organization, 2024; World Health Organization, 2023) Also, establishing legal protection for environmental values like water (Çolakoğlu, 2010: 153) is seen as a part of the growth of modern human rights in this context of insecurity brought on by climate change. Considering the development of the modern era, these rights are mainly discussed and defined within the context of "individual security" as it relates to national security. However, over time, in the context of protecting these rights, the issue of being brought to the agenda as a part of international security rather than being taken into account in national security is being examined. In this context, whereas some nations would rather accept the relevant rights into their legal frameworks, others approach this cautiously and would rather reject it out of concern that it would compromise the concept of national sovereignty. Due to the possibility of interventions directed against their misuse, these challenges undoubtedly make it difficult for these rights to be widely accepted worldwide. (Çolakoğlu, 2021) But the reality is that, much like in African nations, there is no denying the obvious violations of human rights caused by climate change as a direct or indirect threat multiplier.

The majority of these issues, such as droughts, forest fires, and floods, which are primarily the result of large economies, are or will be felt most severely in developing economies since they have fewer natural resources and a lower ability to adjust to the difficulties brought on by climate change. These are the most costly and damaging catastrophes for nations. Natural catastrophes such as typhoons, landslides, hailstorms, and torrential rains cost China alone in the first nine months of 2023 about US$42 billion in direct economic losses. Disasters in Africa from 1970 to 2021 cost US$43 billion in lost revenue, with 95% of deaths being related to droughts. Europe accounted for 8% of all disaster-related deaths worldwide, with recorded damages totaling US$562 billion. (World Economic Forum, 2023b) A 2023 study found that the annual cost of natural disasters might be attributed to climate change at an annual average of US$143 billion. It indicates that human life loss constitutes the majority (63%). (Newman and Noy, 2023) Therefore, all nations have moved into the phase of preparation and adaptation

such the conditions which brought on by a shifting climate. The struggle, especially at the local level, is notable despite its limitations. (Çolakoğlu, 2022; Çolakoğlu, 2020; Çolakoğlu, 2019; Çolakoğlu, 2018) However, as stated in the Global Risks Report 2023, adaptation currently receives only one-third of global climate fund, indicating insufficient investment. Also, disagreements about what constitutes adaptation are more likely as a result, and there is also an increased likelihood of undershooting adaptation efforts due to a lack of shared goals, best practices, strong regulatory frameworks, and metrics. (World Economic Reform, 2023a)

On the other hand, there's a chance that the issues brought on by climate change could exacerbate already existing conflicts and tensions between nations and people, especially in the world's most fragile areas, and jeopardize political and economic stability, or peace. Here, environmental changes are a threat multiplier rather than the underlying cause. When it interacts and converges with other risks and pressures that are already present in a given situation, it might increase the likelihood of fragility or violent conflict. In fact, not only are underdeveloped or developing states experiencing fragility or conflict particularly affected by this situation, but seemingly stable developed states may be overburdened by the combined pressures of climate change, population growth, urbanization, environmental degradation and increasing socio-economic inequalities. Along with its impact on increasing conflict, climate change is also addressed as its impact on terrorism. Because there are many different ways in which climate change affects terrorism. To put it another way, in these fragile conditions, terrorist organizations[2] are also growing strengthened. When organizations and their actions combine with the adverse effects of climate change, the result can be instability and violent conflicts in that nation or region. Terrorist organizations can also increase their influence by taking part in criminal and terrorist activities in these locations. By controlling access to natural resources like water and energy, as well as their critical infrastructures, and by turning these resources into weapons, organizations are increasingly making resource scarcity worse.

As Rüttinger and Nett (2016: III-IV) point out, there are three basic types to approach the links between these changing climatic conditions and organizations. Firstly, in the examples examined in our edited book, conflicts over natural resources and volatility of livelihood are the main reasons that climate change is leading to fragility. Because the economy of a country suffers greatly from the rising intensity and frequency of natural

[2] Terrorist groups discuss in this book how the effects of climate change have influenced their rise to power and growth. The term "terrorist organizations" here refers to structures with political objectives, a desire for power and control, and a focus on methodical, planned, and predetermined outcomes.; (Bozdemir, 1981: 256; Başeren, 2003: 51; Çağlar, 1997: 120-123). Also, the term "terrorist organizations" is used above to refer to a specific category of non-state armed groups, including terrorist organizations, militias, warlords, and criminal organizations. For this difference, see; (Kurum, 2023: 24-25; Demir, 2017: 251-282).

disasters, there is a decrease in the amount of natural resources available. As a result, there will be an atmosphere of growing rivalry and strife between those who have access to the necessities of life and those who do not. Secondly, the effects of climate change on livelihoods—such as food insecurity and water and land scarcity—are becoming more and more negative in many countries and areas. They are aggravating the plight of the people of that nation and region, who are struggling to make ends meet and survive due to resource scarcity and drought, by carrying out terrorist acts, especially to pillage and plunder their agricultural fields. Thirdly, given that natural resources become more scarce in some regions of the world due to climate change, those in control of those resources are likely to have more influence. As a result, terrorist organizations can exploit the fragile factors brought on by climate change; they are increasingly turning to natural resources as a weapon of war. Terrorist organizations, therefore, create unrest and disputes in the fragile conditions they establish in all of these communities and trigger waves of mass migration. In addition to playing a big role in migration, climate change also seems to have a big role in the emergence of terrorist organizations and tensions in Asia, the Middle East, and Africa (Silke and Morrison, 2022: 36). As long as these terrorist organizations' existence is not ended, their actions are not neutralized, and the problems caused by climate change are not addressed in the framework of development, the negative effects they have on local people will not be eliminated.

At this point, NATO's efficiency as a military alliance is becoming increasingly significant. In addition to fulfilling its traditional responsibilities of guaranteeing the security of its allies in the post-Cold War era, NATO tackles security challenges resulting from environmental issues like pollution, the scarcity of natural resources, and other conditions that cause disasters, regional tensions, and violence within the framework of these new missions and duties.[3] Tackling the effects of climate change is currently one of the Alliance's top priorities. Because the world's climate is changing so quickly and there are more extreme weather events that harm infrastructure, the Alliance is putting more attention into this area. For decades, the Alliance has been addressing environmental security concerns that could lead to humanitarian disasters, regional tensions and violence. The Alliance offers assistance in disaster relief, concentrates on environmental threats to military operations and overall security, including environmental variables influencing energy supply, and aims to improve military energy efficiency by utilizing innovative technologies. In this regard, NATO has been reshaping its organization in recent years to align with institutional priorities and current trends. By 2021, *the NATO Climate Change and Security Action Plan*, one of the Alliance's initiatives, aims to integrate climate change into the Alliance's political and military agenda. The plan

[3] See for more information; (Çolakoğlu, 2012)

offers a comprehensive strategy that includes actions to raise Allied understanding of how climate change affects security on a 360-degree approach. The plan highlights the necessity for clear adaptation and mitigation strategies, as well as improved outreach, all the while maintaining a strong defense and deterrence posture. In addition to government initiatives, public-private partnerships, military and dual-use technologies, and national and international efforts that reflect the various types of interventions needed to meet the challenges posed by climate change, this plan includes examples of how individual Allies are putting these measures into practice. (NATO, 2021; NATO, 2024) As part of this action plan, NATO has also committed to minimize greenhouse gas emissions by at least 45% by 2030 and reaching net zero by 2050 in order to reduce military emissions and mitigate their effects. (Kertysova, 2023)

Additionally, *the NATO 2022 Strategic Concept*—which was approved at the June 28–29, 2022 Madrid Summit—is the alliance's official long-term vision. Climate change, as a crisis and threat multiplier, is identified in this document as a major contemporary concern that will have a significant effect on Allied security. It notes that climate change affects the way the armed forces operate, as military infrastructures and bases are vulnerable to its effects, as well as rising temperatures, rising sea levels, wildfires and more frequent and extreme weather events will disrupt our societies, undermine our security and threaten the lives and livelihoods of citizens. Additionally, it says that NATO need to take the lead among international organizations in recognizing and adjusting to the ways that climate change affects security. (NATO, 2022) The most recent initiative by NATO to show that it is committed to tackling climate change in addition to these is the creation of a center of excellence. During the NATO Vilnius Summit in 2023, the Allies decided to establish *the NATO Climate Change and Security Centre of Excellence (CCASCOE)* in Montreal, Canada, in line with its mission and vision. The center of excellence was accredited in May 2024. (NATO, 2024) Based on the implementation of the NATO Climate Change and Security Action Plan, the center aims to be an internationally recognized hub for climate change and security expertise for military and civilian experts and decision-makers. It also supports the Alliance's overall military readiness, deterrence, and defense posture. (NATO CCASCOE, 2024)

Another center of excellence is the COE-DAT, *the NATO Centre of Excellence Defence Against Terrorism*. The COE-DAT is a NATO-accredited multi-national sponsored entity located in Ankara, Türkiye. The centre of excellence effectively works as an advisory board to the Allied Command Transformation (ACT) on terrorism-related issues. Implementing academic research and projects within the scope of counterterrorism and publishing in this context are among its functions and activities that support NATO, nations, partners, and renowned organizations within the international counter-terrorism

community in the field. (NATO COE-DAT, 2024) The edited book is the result of COE-DAT's project named *"Climate Change and Terrorism Book"*. The book, which involved numerous experts in their respective fields, aims to gather and assess information on strategies and optimal approaches to mitigating the relationship between climate change and terrorism, with the ultimate goal of promoting the production of a reference work.

The connection between climate change and terrorism is a complicated feedback loop, with one thing contributing to climate change and another facilitating terrorism, which further exacerbates climate change (Asaka, 2021). To clarify, there is a chance that the issues brought on by climate change could exacerbate already existing conflicts and tensions between nations and people, especially in the world's most fragile areas, and jeopardize political and economic stability, or peace. Therefore, NATO allies recognize that a deeper comprehension and management of climate change security issues are needed. Security-ensuring structures such as NATO increasingly strive to be proactive in anticipating threats by implementing strategies and measures that seem appropriate to reduce risks and address the primary security issues. NATO aims to maintain the stability and well-being of societies. In this context, the project of COE-DAT takes on greater significance. To support higher security standards, it is crucial to examine and gather the most effective best practices in the struggle against these phenomena, taking into account the major common dangers and new security difficulties. This approach is used to develop the internal structure of this book.

This edited book is divided into three main parts. The conceptual framework is explained in Part I, with a major emphasis on the complex nature of the connection between conflict and climate change. With an emphasis on both primary natural systems—such as coastal erosion, freshwater availability, and extreme weather events—and secondary human systems—such as water scarcity, agricultural productivity, and economic performance—The first chapter, *"^IIntroduction to Climate Change and Terrorism"*, explores the direct effects of these hazards on military infrastructure and operations. The chapter seeks to give a thorough understanding of the complex threats to security posed by climate change and the strategic actions required to confront them, while also highlighting the significance of addressing the entire force in an integrated manner. *"Climate Change, Climate Security, and Conflict"*, the second chapter, provides an in-depth analysis of the complex relationship between conflict and climate change from a broadly interdisciplinary approach. The beginning of the chapter provides a historical analysis of the development of the concepts of conflict, peace, climate, and security, emphasizing the connections between these domains. Following that, the chapter looks at the methodological developments that have made it possible to assess the effects of climate change on conflict more precisely and integrates how this addresses

into or conflicts with NATO security frameworks, connecting the components with the current policy discussions.

Part II, which focuses on the nature of the relationship between terrorist organizations and changing climate circumstances, opens with the chapter *"Assessing Efforts to Address Nexus Between Climate Change, Conflict, and Terrorism"*. Its aim is to assess global initiatives aimed at addressing security issues and the threat of terrorism linked to climate change, while also understanding the causes of these problems. It discusses how climate change is a threat multiplier for terrorism and provides an overview of various approaches that highlight the connection between terrorism and climate change. To reduce the risk of climate-related terrorism, it places emphasis on resilience building, effective governance, and addressing inequalities. The next and final chapter in Part II, *"Climate Terror as a Tool of Geostrategic Competition"*, uses a multidisciplinary approach to examine the reasons behind, strategies used, and consequences of using violence and threats related to climate change as tools of power projection. The chapter also examines how case studies and theoretical frameworks are being used to strategically exploit the effects of climate change. It does this by making links between resource competition, environmental changes, and the changing character of international conflict, especially in relation to terrorism.

The case studies comprise Part III. Based on the conceptual framework provided in both parts, these are based on country analyses from throughout worldwide that illustrate the connection between terrorism and climate change. *"The Interaction of Climate Change with Terrorism as a Threat Multiplier: The Case of the Northern Triangle"* is the title of the first chapter in this part. This region, which is marked by extreme violence, lawlessness, and poverty, has a number of issues, including high murder rates, domestic abuse, gang and organized crime activity, drug trafficking, and unemployment. On the other side, altering climatic conditions exacerbate already-existing issues, provide serious threats to this region, and act as a threat multiplier by expanding regional conflicts and terrorist attacks. The aim of this chapter is to identify how the Northern Triangle countries relate to terrorism and climate change. The Somalia and the Horn of Africa region, which has been among the regions most impacted by climate change for a while, is the main topic of second chapter, the title of *"Al-Shabaab's exploitation of climate change in Somalia"*. Climate change contributes to instability in this region in a number of ways, including mass migration, the denial of livelihoods, the inaccessibility of crucial resources like food and water, an increase of conflict over those limited resources, and a major strain on established societal norms and structures. The chapter concludes that terrorist organizations like al-Shabaab are increasingly and deliberately taking advantage of these key drivers, which have a fundamental connection to climate change.

The following chapter is titled *"Climate Crisis as a Catalyst of Terror? An Analysis on the Impacts of Climate Change in Senegal and the Potential of Terrorism"*, which focuses on the impacts of the climate crisis in Senegal. The country situated in the Sahel region of Sub-Saharan Africa faces many challenges as due to of its underdeveloped humanitarian and economic conditions. It experiences extended dry seasons, droughts, heat waves, bushfires, and reduced rainfall as a result of climate change, but it is also more vulnerable to droughts, locust invasions, floods, and coastline erosion since it is a low-lying nation. As a result, the climate crisis puts the country's human health, agriculture, fishing, earnings, settlements, and biodiversity at risk. In addition, the Sahel region has experienced several political and social upheavals and has become increasingly vulnerable to terrorist acts. Senegal is relatively stable when compared to its neighbors, but threats posed by climate change could exacerbate the nation's socioeconomic and political weaknesses. This study looks into whether Senegal's increasing vulnerability to terrorism is a result of the climate crisis This edited book's final chapter describes the ways in which the PKK, an armed terrorist group, engages in environmental terrorism in Türkiye and emphasizes the link between its activities and climate change. The context within which provides a detailed explanation of how, since the 1990s, the PKK has largely used forest fires as an environmental terror strategy.

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PART I: Conceptual Framework
CHAPTER 1

The Climate Challenge: Strategic Implications for NATO

Katie Woodward[*], Hengameh Irandoust[**], Cristian Ciulean[***], Andrew Sirjoosingh[****]

Abstract

This chapter examines the intricate linkages between climate system changes and the emergence of new environmental hazards, including floods, storms, droughts, heat waves, loss of permafrost, rising sea levels, and biodiversity loss. It investigates the direct impacts for NATO of these hazards on military infrastructure and operations, focusing on both primary natural systems—such as coastal erosion, freshwater supply, and extreme weather events—and secondary human systems, including water scarcity, agricultural productivity, and economic performance. The chapter explains the concept of compound risks, illustrating how the convergence of multiple hazards can intensify challenges like migration, resource competition, and economic fragility, thereby escalating political risks such as civil instability and state weakness. Through an analysis of these climate-induced challenges, the chapter highlights the significant implications for NATO and military operations, including the potential for increased organized violence, the proliferation of extremist groups, and the rise in intra- and interstate conflicts. Emphasizing the importance of a whole-force integrated approach, the chapter aims to provide a thorough understanding of the multifaceted security threats posed by climate change and the strategic responses required to address them.

Keywords: *Climate Change, Strategic Implications, Military Operations and Infrastructure, Compound Risks, NATO*

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1. Introduction

Global climate has always fluctuated, with periods of warming and cooling. Since the last glaciation period ended approximately 10,000 years ago, it has been relatively stable. That stability is now faltering, fast. The climate is changing, primarily driven by human activities that significantly alter the Earth's land use and atmospheric composition, thus influencing natural processes. The scientific evidence for climatic changes and their causes is strong. The global average surface temperature has shown a consistently rising trend during the past century increasing by at least 1.1° Celsius (°C) (1.9° Fahrenheit, °F), causing rapid and catastrophic events as well as gradual and subtle shifts. Floods, storms, droughts, heatwaves, often with devastating consequences, exemplify fast-onset phenomena, demanding urgent, coordinated responses. The magnitude, extent, frequency and duration of extreme weather events in the last decade alone serve as a warning of what is to come, and these observable reminders are increasing (Hoegh-Guldberg *et al.*, 2018). In contrast, slow-onset processes like glacial and permafrost melting, rising sea levels, ecosystem degradation, and biodiversity losses unfold over decades, their cumulative effects being equally disruptive.

Addressing the security implications of climate change is paramount to ensure operational effectiveness and strategic stability (NATO Secretary General, 2022, 2023). Since the publication of the NATO Strategic Concept in 2022, in which Secretary General Jens Stoltenberg emphasized the need for the alliance to take action to address climate change, NATO has continued to lead the call for a coordinated and comprehensive approach to integrate climate considerations into its strategic framework to maintain operational readiness, secure infrastructure, and support geopolitical security. In recent years, NATO has established initiatives such as the 'Climate Change and Security Action Plan' (NATO, 2021) and in addition to activities across NATO's Operational Commands, complemented by a core programme of work across the NATO International Staff and International Military Staff, launched a new dedicated centre of expertise, the NATO Climate Change and Security Centre of Excellence, known as CCASCOE.

Beginning its operations in late 2023, the CCASCOE, based in Montreal, Canada, highlights NATO's commitment to integrating climate change into its defence planning and operations (*Prime Minister's Remarks at Celebration Event on NATO Climate Change and Security*, 2024). In addressing climate change, "a primary structural force that will have a profound impact on every aspect of the evolving security environment" (NATO Allied Command Transformation, 2023a), a reactive stance will not suffice. Therefore, the CCASCOE exists to develop shared knowledge of the security impacts of climate change so that Allies can acquire the capabilities that will be required in the future security environment and establish best practices to reduce the climate impact of military activities.

With many perspectives, definitions, and widespread misinformation, myths and misconceptions regarding climate change delaying coherent action, this contextual chapter provides a foundation for subsequent chapters through exploring the intricate linkages between climate change hazards, impacts, and instability and insecurity around the world, including in NATO's operational sphere, and the significant implications of new and intensified environmental hazards for militaries and NATO.

2. Climatic Changes: A Phenomenon Initiated and Aggravated by Human Activities

We live in the 'Anthropocene Epoch', an informal term in geology for the past two centuries of the Holocene, that signifies the current era in which human activities, mainly land use changes and burning of fossil resources, have profoundly altered the Earth's climate and ecosystems[8] (Johnson *et al*., 2022).

Natural factors caused climate changes throughout Earth's history. Volcanic eruptions, for instance, can insert large quantities of aerosols into the stratosphere, reflecting sunlight and temporarily cooling the Earth's surface. Solar radiation variations, driven by changes in the sun's output or the Earth's orbit, have historically influenced the Earth's climate over geological timescales. However, natural factors cannot account for the rapid warming observed in recent decades, which is overwhelmingly attributed to human-induced, 'anthropogenic' causes (NASA, 2024).

This human influence is most evident in the release of greenhouse gases (GHGs) like carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), primarily generated by fossil fuel combustion, deforestation, agriculture, and industrial processes, lifestyle and patterns of consumption, and production (Lee & Romero, 2023), leading to a rapidly changing climate that poses significant challenges for both civilian and military sectors.

The combustion of coal, oil, and natural gas for energy and transportation is the largest source of GHG emissions, significantly enhancing the greenhouse effect and accelerating global warming (Intergovernmental Panel on Climate Change (IPCC), 2019). Military operations, with a heavy reliance on fossil fuels for vehicles, aircraft, and naval vessels, contribute to this impact.

Deforestation and land-use changes also play a serious role in climate change. Forests and wetlands act as carbon reservoirs, absorbing CO_2 from the atmosphere and storing it in biomass and soils over long time scales. However, when forests or wetlands are degraded or destroyed -often to make way for agricultural expansion, urban development, but sometimes also for military training and operations—the stored carbon is released back into the atmosphere, increasing the "greenhouse" effect which contributes to global warming.

[8] Officially, the current epoch is called the Holocene, which began 11,700 years ago after the last major ice age.

Agricultural activities, such as livestock farming, rice paddies, and the use of synthetic fertilizers, produce significant amounts of CH_4 and N_2O, potent GHGs that contribute to global warming (Food and Agriculture Organization of the United Nations, 2017). Additionally, industrial processes, especially in cement, steel, and chemical production, significantly contribute to GHG emissions. Reactions like limestone calcination in cement release CO_2, while the fossil fuels used to achieve high temperatures further add to these emissions. CH_4 and N_2O are also emitted, particularly in petrochemicals and fertilizer production. Additionally, aerosols from industrial activities interact with Earth's radiation balance, influencing both warming and cooling effects depending on their properties and atmospheric distribution. Military demands for infrastructure and materials, including cement and steel, intensify these industrial emissions. Finally, civil and military mobility and transport contribute significantly to global GHG emissions.

The world is currently dealing with the consequences of more than a century of such emissions with climate related hazards and disasters already increasing in frequency and intensity and the evidence is clear, the situation is getting worse (IPCC, 2023). Indeed, the writing has been on the wall for some years now, the occurrence of heatwaves in Europe has tripled since 1950, and the intensity of hurricanes in the Atlantic has increased significantly compared to a decade earlier (Coumou & Rahmstorf, 2012). For the military, heatwaves have seen outdoor temperatures push equipment and personnel beyond their limits, for example in Iraq, exceeding 50°C and indoor temperature in excess of 60°C and the number of 'black flag' days, when temperature increases beyond 35°C, have increased restricting or ceasing military operations or training (NATO Secretary General, 2023). Disasters requiring military support have increased in 2023, with 29 military deployments to support climate-related emergencies in 14 countries (Goodman & Baudu, 2023). In 2023, 2,214 military personnel were involved in responding to wildfires in Canada for 131 days during which over 200,000 civilians were evacuated (NATO Secretary General, 2022).

Climate change has tested NATO's resilience, the escalating effects captured in the third edition of the NATO Climate Change and Security Impact Assessment (NATO Secretary General, 2024) are well evidenced, with the potential to aggravate security challenges.

3. Climate Hazards and Effects

Climate change can be measured through a set of indicators, which are defined differently across organizations. For example, the Copernicus Climate Change Service (C3S), which provides authoritative information about climate around the world, measures four indicators; 1) Temperature, (Global, Global Land, and Arctic); 2) Ice and Glaciers

(Sea ice, Ice sheets, Glaciers); 3) GHGs (CO2 and CH4); and 4) Ocean (Global Sea level, Global Sea surface temperature, Global Ocean heat content) (Copernicus, 2024). The US Environmental Protection Agency (EPA) has developed more than 50 climate change indicators regrouped under GHG, Weather and Climate, Oceans, Snow and Ice, Health and Society, and Ecosystems. Despite the lack of standardization of terminology and taxonomy, there is a high degree of coherence in the concept of climate hazards and impacts.

Fast-onset phenomena – including but not limited to floods, storms, droughts, heatwaves – represent intensifying environmental hazards. Changes in precipitation patterns lead to more intense and unpredictable weather events, such as storms, hurricanes, and flooding. In civil society, extreme rainfall events, such as those experienced in recent years in Europe and Asia, have caused widespread flooding, leading to substantial economic damage and casualties and extensive damage to infrastructure Wu *et al.*, 2022). The increased sea surface temperatures provide more energy for storms, resulting in greater wind speeds, more intense rainfall, and higher storm surges. For example, 2017 was one of the worst hurricane seasons on record, Hurricane Harvey, a devastating Category 4 hurricane in Texas and Louisiana demonstrated the devastating impact of intensified storms on human settlements, leading to deaths and significant economic losses (Trenberth *et al*., 2018). Similarly, tropical cyclones increased intensity result in huge loss of life; Storm Daniel in 2023 was the deadliest Mediterranean tropical-like cyclone in recorded history with over 4000 fatalities (Rafferty, 2024; United Nations Development Programme, 2023). Military installations are not immune to destruction by natural disaster, and personnel are vulnerable. Naval Air Station Sigonella in Sicily provides an example of a strategic base vulnerable to intense storms known as "medicanes," a rare type of Mediterranean cyclone. These storms, though infrequent, can be highly disruptive, cutting off electricity and water supplies and overwhelming transport infrastructure. (De La Vara *et al*., 2021; NATO Secretary General, 2023).

Droughts are also becoming more frequent and severe, leading to reduced agricultural productivity, food and water shortages, heightened wildfires risks, and increased competition for water resources, all of which strain ecosystems and human communities (Ahmadalipour *et al*., 2019; Algur *et al.,* 2021; Institute for Economics & Peace, 2020; Naumann *et al.,* 2021).

More frequent and severe heatwaves cause heat-related illnesses and fatalities, particularly among vulnerable populations such as the elderly and those with pre-existing health conditions (Bell *et al.,* 2024; European Environmental Agency, 2017; Meadows *et al.,* 2024; World Health Organization, 2008). In military personnel, a temperature increase of just 0.6°C saw heat injury cases rise by a quarter (NATO Secretary General, 2023).

Slow onset processes, unfolding over decades – including but not limited to, loss of permafrost, rising sea levels, and biodiversity loss represent new environmental hazards. Studies have shown that the Arctic is warming at more than twice the global average rate, leading to rapid changes in the region's ecosystems and infrastructure (Arctic Monitoring & Assessment Programme, 2019). In Polar climates, the Greenland and Antarctic ice sheets are particularly vulnerable, with substantial ice mass loss accelerating over recent decades (Otosaka *et al.,* 2023). The warming of permafrost in the Arctic has profound implications for global climate systems. Permafrost contains vast amounts of organic carbon, and as it melts, this carbon is released into the atmosphere as CH4 and CO2, potent GHGs. This feedback loop accelerates global warming, further destabilizing climate patterns. In the High North, an area of strategic importance for the alliance, permafrost loss poses a significant threat to infrastructure because it serves as a stable foundation for buildings, roads, airstrips, and pipelines. When permafrost thaws, the ground becomes unstable, causing structures to sink, tilt, or collapse, leading to costly damage and disruptions (NATO Secretary General, 2023). Additionally, as permafrost thaws, it can release ancient pathogens that have been trapped in the frozen ground for thousands of years. These pathogens, which include bacteria and viruses, may become reactivated when exposed to warmer conditions, potentially posing serious health risks to humans, animals, and ecosystems (Klobucista & Maizland, 2022). Animals as vectors for diseases may move further north as well. Already in Lapland in Finland, medical teams are seeing an increase in tick-borne disease as a result of warming temperature in previously frozen land (The Finnish Defence Forces, 2024).

Since 1900, global sea levels have risen by about 20 centimeters, with the rate of increase accelerating in recent decades. Projections indicate that, without significant mitigation efforts, sea levels could rise by more than one meter by 2100, which threatens coastal communities and will lead to the displacement of millions of people (Lindsey, 2022). Naval Station Norfolk, the biggest naval complex in the world is extremely vulnerable to such phenomenon (NATO, 2022a).

Biodiversity loss and ecosystem degradation, including marine environments, can have far-reaching impacts on people's livelihoods. For example, ocean acidification, resulting from increased CO2 absorption by seawater, lowers the pH of the oceans, harmfully affecting marine life, particularly organisms with calcium carbonate shells or skeletons, such as corals, mollusks, and some plankton species (IPCC, 2019). The disruption of these marine species has cascading effects on oceanic food reserves and the communities that depend on them (Orr *et al.,* 2005). Military forces may be affected as they often rely on coastal bases and infrastructure, which can be compromised by the loss of protective coral reefs and increased erosion due to the degradation of marine

ecosystems. Additionally, the decline in fish stocks and marine biodiversity can lead to regional instability, affecting the security environment and necessitating increased military involvement in humanitarian and stabilization efforts.

The interconnected nature of climate change hazards and impacts means that the effects observed in one area can have cascading consequences on others, further compounding the challenges faced by military operations globally.

4. Complex and Compound Risks

Taking a proactive and comprehensive approach is no easy task. The impacts of climate change are profound and complex with effects across all levels of war from grand strategic to tactical in peacetime and in war. Climate change is a risk, and one which is often compounded with other risk factors, exacerbating their already negative outcomes, hence the widespread use of the term 'threat multiplier' (NATO Allied Command Transformation, 2023a; United Nations General Assembly, 2009). For example, rising temperatures have repercussions in multiple systems including food, infrastructure, health and wellbeing, biodiversity and ecosystems (Hoegh-Guldberg *et al.*, 2018). In certain areas, climate change hazards prompt consequences such as loss of land and livelihood, food, water and energy insecurity, which can in turn lead to migration, social unrest, and conflict (NATO, 2022). Some of the other resultant compound effects of climate change are economic instability, pressures on national and global governance, emergence of radical movements and non-state armed groups (NSAG), terrorism, organized crime (including human trafficking and gender-based violence), alongside shifts in societal behaviors, values, and cultural norms, as well as decreased trust in state and corruption (NATO Allied Command Transformation, 2023a).

The level of ***risk*** posed by such environmental hazards or stressors results from the interaction of ***vulnerability*** (of the affected system), its ***exposure*** over time (to the hazard), as well as the (climate-related) ***hazard*** and the likelihood of its occurrence. (IPCC, 2022). Represented in Figure 1.

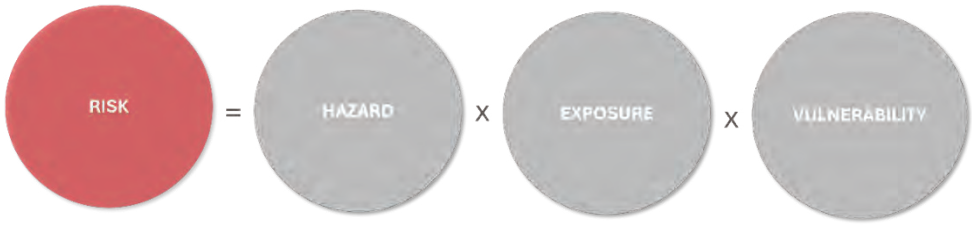

Figure 1: Representation of Risk (adapted from IPCC and UNDDR)

Different types of risk have been identified in disaster management literature, such as systemic, emergent, cascading, and compound, however, it can be difficult to grasp the key distinctive features of each type as all of them comprise elements of amplification and interconnectedness (Pescaroli & Alexander, 2018; Sulfikkar Ahamed *et al.*, 2023). The most common types are Systemic, Cascading and Compound.

Systemic risks are defined by the SIPRI Report 2022 (de Coning *et al.*, 2022) as 'multiple shocks or pressures that interact with sufficient severity and at sufficient scale to generate cumulative risks that can threaten the integrity or stability of societal or environmental systems: an economy, community, or even a country'. Key aspects of systemic risk can be summarized as: local triggering events occurring simultaneously generate global and large-scale adverse effects once they cross a tipping point, requiring a system approach to understand the complex and non-linear cause-effect relationships (Disaster Risk Reduction Terminology, 2019; Renn, 2016). As an example, Hurricane Sandy in 2012 led to severe impacts on energy, transportation, and financial systems.

Cascading risks are where 'an initial event creates risk(s) that spill over into other regions or sectors, generating further impacts that snowball to produce new risks distinct from and potentially greater than the original event' (de Coning *et al.*, 2022). Based on a large literature review, (Pescaroli & Alexander, 2015, p. 65) offer the following definition for cascading disasters:

"Cascading disasters are extreme events, in which cascading effects increase in progression over time and generate unexpected secondary events of strong impact. These tend to be at least as serious as the original event, and to contribute significantly to the overall duration of the disaster's effects. These subsequent and unanticipated crises can be exacerbated by the failure of physical structures, and the social functions that depend on them, including critical facilities, or by the inadequacy of disaster mitigation strategies, such as evacuation procedures, land use planning and emergency management strategies. Cascading disasters tend to highlight unresolved vulnerabilities in human society. In cascading disasters one or more secondary events can be identified and distinguished from the original source of disaster."

Thus, key features of cascading disasters are the existence of primary and secondary events, a chain or network of effects between the two, and a complex interaction of vulnerabilities that amplify the impacts on critical infrastructures *(Pescaroli & Alexander, 2018; Sulfikkar Ahamed et al.*, 2023). For instance, the 2011 Great East Japan Earthquake resulted in a tsunami that devastated the coastal communities and resulted in radioactive contamination by nuclear reactors. Climate-induced events like extreme heatwaves, droughts, storms and strong precipitation can, in a similar manner, negatively

impact populations and their most vital infrastructures such as power generation plants, with far-reaching effects that can disrupt entire technological, financial, and economic sectors. Electrical infrastructure are vulnerable to climate events, and even renewable energy sources are not spared as they are sensitive to solar insolation and wind patterns (Center for Energy, Environmental, and Economic Systems Analysis (CEEESA), n.d.).

Compound risks occur when 'two or more factors interact in a given region or context to generate a more complex set of risks with greater impact than any of the individual risks pose alone' (de Coning *et al.*, 2022). Compound disasters are the result of the combined impact of successive or simultaneous hazards, collocated in time and space, which can generate widespread losses and overwhelm the ability of the local community and even the central government to respond (Liu & Huang, 2014; Zscheischler *et al.*, 2020). Compound risks involve independent events that occur simultaneously and their combinations, whereas the other two concepts focus on events that build on one another (Sulfikkar Ahamed *et al.*, 2023). Although climate change effects can be systemic or cascading, they are best characterized as compound. The complexity of compound risks is prominent in the example from Lake Chad, in the Sahel region of west-central Africa, where preconditions such as poverty and under-development, combined with environmental degradation, desertification, and weather extremes and the resulting food and water insecurity have created a humanitarian crisis, forced massive displacement, and increased community violence across the region (Norwegian Institute of International Affairs, 2021; Refugees International, 2023).

5. Strategic Implications for NATO

Climate change is now recognized, to some degree, across all of NATO's core tasks: Deterrence and Defence, Crisis Prevention and Management, and Cooperative Security. The Deterrence and Defence section focuses on military operations, requiring NATO to adapt its strategies, infrastructure, and logistics to withstand climate-induced disruptions. In contrast, the Crisis Prevention and Management and Cooperative Security section emphasizes the socio-political impacts of climate change, highlighting the role of NATO in coordinating civil preparedness and disaster response.

Both sections emphasize NATO's critical need for resilience, as highlighted by HQ SACT during the Bucharest Layered Resilience Seminar in 2022. NATO defines this resilience as the capability to anticipate, prepare for, adapt to, and recover from both traditional and emerging threats, with climate change requiring a proactive and transformative strategy rather than simply maintaining the status quo. These efforts will be advanced over the next year through designated Thematic Working Groups focusing on Command and Control, Situational Awareness, Response Planning, Logistics, Perseverance, Military Infrastructure, and Warfighting, all of which will be explored in the subsequent text.

6. Deterrence and Defence

Based on the Concept for Deterrence and Defence of the Euro-Atlantic Area (DDA), and supported by the NATO Warfighting Capstone Concept (NATO Allied Command Transformation, 2023b), NATO needs to adapt its thinking, organization, including those posed by climate change, of its standing (regional) defence plans.. The ability to operate in increasingly harsh and unpredictable environments will test NATO's capacity to address new and emerging threats. NATO's Concept for Deterrence and Defence of the Euro-Atlantic Area (DDA) addresses modern military threats, particularly from Russia, with a strategic focus on deterrence and defense across the alliance. Although the DDA doesn't directly reference climate change, as climate-induced disasters and resource competition could heighten geopolitical tensions, especially in vulnerable regions. DDA's framework offers a useful lens for addressing the security implications of climate change, ensuring NATO's ability to manage emerging threats related to environmental stressors. Emerging thinking on military resilience, highlighted in the 6 'Outs,' frames NATO's capacity to anticipate and adapt (NATO Allied Command Transformation, 2023b):

- *Out-Think:* Anticipating threats and understanding the strategic environment better than potential adversaries, enabling proactive and informed decision-making.
- *Out-Excel:* Striving for excellence and agility by leveraging NATO's unique military ethos, culture, and diversity, and maintaining the initiative to succeed under any circumstances.
- *Out-Fight:* Operating decisively across multiple domains, coordinating with other instruments of power and actors to conduct shaping, contesting, and fighting activities effectively.
- *Out-Pace:* Recognizing risks and seizing opportunities by deciding and acting faster than adversaries, ensuring a competitive edge in both planning and execution.
- *Out-Last:* Thinking, planning, operating, and adapting with a long-term perspective, ensuring the Alliance can endure and succeed through prolonged strategic competition and conflict.
- *Out-Partner:* Building and exploiting mutually supportive relationships and partnerships, enhancing NATO's collective strength and capability to address complex security challenges.

Climate change is poised to be a disruptive factor in NATO's pursuit of these goals. For instance, the need to operate in increasingly harsh and unpredictable environments

will challenge NATO's ability to out-think and out-pace adversaries, while the strain on resources and infrastructure may hinder efforts to out-last and out-excel in prolonged conflicts. Additionally, climate-induced crises will demand more from NATO's partnerships and collaboration efforts, as nations collectively respond to the global consequences of climate change. As such, the Alliance must integrate climate considerations into its warfighting strategies, from adapting the Minimum Capability Requirements in the Defence Planning Process, to ongoing review of the Regional Plans with a Climate Change lens, to maintain its competitive edge and ensure long-term success in an increasingly uncertain world.

Warfighting, the strategic and tactical use of military forces across various domains—land, sea, air, space, and cyberspace—is central to achieving specific objectives in conflict situations. As the cornerstone of military operations, warfighting encompasses situation analysis, planning, execution, and adaptation, all of which are increasingly challenged by the effects of climate change.

Central to effective warfighting is Military Command and Control (C2), the authority and ability to direct forces. C2 systems are essential for planning, directing, and managing military operations, ensuring that leaders can respond effectively even in complex and fast-changing environments. The adaptability of these systems is especially critical in the face of climate change, which introduces new and unpredictable challenges. As the environment becomes more volatile, C2 systems must be flexible and resilient, capable of operating under the difficult conditions brought on by climate-related disasters, and an acceptance by different actors to accept the authority of a single command. This adaptability is particularly needed in situation analysis and response planning as key components of C2[5].

Situational awareness, an outcome of situation analysis, is a critical requirement of crisis intervention that involves the knowledge and understanding of the current environment within a battlespace, enabling timely and accurate decision-making. However, situational awareness is increasingly at risk due to climate change. Atmospheric changes can impair radar performance, leading to incomplete or inaccurate information that compromises critical decisions. For instance, disruptions caused by rising temperatures and increased evaporation rates can create detection gaps, making it difficult to accurately track threats. Additionally, climate-induced changes to landscapes, such as those resulting from wildfires, can hinder troop movement and tactical operations, further complicating military engagements. Maintaining high-quality geo-spatial terrain capabilities and resilient systems is essential to ensuring that situational awareness remains effective in a changing climate.

[5] C2 is used here over C4I to focus on functions like decision-making and authority, avoiding the complexity that comes from conflating command with system management.

Military response planning is another vital element to be able to conduct effective C2 and involves the systematic preparation and coordination of military actions in response to potential or actual crises. Traditionally focused on specific, isolated emergencies, military response planning must now evolve to address the more frequent and severe crises driven by climate change. Natural disasters like hurricanes, floods, and wildfires are occurring with increasing regularity, demanding that military planning become more proactive and integrated.

NATO must maintain the freedom of action and flexibility to respond to the full spectrum of challenges with an appropriate and tailored approach. However, climate change will test the resilience of military installations and critical infrastructure, impair the effectiveness of capabilities, increase threats to defence supply chain security, and may create harsher conditions for military operations and missions.

Military infrastructure, the backbone of military readiness, deployment, and sustained operations, includes buildings, energy and water systems, land assets, and operational technologies, both fixed and deployed, which are all increasingly vulnerable to the varied risks posed by climate change. For example, the destabilization of permafrost in the Arctic can damage critical infrastructure, posing logistical challenges, while rising sea levels threaten coastal military bases, necessitating costly adaptations or relocations. There are also climate resiliency implications for military equipment, including maintenance requirements, performance, longevity, and effects on budgets for refits or procurement of replacement equipment. Recognizing these risks, initiatives like the U.S. Department of Defense's Climate Adaptation Plan focus on making military infrastructure and systems resilient to climate impacts, ensuring that facilities and equipment can adapt to evolving conditions.

Logistics, defined as the science of planning and executing the movement and maintenance of forces, is another critical area impacted by climate change. The complexity of military logistics, often reliant on civilian resources, is heightened by the challenges posed by rising sea levels, extreme weather, and damaged infrastructure. These factors could hinder the delivery of essential supplies and equipment, particularly in crisis response scenarios. NATO's approach to crisis management, which blends political, civilian, and military efforts, must incorporate climate resilience to ensure that operations continue even during large-scale disasters. Strengthening the capacity to manage multiple concurrent operations, including humanitarian assistance and disaster relief, is crucial for maintaining NATO's operational flexibility and deterrence posture. This shift is highlighted by the adoption of National Resilience Plans, which bridge civilian and military systems and emphasize the importance of designing military capacities that can withstand climate-induced disruptions. Furthermore, given the reliance on private sector contracts for a large proportion of NATO's supplies and logistics, a cross-sectoral

approach is necessary to address the challenges posed by climate change and ensure the continued effectiveness of military operations.

Finally, the physical and psychological resilience of military personnel, known as military perseverance, is increasingly tested by the extreme environments in which they operate. As global temperatures rise, military personnel will face unprecedented conditions, requiring new approaches to managing heat stress and other environmental challenges. This includes a deeper understanding of the physiological mechanisms that help humans tolerate extreme conditions, allowing for improvements in soldier preparedness through methods such as heat acclimatization. As global warming opens new operational theaters, such as the Arctic, soldiers must also adapt to cold stress, which presents its own set of challenges. Ensuring that military personnel are physically and mentally prepared to operate in these environments is essential to maintaining operational effectiveness. Many military personnel have experience managing heat-stress conditions during missions, and they will need to do so more frequently in future operational environments shaped by climate change, with temperatures in some cases surpassing anything they've encountered before (Parsons *et al.*, 2019; Moran *et al.*, 2023). This experience and scientific insight have improved understanding of how to help soldiers tolerate heat, through hydration and gradual activity increase over five to ten days (heat acclimatization). Mitigation strategies include ice immersion and altered training schedules (Moran *et al.*, 2023). As global warming opens Arctic Sea lanes, military deployments in cold regions are rising. However, physiological responses like shivering and blood vessel constriction offer limited protection, even after cold acclimatization (Castellani & Young, 2016).

In summary, a resilient warfighting capability in the modern era cannot be effectively conducted without considering the profound impacts of climate change. From C2 systems and situational awareness, resilient communications systems, to response planning, logistics and infrastructure, every aspect of military operations must be adaptable and resilient to the new realities of a changing environment. By integrating climate considerations into every level of military planning and operations, NATO can maintain its strategic advantage and ensure long-term success in an increasingly uncertain world.

7. Crisis Prevention and Management, and Cooperative Security

NATO must also contribute to the efforts of the Partners and the international community for maintaining peace, security and stability, in order to be able to do effective crisis prevention management. Climate change places societies and citizens at risk, putting greater emphasis on civil preparedness and disaster response, thereby generating new tasks for militaries and stressing the civil systems upon which militaries depend, and raising important challenges for policymakers and military planners. NATO, with its strong history of openness and partnering, possesses powerful leverage mechanisms to assess

and address the challenges of climate change more broadly on defence and security. The effects of climate change shape the geopolitical environment and may influence adversarial behavior, both state and non-state, and as such, will have a significant and growing impact on the global security environment over the coming decades.

How climate change effects are related to peace and security issues is complex and nuanced. Often climate change and environmental issues compound existing risks that are related to underlying social, political and economic issues.

Drivers of insecurity are generally divided into two types: proximate and structural drivers (United Nations Climate Change Learning Partnership, n.d.). The former are short term factors that can more immediately trigger insecurity, such as an extreme weather event, while the latter are long-term factors that are part of the socio-politico-economic tissue of societies. Research shows that climate-related security risks arise in areas that are already strained by social, economic and political tensions and that the latter are often underestimated when conflicts occur (International Rescue Committee, 2023). Subsequent chapters will no doubt explore the intricacies in more depth, for instance environmental scarcity caused by climate change has often been identified as a cause of conflict and insecurity. Although there is evidence that this is sometimes the case, there is no systematic relationship, and the causes of insecurity should always be sought in the context in which they occur (United Nations Climate Change, n.d.) and be free of methodological bias, for example, there is evidence that studies on climate-conflict links tend to overlook countries where environmental crises were not followed by conflict or to focus on countries where more data is available (Adams *et al.*, 2018; Hendrix, 2018).

Nevertheless, looking broadly at some of the risk pathways, climate change can compound the effects of structural drivers such as geopolitical tensions, existing intra or inter-state conflicts or socio-economic and political pressures, and lead to peace and security issues over time (Figure 2).

Added to this are human insecurity factors, which jeopardize the safety and livelihood of populations, including displacement and migration, resource (food, water, energy, etc.) insecurity, diseases, presence/emergence of radical movements, organized crime, corruption. As shown in Figure 2, there is a feedback loop between human insecurity factors and structural drivers such as social, economic, and political tensions or existing conflicts, each one having the potential of exacerbating the other, independently of exposure to any climate-related hazards. But insecurity factors can also be heightened by climate change effects or result from a combination of both climate change and structural drivers, particularly in already fragile and conflict-prone societies. Figure 2 illustrates how the direct and indirect effects of climate change on the lives and livelihoods of people can aggravate all the other drivers of insecurity (red arrows).

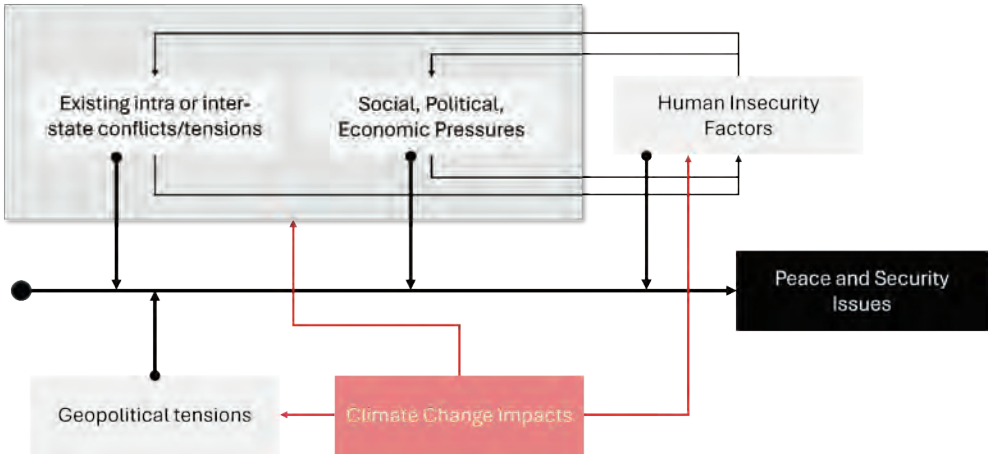

Figure 2: Relationship between climate change impacts and other risk factors

An example of the interlinkages between human insecurity, socio-economic and environmental pressures can be seen in the Northern Triangle (El Salvador, Guatemala, Honduras) where migration has sharply increased over the past decade (Sigelman, 2019) driven by poverty and violence, as well as food insecurity caused by climate change effects (Pons, 2021). Social inequality and lack of economic development have increased poverty levels, while corruption and violence have weakened the institutions, making them even less effective (Meyer, 2019; Sigelman, 2019). The situation has been worsened by temperature and rainfall variations that have impacted coffee production, and consequently, the farmers' wage has dropped and coffee farm workers have been put out of work, creating even more poverty (de Coning *et al.*, 2022).

Although climate change effects deteriorate the conditions of poverty, violence, and migration, they can do so because of the prevailing structural drivers, including unequal access to resources (Thomas *et al.,* 2019) and weak governance, which can by itself increase the risk of insecurity (Tarif, 2022). Climate stressors are unlikely to create such conditions in highly resilient countries with strong governance, institutions, and economy (Adger *et al.,* 2005). For example, despite a devastating season of wildfires in Canada in 2023 that caused many problems, such as air pollution, health issues, loss of property, and disruption in communications, water, or power, Canadians did not experience long-term food and water insecurity or migration. Lower adaptation efficiency to climate change effects has been shown to be associated in particular with less government spending, an uneven income distribution and bad governance, which explain why poor countries are more heavily impacted by climate change effects (Fankhauser & McDermott, 2013).

History of conflict is another structural driver (Figure 2) so it is not of a surprise that research reports it as a predictor of future conflict (Gilmore & Buhaug, 2021). Again, this will be explored in more depth throughout this book, however, when a region is under climate stress, armed conflict not only increases poverty and undermines development (United Nations Secretary General, 2022), but it augments vulnerability to the impacts of climate change, as it creates further resource depletion, and affects societal resilience and adaptation, thus creating a vicious cycle of insecurity and fragility, referred to as the 'climate-conflict trap' (Garfinkel, 2021).

Stretching 5000 kilometers from the Atlantic Ocean to the Red Sea the Sahel region in Africa experiences intense heat, unpredictable rainfall and extreme drought. In this harsh climate a complex web of factors linking climate change effects and the structural drivers has led to a severe and growing humanitarian crisis. The combination of intra-state conflicts, poverty, extreme weather and weak governance has resulted in massive displacements in this region. According to the Internal Displacement Monitoring Centre (2021), in 2020 alone, weather-related disasters forced 30 million people to flee their homes to areas that were not prepared to receive people in these numbers. These population movements increase the risk of communal conflicts (de Coning *et al.,* 2022), and the Sahel region is testament to this where changes in transhumance routes have led to increasing farmer-herder conflicts over land (Brottem, 2021). Moreover, lack of trust in the state and the search for other sources of subsistence and protection has moved populations away from the centres and enticed them to join rebel groups in the peripheral areas where they engage in criminal activities. Economic challenges and human insecurity factors combined with that of overpopulation (Institute for Economics & Peace, 2020) can lead to greater competition over scarce natural resources (Office of the Director of National Intelligence, 2024) depleted by climate stressors.

Climate security is not just a problem in hot dry climates. In the Arctic, an area that is emerging as a 'key strategic focal point of the global commons' (NATO Allied Command Transformation, 2023a), we can see an example of the intersection between geopolitical tensions and climate change effects (Figure 2). The receding sea ice has created new navigation routes which can become critical supply routes connecting East Asia, Northern Europe and North America. It has also rendered the natural resources of this region, such as fish stocks, fossil fuel, key metals and minerals, including rare earth elements needed for the Green Energy Transition, more easily accessible (Backus, 2012; Huebert, 2012; Morozov, 2012; Nordregio, 2019). This has given rise to a situation of competition among Arctic and 'near-Arctic' nations in a challenging security environment that is already under military tension (Office of the Director of National Intelligence, 2024).

Climate change is therefore not a direct cause of insecurity, but one that compounds the effects of other drivers of insecurity. Climate stressors can impact ecological, social and political systems whose resistance depends on their solidity, stability and coping capacity. Addressing climate security risks therefore requires integrated approaches that can tackle peacebuilding, climate action and social inclusion all at once to create the conditions for preparedness and response to extreme weather and associated risk, and climate change adaptation and mitigation (United Nations Climate Change Learning Partnership, n.d.). Within NATO, the NATO Defence Planning Process (NDPP) provides a framework for integrating these climate considerations into long-term strategic planning, ensuring that NATO forces remain ready to confront the escalating security challenges posed by climate change.

8. Conclusion

Given all evidence, rapid climatic changes are real. They will intensify existing threats and hazards, which are a challenge for NATO nations and its armed forces. NATO cannot afford to let denial, disinformation and disinterest delay coherent action. Spreading the awareness of these issues, developing the complex and nuanced narrative, and identifying risk and opportunities for proactive action in response to climate change, is essential to enable the alliance to remain on top of the security challenges posed by climate change. This forward-looking, pro-active approach is the core mission of the new NATO Climate Change and Security Centre of Excellence, supporting the implementation of the NATO Climate Change and Security Action Plan.

NATO continues to operate in a profoundly challenging security environment– climate change amplifies many challenges, making it imperative for the Alliance to adapt swiftly and decisively to maintain security and stability in an increasingly volatile world.

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PART I: Conceptual Framework
CHAPTER 2

Climate Change, Climate Security and Conflict

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Abstract

This chapter provides a nuanced exploration of the complex relationship between climate change and conflict, challenging the oversimplified notion that climate change directly causes conflict. It draws on a multidisciplinary perspective, integrating insights from history, international relations, anthropology, economics, and military studies to offer a comprehensive understanding of the climate-conflict nexus. The chapter begins with a historical analysis of how the concepts of conflict, peace, climate, and security have evolved, highlighting the interconnections between these domains. It then examines the methodological advancements that have enabled more precise assessments of climate change impacts on conflict and integrates how this aligns with or challenges NATO security frameworks making the connection with the current policy discussions. Additionally, the chapter engages with ongoing scholarly debates, emphasising the importance of avoiding categorical errors in understanding the climate-conflict nexus. By offering a critical overview of key research and emerging trends, this chapter equips both military and civilian practitioners with the knowledge necessary for informed decision-making in an increasingly climate-affected security landscape.

Keywords: *Conflict, climate security, threat-multiplier, securitization*

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1. Introduction

In an increasingly interconnected world, the intersection of environmental challenges and security threats has grown more intricate. Climate change, while primarily viewed through an ecological lens, is now recognised as a critical factor influencing both national and international security dynamics. The rising global temperatures and their far-reaching impacts are seen in the world today reinforcing the reality that climate change is not merely an environmental issue but a significant catalyst for political and social instability. Tasked with safeguarding their citizens, governments must now contend with a new reality affecting regimes globally: climate change as a catalyst for instability.

Although climate change does not directly cause conflict, it acts as a powerful stressor that undermines the resilience of communities, making them more susceptible to unrest, violence, and civil disorder. This is particularly evident in regions already beset by conflict, where the additional burdens imposed by climate change further complicate peace efforts and diminish prospects for stability. Therefore, a comprehensive understanding of the climate-conflict nexus is essential.

The evolution of NATO over its 75-year history reflects a growing recognition of the need to address these emerging threats. Predominantly a defensive alliance, NATO has adapted its role in response to the changing security landscape. The current strategic concept, reaffirmed in 2022, outlines the alliance's core tasks of deterrence and defence, crisis management, and cooperative security. As the threats posed by climate change become increasingly evident, NATO's involvement in peacekeeping and crisis response is expanding to incorporate environmental and geopolitical considerations.

Through historical case studies, such as NATO's missions in Kosovo and Iraq, the necessity of a comprehensive approach that integrates climate considerations into security operations support the identification of valuable insights into how the alliance can evolve its strategies and maintain global stability in the face of escalating climate challenges.

The newly established NATO Climate Change and Security Centre of Excellence (CCASCOE) plays a pivotal role in addressing these issues, focusing on disseminating knowledge and enhancing awareness regarding the intricate cross-sectoral implications of climate change on security. The chapter will delve into the complex relationship between climate change and conflict within the broader framework of climate security, an area gaining traction within NATO.

Unlike traditional threats, climate change does not manifest as a distinct actor or adversary, complicating its classification within security frameworks. Concerns arise regarding the appropriateness of terms like "threat" or "risk" when discussing climate

change in security contexts. Defining a threat generally involves evaluating dimensions such as negativity, intentionality, ability, relativity, and emergence. While climate change negatively impacts health, livelihoods, and societal stability, it operates without conscious agency, distinguishing it from traditional threats. Hence, the commonly adopted perspective framing climate change as a "threat-multiplier," intensifying existing tensions and vulnerabilities, particularly in fragile regions. The challenge lies not in attributing agency to climate change but in recognising its role in exacerbating broader security challenges.

As discourse around climate security evolves, it increasingly encompasses the responsibilities of developed nations in addressing climate-related risks, fostering a more equitable examination of climate security globally. This chapter explores the relationship between climate change and conflict, highlighting the methodological and theoretical challenges in establishing causal links between climate variability and conflict. It aims to illuminate long-standing debates and their relevance to contemporary security challenges. For those new to the topic, the climate-conflict nexus presents significant methodological complexities, ontological uncertainties, and causal challenges. By reflecting on historical contexts, this exploration seeks to inform future strategies and reduce the likelihood of repeating past errors.

The vast literature on the climate-conflict nexus warrants focused examination rather than exhaustive accounts. Thus, this chapter prioritises conceptual frameworks, methodological discussions, and real-world implications for defence audiences, highlighting key texts that inform ongoing discourse. Engaging with ongoing debates regarding the securitisation of climate change, it critically examines diverse perspectives surrounding whose security is prioritised, the referent objects of security, and the implications of framing climate change as a security issue. Ultimately, it advocates for narratives promoting cooperation and shared responsibility to ensure effective and equitable responses to the emerging security landscape and the need for context-sensitive research approaches, framing climate change as a complex, interconnected security issue.

2. Stakeholders in Peace and Security

In the context of NATO's 75-year long history, the role of the alliance in the preservation of global peace and the prevention of conflict is a newer focus. Clearly NATO has always been a stakeholder in peace and security, however, it was and remains a defensive alliance. As the security landscape has evolved since the World War II, the role of NATO has evolved with the current strategic concept 2022 (NATO, 2022) clearly reconfirming three core tasks for the alliance; 1) deterrence and defence; 2) crisis management and 3) cooperative security.

Since the end of the Cold War, NATO has become more active in working with partners in the international community to help resolve complex, deep-rooted problems and provide the security assistance to enable self-sustaining peace processes to flourish. Formally, the decision to do so originates from a 1992 meeting of foreign representatives in Oslo in which NATO partnered with the organization now known as OSCE, the Organization for Security Cooperation in Europe. By the end of 1992 NATO had also formally agreed to support peacekeeping under the authority of the UN Security Council. NATO's engagement in peace-support operations, beginning with Bosnia and Herzegovina in 1995, marked a significant shift in the Alliance's approach to addressing complex and multifaceted security challenges. These missions, which later expanded to include Kosovo, the Republic of North Macedonia, Iraq and Afghanistan, demonstrated an increased need for NATO to operate effectively in environments where environmental and geopolitical factors intertwined to create instability. For example, in Kosovo, wildfires in 2017 and 2022, coupled with severe flooding in 2023, increased the socio-economic pressures on citizens resulting in instability. In Kosovo, the situation was also complicated by increased environmental crime, particularly woodcutting and waste dumping, degrading the natural environment and increasing the range of military tasks needed to ensure security (NATO Secretary General, 2022). Today, approximately 4,500 Allied and Partner troops operate across Kosovo as part of NATO's Kosovo Force (KFOR). In Iraq, there is a situation of escalating climate and environmental risks, including rising temperatures, water scarcity, pollution, and biodiversity loss, which are increasingly impacting security. These challenges, intensified by their uneven effects across different groups, are fueling local unrest and deepening existing inequalities and fragilities (Csordas et al., 2024). The NATO Mission in Iraq (NMI) currently involves several hundred personnel from Allies and partner countries Austria and Australia. NMI coordinates with a wide range of other international stakeholders, including the Global Coalition Against Daesh, the European Union and the United Nations. In February 2021, NATO agreed to expand NMI at the request of the Iraqi government.

These missions offer valuable lessons on how the Alliance can evolve its strategies to confront the emerging security threats posed by climate change. The integration of environmental considerations into NATO's operational planning is crucial for enhancing its effectiveness in crisis management and cooperative security efforts. As the impacts of climate change intensify, NATO's ability to adapt its operations to address these complex issues will be vital for maintaining stability in affected regions. This requires not only military readiness but also a holistic understanding of how climate-induced stressors affect societal dynamics and governance.

3. A Comprehensive Approach

In more recent years, NATO's re-deployments into Iraq, multinational cooperation in Darfur, and its support to natural disaster relief, have further underscored the need for a comprehensive approach that integrates climate considerations into security operations.

For example, Iraq is highly vulnerable to climate change, with decreasing precipitation and water scarcity worsening desertification and increasing the frequency of dust storms. This vulnerability is further compounded by stronger and longer heatwaves, reduced soil absorption leading to heavy flooding, and rising seawater salinizing arable land (International Organization for Migration Iraq, 2022). The presence of unexploded mines poses both immediate explosion risks and long-term pollution hazards (International Campaign to Ban Landmines, 2021). Additionally, extensive gas flaring in Iraq significantly pollutes air, soil, and water, affecting human health (The World Bank Group, 2022). The country faces challenges in disaster risk reduction and environmental protection due to overlapping security agency mandates and enforcement gaps. Addressing these issues by integrating disaster protection and ecosystem preservation into security sector functions, including those of NATO, is crucial for fostering social cohesion, trust, and state legitimacy (Csordas et al., 2024).

Sudan is already struggling from what experts and activists say is the results of shifting weather patterns: worsening conflicts over scarce land and water resources. Increasing demands on dwindling natural resources has fuelled inter-ethnic conflicts, including the 2003 war that erupted in the arid western region of Darfur. Together with the European Union, NATO has been assisting the African Union (AU) expand its peacekeeping mission in Darfur, Sudan, since 2005. The Alliance has been airlifting AU peacekeepers into the region and providing training in running a multinational military headquarters and managing intelligence[6].

These experiences suggest that NATO's future success in maintaining global stability will depend on its ability to adapt its strategies to the new realities of climate-induced stressors. As climate change increasingly exacerbates such conditions, understanding NATO's historical experiences in these regions is critical. NATO's historical role in addressing complex security challenges, particularly in regions where environmental and geopolitical factors are intertwined, provide valuable lessons for the Alliance's future strategies in the face of climate change.

In this context, the European Atlantic Disaster Response Coordination Centre (EADRCC) will be pivotal. The EADRCC, NATO's primary civil emergency response mechanism, plays a crucial role in coordinating disaster relief efforts in member and partner nations.

[6] SHAPE | Darfur (nato.int)

As climate change leads to more frequent and severe natural disasters, NATO's capacity to support crisis management through EADRCC will assist in mitigating the destabilizing effects of these events. Integrating lessons from the EADRCC's operations, particularly its experience in facilitating coordinated responses to disasters, will be essential for NATO to effectively address the complex compound risks posed by climate change.

4. Evolving Environmental Protection

Similarly, NATO has evolved its environmental protection responsibilities to a broader climate change manifesto. With origins in the late 1960's, environmental protection featured prominently in the work of the Committee on the Challenges of Modern Society, shaped by earthquakes in Türkiye and wildfires in Greece. In the 1980's and 1990's the focus shifted more towards environmental disaster awareness, prevention and response.

NATO's strategic concept has evolved over time to reflect these changes in the security environment. Starting with the 1991 Strategic Concept, which emerged in the post-Cold War context, NATO expanded its focus beyond collective defence to include crisis management. The 1999 and 2010 concepts further adapted by addressing new threats such as cyberattacks, terrorism, and environmental challenges. The first origins of what is now currently considered 'climate security' can be seen in the NATO 2010 Wales Summit, however, it is as we enter the 2020's that the concept began gaining momentum. By 2022, NATO recognised climate change as a significant security challenge in the Strategic Concept, emphasising the need for resilience and adaptation in the face of global environmental crisis.

This evolution underscores NATO's commitment to adapting its strategies to address the complex threats of the modern society. In pursuit of peace, the recognition that preventing and managing conflict can be aligned to better effect with efforts to adapt to and mitigate climate change has led to the convergence of these two pathways towards 'Climate Security', and associated climate-conflict and climate-peace terminology.

The term 'climate security', also referred to as the 'climate-security nexus' (Bastian et al., 2023; Nevitt, 2023), highlights the security implications of climate change. Definitions vary among organizations, reflecting the complexity and differing global impacts of climate dynamics (Friedman, 2024). While the U.S. Department of Defense (DOD) offers a broad definition encompassing nearly all risks posed by climate change, this breadth risks diluting its strategic clarity. NATO similarly avoids a singular definition, instead emphasising the diverse security threats climate change presents across military and geopolitical domains. For this chapter, 'climate security' is understood as the physical, economic, or societal impacts associated with climate change that substantially alter political stability, human security, or national security infrastructure. (PNLL, n.d.).

Definitions aside, the security implications of climate change are now regularly referred to by NATO as the "defining challenge' of the 21st century" (NATO, 2022, p. 6), and the "overarching challenge of our time" that will "measurably" increase the risks to security and "worsen as the world warms further" (NATO Secretary General, 2022, Foreword) "the most consequential and, in the long-term, the most likely existential challenge" (NATO Allied Command Transformation, 2023, p. 7).

5. Contemporary Security Challenges

It is in this context that the new NATO Climate Change and Security Centre of Excellence (CCASCOE) was formed. One of the roles of CCASCOE is to share knowledge and awareness on the complex cross-sectoral implications of climate change on security. Accordingly, this chapter explores the complex relationship between climate change and conflict, framed within the broader concept of climate security—a focus gaining prominence within NATO. While the idea of climate security is gaining new momentum, the underlying issues have been the subject of study and analysis for many years.

This chapter aims to shed light on these long-standing debates and their relevance to contemporary security challenges. Importantly, for a new audience, the climate-conflict nexus is fraught with methodological complexity, ontological complexity, causal complexity, and uncertainties; by taking a historical look back it aims to better inform the future, reducing the risk of categorical errors being repeated. So much has been written on this complex climate-conflict nexus that a full account would fill another book, therefore this chapter focuses on the conceptual framing, the methodological debates, and the real-world implications for a defence audience, highlighting some of the key texts informing this ongoing debate.

Fundamental to this chapter is the awareness that there is not an absolute truth to be found, that is, no matter how long or how comprehensive our search, the understanding of climate and conflict will always evade discovery. It is an inherently complex and complicated nexus formed and informed by dynamic and context specific factors that require continuous examination. Instead, by bringing some of the climate conflict debates to the fore, this chapter seeks to provide a contextual contribution to the wider conversations underway that are shaping the field and some of the initiatives helping to build understanding.

6. The Language of Climate, Conflict and Security

While it is now widely accepted that addressing climate change involves national security measures and the participation of military actors, gaining a deeper understanding of ongoing discussions in the broader climate security field, especially those outside government circles, can significantly enhance our comprehension and improve the effectiveness of responses.

This broader perspective provides valuable insights into the complex dynamics at play and helps shape more informed and strategic approaches to climate security challenges.

The debate over whether the language of security is appropriate for addressing climate change remains a contentious issue within academic and policy circles. Scholars such as Maria Julia Trombetta, Olaf Corry, and Anslem Vogler, have critically examined the implications of applying a security framework to climate change, arguing that this approach may be fundamentally flawed (Corry, 2012; Trombetta, 2008; Vogler, 2023). The philosophical challenge in framing climate change within the traditional security paradigm stems from the conceptual differences between anthropogenic climate impacts and conventional security threats. Traditional security focuses on identifiable threats with clear intent, whereas climate change, driven by complex human-environment interactions, lacks a deliberate actor. This philosophical distinction, as highlighted by Trombetta and others, underscores the need for a change in thinking towards a broader, more inclusive understanding of security - one that encompasses systemic risks and vulnerabilities rather than solely militaristic threat.

One central critique is that climate change lacks the characteristics of a traditional security threat. It is not an adversary with intent, and thus, traditional security measures are often ill-suited to address it. Unlike conventional threats, climate change does not target specific states or populations with malice; instead, it presents a diffuse and non-anthropogenic challenge that complicates the identification of a clear referent object for security responses. Should we be protecting states, individuals, societies, or ecosystems?

As early as 1990, well-researched arguments began to link national security with environmental change. Scholars raised several concerns, including the limitations of applying traditional, state-centered views of security to environmental challenges. They also warned against using militarized, adversarial language, which could exacerbate tensions rather than resolve them. Additionally, framing environmental issues as national security threats risks deepening societal divisions and sparking conflicts over increasingly scarce resources (Deudney, 1990).

Furthermore, the securitization of climate change can obscure the root causes such as environmental degradation and human mobility migration and displacement, and lead to policy responses that prioritize immediate, reactive measures over long-term, sustainable solutions. By framing climate change in adversarial terms, there is a risk of escalating tensions and focusing on secondary conflicts, rather than addressing the underlying socio-economic and environmental factors that drive vulnerability. This perspective underscores the importance of a nuanced approach that goes beyond traditional security paradigms, advocating for policies that are as much about building resilience and adaptation as they are about deterrence and defence.

7. Securitization of Climate Change

The debate over the securitization of climate change—framing it as a security issue—continues to shape the discourse on environmental and climate security. This ongoing tension reflects the complex and sometimes contradictory implications of merging environmental concerns with traditional security paradigms. On one side of the debate, 'Realists', who dominate traditional security studies, argue that security should be narrowly defined as the protection of the state from immediate military threats. They view environmental issues as secondary, ranking them lower on the security agenda because historically, environmentally linked conflicts have tended to be subnational and low intensity. This perspective suggests that environmental changes, while significant, do not warrant the same level of urgency as conventional military threats.

In contrast, 'Constructivists' and 'Poststructuralists' challenge this narrow view, arguing that what society considers a 'threat' is not inherent but socially constructed. Constructivist perspectives, particularly in the realm of climate security, argue that the concept of 'threat' is not an objective reality but rather a social construct shaped by cultural, political, and historical contexts. This viewpoint encourages a re-examination of how we define and respond to security threats, urging a shift away from state-centric and militaristic paradigms towards approaches that prioritize human security, resilience, and sustainability in the face of climate change.

The theory of securitization, prominent in this school of thought, puts forward that an issue only becomes a security threat when a society or government labels it as such. This framing can dramatically alter the perception and response to the issue, often escalating the situation to one that requires urgent and sometimes extreme measures. In the case of climate change, securitization could lead to actions that prioritize military solutions over diplomatic or developmental approaches, potentially sidelining the root causes of the problem in favour of short-term security objectives. This debate highlights the need for careful consideration of how climate change is framed within security discussions, ensuring that the responses are both effective and appropriate to the nature of the threat.

8. Referent Objects of Security

Discussing climate change and its link to conflict and security in this way, the notion of 'whose' security is at play is a point engendering diverse analyses. For example, as (Daoudy et al., 2022, p. 3)many voices have amplified an increasingly popular narrative posing a climate–conflict–migration nexus. This essay reviews the literature on climate security, exploring the human security impacts of climate change in the Middle East and North Africa (MENA summarizes:

"Analysts differ widely with respect to the referent objects of security (state, international community, communities and individuals, or ecosystems), the actors responsible for addressing the threats (military/security apparatus, multilateral organizations, communities, or individuals), and the types of threats (drought/scarcity, rising sea levels, climate variability, or conflict). In other words, making assumptions about 'security' without identifying a referent object leads to misunderstandings over the nature of climate insecurity and how it operates on political, social, and ecological levels."

Of significant concern is the potential for securitization to stigmatize vulnerable populations, scholars warn that framing climate change as a security issue could inadvertently portray marginalized communities as threats, rather than as victims of environmental injustice (Daoudy et al., 2022)many voices have amplified an increasingly popular narrative posing a climate–conflict–migration nexus. This essay reviews the literature on climate security, exploring the human security impacts of climate change in the Middle East and North Africa (MENA.

To effectively integrate climate considerations into NATO's strategic framework, policymakers should carefully frame climate change in security discussions to avoid escalating tensions and reinforcing harmful stereotypes. While the debate over securitizing climate change highlights critical concerns, it also presents an opportunity for policymakers to refine their approaches to ensure that climate security is addressed effectively and equitably.

This can be achieved by promoting narratives that emphasise cooperation and shared responsibility rather than adversarial relationships. Additionally, encouraging dialogue between military leaders and environmental experts will be essential in developing balanced strategies that address both immediate security concerns and long-term sustainability. By adopting these approaches, the risks associated with securitizing climate change can be mitigated, ensuring that responses are both effective and appropriate to the nature of the threat while protecting the rights and dignity of vulnerable populations. Furthermore, enhancing collaboration with international organizations focused on climate adaptation and mitigation can help NATO remain agile and responsive to the emerging security landscape shaped by climate change.

9. Climate and Conflict – Tangible Threats?

In this emerging security landscape, it is important to also understand the framing of climate change and conflict, addressing the issue that climate change is not a tangible threat in the traditional security sense as it is not an actor or adversary. Concerns continue to be identified around the applicability of terms such as 'threat' or 'risk' when labeling

these challenges, and the political responses generated accordingly (see for example Angela Oels's overview in (Scheffran et al., 2012, Chapter 9)).

Climate change has often been referred to as a threat, and it does meet some of the defining criteria of a threat below. However, one could argue that it cannot be considered as such, essentially because of lack of agency. The notion of threat, in general, can be defined along five dimensions (Box 1.):

Box 1. Five dimensions of threat[7]

Negativity: A threat is viewed as having the ability to produce a negative impact on, or to negatively interfere with the goals of its referent object.

Intentionality: A threat can only be considered as such if it has intent, i.e., it is or is being controlled by a goal-oriented and rational actor. In the absence of intent, there is danger but not threat. Intent lends deliberation to a desire; thus, intent must be viewed as a desire the threat has committed itself to fulfil. A threat will 'track' the success of its attempts to achieve its intentions and is disposed to re-plan to achieve the intended effects if earlier attempts fail (Bratman, 1987).

Ability: To be a threat, an actor/entity should have the capability and opportunity to inflict the negative effect it intends to. Capability is defined as the ability (e.g., physical, cognitive, social, or informational) of an actor/entity to achieve its goal (or part thereof). Opportunity is defined as the existence of the required preconditions for the actor/entity's goal to be achieved.

Relativity: A threat is always considered as such in relation to a referent object, and not in absolute terms. Furthermore, the level of harm that can be inflicted by a threat is proportional to, and can only be measured against, the vulnerability of that referent object.

Emergence: A threat is always conceived of by the referent object that suspects, expects or observes it, as being in progress. Threats are represented in terms of potential and actualized relationships between threatening entities and threatened entities (Steinberg, 2005). A threat ceases to exist once it has achieved its goal

Climate change shares several characteristics commonly associated with security threats: it is an ongoing process (emergence) that increasingly leads to extreme and unpredictable weather events, it negatively impacts health, livelihoods, and societal

[7] Revisited from (Irandoust et al., 2013).

stability (negativity), and its effects are experienced unevenly across different populations based on their vulnerability and adaptive capacity (relativity). However, a key difference sets climate change apart from traditional security threats: the lack of intentionality. Unlike conventional threats, which involve a rational actor with the intent to inflict harm, climate change is driven by a complex web of anthropogenic activities, yet it operates without a conscious agent. This absence of intentionality complicates the framing of climate change as a direct threat in the traditional security sense.

10. A Threat-multiplier

Nonetheless, this does not diminish its profound impact on global security. Instead of being a direct aggressor, climate change acts as a 'threat-multiplier,' exacerbating existing tensions and vulnerabilities within societies. It amplifies the risks in already fragile regions, leading to increased instability, conflict, and displacement. The challenge, therefore, lies not in attributing intentionality to climate change, but in understanding and addressing the multifaceted ways in which it intensifies other threats to human security. This perspective shifts the focus from seeing climate change as an isolated phenomenon to recognising its role in compounding broader security challenges, demanding coordinated and comprehensive responses from global and national security frameworks.

Therefore, key to NATO's framing of the climate-conflict nexus is the idea that climate change is a 'threat-multiplier' or 'stressor.' The idea of climate change as an amplifier of other security challenges and its representation in security strategies can be traced back to at least 1998 (Mongolia) and prior to 2004 in strategies of South America and Asia. As a multiplier of threat, it had been identified as early as 2004 in both Western (Norway) and non-Western (Burkina Faso) countries and now features in the strategies of 93 countries from 2000-2020 (Vogler, 2023)displacement, and violent conflict. This study analyzes how ministries of defense and other security policy actors from 93 countries framed climate and other environmental change in national se curity strategy documents (NSSD.

In framing climate change as a threat-multiplier, the term was first used by a group of venerated U.S. generals and admirals convened by the U.S. Centre of Naval of Analysis (CNA) recognising the various ways in which climate change could exacerbate preexisting insecurities linked to other causes, such as poverty and weak institutions, and thereby increase the likelihood of violent conflict (CNA Military Advisory Board, 2007). The policy response in the U.S. led the mainstreaming of this approach, accepting and incorporating this terminology. The concept was incorporated into Department of Defense strategic and review documents, such as the Quadrennial Defense Review, explicated at congressional testimony, and adopted into legislation and executive branch orders and policies through the period 2007-2022 (Goodman & Baudu, 2023).

While less explicit than the near contemporaneous CNA report, the same terminology was employed by the High Representative and the European Commission to the European Council, Dr. Solana Madariaga, in the introductory remarks to support the framing of climate change as an exacerbating factor for regions "which are already fragile and conflict prone" (Council of the European Union, 2008, p. 2). The European Union (EU) has further incorporated this concept into strategy documents, through for example, its Climate Change and Defence Roadmap (European External Action Service, 2022), the Concept for an Integrated Approach on Climate Change and Security (European External Action Service, 2021) and the recent Joint Communication to the European Parliament and the Council (High Representative of the Union for Foreign Affairs and Security Policy, 2023), the latter of which focuses in-depth on the nexus of climate and security.

In 2009, the United Nations General Assembly (UNGA) issued a report that introduced the concept of climate change as a "threat multiplier" (United Nations General Assembly, 2009, p. 2). This report explored how climate change could intensify existing security risks through five specific channels, which could be mitigated by implementing effective policies and actions, known as "threat minimizers." These minimizers include efforts to mitigate and adapt to climate change, promote economic development, strengthen democratic governance and local and national institutions, foster international cooperation, advance preventive diplomacy and mediation, ensure timely access to information, and boost support for research and analysis to deepen the understanding of the links between climate change and security.

NATO's first formal climate security strategy, outlined in the Climate Change and Security Action Plan (NATO, 2021), emphasises the concept of climate change as a 'threat multiplier' that affects Allied security. This framework has been central to the strategy's implementation and subsequent analyses, such as those found in the NATO Climate Change and Security Impact Assessments[8] and the Compendium of Best Practices[9].

The discourse on climate security, which initially focused on the exacerbating effects of climate change on existing vulnerabilities—particularly in non-Western nations, as discussed in the CNA and EU papers has evolved. Contemporary analysis now places greater emphasis on the responsibilities and consequences for developed nations, ensuring a more comprehensive and equitable examination of climate security, that is, current analyses have broadened to consider how developed nations also play a significant role in contributing to climate-related security risks and must bear responsibility for addressing

[8] NATO - Topic: Environment, climate change and security

[9] 230710-climate-change-best-practices.pdf (nato.int)

these issues (Scheffran et al., 2012, Chapter 9). As the concept of climate security continues to evolve, NATO's approach must continue to adapt, recognising not only the impacts on global security but also the responsibilities of developed nations in addressing these risks.

11. Complexity in Climate Conflict Research

Given the increasingly complex and interconnected security landscape, a further debate raised by the securitization of climate argument relates to the observation that using a security frame focuses on contentious and conflict-centered second-order effects of climate change, slighting or even obscuring root causes and diluting appropriate political responses. The literature overwhelmingly indicates that it is a complex and multi-dimensional issue. Rather than directly attributing climate change as a simple cause of conflict, the relationship is intricate, involving various intervening factors that influence how climate impacts might contribute to instability. These include strategic alliances, political power dynamics, socioeconomic inequalities, psychological perceptions of inequality, and cultural identities (Box 2.).

Box 2. Multi-level factors[10]

Strategic alliances are essential in maintaining a rules-based international order and minimizing the risk of interstate conflict in an increasingly multipolar and unpredictable world. The stress climate change places on these strategic systems highlights the importance of integrated approaches to security that consider both the immediate and long-term impacts of environmental stressors.

The political dimension underscores the vulnerability of governance systems—both democratic and authoritarian—to the pressures exacerbated by climate change. Weak governance often correlates with increased intrastate violence and terrorism, as violent groups exploit failing institutions to gain control over power and resources.

Socioeconomic factors, including economic inequalities and the failure of the social contract, further contribute to the risk of conflict, especially in contexts of absolute poverty.

Psychological factors, such as the perception of inequality and the erosion of trust and legitimacy, complicate efforts to achieve equitable solutions to climate-related challenges.

Cultural factors, including collective and individual identities, shape the ways in which communities respond to climate stressors, influencing both conflict and peace outcomes.

[10] Adapted from a synthesis of Conflict Analysis frameworks

Conflict and peace are determined by a complex interaction of these factors, each dependent on temporal and spatial conditions. Yet, when it comes to relating climate change to conflict, there has been significant debate in the literature as to whether the onset of the former causally leads to the latter. Perspectives on the relationship from multiple academic disciplines have emerged such as environmental studies (Barnett, 2003), international relations (Busby, 2018; Ide, 2023; Von Uexkull & Buhaug, 2021), economics (Burke et al., 2015) and focused statistical studies (Hsiang et al., 2013; Von Uexkull et al., 2016).

The methodological and theoretical challenges that arise when attempting to quantify the influence of climate variability on conflict, particularly civil conflict is complex. Whilst some studies suggest a link between climate factors (such as temperature and rainfall) and conflict, these findings are not universally consistent across different contexts, many of the meta-analytic studies oversimplify the issue and may lead to misleading conclusions (Solow, 2013), This highlights the importance of considering the specific conditions under which climate factors might contribute to conflict, rather than assuming a direct and uniform causal relationship. More nuanced and context-sensitive research approaches that consider the various indirect mechanisms and intervening factors that might influence the climate-conflict nexus are needed.

12. Climate Security – Research Paradigms

The divergence in methodologies and findings can, in part, be explained by the differing research paradigms that shape the study of climate change and conflict. While some researchers adopt a positivist approach, favouring empirical data and statistical methods to establish correlations and causality, others follow a constructivist approach, which argues that these links are highly context-dependent and shaped by social constructs rather than objective realities.

The relationship between climate change and conflict is more complicated than cursory statements allow, accordingly Jan Selby, in a 2014 paper, outlines these concepts in more precise detail, critiquing the positivist climate conflict approach. In summary, Selby contends, first, that the correlations identified by positivistic research are specious, since they always rest upon coding and causal assumptions which range from the arbitrary to the untenable. Second, that even if the correlations identified were significant and meaningful, they would still not constitute a sound basis for making predictions about the conflict impacts of climate change. And third, that such an approach reflects and reproduces an ensemble of stereotypes, ideologies and policy agendas (Selby, 2014).

The field of climate-conflict research is rapidly evolving, with a growing recognition of the need for more sophisticated methods that can capture the intricate relationships

between climate change and security outcomes. One such effort is highlighted in a recent review which provides a comprehensive overview of climate security risk assessment methods (Šedová et al., 2024). The authors analyzed 28 different approaches that focused on various security risk outcomes which simultaneously consider climate as a risk factor, and conflict either as an outcome and/or a driver of climate vulnerability. This review, particularly Table 1 (Šedová et al., 2024, p. 180), offers a valuable resource for comparing several climate security metrics currently being applied.

The review reveals that although there is diversity in the methods used, many tools are neither transparent nor robust. Many of the tools have broad geographical coverage, typically focusing on regional or national scales rather than the more critical subnational levels where climate impacts are most pronounced. While some tools attempt to address the complex interactions between climate variables and conflict outcomes, many do not fully integrate these complexities. Furthermore, only a few tools have strong validation procedures, which weakens their credibility. The study suggests that to improve the utility of these tools in shaping climate security policies, there needs to be greater inclusivity, more transparent methodologies, and stronger validation practices.

This perspective aligns with the broader discourse on the need for integrated and context-sensitive approaches to climate-conflict research. For those interested in further exploring these developments, recent articles and special issues have highlighted active research directions. For example, (Von Uexkull & Buhaug, 2021) discuss the security implications of climate change, while (Simpson et al., 2021) propose new frameworks for incorporating complex factors into climate risk assessments. Additionally, (Mach et al., 2020) offer insights into how different research streams can complement each other. Finally, (Amakrane & Biesbroek, 2024) provide an analysis of how current defence policies are adapting to integrate climate change considerations into their strategic planning. In addition, promising cross-sectorial and multi-disciplinary investigations are underway, for example, those that develop methodologies to elicit individual and consensus opinions from a set of experts carrying representative viewpoints (Mach et al., 2019), and Scenario Based Analysis.

As the field of climate security matures, NATO can strengthen its climate security approach by incorporating climate risk assessments into security planning and refining early warning systems that monitor climate-related risks in conflict-prone regions to allow for proactive measures that reduce the likelihood of conflict escalation due to environmental stressors. To do this effectively, it is constructive for military partners to be aware of and, where possible, engage with the academic community to better understand the relationship between climate change and conflict. The CCASCOE will serve as a vital bridge between NATO and the academic sector, fostering collaboration

that enhances the understanding of climate-conflict dynamics so that NATO can better represent and respond to the complex challenges posed by climate change, ensuring a comprehensive and evidence-based approach.

13. Conclusion

The relationship between climate change and conflict represents one of the most pressing and complex challenges of our time. While climate change does not fit neatly into traditional security paradigms, its role as a 'threat multiplier' that exacerbates existing vulnerabilities and socio-political tensions is undeniable. This chapter has highlighted the need for a more nuanced approach to climate security—one that transcends conventional military frameworks and incorporates multidisciplinary perspectives and one that can be achieved by promoting narratives that emphasise cooperation and shared responsibility rather than adversarial relationships.

As global security institutions like NATO adapt to an evolving landscape, integrating climate considerations into strategic planning and operations is imperative. This involves recognising the multifaceted ways in which climate change intensifies other threats to human security and developing comprehensive, long-term strategies that prioritize resilience, adaptation, and sustainable development over short-term, reactive measures. By embracing this broader approach, we can better navigate the complexities of the climate-conflict nexus, contributing to a more stable, resilient, and sustainable global security environment.

As NATO's 30th Centre of Excellence, CCASCOE stands poised to be a cornerstone in addressing the critical intersection of climate change and security. By fostering innovative thinking, driving robust research, and applying strategic foresight, CCASCOE will not only enhance NATO's capabilities but also lead the way in proactively mitigating the risks posed by climate change.

By leveraging cutting-edge research and facilitating cross-sector dialogue, CCASCOE ensures that NATO's strategies are informed by the latest scientific insights, thereby enhancing the Alliance's capacity to anticipate and respond to climate-induced security threats. Additionally, CCASCOE provides training and resources to defence and security personnel, equipping them with the knowledge and tools necessary to implement climate-responsive strategies in their operations. This proactive approach not only strengthens NATO's readiness but also contributes to global efforts in building resilience against the multifaceted impacts of climate change.

Only through a truly integrated approach can we hope to mitigate the risks posed by climate change and secure a more peaceful future for all.

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PART II: Relationship Between the Changing Climate and Terrorist Groups

CHAPTER 3

Assessing Efforts to Address Nexus Between Climate Change, Conflict and Terrorism

İzzet Arı*

Abstract

The relationship between climate change, security, and terrorism is complex and multifaceted. The direct and indirect impacts of climate change serve as a risk and conflict multiplier for terrorism, political instability, migration, and displacement in unstable and fragile areas. Moreover, climate change exacerbates existing vulnerabilities in societies. Several regions that are already experiencing political and social instability face conflicts intensified by the severe effects of climate change. Resource scarcity, such as water scarcity and food insecurity, coupled with competition for resources, exploits climate vulnerabilities, marginalizes populations, creates power vacuums, and ultimately weakens governance. Additionally, extreme weather events, droughts, and sea-level rise displace people, leading to migration and further exacerbating instability, providing a fertile ground for the origination of violence and terrorist activities. Extremist organizations with a proclivity for violence have asserted control over limited natural resources, thereby playing a role in the degradation of natural capital and ecosystems. Among the countries most exposed to climate risks, more than half are involved in United Nations (UN) peacekeeping efforts. This study aims to understand the causes of security challenges and the risk of terrorism related to climate change, and to assess global efforts in addressing these challenges. It provides an overview of various approaches highlighting the causal relationship between climate change and terrorism and addresses the direction of climate threat multipliers on terrorism. International cooperation and knowledge sharing are critical for developing effective responses to this complex challenge. In this context, the efforts of the UN Security Council, through meetings

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and briefings addressing climate change-related migration, security, and terrorism, are assessed. Furthermore, The UNDP, DPPA, and UNEP collaborated on the Climate Security Mechanism, which is examined to address security risks associated with climate change more systematically. Statistical data and studies from international organizations on this nexus are critically evaluated, and country-based early warning systems, conflict prevention strategies, and counter-terrorism efforts are overviewed. Finally, progress towards achieving the Sustainable Development Goals to reduce involuntary climate-related migration and displacement is monitored. Building resilience, ensuring good governance, and addressing inequalities to reduce the risks of terrorism associated with climate change are highlighted in this study.

Keywords: *Climate change, conflict and terrorism, international cooperation*

1. Introduction

The interconnectedness of climate change, security, and terrorism is a complex network of relationships with far-reaching implications and multifaceted (Asaka, 2021). Climate change causes extreme weather events, storms, cyclones, sea-level rise, and resource scarcity (e.g., water and food) to displace people, disrupt livelihoods, and weaken governance structures. Hurricanes, typhoons, and cyclones can devastate coastal communities, forcing people to flee. Floods displace millions annually, damaging homes, infrastructure, and livelihoods. Storm surges inundate low-lying areas, rendering them uninhabitable. Prolonged droughts lead to water scarcity, crop failures, and livestock losses. Farmers and pastoralists abandon arid regions in search of better conditions. Coastal erosion and saltwater intrusion make coastal areas unlivable. Small island nations face existential threats as rising seas submerge land. Heatwaves worsen droughts, affecting agriculture and health. Wildfires force evacuations, displacing entire communities. These changes exacerbate existing vulnerabilities in societies such as women, low-income and poor societies, children, and the elderly, and amplify existing social, economic, and environmental challenges, creating fertile ground for conflict and instability, leading to worsening livelihood conditions, migration and mobility patterns, exploitation by elites, and resources mismanagement (Romm, 2022; UNICRI, 2022).

Climate change-induced migration leads to mass migrations. Displaced populations may face challenges in resettlement, which can strain social structures and resources, potentially leading to conflicts and instability. Additionally, large-scale migration can increase the risk of radicalization and terrorism, as marginalized communities may become susceptible to extremist ideologies (Mavrakou *et al.,* 2022; Silke & Morrison, 2022). 630 million people worldwide could be displaced by sea-level rise alone by 2100 (Kulp & Strauss, 2019). According to the World Bank, a minimum of 200 million refugees, mainly from impoverished areas – with nearly half originating from Africa,

followed by East and South Asia – are projected to be displaced by 2050 due to the impacts of climate change (Clement *et al.*, 2021). Therefore, insufficient resource and effects of climate change can significantly exacerbate instability in regions. In areas already facing resource scarcity (such as water or arable land), an influx of migrants further strains available resources. Displaced populations seek refuge in urban centers. Host communities may perceive migrants as competitors for jobs, housing, and services, leading to social tensions. Migrants often seek employment, but their presence can disrupt local labor markets. Increased labor supply can lead to lower wages for both migrants and locals. Migrants bring diverse cultural backgrounds, which can clash with existing norms and values. Differences in language, religion, and customs may lead to ethnic tensions. Cities face overcrowding, inadequate housing, and strained public services. Rapid migration can lead to increased crime rates, affecting community safety. Vulnerable migrants may be susceptible to extremist ideologies. Thus, this migration induced may increase the risk of terrorism due to the failure of cities to integrate new populations and the proximity of urbanized areas to country borders (Schon & Nemeth, 2022). Poverty, weak governance, conflict, and instability are common factors that contribute to both high climate change vulnerability and terrorism risk in many countries (Vision of Humanity, 2024a, 2024b). Governments often find it difficult to manage migration flows effectively. Weak states, particularly in South and Southeast Asia, are at risk of reduced capacity due to climate change, potentially creating spaces for terrorist groups to operate more freely (Smith, 2007). The absence of coordinated legal and administrative systems to manage climate-induced human displacement risks conflict and political instability (Millar, 2007). For example, left-wing terrorist organizations capitalize on environmental strains and grievances exacerbated by climate change to aid recruitment and incite violence, with case studies demonstrating this in Colombia, Peru, and India (Kingdon & Gray, 2022). Similarly, countries grappling with both climate change impacts and terrorism, such as those in the Sahel region, are caught in a vicious cycle (Vision of Humanity, 2024b, 2024a).

The aim of this study is to analyze the causes, impacts, and responses to security challenges and terrorism risks related to climate change. In this scope, the study focuses on the emerging literature on climate change-induced terrorism and conflict with country-level cases. The method of this chapter is based on desk research and qualitative analysis through content analysis and case studies. Sections two and three explain the reasons and consequences of climate change on conflict and terrorism according to the level of vulnerabilities. Section four presents approaches and global efforts, including those by the UN Security Council, the Climate Security Mechanism, and NATO, to address climate change-related terrorism and conflicts. Finally, the conclusion section provides a brief summary, lessons learned, and policy recommendations for further actions.

2. Multiplier Effects of Climate Change

Climate change acts as a threat multiplier, indirectly contributing to the rise of terrorism by creating conditions conducive to the recruitment and empowerment of violent groups (Charalampopoulos & Feofilovs, 2023). Climate change acts as a catalyst for security threats by undermining human security and state capacity, leading to increased displacement, and instability, and providing opportunities for terrorist organizations to thrive. The complexity of these challenges necessitates multifaceted solutions, including building resilient societies and adapting both rural and urban areas to the impacts of climate change. Climate change can increase the likelihood of conflict and violence (Arnall, 2023), and it becomes the driver of conflict and violent extremism, acting as a "risk multiplier" (Nett & Rüttinger, 2016).

The literature on the link between climate change and conflict reveals widespread consensus that, depending on the situation and how it manifests itself, climate change may exacerbate conflict. This is especially true in regions where agriculture is a major economic and political factor. Research shows that there is a link between climate change and terrorism, with climate change leading to scarcity, job losses and instabilities that may contribute to terrorism (Mavrakou *et al.*, 2022). The concept of a "climate change–terrorism nexus" is further explored by recognizing climate change as a potential major driver of future terrorism, while the role of climate change in igniting, facilitating, or exacerbating terrorist conflict remains relatively unexplored (Silke & Morrison, 2022). "Climate terrorism assemblage" is another concept. It offers a more detailed and complex understanding of how climate change, terrorism, and radicalization are interconnected, highlighting the various ways in which these factors interact and influence one another. This framework considers the complex and emergent interactions between various geopolitical components, such as climatic factors, migration, and discourse on climate security. It emphasizes the strategic territorializations where political claims of causal links between climate change, terrorism, and radicalization are crystallized, such as in the case study of the Syrian conflict (Telford, 2020).

Climate change disrupts economies and livelihoods, particularly in sectors highly dependent on natural resources from agriculture to fisheries, and tourism. Communities reliant on these sectors face increased economic hardships, unemployment, and loss of income, exacerbating poverty, inequality, and social tensions (Worland, 2016). The disruption in agriculture, reduced crop yields and changes in rainfall patterns caused by climate change are leading to food shortages and water scarcity in many regions. Food scarcity drives up prices, impacting vulnerable populations. Hungry populations may protest or engage in civil unrest. Vulnerable communities dependent on subsistence agriculture or lacking access to clean water face heightened risks of malnutrition,

hunger, and waterborne diseases, exacerbating poverty and social inequalities. Shortage of resources, water scarcity or stress, and food insecurity are significant factors that can create vulnerabilities and weaken governance in regions facing political and social instability. Water scarcity, in particular, can have a profound impact on food security, as it is a vital resource for agricultural production. According to the International Food Policy Research Institute (IFPRI), competition for land, water, and energy across productive sectors and even within agriculture can increase as water scarcity intensifies, leading to challenges for prevention, peace-building, and development (Rosegrant *et al.*, 2014). As water becomes scarcer due to climate change or mismanagement, communities, industries, and agriculture compete for limited supplies. Armed groups can assert control over water sources, fertile land, or mineral deposits. Unequal distribution of water resources can lead to tensions between regions, ethnic groups, or neighboring countries. Water-related disputes can escalate into conflicts, especially in arid regions where water is a lifeline. Population growth and urbanization can also drive up the demand for freshwater, leading to water crises and droughts in regions with large and ever-increasing populations, such as China, South Africa, and some USA states (Earth.org, 2023).

The literature also acknowledges that while the causes of terrorism can involve large-scale geopolitical processes, they can also include more personal factors at the individual level. The importance of each factor can vary greatly, and not all causes are present in every case of terrorism (Silke & Morrison, 2022). The impact of climate change on political instability is not uniform, and disparities exist between countries and regions. Regions such as Africa, Asia, the Middle East, and Central America, primarily comprised of developing countries, are regarded as the most susceptible to climate-related catastrophes. Climate Change Vulnerability Index (CIRCA, 2024; Edmonds *et al.,* 2020) and Global Terrorism Index (IEP, 2022)- identify countries that are most affected by their respective issues. The Climate Change Vulnerability Index ranks countries most affected by climate-related extreme events (UNICRI, 2022), while the Global Terrorism Index ranks countries most impacted by terrorism (IEP, 2022). There appears to be a correlation between countries with high climate change vulnerability and those with high levels of terrorism, based on the Global Terrorism Index and Ecological Threat Report data (Vision of Humanity, 2024b, 2024a). Countries such as Nigeria and Pakistan appear on both indexes, indicating they face high levels of climate change vulnerability and terrorism. For example, Pakistan and Nigeria are ranked in the top 5 countries on the global terrorism index and also experience significant climate change impacts (Lytle, 2017; Vision of Humanity, 2024b). Climate change acts as an indirect driver of terrorism by exacerbating conditions that contribute to its spread, particularly in sub-Saharan Africa (Mavrakou *et al.,* 2022). Climate change has the potential to erode

the credibility of governments and escalate conflicts between different communities, especially concerning the utilization of natural resources, which can heighten the likelihood of tensions and instability. During the competition for resources, tensions intensify, leading to marginalization and power vacuums (Romm, 2022). Hard security responses to quell the fighting and the emergence of illicit economies can bring further hardship and suffering, which can fuel recruitment for violent extremist organizations (VEOs) (Romm, 2022). VEOs assert control over limited natural resources, contributing to degradation and conflict. These areas often suffer from high exposure to climate risks, which can lead to challenges for prevention, peacebuilding, and development. Terrorist groups may exploit vulnerabilities to establish safe havens, recruit fighters, and expand their operations (Romm, 2022). Addressing these challenges requires the collaboration of multiple actors and the building of resilient societies (Kechagia *et al.,* 2021).

Climate change can strain social cohesion and exacerbate existing tensions within communities and between social groups. Competition over dwindling resources, displacement, and unequal access to adaptation measures can fuel conflicts, violence, and social unrest, further eroding trust in institutions and governance structures. Addressing the complex nexus of climate change, security, and terrorism requires coordinated efforts at the national, regional, and international levels (UN, 2021). However, existing governance structures may be inadequate to effectively address these interconnected challenges. Strengthening cooperation and collaboration among international organizations, states and non-state actors is essential to develop holistic approaches that address both climate-related risks and security threats. The United Nations system, including the Security Council, is making efforts to respond to the security implications of climate change. This includes developing early-warning mechanisms and integrating climate-related security issues into the Council's resolutions (UN, 2021). Addressing climate issues can prevent conflicts, resolving existing tensions, and fostering peace (Telford, 2023) conflict, migration and terrorism in causal relationships. The paper contends that attempts to establish such causal relationships in conditions of empirical complexity are characterised by a contested politics of implication. Drawing on a critical discourse analysis of a UN Security Council debate on climate security (December 9, 2021. Recognizing the interconnectedness of climate change, security, and terrorism underscores the importance of sustainable development as a means of addressing underlying drivers of conflict and instability. Promoting economic opportunities, social cohesion, and environmental resilience can help build more resilient societies less susceptible to radicalization and violence.

Vulnerable communities often lack resilient infrastructure and basic services, such as healthcare, education, transportation, and sanitation, making them more vulnerable to

the impacts of climate-related hazards (Stapleton *et al.,* 2013). Inadequate infrastructure and services hinder effective response and recovery efforts, exacerbating vulnerabilities and perpetuating cycles of poverty and deprivation. The global resources allocated for bolstering resilience against climate change are inadequate, with adaptation expenses alone projected to range between $70 billion to $100 billion annually by 2050 in developing nations (UN, 2016). The intensification of conflicts in already unstable regions due to a lack of adaptation efforts has broader regional and global security implications. Escalating violence, displacement, and humanitarian crises can spill over borders, exacerbate regional tensions, and contribute to instability in neighboring countries. Moreover, conflicts fueled by climate change can create fertile ground for extremist groups and terrorist organizations to thrive, posing threats to regional and international security (IRC, 2023).

As resource competition escalates, governance structures may weaken due to corruption, inefficiency, or lack of capacity. Power vacuums attract opportunistic actors (such as warlords, criminal networks, or extremist groups) seeking to exploit the situation. In regions with weakened governance, extremist groups exploit resource stress. VEOs exploit limited natural resources, contributing to environmental degradation in various ways (UNICRI, 2022). VEOs can also use environmental degradation and climate change to further their propaganda and recruitment efforts. Climate change is identified as a newly established contributor to terrorist actions, with Non-State Armed Groups (NSAGs) exploiting the fragility and instability caused by climate change to proliferate and recruit vulnerable local populations. Case studies, such as Boko Haram in Lake Chad, demonstrate how NSAGs manipulate natural resources strategically to impose their regime. Some studies (Monroe *et al.,* 2019) have shown that VEOs tend to recruit smart, well-educated members who may be concerned about the impact of climate change on their communities. These organizations can use environmental degradation and climate change as a way to express grievances and later provide an added layer of justification for their violent activities. VEOs can weaponize natural resources by restricting access to them and seizing strategic territory. For instance, when DAESH captured the Mosul dam in Iraq, it gained control over substantial water and electricity resources (UNICRI, 2022).

3. Countries at High Climate Risk and Conflicts

A study by the Stockholm International Peace Research Institute (SIPRI) found that hosting significant multilateral peace operations were located in regions highly vulnerable to the impacts of climate change (Krampe, 2019). In Afghanistan, the decline in agricultural productivity due to climate change and other factors has led to widespread

poverty and food insecurity, making vulnerable populations more susceptible to exploitation and recruitment by criminal organizations and armed groups. Across West Africa and the Sahel, changes in grazing patterns contribute to violence, as climate change disproportionately affects certain countries, making them more exposed to climate risks. Frequent cyclones, flooding, and sea level rise influence Mozambique's infrastructure and livelihood. Unpredictable rainfall patterns impact water supply and agriculture in Zimbabwe, and ongoing food shortages make the country more vulnerable. Rising waters in the Bahamas are hazardous to freshwater and land resources because tropical cyclones frequently hit the archipelago. Hurricanes that frequently hit Puerto Rico leave destruction in their wake. Extreme weather events are common in Myanmar's coastal regions; in 2008, storm Nargis caused thousands of people to be displaced. Haiti faces frequent hurricanes and earthquakes that disrupt communities so poverty, deforestation, and weak governance compound climate risks. Bangladesh faces inundation due to low-lying delta regions, and frequent cyclones damage infrastructure and agriculture. Rising seas threaten coastal communities of Guinea-Bissau. In Sierra Leone, logging and mining harm forests and biodiversity. Extreme weather events affect livelihoods in the country. Ongoing conflict compounds climate risks in South Sudan. These countries require urgent climate adaptation and resilience-building efforts. Effective UN peacekeeping can mitigate conflict risks arising from climate stress. Extremist groups manipulate climate-induced resource scarcity to their advantage. For example, DAESH in Iraq and Syria exploited water shortages. Al-Shabaab in Somalia profits from charcoal production. To build lasting peace and to tackle inequality, poverty, and human rights violations, involving all communities, including environmental defenders, amplifies voices and promotes stability.

Over half of the countries most exposed to climate risks are actively involved in UN peacekeeping efforts. These countries face both climate challenges and security responsibilities. Democratic Republic of the Congo hosts the MONUSCO peacekeeping mission, which aims to stabilize the region. The risk is related to extreme weather events and resource scarcity. Golan Heights in Syria, is vulnerable to climate impacts and geopolitical tensions. The UNDOF mission is monitoring the Israel-Syria ceasefire, while the UNIFIL mission in Lebanon is working to ensure stability, particularly in the context of climate vulnerability and post-conflict recovery in southern Lebanon. The UNISFA mission monitors the Abyei area (Sudan-South Sudan border) related to climate stress and territorial disputes. These countries grapple with both environmental and security challenges, emphasizing the interconnectedness of climate and peacekeeping efforts. Figure 1. presents whole picture of climate change related conflicts in Afghanistan, Mozambique, Zimbabwe, Bahamas, Puerto Rico, Myanmar, Haiti, Bangladesh, Guinea-

Bissau, Sierra Leone, South Sudan, Democratic Republic of the Congo, Syria, Lebanon, Sudan, Somalia and Iraq. These countries face a confluence of climate related stressors that intensify existing vulnerabilities and trigger new conflicts. In these countries, climate change has led to severe droughts, extreme weather events, and unpredictable rainfall patterns, which have critically impacted agriculture, water resources, and food security. Additionally, many of these countries have fragile political structures and limited economic resources, which hinder their ability to respond effectively to climate-induced disasters. Furthermore, the compounded effects of climate change and conflict often force mass migrations. Altogether, the nexus between climate change and conflict in these countries highlights the urgency of comprehensive strategies that address both environmental and socio-political challenges in order to build resilience and stability.

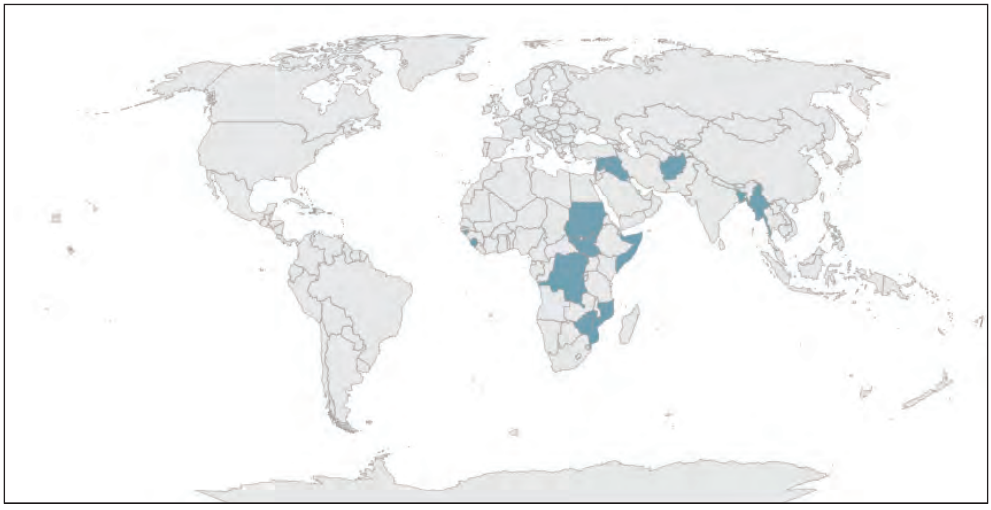

Figure 1. Countries facing conflicts related to the effects of climate change (Prepared by the Author)

4. Global Efforts and Approaches

The global climate change is a common problem for all countries. Fighting against it requires cooperation and collaboration among various stakeholders. International and multilateral organizations and institutions would coordinate and manage essential actions. Similarly, terrorism and conflict are common issues, and cooperation and partnerships are required to eliminate conflict and terrorism. UN Secretary-General António Guterres highlighted that climate change aggravates terrorism by exacerbating existing vulnerabilities (Street, 2021). UN Security Council, Climate Security Mechanism and NATO are the main bodies for leading global efforts for climate change-related terrorism and conflict.

4.1. The UN Security Council

The UN Security Council has a role in addressing climate change-related migration, security, and terrorism through its mandate to maintain international peace and security. In July 2011, the Security Council held an open debate on climate change. Resolution 2349 which was released in 2017 emphasized the need to address climate-related risks in the context of the conflict in the Lake Chad basin. A debate on "understanding and addressing climate-related security risks" took place in July 2018 (UN, 2019). The Council has debated the potential impact of climate change on security, including the link between climate change, irregular migration, and socioeconomic disparities. The Council has also requested missions to assist governments in the region and the UN system in undertaking risk assessments and risk management strategies relating to climate change, energy poverty, ecological changes, and natural disasters (Murphy, 2019). The Council would focus on regional terrorism and conflict to increase the security measures at vulnerable places and communities. On January 25, 2019, the UN Security Council recognized climate change as a "threat multiplier" to international peace and security (UN, 2019). This acknowledgment highlights the impact of climate change on various aspects, including displacement, unemployment, food insecurity, and recruitment in armed groups. However, the UN Security Council has not yet passed a resolution specifically defining climate change as a threat to international peace and security.

The Security Council considered a draft resolution that aimed to integrate climate-related security risks into UN conflict-prevention strategies. Despite efforts to address the issue, the Council has not been able to agree on a resolution that codifies climate change as a security concern (Buhaug *et al.,* 2023; Day & Krampe, 2023; McDonald, 2023). This is evident from the fact that a draft resolution in December 2021 failed to pass due to opposition from some members, particularly Russia (Arias, 2022; McDonald, 2023; Reliefweb, 2021; SCR, 2022). The challenges in adopting a Council resolution on climate change, highlighting the opposition from countries like Russia, China, and India is a kind of fundamental impediments to such a resolution and question the authenticity of the opponents' arguments (McDonald, 2023).

However, the Council has engaged in discussions and debates on the topic of climate change and security, with some members advocating for a more prominent role for the Council in addressing the issue. In 2020, during Germany's presidency, a high-level debate on the intersection of climate change and security was held, resulting in the creation of an informal expert group and calls for appointing a Special Representative on Climate and Security (McDonald, 2023). A draft resolution co-sponsored by Niger, the Council President for December, and Ireland would have asked the UN Secretary-General to make climate-related security risks a key part of comprehensive strategies

to prevent conflicts. The aim was to lower the likelihood of conflicts recurring due to the negative impacts of climate change during the open debate, nearly 60 speakers emphasized that vulnerable populations and countries affected by climate change are also susceptible to terrorist recruitment and violence.

Additionally, the UN Security Council has included references to climate change in some of its resolutions and statements, particularly in the context of peacekeeping and peacebuilding operations. For example, Security Council Resolution 2625 mentions the need for the international community to support Africa in its efforts to adapt to and mitigate the challenges posed by climate change (SCR, 2022). Despite these efforts, the Council's engagement on climate change remains limited, and the issue is not yet fully integrated into its work on peace and security. The Council has passed more than 70 resolutions and presidential statements focusing on various aspects of climate-related implications for peace and security, but a resolution officially recognizing climate change as a threat to international peace and security has not been passed (UN, 2019). The positions of the permanent members of the Council, some of which, like France, the US, and the UK, are generally in favor of tackling the issue, while others, like Russia, are more resistant to it, have an impact on the dynamics surrounding climate change and security.(SCR, 2022). A new text was added to some mandate renewals in 2022, acknowledging the UNFCCC and the Paris Agreement, including for the UN Assistance Mission in Iraq and the UN Support Mission in Somalia (UNSOM) (SCR, 2022). The Security Council has not passed a comprehensive resolution that specifically addresses climate change, but these discussions and acknowledgments show that people are becoming more conscious of the connection between climate change and global security. (UN, 2021b).

Discussions around the Council and its role in climate change literature address the ongoing efforts of the Council and the desired engagement for better-combatting terrorism and climate change. Penny (2007) discusses the legal authority of the UN Security Council to compel states to address climate change and explores the links between climate change and security. It suggests that the UN Security Council has substantial authority to make binding decisions on climate change and that political will is necessary to support such efforts. Scott (2008) presents its reflections on the first UN Security Council debate on climate change and the subsequent diplomatic shift away from framing climate change as an international security issue. The role of the Council with its coercive powers in coordinating global efforts to mitigate or adapt to climate change is necessary (Scott, 2008). The effects of climate change on international security and the controversial discussion about the link between climate change and security threats are obvious so the mandate and competencies of the Council shall be addressed to prevent climate change-related threats (Voigt, 2009). Some studies identify measures for a pragmatic transformative agenda that could help the Council

better address the climate challenge (Conca, Thwaites, & Lee, 2017). For example, the Council could have a role in mitigating climate change by examining the legal and practical implications of prospective actions in areas like climate mitigation requirements and commitment enforcement (Conway, 2010). Scott (2015) reviews the debate on whether the Council should consider climate change within its remit and maps out four broad categories of possible Council responses, ranging from rejection to proactive engagement. Thielbörger (2016) suggests four possible ways to justify the Council's competence in addressing climate change, including individual case-based, imminent threat-based, human rights-based, and cause and solution-based approaches. This study analyzes a large corpus of the UN Security Council documents to trace the evolution of discourses on climate change within the organization. The efforts to place climate change on the Council agenda and the ongoing process of climatization within the Council's debates, the expansion of climate politics, and the Council's role in the climate crisis need to be reviewed (Maertens, 2021; Scartozzi, 2022).

4.2. Climate Security Mechanism

The Climate Security Mechanism (CSM) is a UN initiative that aims to facilitate coordination and establish a common notion in the UN system for assessing climate-related security risks. The CSM's conceptual approach emphasizes the need for joint analysis, information sharing, and a collaborative and multisectoral approach to complete a comprehensive climate security and integrated risk assessment (UNEP, 2021). The CSM has contributed to the recognition of climate-related security risks in some Security Council Resolutions. Its work fits well within a global current of increasing awareness of the linkages between climate change and security (Brusset, 2022). The CSM with its toolbox outlines a method for conducting comprehensive climate security assessments that take into account both the immediate and indirect impacts of climate change on security across three key risk dimensions: the climate stressor or shock, the extent of exposure to these stressors, and the vulnerability or resilience of the affected populations (UNDP & Life and Peace, 2023). The CSM's effectiveness in addressing climate-related security risks systematically can be evaluated based on its relevance, sustainability, coherence, efficiency, effectiveness, and impact. The assessment of the CSM underscores its significance and viability, emphasizing comprehensive programming that integrates environment, resilience, and conflict management. Additionally, the CSM stresses the importance of integrating a dedicated peacebuilding aspect into all initiatives and ensuring that programs are environmentally sustainable while also enhancing natural resources and addressing socio-economic concerns (Brusset, 2022). The CSM's regional and country applications have shown positive results, with a focus on climate security programming that incorporates a specific peacebuilding component in all programming. However, there are challenges related to the scale of interventions and levels of impact, governance of the commons and policing, and the need for improved knowledge of potentially impactful adaptations that are showing positive results

(UNDP & Life and Peace, 2023). Overall, the CSM's conceptual approach and tools provide a solid foundation for addressing climate-related security risks systematically. However, there is a need for continued focus on integrating climate security programming across the three critical dimensions, incorporating a specific peacebuilding component in all programming, and addressing the challenges related to the scale of interventions and governance of the commons and policing. The CSM's role in promoting a comprehensive approach to address security impacts and risks, developing early-warning mechanisms, and further integrating climate-related security issues in UN Security Council resolutions is crucial in addressing the complex and interrelated global challenges of climate change, migration, and terrorism.

4.3. NATO

The role of NATO has been evolving through better climate policy and actions among alliances. The NATO Parliamentary Assembly adopted a resolution in October 2015 urging NATO members to support a legally binding agreement at the Paris Climate Change Conference and improve strategic awareness of the security threats posed by climate change (IISD, 2015). NATO calls to increase the frequency of military and political consultations on climate change within the organization and recognize climate change-related risks as significant threat multipliers in foreign and security policies (IISD, 2015). At the NATO Brussels Summit in 2021, leaders of Allied nations endorsed a Climate Change and Security Action Plan intending to position NATO as the primary global entity in comprehending and adjusting to the repercussions of climate change on security (NATO, 2023a, 2024a). The main measures of the Action Plan are to increase Allied awareness of the impact of climate change on security, to outline clear adaptation and mitigation measures, and to enhance outreach while ensuring a credible deterrence and defense posture (NATO, 2023a, 2024a). During the NATO Summit in Madrid in June 2022, leaders of Allied Heads of State and Government approved the Alliance's 2022 Strategic Concept, emphasizing NATO's aim to take a prominent role globally in comprehending and adjusting to the influence of climate change on security. NATO is committed to spearheading initiatives to evaluate and tackle the obstacles presented by climate change (NATO, 2024a). NATO's initial Climate Change and Security Impact Assessment acknowledged climate change as a significant overarching challenge that will heighten security threats, prompting a fundamental shift in NATO's defense and security strategies (NATO, 2024a). Resolution 480 - Climate Change and International Security in November 2022, climate change includes several key points and actions taken by the organization to address this global challenge (NATO, 2022). NATO Secretary General Jens Stoltenberg emphasized NATO's commitment to fighting climate change and being part of the global solution at the 28th UN Climate Change Conference of the Parties (COP28) in Dubai in December 2023 (NATO, 2024a). Recently, at the NATO Summit in Vilnius in July 2023, the NATO Centre of Excellence for Climate Change and Security was established in Montreal, Canada. The Centre is a unique platform for both military and

civilian actors to develop, enhance, and share knowledge on climate change and security effects, and to develop means and best practices to respond to these challenges (CCASCOE, 2024; NATO, 2023a, 2024a). These resolutions decisions demonstrate NATO's recognition of climate change as a significant threat multiplier that shapes the security environment and the organization's commitment to addressing this challenge through awareness, mitigation, adaptation, and enhanced outreach efforts (NATO, 2023b, 2023a, 2024b; Shingler, 2023)

Discussions around the role of NATO in climate change have been evolving. Strommen (1994) focuses on NATO's research programs aimed at understanding and predicting changes in the global environment, particularly those resulting from human activities and their impact on climate. Causevic and Al-Marashi (2020) discuss the need for NATO to change its security doctrine to manage climate change threats, particularly in the Middle East. They suggest that NATO should become a Climate Alliance Treaty Organization and highlight how NATO has previously dealt with environmental issues in Iraq post-war with the DAESH (Causevic & Al-Marashi, 2020) . Farhan et al. (2023) emphasize the need for NATO to adapt its political and institutional structures to anticipate and manage climate risks and improve operational resilience. They argue that climate change adaptation and mitigation should be integrated with traditional security threats (Farhan *et al.,* 2023). Milburn (2023) argues for a more active approach from NATO in mitigating climate change through strategic, planning, purchasing, technological development, and operational capabilities to address security risks associated with climate change and to reduce vulnerabilities in military operations supply chains (Milburn, 2023) . Kecskeméthy and Teknős (2023) examines NATO's stance on climate change and its policies to counteract its negative impacts. They discuss how NATO's strategic objectives are influenced by ecological challenges and the need for NATO to consider sustainable development objectives and energy security in its response to environmental damage (Kecskeméthy & Teknős, 2023). Ślusarczyk (2023) traces the emergence of environmental protection in NATO's political concepts and how the Alliance has faced environmental security challenges, including climate change and resource depletion. NATO's 2030 Strategic Concept was highlighted by focusing on the security impact of climate change due to inadequate environmental protection (Ślusarczyk, 2023).

5. Conclusion

Climate change poses significant threats to international peace and security by exacerbating resource scarcity, economic hardships, and social tensions. Its impacts disproportionately affect vulnerable populations, particularly those dependent on natural resources for their livelihoods. As climate change disrupts agricultural production, reduces crop yields, and leads to water scarcity, it can drive food insecurity, poverty, and inequality in affected regions. This in turn can increase the risk of conflict, instability, and the rise of extremist groups that exploit resource stress and grievances.

The UN Security Council has recognized climate change as a "threat multiplier" and has engaged in discussions on the issue, but has not yet passed a resolution specifically defining it as a threat to international peace and security. NATO has also acknowledged climate change as a significant security challenge and has taken steps to address it. Addressing the security implications of climate change requires a comprehensive, multifaceted approach that involves cooperation among various stakeholders, including the UN, Climate Security Mechanism, NATO, and regional organizations. This should include efforts to build resilient societies, adapt to the impacts of climate change, and tackle the root causes of resource scarcity and inequality. The UN Security Council, with only 15 members and dominated by the permanent five (P5) members, lacks representativeness and hinders the development of comprehensive, globally-coordinated solutions that reflect the diverse perspectives of all UN member states. The Security Council, primarily designed to address traditional security threats, lacks the specialized expertise and mechanisms to effectively tackle complex, multifaceted issues like the climate-security nexus. In addition to this, Climate Security Mechanism has been underfunded, limiting its ability to provide necessary support and resources, and has faced criticism for its focus on research and analysis over concrete, on-the-ground solutions, as well as for its fragmented efforts lacking a clear, unified strategy to address the climate-security challenge across the UN system and beyond.

Mitigation of climate change depends of reduction of greenhouse gas emissions, effective adaptation, finance, technology transfer and awareness raising at all level of the society. Even though, the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement are the main multilateral climate agreements, their effectiveness are being questioned while the whole Earth is suffering from the climate crisis. The Secretariat UNFCCC and its bodies focus on their agenda according to proposal from country parties or party driven priorities on the annual COP meetings, so many nexus issues such as climate change-terrorism-conflict are not receiving enough attention. Although, the global efforts and international supports for addressing the climate change originated terrorism and conflict have recently emerged, any agenda focusing on funding or allocation of financial resources and technology transfer for specific programs or action plans are not sufficient. Data, research and systemic issues, multilateral cooperation for experience sharing, capacity building and technology transfer are seen as main areas of improvement.

Finally, addressing the security implications of climate change is crucial for maintaining international peace and stability in the face of a rapidly changing global environment. It requires a concerted effort from the international community to mitigate the effects of climate change and build a more secure and sustainable future for all.

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PART II: Relationship Between the Changing Climate and Terrorist Groups
CHAPTER 4

Climate Terror as a Tool of Geostrategic Competition

Hakan Ömer Tunca*, Mehmet Cem Oğultürk**

Abstract

The concept of security has changed and expanded significantly with the two great world wars and especially with the end of the Cold War beyond centering philosophically and traditionally on a state or alliances, organized crime organizations and terrorist activities, it has begun to include issues such as climate change, attacks on individual or public health as well as attacks on the economy, attacks on welfare, especially mass migration and refugee movements, attacks on democracy and basic human rights. Through a multidisciplinary approach, drawing on insights from political science, security studies, and environmental studies, this study examines the motivations, tactics, and implications of employing climate-related threats and violence as instruments of power projection.

Climate change is increasingly recognized as both a threat multiplier and an existential challenge within the broader concept of security. Its impacts extend beyond environmental degradation, influencing social vulnerability, weakening resilience, and exacerbating existing societal tensions. One of the most concerning linkages is between climate change and terrorism. Climate change, by intensifying resource scarcity and social instability, creates environments that can foster radicalization and violence. Social vulnerability, driven by factors like displacement, food insecurity, and economic instability, makes populations more susceptible to the influence of extremist ideologies. At the same time, the capacity of societies to recover and adapt diminishes, further compounding the risks. In this way, climate change not only facilitates terrorism but is also indirectly exacerbated by it, as the violence and instability generated by terrorism can undermine global efforts to combat environmental degradation. The intersection of geopolitics and climate

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change is another critical aspect. Classical geopolitical theory traditionally focuses on the relationship between a state's territory and its power, emphasizing the strategic importance of geographical features. Geostrategy, a subset of geopolitics, involves using these geographical factors to craft strategies that protect national interests, and its concerns are increasingly focused on the implications of environmental changes for trade routes, strategic resources, and territorial disputes. Climate-induced disasters are not only humanitarian crises but also opportunities for states or non-state actors to achieve geopolitical objectives. These objectives might include territorial expansion, control over vital waterways, or influence over regional dynamics.

By analyzing both case studies and theoretical frameworks, this study explores how the consequences of climate change are being strategically leveraged, drawing connections between environmental changes, resource competition, and the evolving nature of global conflict, particularly in relation to terrorism.

Keywords: *Climate change, Terrorism, Social vulnerability, Geopolitics, Geostrategy, Resource scarcity, Environmental degradation*

1. Introduction

The interplay between climate change and global security has become one of the most urgent challenges of our era, fundamentally transforming international relations and redefining traditional concepts of conflict and collaboration. As climate change accelerates, it serves not only as a potent threat multiplier—intensifying existing vulnerabilities and breeding instability—but also as a trigger for new forms of violence and conflict, including terrorism. This study examines the complex interrelations between climate change and terrorism through the lens of geostrategic competition, demonstrating how environmental degradation can be weaponized to achieve political and territorial goals. At the heart of this issue, climate change significantly endangers social stability, with repercussions that deeply affect communities already contending with economic disparity, political disenfranchisement, and historical animosities.

The deterioration of essential resources—such as water, arable land, and energy—can heighten social vulnerability, creating an environment ripe for extremist ideologies and violent acts to take root. The consequences of climate-induced crises include displaced populations, strained economies, and weakened governance structures, highlighting the need to comprehend how these elements can combine to provoke terrorism. Conversely, the operations of terrorist organizations can also have extensive repercussions for climate stability. Tactics employed by these groups, such as assaults on energy infrastructure, exploitative resource extraction, and deforestation, can worsen environmental degradation, thus amplifying the very crises that facilitate their growth. This reciprocal relationship elucidates a complicated feedback loop wherein climate

change and terrorism coexist and actively shape one another, creating a multifaceted threat landscape that challenges conventional security frameworks.

The concept of geostrategy, based on traditional notions of geopolitical geography, offers a crucial perspective for analyzing these dynamics. By investigating the strategic implications of geographical resources—from trade routes to natural assets—geostrategy equips us with a framework for understanding how state and non-state actors navigate an increasingly competitive global landscape. The ongoing evolution of geopolitical competition, particularly considering climate change, requires revision of strategies to incorporate environmental considerations. Nations have to be able to navigate the difficulties of protecting their interests in a world where climate-related disasters have the potential to destabilize areas and provide opportunities for enemies to take advantage of weak points.

This study aims to further the discussion on climate-related terrorism by delivering an in-depth analysis of the connection between climate change and terrorism framed within geostrategic competition. By scrutinizing specific case studies that illustrate how climate-related disasters, resource scarcity, and environmental degradation have been leveraged for strategic gain, anybody can better understand the broader implications for global security. From confrontations over water resources in arid regions to the effects of rising sea levels on geopolitical dynamics, the evidence presented emphasizes the critical need for a nuanced comprehension of how climate change is transforming security paradigms. In addition, examining theoretical frameworks will augment our understanding of the fundamental mechanisms that drive this relationship. By synthesizing insights from security studies, environmental science, and political theory, it can clarify the pathways through which climate change and terrorism interconnect, ultimately revealing the complexities of their interactions. This multidimensional approach will foster a deeper appreciation of the strategic calculations that define state behavior in the face of environmental challenges. As humanity progresses through an era marked by both climate crises and geopolitical competition, recognizing the significance of climate-related terrorism is essential for policymakers, scholars, and practitioners alike. Understanding how climate change amplifies social vulnerabilities and enables terrorism will be critical for formulating effective responses that address immediate security concerns while fostering long-term resilience and stability. This study endeavors to lay the groundwork for such comprehension, offering insights vital for maneuvering through the uncharted territories of climate-induced geostrategic competition in the twenty-first century.

Climate and the changing climate may be abstract statistical terms and concepts, yet they result in real large-scale physical, hydrologic, and meteorological phenomena. The sheer physical magnitude of climate makes it a moving force, a potential tool manipulated by humans for ends of prestige, profit, or penance. Climate change is now pricking

the competitive spirit of estranged nation-states into reordering budgets, policies, and military installations, as in the scramble for the high ground of the geostrategic Arctic. The implications of changes in weather and climate, particularly in the increase of more frequent and severe hydroclimatic extremes and changes in the spatio-temporal extents of resource bases, may be largely speculative. Yet climate has long been a key consideration in the strategies of the successful states that succeeded in the failed states. Several key factors weigh heavily in the military calculus. Simply, climate is fundamental to the physical translation of world politics on a planet dominated by a single atmosphere and biosphere. Even more so, climate is critical to the sustainable vitality and performance of the public, states, societies, and economies. The concern for continuity and climate security ranks high among the concerns of statesmen who bear responsibility for the protection and continued prosperity of their homelands and peoples. The volatility of the current hydroclimatic environment has led to the understanding that climate vulnerability is equivalent to, and certainly a precursor to, national insecurity.

2. Understanding Climate Terror

In the context of geostrategic competition, climate terror is an administrative resource, a political tool, and a technology capable of eroding the integrity, efficiency, and security of a state by creating or maintaining violence in different forms and by turning states vulnerable to external risks and internal threats. It affects all types of states particularly those threatened by internal turbulence. These states face the complete erosion of state functions and the possible disintegration of the central authorities, including the army and the police, as institutions designed to protect the existing state borders. Given the globalization trends, many states and regional security organizations have taken note of the growing risks and are developing ways to address the issue. Climate terror poses serious challenges for regional politics, reflecting the diverse patterns of interaction and competition among states and transnational movements. External attacks aspire to undermine the political, economic, and military dominance of the given state and to eliminate its statehood. The external sources of terror, political theaters, and motivation to resort to climate terror, which has now been classified as a distinct tool of aggression (Chalecki, 2024; Remmits and Torrosian, 2021; Somers, 2020), are far too diverse to define. At one end of the continuum, highly diverse sources react adversely to the residence, strong identity, beliefs, activities, aspirations, or the statehood of specific ethnic or religious groups. The alternatives promoting the liberal interdependent order seek to conduct and restrain their activity by negotiating separate treaties and other forms of mutually advantageous bargains.

2.1. Definition

There are different definitions of "climate terror". The most complete is the following: Climate terror is a deadly ecological, social, and economic consequence of global warming: death of millions and billions, including victims of changing living conditions, famine, thirst, epidemics, population flight, and forced migration; irreversible changes in social relations; armed conflicts for remaining resources; various disasters related to the interaction of anthropogenic factors and climate change; terrorism associated with all these. Apocalypse, when it is not seen as a natural sudden catastrophe but as a bloody era of global disasters, must be understood separately. Climate terrorism is undertaken to scare humanity to force it to agree to increase the political influence of certain groups, countries, or international organizations under the pretext of rescuing humanity from the horrific consequences of global warming. The causes of the deadly consequences of global warming are also explained clearly in this definition. The breakdown of the climate and the degradation of ecosystems are portrayed as extreme manifestations of the irresponsible behavior of humanity that violates the regulatory functions of nature (Spadaro, 2020; Macklin, 2022; Upadhyay, 2020; Asaka, 2021; Azam, 2023; Jackson and Jensen, 2022; Dalby, 2021; Krupocin and Krupocin, 2020).

2.2. Climate Change Enabling Terrorism

Global climate change can act as a catalyst for certain endemic forms of instability and violence, with terrorism being one of the most conspicuous manifestations. As climate change progresses, it creates a new "terrorist technology" that alters the landscape of terrorism, erasing regional disparities in its emergence and intensity. One significant consequence of climate change is the reconfiguration of damage zones and vulnerabilities across global communities. As climate conditions deteriorate, areas that were previously resilient—such as northern regions, Siberia, and the Far East, which are rich in competitive resources—will increasingly face threats that they have never encountered before. Human societies are intricately connected to their local climates, having adapted over time to specific climatic conditions. This interdependence means that changes in climate patterns disrupt the social and physical infrastructures that communities rely on. Such disruptions can lead to shifts in refugee movements and heighten acute vulnerabilities. Climate change not only alters the established climatic equilibrium but also impedes the utility and stability of social and physical systems built on historical precedent and strength. The vulnerabilities uncovered by climate change can give rise to unforeseen tipping points, resulting in social collapses (Jenkins, 2020).

Moreover, the exploitation of climate-induced vulnerabilities offers terrorists opportunities to reveal and capitalize on these latent weaknesses. The interplay between climate change and various anthropocentric conflicts exacerbates the conditions that enable terrorism, making stabilization efforts in or near unstable regions increasingly problematic. Pressures stemming

from climate change related to water stress/scarcity, food insecurity, land degradation, and financial instability can heighten infrastructure vulnerabilities, trigger forced migrations, and lead to lingering political, economic, social, and security crises. Therefore, a crucial aspect in understanding the rise of terrorism is to acknowledge how climate change grievances are intertwined with the ability of states to prevent or respond effectively to violent actions. (Asaka, 2021; Telford, 2020; Raineri, 2020; Ide, 2023; Busby, 2020).

2.3. Terrorism Triggering Climate Change

Understanding the tremendous effects that terrorist activities can have on our environment is essential to believing that climate change can be properly addressed. Doing so can help us move from destructive to constructive goals and keep ourselves from becoming trapped in cycles of insecurity. The labeling of specific countries as the "axis of evil" was an error, and only by avoiding automatic labeling can we move from intimidation to mutual support. Furthermore, the decision to escalate large-scale terrorism to obstruct oil supplies to consumer nations suggests that terrorism may soon become a persistent factor influencing climate change, similar to human conflict and global economic dynamics. Geopolitical models indicate that the long-standing era of conflict may be diminishing, though humanity must take action until there is concrete evidence of increased capabilities to neutralize potential or actual terrorists. If covert operations to counter such threats are no longer guaranteed, then this calls for even more urgent action. Examining the harrowing images of terrorism throughout the 20th century reveals that recent incidents are starting to contribute to global climate change. Today, human beings witness greenhouse gas emissions stemming directly from reactions to international terrorism, often without any military engagement. Consequently, environmental and national security experts worldwide are urgently advising policymakers and the public that effectively managing the repercussions of rising terrorism should be integrated with efforts to prevent uncontrolled and dangerous climate change. The attacks on September 11 not only caused tragic loss of life, but the resulting fires and destruction also led to significant environmental damage, including a marked deterioration in air quality. The emissions from the prolonged fires and debris contributed to localized pollution and had broader negative effects on global warming (Silke and Morrison, 2022; Spadaro, 2020; Asaka, 2021; Telford, 2020; Macklin, 2022; Campbell and *et al.,* 2022).

2.4. Terrorist Organizations and Climate Change

Terrorist organizations represent a distinct category of non-state actors within the complex landscape of global conflict and violence. These organizations engage in the use of force or violence, frequently resorting to life-threatening actions that are both shocking and destructive as a means to achieve their objectives. Their pursuits often

revolve around goals that are widely considered unacceptable by the broader society, and they tend to operate outside the boundaries of legality and moral standards accepted by most people. They typically do not hold themselves accountable to the general public, particularly beyond the confines of the specific group to which they belong. Most citizens in democratic nations find it difficult to categorize terrorists, especially those who deliberately target innocent civilians, as having a legitimate political agenda. Instead, these individuals are often seen as conducting political acts that lack a coherent or acceptable political program. This perception underscores the disconnect between the actions of terrorist organizations and the mainstream political discourse that values peace and democratic processes (Polo, 2020; Pettersson and Öberg, 2020; Polo and González, 2020; Combs, 2022).

Until now, the major environmental acts of terrorism have included industrial poisons attributed to certain groups as well as agent attacks. These represent some of the most horrible acts of pollution and disempowerment of living conditions in the history of environmental actions. In the future, the destructive capacity of these acts could equal that of environmental agents in their effects on human lives and the quality of life. As climate change progresses and the increasing frequency of natural disasters leads to greater human suffering and negative economic and environmental consequences, politicians and humanitarian organizations will be required to help increase community resiliency to climate change and provide substantial aid in the wake of natural disasters. In some cases, military organizations may be called in to contribute to national or international humanitarian assistance operations in response to major natural disasters (Spadaro, 2020; Silke and Morrison, 2022; Feuer, 2023; Hough, 2020; Macklin, 2022).

2.5. State-sponsored Climate Terrorism

The development of unconventional terrorism used by the "gray zone" states may involve state-sponsored climate terror. This would make it possible for an adversary to influence an opponent's vital regions as a result of serious environmental damage. The method of state-sponsored climate terror implies the perpetrator's control over specific large-scale technologies, the use of weather modification tools, and initiating a chain reaction in the Earth's climate system. State-sponsored climate terrorism introduces specific cognitive challenges linked to the obligation to develop an effective anti-terrorism strategy that is unfriendly to the unstable climate. A state's involvement in climate terrorism highlights the need for new national and international spatial development policies as well as global energy policies. These policies include developing anthropogenic climate change mitigation strategies, developing nuclear power engineering, shifting the spatial distribution of global energy balances, creating a planetary system for population migration, and developing low-carbon society transitions (Ramirez, *et al.,* 2021; Gupta, 2020; Macklin, 2022).

Climate-induced environmental changes, such as severe droughts and floods, can lead to large-scale displacement, resulting in millions of refugees suffering from thirst, hunger, and disease. These crises exacerbate existing challenges to sustainable development and can destabilize social systems. In this context, "gray zone" states—nations engaging in aggressive actions that fall between traditional diplomacy and open warfare—may exploit such vulnerabilities by sponsoring or facilitating climate-related terrorism. This form of unconventional terrorism leverages environmental catastrophes to weaken adversaries, disrupt social cohesion, and gain strategic advantages. The interplay between climate change, forced migration, and conflict has been documented, highlighting how environmental stressors can intensify resource competition and social tensions, potentially leading to violence and instability (Werz and Conley, 2012). Additionally, the concept of gray zone warfare encompasses tactics that blur the lines between peace and conflict, including the use of environmental factors to achieve geopolitical objectives (Csis, 2025).

2.6. Weaponization of Climate Change

Climate terror has emerged as an effective tool in the geostrategic competition that characterizes the dynamics of power in the 21st century. Everybody is witnessing an era that can rightfully be described as the age of climate wars. Essential resources such as land, water, and even natural phenomena like heat waves and dust storms have increasingly transformed into powerful instruments used for coercion, exerting pressure, and enforcing punishment.

Climate change and extreme weather events are not merely environmental concerns; they are actively deployed as strategic means to undermine common security, destabilize nations, and cause radical shifts in the environment and the geopolitical landscape. In this context, developed countries are honing their abilities to leverage green technologies, turning them into tools of military and political influence. By capitalizing on other nations' partial dependency on the global market for these technologies, such nations aim to exert considerable pressure and influence. Trade restrictions on the exports of green technologies, or even on products that are manufactured utilizing this technology, can serve as potent mechanisms of pressure. Additionally, the mere threat of imposing such restrictions may prove to be an efficient means to compel compliance or foster alignment with the interests of developed nations. The actual implementation of these advanced technologies has the potential to evolve into a form of political and military pressure. If a legal regime is established that stipulates the necessity of obtaining the UN Security Council's sanction for the utilization of these technologies, such a framework could significantly amplify their role in global power dynamics. Therefore, climate terror not only reshapes environmental conditions but also redefines the boundaries

of geopolitics, creating profound implications for international relations and security strategies (Shabbir, 2022; Nanlohy and Grgić, 2024, Saeed and Yaqub, 2023).

3. Historical Precedents

The intersection of climate change and terrorism possesses a wealth of historical precedents that unveil a highly complex and intricate relationship between a wide array of environmental factors and the disturbing phenomenon of violent extremism. The concept of "Climate Change Enabling Terrorism" emerges clearly when viewed within the context of resource scarcity, particularly emphasizing essentials such as water, arable land, and other critical resources vital for human survival and stability. (Henkin, 2022; Nett and Rüttinger, 2016; Romm, 2022). These crucial elements often serve as significant catalysts for conflict and escalating unrest in various volatile regions worldwide.

A pertinent example can be found in the ongoing, dire water shortages currently being faced in the Middle East, which are significantly exacerbated by the adverse and sometimes catastrophic effects of climate change. These factors have undeniably contributed to immense rising tensions and instability in areas such as Syria, where the conjunction of dwindling water supplies and socio-political strife has created a precarious situation. The Syrian civil war, which has often been directly linked to a prolonged, severe drought that devastated agricultural output across the region, serves as a prime illustration of how environmental degradation can create conditions that are exceptionally conducive to societal unrest and violent conflict. This acute water crisis, compounded by the state's notorious mismanagement of vital resources, fueled a multitude of legitimate grievances among the populace. Ultimately, this created a fertile breeding ground for extremist groups such as ISIS, who skillfully exploited local discontent and dissatisfaction for their gain, thriving in an atmosphere of instability and strife. Conversely, the notion of "Terrorism Triggering Climate Change" (Ramcharan and Ramcharan, 2020; Kohler, dos Santos and Bursztyn, 2019) captures the painful reality that certain terrorist actions and campaigns can lead directly to significant environmental degradation with lasting consequences (Eklund, *et al.,* 2022; Dinc and Eklund, 2024; Al-Saidi, 2020). A prominent and distressing example of this phenomenon can be found in the Boko Haram insurgency in Nigeria, which has resulted in severe devastation to the nation's treasured biodiversity, vital land resources, and local economies. The relentless destruction of essential infrastructure and agricultural land inflicted by this group not only serves to disrupt local economies, creating widespread poverty and hardship but also contributes directly to increased deforestation and soil degradation. Such environmental actions can further worsen and exacerbate the already severe effects of climate change in the region, feeding into a cycle of destruction without easy resolution. The ramifications of such a situation showcase how violent extremism can have a profound and detrimental impact on the environment, thus creating a vicious

cycle where insecurity and ecological decline perpetually feed into one another, making recovery increasingly difficult and elusive (Ekpo and Is'haq, 2022; Ya'u, 2022; Olaniyan and Okeke-Uzodike, 2021; Akpoghom, 2022; Akosa, 2023).

Further complicating the already fraught relationship between climate change and terrorism are the dynamics surrounding "Terrorist Organizations and Climate Change", wherein various violent groups are increasingly recognizing the strategic advantages of leveraging climate-related grievances to further their agendas. The rise and various activities of organizations like Al-Shabaab in Somalia epitomize this troubling dynamic. This extremist group has cunningly leveraged the profound and often devastating impacts of climate change—most notably the severe droughts that have been impacting the region—to recruit dissatisfied, disenfranchised individuals and radicalize them into their extremist fold. Al-Shabaab skillfully capitalizes on the pervasive desperation wrought by acute food scarcity and the lack of essential resources, effectively presenting itself as a savior that offers solutions to these dire problems that many in the local community are facing (Spadaro, 2020). This multi-faceted strategy not only helps the organization gain crucial local support but also significantly enhances its operational footprint, providing it with a continual pool of recruits and sympathizers, thereby strengthening its position and reach within the region.

Finally, the concept of "State-Sponsored Climate Terrorism" throws light on troubling instances where governmental powers may exploit adverse climate conditions or manipulate environmental resources as a means to suppress opposition or advance particular political goals. A historical example of this can be found in the destructive actions taken by the Khmer Rouge in Cambodia. This regime engaged in a series of devastating policies that led to significant ecological devastation, including widespread deforestation, devastation of local ecosystems, and severe mismanagement of agricultural land with lasting effects on the environment and communities (Macklin, 2022; Byman, 2022; Lepskiy, and Lepska, 2023).

These actions not only served to control and suppress the populace by drastically limiting their access to essential resources but also triggered profound and irrevocable environmental changes that subsequently destabilized the entire region further, making recovery and stabilization increasingly elusive and difficult. Through the examination of these numerous case studies, it has intricately illustrated the multifaceted and complex interactions between climate dynamics and terrorism. They highlight how various environmental factors can enable the rise of violent extremism while simultaneously being exacerbated by it. This creates a particularly challenging and daunting landscape for security and humanitarian efforts, thereby necessitating innovative and multifaceted responses designed to effectively address the intertwined nature of these critical global issues comprehensively and sustainably (Eklund, *et al.,* 2022; Dinc and Eklund, 2024; Linke and Ruether, 2021).

4. Impacts on Global Security

Climate change functions as a significant aggravator of existing threats, capable of intensifying preexisting security challenges and exacerbating already dire circumstances. The linkage between climate change and conflict is not a distant possibility but rather a current reality. To illustrate this point, consider several contemporary conflict drivers: the competition for control over the melting Arctic region, the race for dwindling oil and gas reserves in the northern territories, the escalating tensions between India and Pakistan regarding Pakistan's insufficient access to water, and the disputes between China and India over the Brahmaputra River. These instances not only exemplify conflict triggers associated with climate change but also serve as potential instances of climate-related violence utilized within a new paradigm of geopolitical rivalry. They underscore the current landscape, which presents numerous opportunities for analysis of how climate change and its associated risks may be exploited to further geopolitical agendas, or how they are employed to sustain or assert regional dominance by key actors (Abdi, Abdinur and Mohamed, 2023; Odeyemi, 2021).

The impacts of climate change on global security are increasingly becoming a matter of concern. As access to essential resources diminishes, countries must prepare for the geopolitical ramifications of resource scarcity. The link between climate-related stressors and conflict is multifaceted, necessitating comprehensive research to unpack these complexities. Issues such as food insecurity, instability in water supplies, and mass migration are all critical factors that can exacerbate tensions within and between nations (Augsten, Gagné and Su, 2022; Sweijs, De Haan and Van Manen, 2022; Thalheimer and Christian, 2020). Human societies have always been influenced by climatic conditions, but the urgency of these challenges is escalating. To effectively address these issues, the international community needs to use collective knowledge and develop forward-looking analysis. By prioritizing climate and security on a global agenda, countries can foster more research and collaborative action. An integrated approach is essential to bolster both national and international frameworks that connect climate change, environmental degradation, and peace. This is vital not only for fostering sustainable development in vulnerable regions but also for enhancing the overall security landscape for countries worldwide. Engaging with these interconnected issues will be crucial in navigating the future of global stability amidst the pressing challenges posed by climate change (Marcovitz, 2011).

5. The Future of Climate Terror

Oxygen, being abundant on Earth's surface, makes combustion an easily accessible means of destruction. The deliberate use of fire as a tool of environmental sabotage is not new, but in the context of climate terror, it takes on more severe implications. Arson, whether carried out by individuals or organized groups, has historically been

a destructive force. However, as global fish stocks decline due to overfishing, reliance on upland agriculture for food security increases. This makes agricultural regions more vulnerable to targeted environmental attacks, such as deliberate wildfires aimed at destabilizing food supplies. Recent claims suggest that certain actors have the capability to significantly disrupt global food production by igniting critical petroleum reserves, a threat that has been voiced even outside wartime scenarios (Lacy, 2024; Young, 2023).

Climate terror has the potential to cause greater harm than chemical or biological threats, as it targets entire ecosystems and infrastructures. Unlike conventional warfare, which often creates divisions between opposing factions, climate-related terrorism affects a broad spectrum of society, from military strategists to financial institutions, impacting both dominant and vulnerable groups alike. Furthermore, advancements in weather prediction and chemical dispersion technologies complicate efforts to detect and prevent such acts. The growing complexity of these threats necessitates improved global cooperation and information-sharing networks to enhance security measures. Without such coordinated efforts, the burden of security will continue to fall on under-resourced personnel responsible for surveillance and enforcement in both urban and remote areas (Spadaro, 2020; Mann, 2021; Johansen, 2023; Schoonover *et al.,* 2021).

6. Conclusion

This chapter aims to contribute to the ongoing discussion on the potential implications of climate change for modern security, particularly in the context of intensified geopolitical competition between leading world states. It identifies the main causes of the current silent alarm, assesses the importance of global changes in the environmental and social spheres, and considers three factors that determine the impact of climate threats on national and collective security.

It suggests studying the forecasted changes in the world during this century not from the point of view of raising the average temperature, anthropogenic impact, and specific negative events related to human activities, but considering their complex and almost inevitable impact. It is possible to claim that anthropogenic climate change is just another method of demonstrating traditional world power strategies. The importance of natural climate change is also difficult to overestimate. In addition, modern military research also approaches the issues of deliberately causing drought in the territory of a potential enemy as seriously as economic sanctions and a long-standing military-academic tradition of igniting forest fires does not set a different goal than maintaining the sustainability of the state by using various “climate and weather” methods.

As it has witnessed throughout history, climate shapes the contours of international politics and strategy simply because it has a role in creating the conditions for the power

and empires of civilizations to rise and fall - whether Egypt or Mesopotamia, Tang Dynasty China. Climate remains a key strategic factor, although not the only or even the most important one: latent geographic conditions, specifically periodic weather patterns, for example, made it possible for tiny isolated European Maritime powers to develop the capability to project around the world, differentiating the modern from early modern world, and indeed, in an earlier periodization, the emergence of our planet-world. In general, rising temperatures are thought to increase uncertainty and unrest, causing threats of domestic political instability and power transitions stemming from interstate conflict. Insecurity over the availability of a state's necessary resources, including water, food, and energy, and the desire to acquire and sustain international power capabilities, drive nation-states in their use of power - war, hard or soft power, persuasion, and other means of competition - to achieve this end.

The scale of global warming potentially raises concerns beyond the military only of the states that experience those climate changes. In considering the implications of allies of civilized states motivated to defend themselves and assert their ability to shape their futures in a manner consistent with their preferred ways of life or in moving to protect and stabilize failed or failing states from other powers keen to implement poorly defined or overly ambitious goals, the locus of competition may well be off-planet in ecospheres degraded by the effects of climate change. In regions other than the Arctic, however, nations - sometimes cooperating with or at odds with other nations - continue to compete for the ecosphere's resources, either to obtain and use those resources independently or to monetize other types of interests. In the realm of planetary or off-planet defense, something like the Spice Wars might consume nations both major and minor, as they compete in mass politics to secure their positions in a world plagued by the aftereffects of organic and mineral competition and basic social instability. In the region of political, commercial, military, and national competitive interests sometimes intersect and ripen into conflicts and sometimes cooperation between great, middle, and small powers. It is important to consider the nexus of climate terror in the world, though the contexts can be more subtle and complex than advertised.

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PART III: Case Studies
CHAPTER 5

Al-Shabaab's Exploitation of Climate Change in Somalia

Stephen Harley*

Abstract

Somalia and the Horn of Africa region have for some time been one of the areas most affected by climate change. Concurrent with rapid, dramatic and often irreversible alterations to the environment over the last four decades, Somalia descended into chaos in the 1990s. Latterly, and in spite of increasingly effective governance and international responses, the country and the wider region has been sucked into a bloody campaign against the al-Qa'ida-inked terrorist group, al-Shabaab. This was, at once, the result of and an accelerant for climate change linked instability. This study uses as its methodology the case study approach, which allows in-depth, multi-faceted explorations of complex issues in their real-life settings. It concludes that climate change is a driver of instability, be it manifested through mass migration, the denial of livelihoods, the rendering inaccessible of critical resources as basic as water and food, the provocation of conflict around those dwindling resources, and a source of significant stress upon existing societal structures and norms. The study also concludes that this is inextricably linked with the drivers of terrorism and that these self-same drivers are increasingly and actively exploited by terrorist groups such as al-Shabaab. It makes a number of observations about the likely developing responses of terrorist groups to the effects of climate change elsewhere, which should ideally be addressed by further case studies.

Keywords: *al-Shabaab, Somalia, climate change, terrorism, counterterrorism*

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1. Introduction

> *"Intense alternations between heavy rains and extremely dry periods make Somalia highly susceptible to the effects of extreme weather and climate change, with its effects increasingly extending beyond the environmental sphere into the social, political and security realm." (Hodder, 2021)*

Somalia and the Horn of Africa region have for some time been one of the areas most affected by climate change. The source of opening quotation, the United Nation's first Climate Security & Environmental Advisor, Christophe Hodder, has separately stated that he believes that,

> *"Looking ahead, projections indicate that by 2080 (possibly even 2060), the majority of Somalia could become too hot to sustain human life." (Hodder, 2024)*

This is at once attention grabbing – it should be noted that the doom-laden prediction has been extensively questioned – but also echoes another theory about Somalia and the link between climate change and security. The Australian-American counterinsurgency expert, David Kilcullen, has asserted that the collapse of the Siad Barre regime in the late 1980s/early 1990s and the subsequent descent of Somalia as a whole into chaos for a quarter of a century was the result of mass migration from rural areas towards the urban littoral in response to a climatic catastrophe which essentially overwhelmed the state. This challenges, Kilcullen says, the assumption the Mogadishu government in the late 1980s/early1990s collapsed and took the country with it: instead, it was not that 'the center could not hold', but that the periphery dragged down the center. If Kilcullen is correct with regards to Somalia at least – there were many other reasons for the fall of the Siad Barre regime, it must be acknowledged – and the Horn of and East Africa may be facing an even worse predicament in the not too distant future, with the added dimension of increased instability in the region and the most resilient element of the al-Qa'ida franchise active: then this chapter is not only timely but in fact urgent. (Kilcullen, 2013).

The study focuses, therefore, on the security implications of climate change in Somalia and, in particular, how the al-Qa'ida linked terrorist insurgent group, Harakat al-Shabaab al-Mujahideen, more commonly referred to as al-Shabaab (Arabic: the youth), has responded to and exploited the ever-increasing effects of climate change in the troubled Horn of Africa country. The rapid, dramatic and often irreversible alterations to the Somalia environment over the last four decades have occurred concurrently with protracted disorder. Latterly, and in spite of increasingly effective local governance and extensive international responses since 2008, the country and the wider region has found itself sucked into a bloody campaign against the al-Qa'ida linked terrorist group. This was, at once, the result of and an accelerant to climate change linked instability.

The methodology used in this study within this framework is the case study approach, which allows in-depth, multi-faceted explorations of complex issues in their real-life settings. While there is a relative dearth of academic literature on the subject of Somalia and al-Shabaab, a combination of reliable news coverage, commentary by directly engaged international actors and the author's own extensive experience in Somalia provides the data on which the study is based.

The study concludes that climate change is a driver of instability, be it manifested through mass migration, the denial of livelihoods, the rendering inaccessible of critical resources as basic as water and food, the provocation of conflict around those dwindling resources, and a source of significant stress upon existing societal structures and norms. The study also concludes that this is inextricably linked with the drivers of terrorism, and that these self-same drivers are increasingly and actively exploited by terrorist groups such as al-Shabaab. It also notes that al-Shabaab has proved flexible - although inconsistent - in its responses to climate change, ranging from humanitarian interventions to the deliberate and targeted exacerbation of the effects of climate change on its subjugated population. It makes a number of observations about the likely responses of terrorist groups to the effects of climate change elsewhere and recommends a number of further case studies of similar intersections of areas affected by climate change and active terrorism campaigns.

2. Methodology

This chapter uses the well-recognized methodology of the case study. Priya (2021, p18) summarizes Yin's definition of a case study as:

> *"…an empirical inquiry which investigates a phenomenon in its real-life context. In a case study research, multiple methods of data collection are used, as it involves an in-depth study of a phenomenon… a case study is not a method of data collection, rather it is a research strategy or design to study a social unit."*

The format is very appropriate to this study of al-Shabaab's response to climate change since, as De Vaus (2008 p220) notes, it is "research into an individual, a family, a community, an organization, an event or a decision": in this instance the author examines both an organization, al-Shabaab, and a series of events, the three major climate catastrophes which struck Somalia in 2010-11, 2017 and the period 2021 to the present. Since this study explores not a single event but the developing and differing responses of the terror group to a succession of climatic events, this study is what Bryman (2008 p695) terms a 'longitudinal case study':

> *"A longitudinal study entails studying the same phenomenon on two or more occasions in order to discern any perceptible change which has occurred in the phenomenon under investigation over the period of time"*

Yin (1993) states that there are three types of case study: descriptive, explanatory and exploratory. This chapter is an explanatory case study, is 'to explain 'why' and 'how' certain conditions come into being, that is, why certain sequence of events occur or do not occur'.

Yin (2014) also provides a suggested structure for case studies, which this research has followed:

- The purpose of the study
- The type of research
- The research questions
- The multiple cases being studied
- The epistemological underpinnings of the study
- A literature review
- Sampling and methods of data collection
- Analysis
- Presentation of conclusions and recommendations

Or, in a simpler form as stated by Tellis (1997),

- Design
- Conduct
- Analyze
- Develop conclusions and recommendations

This chapter examines three periods of climatic catastrophe in Somalia and asks two questions about each:

- How did al-Shabaab respond to the climatic catastrophe?
- How did other actors (the government, the international community etc.) respond to the climatic catastrophe and how, if at all, did al-Shabaab respond in turn?

The chapter then concludes by asking a final question:

- What can be learned from al-Shabaab's responses to climatic catastrophes?

In terms of sampling and data collection, Tellis (1997) also notes that there are six types of evidence:

- Documents
- Archival sources
- Interviews
- Direct observation
- Participant observation
- Artefacts

In the case of this study, the primary sources are documents drawn from news sources and reliable international actors. This has been supplemented by direct observation by the author, who was based in Somalia throughout the period in question. Interviews were conducted with various sources who were directly engaged in the various international responses to the studied crises, including the United Nations and a number of local and international NGOs but these were not used in the final research due to the limited perspectives each could offer into al-Shabaab's actions, either due to a lack of direct exposure to the terror group and the effects of its actions, or due to perceived bias due to self-interest (some of those spoke to represented groups whose responses were ineffective or who may have illicitly engaged with al-Shabaab in order to gain access to affected areas of Somalia, which could have legal repercussions due to some countries' anti-terror legislation). Al-Shabaab could not, of course, be accessed for comment.

At this juncture it is worth declaring the author's own engagements with al-Shabaab. He has worked for both the United Nations and the UK Foreign, Commonwealth & Development Office (FCDO) in a variety of roles which have broadly focused on building the institutions of government and security in Somalia and undermining the al-Qa'ida linked terror group: specifically he has provided strategic communication support to the African Union Mission in Somalia (AMISOM, then latterly ATMIS, the AU Transition Mission in Somalia) and the Federal Government of Somalia (FGS); led a project to encourage and exploit the defections of senior members of al-Shabaab; and delivered vital stabilization activities in newly recovered areas of rural Somalia in the aftermath of al-Shabaab withdrawal. While this may infer bias against al-Shabaab, this is not the case: the author claims a highly nuanced understanding of al-Shabaab and the often-legitimate grievances that drive the group. He is also a strong proponent of a conditional negotiated settlement. This empathy is, however, tempered by an awareness of the horrors al-Shabaab is capable of causing and the fact that he was nearly killed by the group on two separate occasions.

One element that is absent is a literature review: this is because there is virtually no academic material focused on al-Shabaab's response to the three periods of climatic catastrophe beyond the primary documentary sources that constitute the main body of the evidence in this chapter. This is broadly true of Somalia as a whole as a subject of academic study, although this is being gradually addressed through a small but steady stream of publications focused on the turbulent nation.

Instead, the author provides a brief history of al-Shabaab since its rise to power in the early 2000s and Somalia since independence to provide contextual awareness for readers who are not familiar with the recent history of the Horn of Africa.

3. Background

There are a number of studies of Somalia and al-Shabaab that chart the country's troubled history. Lewis (2008) provides a useful cultural history, the essential backdrop to all of Somalia's current predicament. More recently Jarle Hansen (2016), Harper (2012 & 2019) and Maruf & Johnson (2018) have provided insights into al-Shabaab itself. Ferguson (2018) provides a broader study of Somalia's recent history while Keating & Waldman's UN supported collection of articles (2018) provides more specific thematic focus across a number of areas. All are worthy of further study by those interested or engaged in Somalia. However, for the benefit of the generalist, the author provides a brief summary of Somalia's recent history with a specific focus on the effects of climate change and the al-Qa'ida linked terrorist group, al-Shabaab.

Somalia became an independent state in 1960 and for two decades was a relatively prosperous, stable and influential state on the African continent at least. Despite the common perception of Somalia as an arid space, the country's two rivers, the Jubba and the Shabelle, allowed the country to become a major agricultural provider: it also has an abundance of seafood, a benefit of Somalia having the longest shoreline on mainland Africa. The country is also believed to have significant untapped mineral resources, but persistent insecurity precludes their exploitation.

Somalia society and politics is driven by clan dynamics: there four main clans, the Hawiye, the Darod, the Isaaq and the Digil/Mirifle along with a number of minority clans. Clan defines virtually every interaction, every government and security appointment and every business transaction. The six Somali Federal Member States (FMSs) demonstrate how pervasive the influence of clan dynamics are: the three relatively clan homogenous states, northern Somaliland and Puntland, and southern Jubbaland are stable, whereas the clan 'melting pots' in the south/center, Southwest, Hirshabelle and Galmudug are intensely restive and are the main operating areas for al-Shabaab.

The seizing of power by a rogue Darod army general, Siad Barre, in the late 1960s saw Somalia embark on a period of 'scientific socialism' which was relatively successful in the short term, culminating in the initially successful reclamation of the Somali region of Ethiopia ('the Ogaden') in 1976. However, the war ended in disaster when the Soviet Union withdrew its support for Somalia and instead reinforced the Ethiopians. Somalia aligned itself with the west and China, but the nation declined economically, and inter-clan violence began to suck the country towards civil war. The state finally collapsed in the late-1980s.

The early 1990s saw Somalia enter a period of chaos that was defined by climatic catastrophe and incessant warlord-ism along loose clan lines. A degree of stability was established in the early 2000s by the Islamic Courts Union (ICU): but the links between the ICU and al-Qa'ida attracted the attention of the west and it was overthrown in 2006

by US-supported Ethiopian forces. One faction of the ICU survived, though: al-Shabaab, which embarked on a highly effective insurgency across south/central Somalia.

While the Ethiopian forces had conquered Somalia with devastating ease, fighting al-Shabaab's insurgency proved more challenging: the Ethiopian National Defense Forces (ENDF) withdrew and were replaced by an African Union peacekeeping mission, AMISOM. With significant international support the peacekeepers gradually became more effective, expelling al-Shabaab from the major urban hubs in 2010-2012, thus allowing the formation of the FGS.

Al-Shabaab then transitioned to a three pronged-approach which continues up to the present: firstly, continued attacks against isolated and poorly defended AMISOM positions in the rural hinterland; secondly, terrorist attacks in the cities, often making use of suicide bombers and suicide car bomb attacks, and then complex attacks that often resulted in protracted, bloody sieges; and, thirdly, transnational attacks primarily targeting AMISOM Troop Contributing Countries including Kampala, Uganda in 2010, Nairobi and Garissa, Kenya (2013 & 2015 respectively) and Djibouti (2014) and then Nairobi again in 2019.

At the same time the group swore formal fealty to al-Qa'ida in 2012 and began to shift its efforts towards fundraising, developing a sophisticated system of road tolls on rural arteries and a hidden network of tax collectors in the cities who are often more efficient and provide a more transparent service than their government counterparts.

At the time of writing al-Shabaab appears to have successfully resisted a Somali government offensive that was launched in late 2022, simply withdrawing into its strongholds in south/central Somalia and apparently creating new 'safe havens' Somali ethnic regions of north Kenyan and eastern Ethiopia. Some commentators believe that al-Shabaab is, in fact, actively recruiting again, amongst Somalis but also Kenyan Muslims and disaffected elements within Ethiopian society, notably the Oromo and Amharic peoples. Al-Shabaab is also now assessed to have a significant property portfolio beyond Somalia (Mubarak, 2018 & 2020), a sign of the group's movement along a continuum from insurgency to terrorist organization to organized criminal gang to, possibly, political engagement and a form of legitimacy. As some have noted, politically many of those in government in Mogadishu share the same world view as al-Shabaab: but not the espousal of terrorist violence and the rejection of the Somali clan system that scrabbles self-interestedly over the control of ever decreasing resources and that lies at the heart of much of Somalia's woes.

And it is at this point that the focus of this paper returns to the effects of climate change in Somalia, which at once creates the conditions for conflict between clan blocks and between the government and al-Shabaab and, conversely, which is exacerbated by those self-same conflicts.

4. Discussion

In this section the three most recent periods of climatic catastrophe – 2010-2011, 2017 and the past five years (2021 onwards) are discussed. This section examines each period in detail and makes separate observations about al-Shabaab's response linked to each period, prior to drawing the whole together and examining a terrorist group's developing responses.

2010-2011

The 2010-2011 climate catastrophe coincided with al-Shabaab being driven – or, as al-Shabaab claims, choosing to tactically withdraw – from major urban centres such as Mogadishu. It is estimated that over 250,000 people died in this period (Burke, 2017). The group portrayed itself as having a humane policy towards those who found themselves in the areas it still occupied but, in reality, adopted a 'hard' policy during this period: Rono notes that the group actively obstructed aid convoys, burned aid deliveries and even attacked and killed charity/NGO workers. The group was identified by the UN as being the source for the dramatic calamity that unfolded in south/central Somalia in this period (Rono, 2017).

However, al-Shabaab also attempted to engage with NGOs and other humanitarian actors in this period, realizing how significant the calamity was: the attempted engagement went both ways between the terror group and the humanitarians, with humanitarian actors often willing to put aside their qualms about the terror group in order to reach those most in need. Al-Shabaab has been described by Hockey & Jones (2020) as effectively 'out-sourcing' humanitarian aid to the NGO community, albeit at a price to the latter for gaining access. The group similarly taxed the aid itself. This clearly presented some risk to NGOs at a time when many countries and international organizations were developing their counterterrorist and counterterrorism finance legislation, meaning those humanitarian groups risked prosecution: this was reflected in the reticence of some interviewees to have their organizations named, thus precluding direct reference to their experiences of dealing with the 2011 crisis and al-Shabaab.

It is also worth noting that this also continues a long tradition of exploitation of humanitarian aid that stretches back to the early 1990s, when warlords actively denied communities aid to exacerbate the crisis and encourage even larger scale interventions, which they could then exploit: the International Committee of the Red Cross (ICRC), for example, is reckoned to have paid warlords and their militias $100,000 per week for militia protection in this period (Kiley, 2018).

In conclusion, al-Shabaab's first experience of a period of climate catastrophe was to engage with humanitarians – for a price – but at the same time to deny access or even target the aid and those providing it, resulting in a huge loss of life for which al-Shabaab was universally blamed. This seeming inconsistency on the part of al-Shabaab reflects a group

that is less homogeneous than many assume and reflects personal or local agendas within the broader organisation's response to crisis. It also highlights the inconsistency of approach between the NGO/humanitarians and the rest of the international community, which may have resulted in some desperately needed aid being delivered, but also provided al-Shabaab and other nefarious actors such as clan militias with significant amounts of revenue.

2017

By the time of the 2017 climatic catastrophe, al-Shabaab appeared to develop its response. This time al-Shabaab was certainly more coordinated, with the appearance of local Drought Committees in affected areas as well as the reconstruction of damaged canals to allow the continued growth of agricultural produce and the distribution of both food and Non-Food Items (NFIs) such as blankets or plastic sheeting for building temporary shelters as flooding overwhelmed flood barriers and displaced populations (Rono, 2017). The group proclaimed via Somali Memo, one of its 'news' websites, that:

> *"Each family [in El-Bur town] received 25 kg of sugar, 25 kg of rice, 25 kg of flour, and two plastic containers of cooking oil. The food is enough to last more than a month."*

Al-Shabaab also allowed Islamic NGOs access to the areas it controlled in this period (Burke, 2017). The group even sought to reinforce its previous 'eco-friendly' directives such as banning logging and the erosion of pasture lands in 2011 (Hockey & Jones, 2020) by banning plastic bags in 2018 (McKernan, 2018). It had clearly learned from the experience of 2010-11.

But at the same time as presenting a 'softer' approach in response to the 2017 drought-then-flood, the group still proved itself capable of inconsistency and brutality. It changed its policy on Islamic NGOs and denied them access, perhaps suspecting some of being linked ultimately to their home nation governments (Egypt, Qatar, Saudi Arabia, Turley, UAE etc) and, in turn, to the FGS or its international partners.

At the same time, Al-Shabaab claimed to be 'allowing' those under its control to leave in search of aid and shelter: but this may have been an attempt to overwhelm government occupied areas with Internally Displaced Persons (IDPs), as evidenced everywhere there was a FGS presence, from villages in the hinterland to major cities, all of which suddenly found themselves playing host to hundreds or even thousands of incomers. These incomers were often from other clans and therefore unwelcome at a time when resources were already stretched (British Embassy Mogadishu, 2020). Equally, this may have been 'forced displacement' to control the use of al-Shabaab's own limited resources. Either way, Save the Children assessed that 700,000 people were displaced from al-Shabaab-controlled areas in this period and that only 10-15% of aid that would have reached a government-controlled area in this period reached an al-Shabaab-controlled area (Burke, 2017).

At the same time, al-Shabaab also held other communities 'hostage', effectively denying them the chance to at least move elsewhere in search of desperately need resources. In this period there was also a noticeable spike in the execution of so-called 'foreign spies' in al-Shabaab-controlled areas, although whether any were actually acting on behalf of the Somali government or international actors, or perhaps just being in possession of a cellphone, a serious offence in an al-Shabaab-controlled area, is debatable (Hockey & Jones, 2020). The group also exhibited vindictiveness against communities that had been recovered from its control, including deliberately polluting water sources with fuel, as it did in Lower Shabelle in 2019 (British Embassy Mogadishu, 2019).

In 2017, then, al-Shabaab continued to be inconsistent but was more strategic in its response, seeking to emphasize its ability to provide services to the communities it controlled. It is of note that in this period al-Shabaab's messaging around its 'good deeds' came to average 30% of its outputs, a significant increase, and an indication of the group's increasing awareness of the battle over not reality but perceptions. But at the same the group continued to terrorize the population under its control or in FGS controlled areas, again exacerbating the effects of the climatic catastrophe.

2021 - present

There have been various studies of al-Shabaab's response to the COVID-19 pandemic, including Hockey & Jones (2020) and the author's own chapter within COE-DAT's study (2021). This not the subject of this chapter, but both publications highlight the fact al-Shabaab's response once again emphasized the group's inconsistencies, at first denying the existence of the COVID-19 virus, then portraying it as something which only affected non-believers and then finally attempting to control the effects of the virus by adopting control measures such as isolation centers and limiting freedom of movement. Al-Shabaab has proved to be consistently inconsistent.

The final period of focus for this article, though, is longer, running essentially from the end of the COVID-19 pandemic to the present. In this period Somalia appears to have moved beyond relatively isolated incidents such as the early-1990s, 2010-11 or 2017 and now seems to be permanently prey to climate change. The country, as noted before, has two main rivers, the Shabelle and the Jubba: but in this period the twice-yearly rainy seasons, the Gu and the Deyr, failed five times in succession (Mubarak, 2023 & Karif, 2024). Somalia is now at a point where late rains simply cannot penetrate the hardened soil and instead cause significant flooding. Traditional livelihoods such as pastoralism and agriculture have been rendered no longer viable (ICRC, 2017).

A confluence of events has further exacerbated the situation in this period: climate change, which is assessed to have displaced somewhere between 1.3-2.9 million Somalis

(Kheira, 2024 & IRC, 2023). This has combined with a Somali government offensive against al-Shabaab in the Hirshabelle and Galmudug Federal Member States: the effects of conflict are assessed to have displaced another 600-000-700,000 people. But the effects of Russia's war in Ukraine have also affected Somalia, since the country relied on Ukraine and Russia for 100% of its grain supplies. As well as the Ukraine invasion, other conflicts have also drawn away desperately needed funding, such Sudan and Gaza since April and October 2023 respectively.

In this period the international community has explored more radical approaches to address climate change in Somalia, led by the need to respond urgently and decisively to such prophecies as Hodder's in the introduction to this chapter (Hodder, 2021). Some have sought to address the drivers of resource-based conflict in rural Somalia (Kheira, 2024), while others have been even more ambitious, seeking to 're-green' Somalia with more robust crops than were previously the norm, along the programmed dispersal of seeds and petals and 'carbon investment' through tree-growing. Whether this will be enough to avoid desertification has yet to be seen, and al-Shabaab is seldom involved in the efforts. Humanitarian actors have consistently proposed negotiation with al-Shabaab (IRC 2013 & Belliveau, 2015). These propositions do not, however, take into account the many other factors involved in a negotiated settlement, as detailed by Harley & Toros (2018). In this period al-Shabaab has shifted its emphasis more towards 'soft power', increasing the quantity of messaging around the services it provides to the communities who support it.

In late 2023 the group announced that Hassan Ali Yaqub, a former Shadow Governor of a region of south/central Somalia and well-known senior figure within the group, had been appointed Head of the Flood Relief Committee. Messaging noted that the group was 'handling the floods better than the western-backed Somali govt' (Anzalone, 2023) and then, the following month, encouraged local business to donate to the effort, using the hashtag #IslamizingrebelGovernance.

Figure1: Al-Shabaab announces the establishment of a Flood Relief Committee
Source: https://x.com/IbnSiqilli/status/1726054744261579155

Figure 2: The Head of the Flood Relief Committee appears in one of the group's media releases
Source: https://x.com/IbnSiqilli/status/1726054744261579155

In March 2024, as the effects of floods were still felt across south-central Somalia and in north-eastern Kenya, the group even replaced a video of one of its attacks with a high-production quality account of flood repairs along the Jubba River near the village of Salagle in Jubbaland (Al-Shabaab/Al-Kutaib Media, 2024).

Figure 3: A still image from an al-Kutaib media release on al-Shabaab's flood relief efforts

Source: (Al-Kutaib Media, 'Dayactirka Webiga Juba - Degaanka Dakhajo Degmaga Salagle (Jubba River Maintenance -Dakhajo Area, Salagle District)' (2024)

Figure 4: A still image from an al-Kutaib media release on al-Shabaab's flood relief efforts

Source: Al-Kutaib Media, 'Dayactirka Webiga Juba - Degaanka Dakhajo Degmaga Salagle (Jubba River Maintenance -Dakhajo Area, Salagle District)' (2024)

Some local sources reported that some of the areas of the flood repair activities by al-Shabaab had been disproportionately affected by some communities deliberately protecting themselves with improvised flood barriers, thus exacerbating the effects of other areas. This, again, is consistent: al-Shabaab has long proved adept at playing clan blocs against each other, especially if one is vulnerable, such as a minority clan, or is perceived to cooperate with the government.

The video also includes imagery of the disbursement of funds to displaced people in the area, even noting the donated sum as being $40 – a large amount in al-Shabaab-controlled territory – and highlighting the use of cell phone banking to make the transfer. The details of the banking transfer are most likely highlighting the fact that the system used is Somali, not Kenyan: Kenyan cell-phone SIMs are tied to the user's ID, whereas Somali SIMs are not, and therefore allowing the anonymous transfers of funds. This protects the beneficiary – but also al-Shabaab.

Source: Al-Kutaib Media, 'Dayactirka Webiga Juba - Degaanka Dakhajo Degmaga Salagle (Jubba River Maintenance -Dakhajo Area, Salagle District)' (2024)

In this most recent period, then, while the effects of climate change become steadily more significant and potentially irreversible, while geo-politics have side-lined Somalia and while international efforts to try to at least provide alternative solutions to what was seemingly inevitable, al-Shabaab has focused instead on relatively sophisticated messaging which portrays itself as effective and beneficent.

Figure 6: The ruins of a building in Bokore village destroyed by al-Shabaab in retribution for a community cooperating with the government

Source: British Embassy Mogadishu Somalia Stabilisation Update: Mahas District, Hiraan Region, HS State dated 13 October 2023

Figure 7: The ruins of a water pump generator destroyed in Bokore village by al-Shabaab in retribution for a community cooperating with the government

Source: British Embassy Mogadishu Somalia Stabilisation Update: Mahas District, Hiraan Region, HS State dated 13 October 2023

This has not, of course, precluded an occasional return to al-Shabaab's vindictive, violent tendencies: in 2022 in Bokore, a village in Hirshabelle Federal Member State, the group counter-attacked the village and, during a brief period of re-occupation, the group

destroyed buildings, wells and generators, rendering the town effectively uninhabitable (British Embassy Mogadishu, 2023). Bokore was only one of a number of areas that suffered this fate. But these are now much less frequent in comparison to al-Shabaab's efforts to portray itself as an effective deliverer of services and security to a population that is often caught between the terrorist group and equally unpalatable government institutions.

5. Conclusion & Recommendations

As the effects of climate change in Somalia have increased to a seemingly irreversible point, al-Shabaab has proven itself over a period of just under fifteen years to be capable of astuteness and flexibility. During the first two periods of climatic catastrophe, in 2010-11 and then again in 2017, the group wavered between brutality and humanity, between delivering desperately needed services and then at the same time denying them, often with devastating results. Al-Shabaab undoubtedly must shoulder some of the blame for Somalia's calamitous levels of deaths, displacement, malnutrition, and food and more general human insecurity. Al-Shabaab is not the only culprit though: ineffectual, incompetent and often clan- or self-interested governance and slow, inconsistent or unsuccessful interventions by the international community also play a role.

Al-Shabaab has, though, most recently adopted a broadly more 'soft power' approach to the effects of climate change in Somalia and the neighboring ethnically Somali regions of Ethiopia and Kenya. Building on previous, albeit random examples of some degree of eco-friendliness – banning logging and the associated trade in charcoal, exerting control over land rights to limit de-pasturing, and even prohibiting the use of plastic bags – the group has created a perception of being a group that offers more than violence. It does, of course, still offer violence to those who cross it or are suspected to support the Somali government and the international community.

This is most noticeable in al-Shabaab's use of communications. While the veracity of the group's claims is debatable – and currently impossible to prove either way – al-Shabaab communicates extensively around its provision of services generally, and humanitarian responses in particular. The group alternates between high quality video products in multiple languages, shared online through the group's media production house, al-Kutaib; and a steady stream of 'news'-style postings on social media and its websites such as Somali Memo and Calamada. The group clearly devotes much effort to this: its adversaries could learn from it.

In terms of recommendations, this research was limited in time and resource and would benefit from a more protracted study which involves equally with the international community, those who have lived under al-Shabaab and have been most affected by climate change and, finally and wherever possible, members of al-Shabaab itself (most

likely former members). While no-one would cast al-Shabaab as 'eco-terrorists', a greater understanding of the interacting dynamics between the terror group, the Somali government, civil society and the range of international actors may provide a deeper understanding and perhaps even a model for how climate change and security challenges can develop, particularly those involving a terrorist group.

Another recommendation would be parallel case studies of other terrorist groups, ideally from diverse origins but whose activities take place against the effects of climate change. There is, for example, an increasing body of evidence of right-wing terrorist groups rejecting climate change as a concept and even attacking infrastructure (Wendling, 2023, Clarke et al, 2023 & Klifford & May, 2022): this would make for a very useful study, as may research into the various disruptive but non-violent 'eco-terrorist' groups as well.

Ultimately the key conclusion that can be drawn for the wider counterterrorism community is that terrorist groups are by their very nature, as Betz (2015) notes, 'scalable, survivable and flexible'. Any change in society, technology or the environment, or any dramatic change in geo-politics, offers the terrorist an opportunity: it should be assumed that other terrorist groups will follow al-Shabaab's adaptive response to the effects of climate change, albeit over a long period of time and perhaps characterized by same inconsistencies as al-Shabaab has shown as the group adjusts its projected image.

In conclusion, it is worth returning to Kilcullen's account of the origins of Somalia's chaos. The rapid displacement of people, as happened from the rural areas of the country towards the urban littoral of the country and then beyond to the numerous Somali Diaspora hubs, presented al-Shabaab with both the chaos on which such groups thrive, but also a vast, disaffected, disorientated, disenfranchised, and displaced community. This is exactly the kind of group in society where terrorist narratives succeed, and climate change is creating more and more of these vulnerable communities around the globe.

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PART III: Case Studies
CHAPTER 6

The Interaction of Climate Change With Terrorism As a Threat Multiplier: The Case of The Northern Triangle

Çağla Vural*

Abstract

In world politics, the "Northern Triangle" refers to the region in Central America that includes El Salvador, Guatemala, and Honduras. Today, the region is characterized by poverty, lawlessness, and intense violence. Indicators of lawlessness and violence are high homicide rates, domestic violence, the activities of organized crime groups and gangs, drug trafficking, corruption, extortion and racketeering, poverty, unemployment, educational problems, high rates of impunity, and migration. Climate change and the accompanying ecological destruction pose vital risks in the Northern Triangle by increasing and accelerating these problems. Extreme weather events such as storms, floods, and droughts lead to crop losses in agricultural products while rising sea levels pose threats such as floods in coastal areas. At the same time, all these effects threaten the region's food and water security, which depends heavily on agriculture for its livelihoods. In addition, with the increase in average temperatures, dangers directly affecting human health such as deaths due to heat waves or the spread of vector-borne diseases arise. In this process, climate change also affects the activities of gangs and organized crime groups, which are defined or decided to be defined as terrorist organizations by the countries in the region and create some opportunities for them. Even under today's conditions, gangs terrorize people in the region and continue their criminal activities in an environment plagued by problems such as water scarcity, food insecurity, and economic instability. The countries of the region, which are vulnerable to both the current state of turmoil and violence and climate change, are unable to adapt to changes in the climate and mitigate the effects of this crisis. Therefore, climate change emerges as a threat multiplier that further aggravates chaos, violence, terrorism, and

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even conflict in the region and expands the sphere of influence of these problems. It is clear that such a crisis will further fuel the existing competition over resources (food, water, etc.) in the region and it is unlikely that this process will proceed peacefully. Against this background, this study aims to identify the links between climate change and terrorism through the countries of the Northern Triangle. Adopting a descriptive method, the study concludes that climate change acts as a threat multiplier that exacerbates and expands the existing conflicts and terrorist incidents in the region.

Keywords: *Northern triangle, organized crime groups and gangs, climate change, terror, lawlessness*

1. Introduction

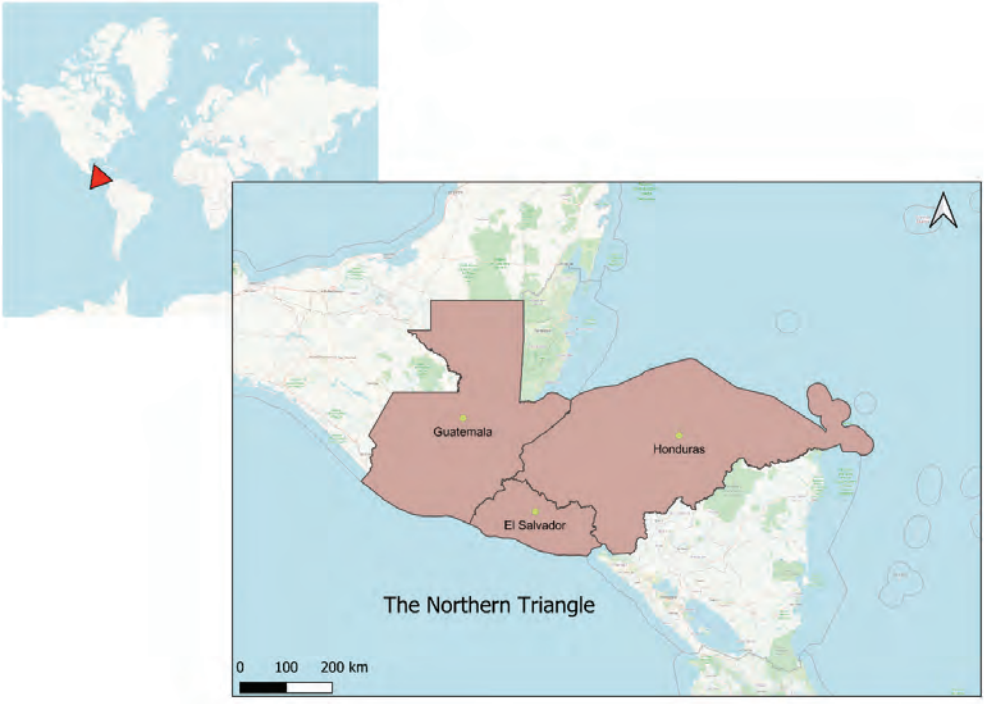
Guatemala, El Salvador, and Honduras are countries in Central America that generally share similar economic, social, and political conditions. Trade agreements reinforced these similarities in 1991-1992, and these countries became known as the "Northern Triangle". Today, however, the region is plagued by widespread poverty, corruption, drug trafficking, extortion, violence, and high rates of migration. This shows that the Northern Triangle now symbolizes lawlessness and violence (Triangulo Norte Centroamericano, 2008). Looking at the averages of some periods in the last 20 years, the region has become one of the most dangerous and violent regions in the world, especially in terms of homicide rates—without being in a state of war. The region's high crime rates are directly related to organized crime syndicates and gangs, whose scope of activity extends to many countries. Organized crime groups engage in transnational activities with wide reaches, such as human trafficking and drug trafficking, while gangs' control local crimes such as drug distribution, extortion, and racketeering. Economic instability, unemployment, and poverty in the region, where insecurity is on the rise, push young people to join these criminal organizations (American Security Project, 2019; Arnson & Olson, 2011; Vural, 2020; ECLAC,2018).

Climate change and the accompanying ecological destruction pose vital risks by increasing and accelerating the existing problems in the Northern Triangle. The effects of climate change, especially in the form of extreme precipitation, droughts, and severe hurricanes, not only cause physical damage but also deeply affect the people of the region in the socio-economic context. In this process, climate change also affects the activities of gangs and organized crime groups, which are defined or decided to be defined as terrorist organizations by the countries in the region and create some opportunities for them. The study thus aims to analyze the correlation between climate change and terrorism in the Northern Triangle countries equation. In this context, a descriptive method is adopted throughout the study. The first section of the study analyses the indicators of lawlessness and terrorism and focuses on the causes and effects of lawlessness and terrorism. While

the second section highlights the threats that climate change poses to each of the countries in the region, the third section concentrates on the frightening occurrences and possible risks in the region brought on by the climate crisis as a threat multiplier. Ultimately, in the conclusion section, the interaction between terrorism and climate change is evaluated in general through the example of the Northern Triangle.

2. Lawlessness and Violence in The Region

Located in Central America, bordered by Mexico and Belize to the north and Nicaragua to the south, the Northern Triangle defines the region formed by Guatemala, Honduras, and El Salvador between the Pacific Ocean and the Caribbean Sea.



Map 1: The Northern Triangle

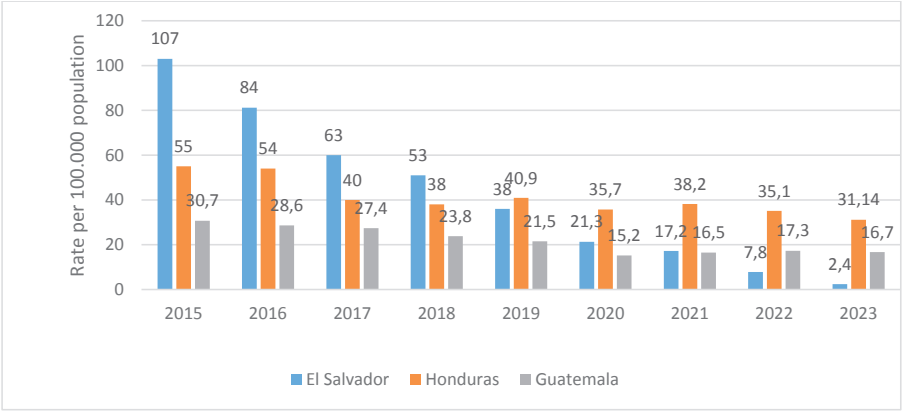
The region, which has the heritage of the Mayan and Aztec civilizations, became a colony in the 16th century. The poverty, destruction, and massacres that came with the conquest of the region caused the population to decline (Manz, 2008: 1-2). The independence finally achieved in the first half of the 19th century did not remedy the suffering of the people of the region under the colonial system, and another order was established in which poverty and violence were at the highest level. The state of destruction and violence that came to the region with the conquests from outside has become chronic as a legacy passed down from

generation to generation with the encouragement of external factors. With this historical memory in mind, this chapter focuses on indicators of the cycle of lawlessness, terrorism, and gangs in the region and the effects of this complex cycle.

2.1. Indicators of Lawlessness and Violence in The Region

The indicators of lawlessness and intense violence in the region are as follows:

a. High Homicide Rates: According to 2017 data, El Salvador had the highest number of homicides in the world (UNODC, 2019). In the same year, Honduras ranked 3rd and Guatemala 9th. Below are the homicide rates of the countries of the Northern Triangle.



Graphic 1: Homicide rates in the countries of the Northern Triangle[11]

According to recent data, it is noteworthy that while homicide rates in Honduras remain high, they have drastically fallen in El Salvador and Guatemala (UNODC, 2024: 110). The dramatic drop in rates in El Salvador, where the number of homicides in 2023 was 69% lower than in 2022 (The UNDP InfoSegura Regional Project, n.d.b.), should also be highlighted. With a homicide rate of 2.4 per 100,000 people in 2023, the country had the lowest rate in the Western Hemisphere except for Canada. It is believed that this is due to the pressure exerted by President Nayib Bukele in his fight against gangs and organized crime organizations (Macias-Flores, 2024). The causes of homicides in Honduras, which has the highest homicide rate in Latin America and the Caribbean after Jamaica (UNODC, 2024: 108), are approximately 12% organized crime/gang-related, 5% other crime-related, 1% intimate partner/family-related, 52% other

[11] Data in the graph is derived from the World Bank, the UNDP InfoSegura Regional Project, the UNODC, and the Government of the Republic of Guatemala sources and reports (Ministry of Government of Guatemala, 2024; The UNDP InfoSegura Regional Project, n.d.a; UNODC, 2024).

causes, and 30% unknown causes. In El Salvador, these rates are approximately 32% organized crime/gang-related, 55% other crime related, 3% intimate partner/family-related, and 10% other causes, while in Guatemala they are approximately 8% organized crime/gang-related, 66% other crime related, 1% intimate partner/family-related, 3% other causes and 22% unknown causes (UNODC, 2024: 99).

b. Sexual Crime and Domestic Violence: Femicide rates are similarly high in the Northern Triangle. Furthermore, women in this region face a variety of violent crimes, such as intimate partner violence, domestic abuse, and sexual assault. Most of those forced to migrate from the region due to violence are women and children. According to a study on the average number of femicides between 2007 and 2012, the most dangerous region of the world for women is the countries of the Northern Triangle. El Salvador ranked first with a rate of 14.4 per 100,000 inhabitants, Honduras ranked second with a rate of 10.9, and Guatemala ranked fourth with an average of 9.1, just behind South Africa (Geneva Declaration Secretariat, 2015: 94).

Another problem in the region is that the abuses women are subjected to are attributed to their relationship with the gang and investigated accordingly. Also, women who have been subjected to violence and abuse are sometimes subjected to sexual violence by judges, prosecutors, police officers, and lawyers (Gonnella-Platts, Villatoro & Collins, 2018). Although a number of agreements on the prevention of violence against women have been signed in the three countries, the impunity rate for these offenses is quite high. The presence of organized crime and gangs, particularly in El Salvador and Guatemala, increases violence and oppression (such as rape and abuse) against women. Moreover, the number of unrecorded cases of violence is also quite high. The rate of women whose fate is unknown or who have been abducted is also high. In El Salvador, for example, although the rate of femicide decreased in 2019, the number of missing women increased (The Dialogue, 2019; Indicadores de Violencia, n.d.). However, the dramatic declines seen in El Salvador in 2023 are noteworthy. For example, femicide rates in the first quarter of 2023 decreased by 88.2% compared to the first quarter of 2022 (The UNDP InfoSegura Regional Project, 2023a). In 2022, femicide decreased compared to the previous year. In the same year, reports of sexual violence decreased by 11.6% compared to the previous year, while physical violence decreased by 12%. However, according to the data at the end of 2022, domestic violence increased by 45% (The UNDP InfoSegura Regional Project, n.d.b.). In Guatemala, 77 out of every 100,000 women were victims of rape in 2022 and at least four women were reported missing every day. At the same time, 170 women and girls were victims of various acts of violence every day. Correspondingly, at least one woman or girl was killed every day as a result

of violence. Despite this, femicide rates in Guatemala decreased by 15.6% in 2023 compared to 2022. However, it should not be overlooked that although the rate of femicide has decreased compared to the data from a year ago, cases of sexual offenses and disappearances continue and sexual violence tends to recur (The UNDP InfoSegura Regional Project, 2023b). The data from Honduras show high rates of sexual offenses against women and domestic violence in the region. Accordingly, in every 100 known sexual offenses in 2022, 88 women were victims. The total number of sexual violence cases registered in the same year was 3115. The number of women who lost their lives as a result of sexual violence is 306. In 2023, femicides increased by 24.2% compared to the previous year (The UNDP InfoSegura Regional Project, n.d.a.).

c. Organized crime and gang violence: According to the Global Organized Crime Index, Honduras ranks 13th, Guatemala 26th, and El Salvador 52nd in the 'criminality score' ranking in 2023 (Global Initiative Against Transnational Organized Crime, 2023). High crime rates in the region are associated with organized crime groups and gangs that have extended their influence to many countries. Large-scale organized crime groups operating transnational activities such as drug trafficking and human trafficking, and gangs controlling local drug distribution, extortion, racketeering, and other illicit activities increase insecurity in the Northern Triangle countries. Economic instability, poverty, and unemployment in the region compel young people to join such gangs. The gangs also clash among themselves and create spheres of influence with invisible borders from small neighborhoods to big cities. Although there are many organized crime groups and gangs in the region (Arnson & Olson, 2011), two of the most prominent are the 18th Street Gang (Barrio 18, M-18) and Mara Salvatrucha (MS-13). The gangs' sphere of influence is expanding to include the whole of Central America (Congressional Research Service, 2019). However, in El Salvador, where the presence of gangs is most prevalent, they are also said to have been largely dismantled, with government repression leading to the imprisonment of around 1.6% of the population associated with them since the beginning of 2022 (InSight Crime, 2024).

d. Drug trafficking: The Northern Triangle is geographically one of the most important regions for drug trafficking between South American countries, which rank among the world's top drug-producing countries, and the USA, which ranks among the top drug-consuming countries. While a significant portion of the drug supply already passes through the region, the crackdown on drug cartels in Mexico since 2006 has pushed many more of the trade routes to the Northern Triangle countries, resulting in increased violence and lawlessness in the region. Almost all organized crime groups and gangs in the Northern Triangle countries

are drug cartels that derive their income from the drug trade. Conflicts between drug cartels also increase violence and the influence of drug trafficking in many criminal offenses such as human trafficking, murders, corruption, and extortion is noteworthy (Avcı, 2018; Velde, 2012: 2-4).

e. Extortion and racketeering: The increase in extortion and racketeering offenses in the Northern Triangle is associated with the expansion of the influence of gangs such as MS-13 and Barrio 18 in the region. Gangs have used violence to make extortion and racketeering one of their main sources of income. 75% of respondents who reported having been extorted in 2016–2017 were from El Salvador, 7.2% were from Guatemala, and 8.5% were from Honduras, according to data conducted by the Latin American Public Opinion Project (Dammert, 2021: 4). Extortion and racketeering in the Northern Triangle involve a complex network of different offenses involving various actors. These activities have become a part of the economic and social life of the state and its citizens. It is so widespread that it accounts for a significant share of the gross domestic product in economic terms. Extortion and racketeering also trigger a tendency toward other criminal activities, such as drug trafficking and human trafficking. The criminal economy created in many sectors, including agriculture and fisheries in rural and urban areas, cannot be prevented due to the weakness of state institutions. It is also known that police officers are sometimes among the perpetrators of crime. However, this situation differs only in El Salvador, where the relationship between police and gangs is characterized by hostility. The gangs commit acts of violence in the event of non-consent to the payments they demand at least twice a month. Public transport operators, small businesses, and residents of poor neighborhoods are usually targeted, although occasionally big businesses are also racketeering. This has a negative impact on national economies, causing losses ranging from $60 million to $400 million per year in Guatemala. For example, according to a 2015 study, organized crime groups generate more than $390 million annually from extortion and racketeering in El Salvador, more than $200 million in Honduras, and more than $61 million in Guatemala. However, due to reasons such as fear and threats, most victims of extortion and racketeering do not file complaints with the authorities. Therefore, it is difficult to measure these offenses (McDermott et al., 2019: 21-23; La Pensa, 2015).

f. Corruption: The countries of the Northern Triangle have long suffered from chronic corruption that permeates all state institutions. According to the 2023 'Corruption Perceptions Index', which assesses 180 countries, El Salvador ranks 31 out of 100 points, while Honduras and Guatemala rank at the bottom with 23 points each. As the score decreases, the rate of corruption increases (Transparency

International, 2024). Besides money, corrupt payments are also made in the form of in-kind payments. Accordingly, it is very common in the region to pay bribes in the form of sexual intercourse for access to state, education, and health services. This is seen in two ways through women, especially in gang areas. One of these is direct payment through sexual intercourse and the other is the use of sexual intercourse as blackmail (Dammert, 2021: 12).

g. High impunity rate: There is a high rate of impunity for murders in the Northern Triangle countries, particularly in Honduras. In the Northern Triangle, the population feels a deep distrust of the security forces and the legal system. The crimes committed by the security forces against their people during the years of civil wars in the past are one of the factors of this distrust. The failure of the legal system, the lack of punishment for crimes, the high rate of corruption and bribery in state institutions, and the weakness of the security forces in terms of quantity and quality also deepen this distrust. The superiority of organized crime groups and gangs in terms of both number and influence also enables them to implement their penal systems. For example, when there is a trial, there are attacks against prosecutors who decide on an investigation. Thus, the introduction of fear and bribery affects the ability of civil servants to make impartial and independent decisions. Guatemala has taken an important step in addressing this situation and has applied to the United Nations (UN) to investigate officials in state administration who work for organized crime groups and gangs. Subsequently, through the efforts of the UN-backed "International Commission against Impunity in Guatemala" (CICIG), many civil servants were removed from office, which helped to reduce the homicide rate in Guatemala (Cheatham, 2019; Beltran, 2017; International Crisis Group, 2017: 17; UNODC, 2007: 31-32, 81-82). By 2022, it should be emphasized that this situation has changed in El Salvador. Given that most of the crimes are associated with gangs and organized crime groups, it is not surprising that this rate has started to decline, with most of them being imprisoned.

h. Poverty, Unemployment, and Education Issues: The Northern Triangle countries struggle with high levels of poverty and unemployment. All three countries are among the poor nations with significant income disparities. In the world ranking of real GDP per capita, Honduras ranks 163rd, El Salvador 142nd, and Guatemala 134th (The World Factbook, n.d.). Although the GDP ratios of the countries show certain increases, income inequalities, violence, and lawlessness hinder economic stabilization. The high rate of corruption and inadequate income taxes cause countries to have low social expenditures. According to the UN Human Development Report, El Salvador ranks 127th, Guatemala 136th, and Honduras

138th among 189 countries (UNDP, 2024). Accordingly, although the literacy rates in the countries are high, the rates of continuing education after primary school are quite low (Fippin, 2019).

i. 1*High migration rate:* The spiral of lawlessness and violence, coupled with the impact of environmental problems, leads to high rates of migration, and the brutal situations experienced by people who risk all possible dangers to achieve better living conditions, both in their countries and on the migration routes, reveal the humanitarian drama in the Northern Triangle. Since 2019, it is estimated that more than two million people have migrated from the Northern Triangle. This number, estimated at an average of 407,000 people per year between 2018 and 2021, decreased during COVID-19 but increased again after the lifting of cross-border travel restrictions. In 2023, 213,000 of those apprehended at the US border were from Guatemala, 181,000 from Honduras, and 53,000 from El Salvador (Global Conflict Tracker, 2024; Congressional Research Service, 2019).

2.2. Causes and Effects of Lawlessness and Terrorism

The process leading to many of the problems mentioned in the countries of the Northern Triangle was fueled by the increase in armaments acquired by each group during the civil wars. During the civil wars of the Central American countries, many weapons were imported to the region for use in conflicts. These weapons were spread over large areas, especially in the Northern Triangle countries and Nicaragua. When the civil wars ended, the masses of men who had fought for years but who had become idle because there was no longer a war environment formed organized crime groups due to their easy access to weapons or their tendency towards crime and violence, which made it easier for them to become members of existing criminal groups (Levitz, 2018; UNODC, 2012: 51-59). Therefore, after coups, conflicts, and civil wars, the Northern Triangle has fallen into a spiral of violence with many organized crime groups and gangs operating at local, national, and international levels.

Two prominent gangs in the region are MS-13 and the 18th Street Gang (Barrio 18, M-18). The gangs have members outside the Northern Triangle in the USA and Mexico. The 18th Street Gang was founded by Mexican youth in Los Angeles in the 1960s, and its acceptance of members of all races led to high rates of participation of Central American immigrants in the gang. MS-13 was founded in Los Angeles in the 1980s by Salvadorans fleeing the civil war in El Salvador for protection from other gangs and later expanded with the participation of other Central American immigrants. In 1996, the Illegal Immigration Reform and Immigrant Responsibility Act strengthened US border controls and facilitated the deportation of immigrants by expanding the types of offenses

that could lead to deportation. The return to El Salvador, Honduras, and Guatemala as a result of this law is directly related to the increased presence of M-18 and MS-13 gangs in Central America. The presence of both gangs has influenced the spread of gang culture in the Northern Triangle. The M-18 and MS-13 gangs mainly recruit bus companies, local businesses, and individuals, and generate income from crimes such as extortion, street-level drug trafficking, theft, robbery, and murder for money (UNODC, 2012: 27-30).

According to a statement made by the US State Department in 2012, there are around 85,000 M-18 and MS-13 members in the Northern Triangle (Meyer & Seelke, 2015: 9). In recent years, it has been estimated that only the number of MS-13 members in the Northern Triangle has increased to 70,000. Although both gangs have members in the USA, it is observed that they have been making efforts to expand in Europe, especially in Italy and Spain (InSight Crime, 2018; InSight Crime, 2019). Although there are some transnational initiatives as mentioned, according to some researchers, the main focus of the gangs is on local issues such as being the dominant power in a particular extortion area and drug distribution area. They often recruit members among vulnerable youth in poor neighborhoods and prisons. There are very few women among the members, but women are seen as the property of the gang (Ventas, 2017).

MS-13 and M-18 gangs clash from time to time due to the rivalry between them. Even groups of the same gang in different regions may clash. While most of the killings in the Northern Triangle are thought to be gang-related, the reasons for the killings may include attempts by members to leave the gang, the contestation of a dominated area by another group, the punishment of government officials such as judges and prosecutors who have sentenced gang members, non-compliance with gang discipline and rules, or witnessing crimes committed by the gang. The drop in homicides that occurred after the government of El Salvador helped broker a ceasefire between gangs in March 2012 is an indication that gangs are responsible for a significant percentage of homicides in this country. As noted, a significant proportion of homicides in the Northern Triangle are committed by gangs. However, homicide rates are also high in local drug trafficking groups, areas where Mexican criminal groups are active, and border areas (Seelke, 2016: 5-7).

In addition to drug trafficking, murders, and extortion, gangs are responsible for crimes such as child abuse, rape, and intimate partner violence in the Northern Triangle. According to police reports, 4374 people out of every 100,000 people in El Salvador were sexually assaulted in 2017, compared to 1463 in Honduras and 10380 in Guatemala in 2016 (UNODC, n.d.). However, while looking at these facts, it should not be ignored that some of the crimes committed are not recorded in police records. Based on a report prepared by UNICEF and the International Commission against Impunity in Guatemala (CICIG), gangs and organized crime groups generate income from sexual slavery rings

with 48,500 victims. The region is also characterized by high levels of kidnapping, illegal arms trafficking, and migrant smuggling. Many of these activities are interrelated and carried out by organized crime groups. State institutions with high rates of bribery and corruption as well as scarce funds are insufficient to punish or deter national or transnational crimes. Countries in the region have from time to time tried to take harsh measures in the fight against crime to reduce the problem of violence and realize economic development, but they have not achieved lasting success in solving the problems that have become chronic (Seelke, 2016: 5-7; Meyer & Seelke, 2015; UNODC, 2012: 15-17).

El Salvador designated gangs as terrorist organizations in 2015 because they committed offenses covered by a special law on terrorist acts. Honduras followed El Salvador in 2017. Guatemala is expected to take a similar step. The terrorist organization designation allows these countries to respond more effectively and harshly to gangs and organized crime groups (Garcia, 2015). However, there are criticisms and debates about the definition. There are questions about the classification of gangs and organized crime groups as terrorist organizations in the same way as larger terrorist groups that are considered to threaten international security. It is thought that these may lead to problems in the context of rehabilitation and integration policies that can be implemented for gangs. At the same time, it is underlined that there is a risk that the fundamental rights and freedoms of all citizens, whether or not they are related to gangs, may be violated due to the legitimization of the state's repressive policies and the hardening of its interventions by securitizing the issue (Mendoza, 2020; Heinrich Böll Stiftung-México Centroamérica y El Caribe, 2016; Musto, 2020; González, 2016). Of course, these evaluations and discussions are the subject of other studies. While being aware of all these criticisms and discussions, the acceptance of this study will be in a similar direction since the states in question have classified gangs and organized crime organizations as terrorist organizations or are in the process of doing so.

The NATO Strategic Concept (2022) recognizes that terrorism, "in all its forms and manifestations, is the most direct asymmetric threat to the security of our citizens and to international peace and prosperity" (NATO, 2022). In this context, for example, there are also studies suggesting that corruption, one of the biggest problems in the Northern Triangle region, may cause threats to international security by strengthening global criminal networks and terrorist activities due to inaction and lack of regulatory control by states. However, it should be emphasized that these groups are strengthened due to the institutional weaknesses of states (González, 2016). As a result, these situations lead to a humanitarian crisis in the Northern Triangle. Gangs use violence as a basic means of control. In fact, according to Boerman, this is the central element of gangs' terrorist strategies. Thus, gangs are able to exert pressure on both citizens and the government. In this atmosphere of terror, which includes many forms of violence, the public is conditioned to remain silent

for fear that the threat will extend to family members in this spiral of violence, which has now become routine. The gangs, who also target public opinion, maintain control through threats, intimidation, and brutality and maintain an atmosphere of terror by punishing those who oppose them. Thus, the gangs, which also shape the sociopolitical structure in the region, exert pressure on governments as an "interest group" and influence the economy, politics, and culture. Inadequate and weak institutions and corrupt officials, from the security forces to legal matters, are also obstacles to taking the right steps to get out of this atmosphere of terror (Boerman, 2019). Apart from corrupt institutions, violence, and terrorism, the people of the region also struggle with environmental problems. The next section focuses on climate change-induced security problems in the region.

3. Climate Change in The Region

Central America, where the Northern Triangle is located, is among the regions most affected by climate change. Since the mid-20th century, extreme heatwaves have been increasing but extreme cold has been decreasing in the region, and the frequency of heat extremes is predicted to increase by the end of the 21st century. The physical impacts of climate change in the region are diverse and include extreme temperatures, drought, sea level rise, coastal flooding, erosion, and ocean acidification. Additionally, problems such as deforestation and desertification, increased vulnerability of ecosystems and loss of biodiversity are other climate change impacts in the region (IPCC, 2023; The Dialogue, 2021).

With these impacts, which are expected to increase until the middle of the century, there is a high risk of being affected by extreme climate events in the entire region. As a result of all these, in the ongoing process, there is increasing water and food insecurity due to changes in water availability in the region; increasing incidence of vector-borne and zoonotic diseases, and human losses due to extreme events and economic damages associated with them. In the region where about 40% of the population lives in poverty, the rural poor are the most vulnerable to the climate crisis as their livelihoods are based on agriculture. For example, according to a projection within the scope of impacts on rural livelihoods, bean production in Nicaragua, El Salvador, Honduras, and Guatemala is expected to decrease by 19% and maize production by 4% to 21% by 2050, while a general decrease in production is expected to occur, especially for small and medium-scale farmers and indigenous peoples living in the mountains (IPCC, 2023). In addition, the area defined as the Dry Corridor in the region stands out as a high-risk area. The Dry Corridor, which includes parts of El Salvador, Guatemala, Honduras, Nicaragua, and Costa Rica, poses risks to physical security, food security, and livelihoods as one of the most vulnerable regions in terms of extreme climate events due to long periods of drought and irregular heavy precipitation (UNEP, 2023).

The Northern Triangle countries in the Dry Corridor have faced severe devastation, especially due to drought. Severe droughts in recent years have triggered poverty and food insecurity in the region and pushed people to uncertain solutions such as migration (ECLAC, 2018: 22). It should not be forgotten that undeveloped/developing countries with economic vulnerabilities are more vulnerable to the negative effects of natural disasters such as earthquakes and tsunamis or global problems such as climate change caused by human activities (Climate Justice, n.d.). Implementation of the policies required to overcome and mitigate the adversities that occur as soon as possible is more difficult in countries where the law is weak and violence is intense. For example, due to Hurricane Mitch in 1998, great humanitarian and ecological destruction was experienced and tens of thousands of people from Honduras had to migrate to the USA (Climate Change Vulnerable Communities and Adaptation, 2003: 13).

Another striking situation is that the majority of those who migrated to the US from the Northern Triangle in 2019 were people living in poverty and food insecurity in rural areas (Sigelmann, 2019: 4). Each of the Northern Triangle countries is vulnerable to the impacts of climate change. According to the Climate Risk Index for 2000-2019, which analyses the extent to which countries are affected by weather-related extreme events (hurricanes, floods, heat waves, etc.), El Salvador ranks 28th, Guatemala 16th, and Honduras 44th. This vulnerability also leads to inadequacies in adaptation capability. According to the ND-GAIN (Notre Dame Global Adaptation Initiative) index, which conducts studies in this context and shows the world ranking of countries' preparedness capacity to cope with global changes brought about by overcrowding, resource constraints, and climate disruption, El Salvador ranks 108 (score 45.9), Guatemala 119 (score 43.9), and Honduras 142 (score 40.3) (ND-GAIN Country Index, 2022).

3.1. Implications of Climate Change in El Salvador

In El Salvador, average temperatures rose by more than one degree Celsius in the early 2000s compared to the 1950-1959 period. However, temperatures in the region are expected to increase at higher rates in the short term, resulting in changes and uncertainties in annual precipitation volumes and precipitation areas. Therefore, the agricultural sector, which is directly related to these physical impacts, is particularly vulnerable to extreme weather events. This situation, which affects production and productivity, causes crop and livestock losses and consequently leads to both food insecurity and economic insecurity through loss of income and increase in food prices. The parallel development of loss of income and increase in food prices leads to malnutrition, especially among the poor, leading to a wide range of health problems. The proliferation of vectors causing diarrhea and respiratory diseases also creates serious health problems, while there are

also direct human losses due to extreme weather events. Water scarcity due to drought or contaminated water also increases health problems. In a region where more than 50% of the rural population already lacks access to safe water, dwindling water resources mean that women and children, in particular, have to travel greater distances to access water and face greater dangers (Ministerio De Agricultura Y Ganaderia (El Salvador), 2015).

According to a USAID report, the sea level in El Salvador has risen by 7.8 centimeters since the 1950s, and it is projected that between 10 and 28% of land in the coastal zone will be lost by the end of the century. Considering that nearly one-third of the population lives in coastal areas, the entire region is at risk from extreme weather events (Ministerio de Medio Ambiente y Recursos Naturales (MARN) (El Salvador), 2019; USAID, 2017; Norio-Tomasino, 2022; Climate Diplomacy, 2023; Climate Links, 2017). At the same time, the region has experienced human and economic losses due to extreme weather events such as Hurricane Ida (2009), Tropical Storm Agatha (2010), Tropical Depression 12-E (2011), Tropical Storm Amanda (2020), Tropical Storm Julia (2022) and Tropical Storm Pilar (2023). According to global climate scenarios, such events will continue to occur with greater intensity and frequency as a result of climate change. Considering other extreme weather events such as continuous droughts that lasted from 2012 to 2016, periodic droughts, and long-lasting fires that spread over large areas, the risks caused by climate change in the region are expected to increase day by day. In the final analysis, according to climate change projections, if greenhouse gas emissions continue at their current rate and in their current form, there is a risk of annual average temperature increases in the country starting from 1.5 °C to 5 °C in certain regions and annual precipitation rates decreasing by up to 30% (Ministerio de Medio Ambiente y Recursos Naturales (MARN) (El Salvador), 2019).

3.2. Implications of Climate Change in Guatemala

Similar to El Salvador, Guatemala is facing climate change-induced food insecurity and water insecurity problems due to rising temperatures and variable volumes, and spatial precipitation uncertainties. In particular, the frequency and severity of extreme weather events such as heat waves, droughts, and extreme precipitation are expected to increase more in the coming periods. Guatemala, which was among the 10 countries most affected by extreme weather events between 1992 and 2011, is also experiencing an increasing number of similar events. Extreme weather events such as Tropical Storm Agatha in 2010, Depresión Tropical Doce-E in 2011, Tropical Storm Boris in 2014, Tropical Storm Eta and Iota in 2020, and Tropical Storm Julia in 2022 caused loss of life, damaged city infrastructures and caused economic losses (Schapendonk et al., 2023; IPCC, 2023). Floods and landslides caused by tropical storms in the country, which also

experienced water shortages, similarly caused human and economic losses (Ministerio de Agricultura, Ganadería y Alimentación (MAGA), n.d.).

The agricultural sector in the region is particularly vulnerable to changes due to its links with the climate. The effect of precipitation changes on planting and harvesting periods and the effect of temperatures on the spread of pests and diseases leads to soil losses due to erosion. This process and declining crop yields jeopardize the livelihoods and food security of rural populations. The agricultural sector accounts for 31% of total employment and 9.9% of GDP in Guatemala (Ministerio de Agricultura, Ganadería y Alimentación (MAGA), n.d.; CGIAR, 2024, Schapendonk *et.al.*, 2023; Word Bank, 2019; Word Bank, 2021). Ultimately, people turn to migration, which involves difficult conditions (Ministerio de Agricultura, Ganadería y Alimentación (MAGA), n.d.; CGIAR, 2024, Schapendonk *et.al.*, 2023).

In Guatemala, where water availability is already declining due to climate change, a projection of a 3.5°C average temperature increase and a 30% reduction in rainfall is projected to reduce crop volume and productivity and livestock production. By 2050, temperatures are expected to increase between 2°C and 4°C, while rainfall days are expected to decrease, but the frequency of weather events such as tropical storms is expected to increase. Similarly, the sea level, which is expected to increase between 9 and 13 cm by 2050, is another prediction that will lead to other problems such as flooding and erosion. Ultimately, all these threats are signaling security risks while increasing vulnerability across Guatemala, particularly in coastal areas (Schapendonk *et.al.*, 2023; IPCC, 2023; Ministerio de Medio Ambiente y Recursos Naturales (MARN), 2021).

3.3. Implications of Climate Change in Honduras

Similar to El Salvador and Guatemala, Honduras is already suffering human and economic losses due to climate change-induced extreme weather events. Disasters such as extreme temperatures, extreme precipitation, tropical cyclones, floods, and droughts have forced many people in the region to migrate. Disasters such as Tropical Storm Eta and Iota (2020) and Tropical Storm Julia (2022), the most severe of which was Hurricane Mitch (1998), have caused other disasters such as flooding, coastal erosion and landslides, increasing damage levels to very high levels. In addition to impacts such as animal and human deaths, and destruction of houses and infrastructures, the destruction of agricultural products has caused food insecurity. Drought and extreme precipitation are another important reason for the destruction of agricultural products. The livelihood of nearly half of the population in the region depends on the agricultural sector. For this reason, the extreme drought that occurred between 2018 and 2019 led to the declaration of a state of emergency (UNHCR, 2024; Lara-Arévalo et al., 2023; Center for Gender & Refugee Studies, 2023).

Climate change causes land erosion, which also contributes to sea level rise, and leads to water and soil pollution. Therefore, water, which is at risk of becoming scarce, is also privatized and used in industrial agriculture, leading to problems in access to water (UNHCR, 2024). All these disasters affect food availability and access to food through food chain disruptions (Lara-Arévalo et al., 2023). Ultimately, it is the rural poor, especially women, who are most affected by this cycle of disasters, which includes food insecurity, water scarcity, and natural disasters. Another climate change impact is the loss of coral reefs, which indirectly affects the whole world. This situation also destroys tourism opportunities for the country, which is struggling with physical and economic difficulties. Despite the government's efforts to fight against it, in some regions, the continuation of mining and deforestation actions by private organizations makes it difficult to cope with the already existing climate change impacts. The government, which has built shelters and activated emergency committees, especially in the context of reducing the risks caused by extreme weather events, has needed international support for many adaptation efforts.

This situation has brought about a high level of debt due to climate change as well as ongoing social problems (UNHCR, 2024). As a result, the Northern Triangle countries, which have physically similar climate change projections, share a common future full of dangers and a common denominator in current security problems. Climate change, which affects vital needs by creating food insecurity and water insecurity, has the power to trigger terrorism along with other effects in the region where lawlessness and violence already exist. The next section focuses on the impact of climate change as a threat multiplier on terrorist incidents within this framework.

4. The Impact of Climate Change as a Threat Multiplier on Terrorist Incidents in The Region

Climate change becomes a threat multiplier by increasing vulnerabilities and other stress factors in communities through its direct physical impacts. Accordingly, for example, in rural areas, when livelihoods are damaged due to the climate crisis in connection with the agricultural sector, this situation increases the competition for already existing resources. In general, regardless of urban or rural areas, competition for scarce resources increases tensions in regions and contributes to conflicts as another factor. Although the relationship between climate change and conflict is complex, it is stated that these changes have the potential to contribute to violence and instability, at least indirectly. In particular, the disruption of global supply chains due to impacts such as sea level rise and extreme weather events and the occurrence of a wave of displacement increase instability in communities and bring the possibility of triggering violence, terrorism, and conflict (NATO, 2024).

Therefore, fragile states, which already have economic and political instabilities, have difficulties in responding to crises and cannot adapt to new post-crisis conditions. As a result, all these factors contribute to further complicating the spiral of violence. At this point, not only do violent tendencies and conflict risks between states or communities occur, but terrorist acts of certain groups are also considered in this context. Climate change contributes to the preparation of a suitable environment for the actions of violent extremist organizations with its destabilizing effects that create pressure. Especially in regions whose livelihoods depend on climatic conditions, it may become easier for individuals affected by the current situation to participate in illegal and illegitimate activities by joining violent extremist organizations to generate income (Romm, 2022). In this case, climate change emerges as one of the factors that accelerate and facilitate the activities of these groups.

Wuchte and Obuyi also emphasize that communities that have lost their livelihoods or have been displaced due to climate change, and especially young people among them, are targeted by these organizations and that more research is needed on the subject. Stating that conflicts between communities increase with migration and that this situation is exploited by violent extremist organizations, the authors underline that women also become more vulnerable to these groups (Wuchte & Obuyi, 2024).

One of the studies explores the relationship between indicators such as extreme weather events and agricultural production and the frequency and severity of terrorist attacks, focusing on Nigeria and Pakistan in the context of climate change creating a favorable environment for terrorist activities through resource scarcity. In this context, it was concluded that decreasing agricultural production due to extreme weather events caused by climate change threatens food security in Nigeria and causes displacement; this situation is used by terrorist organizations such as Boko Haram as a tool to attract young people to their ranks. Some apparent correlations between climate change impacts and terrorist incidents were observed more predominantly in Nigeria, while a more indirect relationship was observed in Pakistan. Here, too, climate change impacts such as extreme weather events reduce agricultural production, leading to economic hardship and fueling already existing ethnic and religious conflicts. However, climate change functions as a threat multiplier rather than a root cause of terrorism and has the potential to increase existing social and political vulnerabilities (Lytle, 2017).

These potential threats have become recognized by governments. In 2018, the Governments of the Lake Chad Basin issued the Abuja Declaration to raise global awareness of the actual and potential impacts of declining water availability in Lake Chad on sustainable livelihoods, security, and development activities. In this context, speeches during the conference drew attention to the fierce struggles for scarce water, migration in search of water, and young people joining terrorist groups due to unemployment and difficult economic conditions (UN, n.d.a).

The link between climate change and terrorism also has started to gain importance in organizations such as the UN. In this context, climate change is one of the issues aimed at creating a dialogue within the scope of The Global Programme on Preventing and Countering Violent Extremism (PCVE), which is carried out by the UN Counter-Terrorism Centre (UNCCT) within the UN Office of Counter-Terrorism (UNOCT) (UN, n.d.b.).

In 2021, in an open session at the UN Security Council, António Guterres, Secretary-General of the UN, drew attention to poverty, weak governance, and terrorist activities in the region's most vulnerable to climate change, noting that in Mali, terrorist groups are taking advantage of the growing tension between herders and farmers to attract recruits, while in Iraq and Syria, water shortages are being exploited by ISIS. In the same session, Mamman Nuhu, Executive Secretary of the Lake Chad Basin Commission and Chair of the Multinational Joint Task Force, highlighted the risks posed to food security by climate change combined with population pressures, noting that due to food insecurity and livelihood constraints, young people, representing 60% of the population, are turning to the trafficking industry and other criminal activities, with a focus on drugs, arms, and human trafficking (UN, 2021).

The countries of the Northern Triangle, where vulnerability to climate change threats is high, poverty rates, and criminal activities are high, also face the risk of similar events. In the region where violence is normalized, a legal system that fails to function against crimes and a state order that has difficulties in ensuring public order in this sense, even if it does, stand out (Ruiz, 2020; UNODC, 2012). Therefore, it is clear that the spiral of violence will become increasingly complex when the severity of the effects of climate change in the region, the activity of gangs, and the state's fragility in its efforts to establish dominance are taken into account.

The aforementioned climate change impacts further deepen the socio-economic problems in the region. The health problems, social unrest, violence, and economic instability that people in the region are already enduring are intensified by climate change and trigger migration flows. Another significant risk that has received particular attention is the possibility of gangs taking advantage of deteriorating conditions. For example, during the COVID-19 pandemic, it was observed that the MS-13 gang took control and assumed a state-like role in El Salvador and Honduras, using the institutional weaknesses and chaos caused by the pandemic to its advantage. Although the quarantines imposed during the pandemic period led to a decrease in criminal activities, it was observed that gangs rapidly adapted their activities to the changing conditions over time with the increase in domestic violence during that period. In today's conditions, gangs continue their activities by putting pressure on the basic life needs of the people, such as food and clean water, taxing the purchase of these materials and related costs—more precisely, extortion. Therefore, given that climate change is likely to further destabilize the region in the long term, gangs are likely to continue to use violence and lawlessness to maintain control and legitimacy (Mia & Bickel, 2021; Lewis, 2023).

More than eight million people in all Northern Triangle countries live in food insecurity, struggling with hunger. Poverty rates in rural areas are 66% in Guatemala, 71% in Honduras, and 42.2% in El Salvador (Pinnow, 2024; The Norwegian Refugee Council (NRC), 2023). Poverty, gang terrorism, climate change, and migration are all fueling violence, but they are also interacting with each other. Nevertheless, all three countries endeavor to take control through various policies in this context.

Although El Salvador's efforts to take control of the situation since 2022, especially by taking measures against gang crimes, have led to a decline in crime rates, some chronic problems persist. In El Salvador, where remittances from citizens working abroad play a significant economic role, several challenges further complicate the situation. Factors such as dependence on remittances, low education levels, loss of labor force, and the financial impacts of the climate crisis all strain the country's resilience capacity. The vulnerability of rural areas in the region is particularly striking. Accordingly, some studies have pointed out that pressures on rural livelihoods will cause food insecurity, which may affect migration (Climate Diplomacy, 2023; Hallet, 2019). However, given what has happened around the Lake Chad Basin, there is a high likelihood that the loss of labor and food insecurity in these gang- and organized crime-terrorized rural areas of El Salvador could also be used by these gangs to recruit members. Given the government's crackdown on gangs in recent years, it is essential to conduct larger-scale, data-driven studies. However, there are difficult conditions in rural areas. The majority of El Salvadoran migrants who have arrived in the US in the last decade have come from rural areas.

Another chronic problem is inequality. The fact that the poor are more affected by extreme weather events and cannot find adequate support after disasters increases social tensions (Climate Diplomacy, 2023). These tensions and the increase in violence play into the hands of gangs, strengthening their hand to ensure the continuity of crimes through both recruitment and terrorizing society. Nevertheless, it should be noted that comprehensive research and data are not yet available in the region to verify possible interactions in the context of climate change and terrorism.

Guatemala, with its high rates of rural poverty, is also affected by climate change, especially in the context of physical vulnerability and the agricultural sector, and experiences problems such as food insecurity and livelihood difficulties at an extreme level. In the region where socio-economic inequalities and institutional weaknesses are also chronic problems, climate-related variables such as extreme weather events cause displacement. Therefore, the target areas where these people are accepted, whether inside or outside the country, are generally places with inadequate infrastructure and social services where the state has little control and authority. There are also trapped populations that do not have the opportunity to emigrate. For those who leave or stay, the common problem remains: gangs and organized crime groups. Both stranded groups and internal migrants in urban areas are vulnerable to a violent atmosphere terrorized by gangs and organized crime groups.

Faced with food insecurity, loss of livelihoods, and lack of basic social services, youth may see gangs as a life opportunity through illegal activities carried out by gangs and organized crime groups. For example, the inefficiency of the state during the COVID-19 period provided an opportunity for gangs and organized crime groups to expand their dominance and recruit more members (CGIAR, 2023; Fetzek, 2023; Tacoli, McGranahan & Satterthwaite, 2012; Garcia *et.al.*, 2023). Considering the increasing number of extreme weather events in the region, especially in the last two decades, and the population it has victimized, it can be seen that climate change as a triggering cause of food insecurity and livelihood problems also has an impact on this situation.

In 2022, Honduras was ranked among the 20 countries with the highest risk of worsening humanitarian crisis on the International Rescue Committee's Emergency Watch List. This is due to the chronic violence that has existed in the region for many years, climate change-induced disasters, and vital problems caused by problems such as food accessibility during the COVID-19 period, and thus displacement. It is stated that the number of people in need of humanitarian assistance in the region has more than doubled since 2020 compared to previous years (International Rescue Committee, 2022). With the COVID-19 pandemic, the destruction and difficulties caused by Hurricanes Eta and Iota, both physically and socioeconomically, have been exacerbated by the terrorized environment of gangs and organized crime groups. Gangs and organized crime groups prevented humanitarian aid in some areas during the COVID-19 pandemic and hurricanes Eta and Iota and forced civilians to hand over aid and resources to them (Lara-Arévalo, *et.al.*, 2023). In addition to the mentioned environmental issues, the people of the region must also contend with the problem of gangs and organized crime organizations that terrorize their living spaces, demand extortion payments, and coerce or force their youth into participation. It is stated that especially in disaster areas where hurricanes occur, gangs take advantage of the situation to tighten their control and impose restrictions on movement (UNHCR, 2021).

However, migration to another region within the country with displacement is also not a solution. Because gangs in Honduras do not allow foreigners to enter their neighborhoods (Scialla, 2021). Therefore, in the region where such wars of control exist, the activities of gangs and organized crime organizations, which have learned how to turn this crisis into an opportunity over time, rather than climate change adaptation policies, come to the fore. In the next section, general evaluations are made.

5. Conclusion

In the Northern Triangle countries, extreme weather events such as drought, extreme precipitation, and hurricanes lead to crop losses, while sea level rise poses threats such as flooding for coastal areas. In regions where infrastructure and social services are already inadequate, these impacts exacerbate water insecurity, food insecurity, and livelihood problems. For gangs and organized crime groups that are defined as terrorist organizations

by the countries in the region or are in the process of being defined as such, this environment of insecurity provides ideal conditions to facilitate the expansion of their control areas.

The Northern Triangle countries are a region with a complex and diverse range of problems, including high homicide rates, domestic violence, organized crime and gang violence, drug trafficking, extortion and racketeering, corruption, high rates of impunity, poverty, unemployment, and educational problems, and high rates of migration. Gangs and organized crime groups, which are one of these problems, are in fact the agents or contributors to the majority of these crimes. It should not be forgotten that the groups in this region are a network that has international connections and expands its influence. For gangs and organized crime groups to continue their illegal activities and maintain the order they have established, the institutional weaknesses of states must also persist. The climate crisis, on the other hand, has the effect of increasing the vulnerability of countries that already have institutional and socioeconomic inadequacies. Therefore, there is a correlation between climate change and terrorism in the context of Northern Triangle countries. An example of this is that gangs and organized crime syndicates in the region block aid after hurricanes or extort this aid for their interests.

Another situation is that the citizens who were displaced after these disasters could not settle in some of the regions they went to because of the gangs or tried to live with difficulties in the environment terrorized by the gangs after they settled. The inability of those who wanted to return to their homes or the difficulties experienced by the populations trapped in the disaster area were also caused by the increasing control of these groups in the region. One reason for the increased control and dominance of gangs and organized crime groups is that young people facing economic hardship due to climate crisis-related disasters end up joining gangs. According to all these indicators, the climate crisis has contributed to the increased terrorization of the region by gangs and criminal organizations in the Northern Triangle countries.

However, it should be noted that climate change does not have a direct impact on terrorism. In this case, climate change acted as a threat multiplier that increased and expanded the existing violence and terrorist incidents. Even in today's conditions, gangs terrorize people in the region and continue their criminal activities in an environment plagued by problems such as water scarcity, food insecurity, and economic instability. This situation pushes especially young people to join gangs in desperation. The countries in the region, which are vulnerable to both the current state of turmoil and violence and climate change, are unable to adapt to changes in the climate and mitigate the effects of this crisis. Therefore, climate change emerges as a threat multiplier that further aggravates chaos, violence, and terrorism in the region and expands the sphere of influence of these problems. Such a crisis will further fuel the existing competition over resources (food, water, etc.) in the region, and it is unlikely that this process will proceed peacefully.

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PART III: Case Studies
CHAPTER 7

Climate Crisis As a Catalyst of Terror? An Analysis on the Impacts of Climate Change in Senegal and the Potential of Terrorism

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Abstract

The climate crisis is usually called a threat multiplier due to its potential to exacerbate existing social, economic, political, and ecological vulnerabilities, thereby increasing the likelihood of migratory flows, social unrest, and political or violent conflicts. In this line, the connection between the climate crisis and terrorism begins to be highlighted in several studies. Despite the controversial nature of this relationship, it is argued that the climate crisis increases the risk of radicalization by intensifying the root causes or underlying conditions, such as the pressure on ecosystems, escalating socioeconomic and political instabilities, and deepening injustices. This study focuses on the impacts of the climate crisis in Senegal. The country located in the Sahel in Sub-Saharan Africa has faced several challenges due to its less-developed economic and humanitarian conditions. As climate change exacerbates weather events, Senegal witnesses longer dry seasons, drought, heatwaves, bushfires, and decreasing rainfall.

Furthermore, as a low-lying country, Senegal must deal with rising sea levels, coastal erosion, and floods. Therefore, the climate crisis has threatened human health, agricultural activities, fishing, incomes, settlements, and biodiversity. The potential for displacement of people who live in low-lying areas is increasing. Moreover, the Sahel has experienced various political and social conflicts and become increasingly vulnerable to terrorist activities. Although Senegal is relatively stable compared to its neighbors, the risks posed by climate change may compound the effects of the socioeconomic and

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political vulnerabilities of the country. This study questions whether the climate crisis accentuates the risk of terrorism in Senegal.

Keywords: *Climate crisis, Senegal, the Sahel*

1. Introduction

Climate change has transformed into a global crisis, especially in the second decade of the 21st century. The planet's ecological systems have been degrading due to rising global temperatures, which reached unprecedented heights. Melting ice caps, disrupted wind cycles, and extreme weather events such as drought, heatwaves, more frequent and destructive hurricanes, torrential rains, floods, and landslides become part of the lives of millions. People often refer to the climate crisis as a threat multiplier due to its escalation of social, economic, political, and ecological vulnerabilities, thereby increasing the likelihood of migratory flows, social unrest, and political or violent conflicts. This line highlights the connection between the climate crisis and terrorism. The term threat multiplier has gained importance in the analysis of climate change's effects on security (CNA, 2007). It identifies the exacerbating role of climate change on existing social, economic, environmental, and political risks, threats, and vulnerabilities. Yet, whether climate change affects terrorism—one of the most damaging security threats—remains a question difficult to answer. Revealing the link between climate change and terrorism is a controversial and complex issue, as this link is very opaque and vague. However, there is a growing literature in this context (Nett & Rüttinger, 2016; Saleyhan & Hendrix, 2014; Walch, 2018; Kechagia et al., 2021; Schon & Nemeth, 2022; Silke & Morrison, 2022; Charalampopoulos & Feofilovs, 2023). Telford (2020) analyzes the relationship between climate change, terrorism, and radicalization using the concept of "climate terrorism assemblage." He points to the intersections of climate insecurities and vulnerabilities of certain identities, such as young, male individuals (Telford, 2020). In the study that Mavrakou *et al.* (2022) critically reviewed the related literature on the nexus of climate change and terrorism, it was found that climate change indirectly affects terrorism. According to Henkin (2022), violent extremist organizations exploit the destructive impacts of climate change. For example, these organizations may exploit individual or collective grievances and insecurities exacerbated by climate change to recruit violent extremists. Furthermore, these organizations may exploit real or perceived weak government capacity and legitimacy to cultivate narratives of alienation and abandonment. These extremist groups could also represent themselves as alternatives to the state, which cannot cope with the impacts of climate change. Their alternative governance models might be a new challenge for states. Regarding resource competition and the value of resources, extremist groups also aim to capture and control strategic resources in order to increase their financial and operational power.

Due to vulnerabilities and political weaknesses, climate change will continue to produce recruiting opportunities for these extremist groups as long as the governance capacity of central and local governments continues to erode (Henkin 2022).

Despite the controversy surrounding this relationship, some argue that the climate crisis poses a risk for the emergence of underlying conditions or root causes of radicalization, as the effects of climate change intensify ecosystem stress and exacerbate socioeconomic and political instabilities and injustices. This study, which focuses on Senegal in the Sahel region of Sub-Saharan Africa, aims to understand how the climate crisis could potentially increase the risk of terrorism in this relatively peaceful country situated in a turbulent region. Senegal has faced several challenges due to its less-developed economic and humanitarian conditions. As a former French colony, Senegal gained its independence from France in 1960 and became a part of the Mali Federation for a brief period. Following the dissolution of this federation, Senegal had formed a Senegambian Federation with Gambia, and finally gained its full independence in 1989. With its 18.2 million population (UNFPA, 2024), Senegal is a lower-middle income country (World Bank, 2024a). According to the World Bank (2024b), the country's GDP per capita is $1,746 in 2023. However, the World Bank (2024c) valued Senegal's GINI coefficient at 36.2 in 2021, indicating that income inequality remains a significant issue in the country. Furthermore, in the Human Development Index, Senegal is still ranked 169 among 193 countries, although the value has increased by 39.4% between 1990 and 2022 (UNDP, 2024). These statistics show that socioeconomic and political conditions in Senegal are in a very fragile balance. Thus, the current and future impacts of climate change could easily break this balance, jeopardizing stability and security.

The context of this study is based on the effects of the climate crisis in Senegal. It examines whether the impacts of the climate crisis amplify Senegal's terrorism risk. After analyzing the various effects of climate change in the Sahel, and particularly in Senegal, this study scrutinizes the socioeconomic, political, and ecological risks that the climate crisis intensifies, aiming to uncover how these intensified risks heighten the possibility of terrorism. In this regard, the aim is to focus on structural injustices and political insufficiencies as the root causes of terrorism, as well as to explain the nexus of climate change and terrorism through this lens. A descriptive method is adopted to analyze the impacts of climate change, security risks, and terrorist activities in the Sahel and the imminent security concerns of Senegal. Subsequently, this analysis is used to evaluate the relation between climate change and the risk of terrorism in Senegal. Consequently, this study, concentrating on the climate change-terrorism nexus in Senegal, adopts the framework used by Renard (2008) to examine how the climate crisis could intensify the risk of terror in Senegal.

Senegal is located in the Sahel, where various countries have experienced the violence caused by several terrorist or separatist groups for years. Even though Senegal was able to stay clear of the violent conflicts threatening regional states, the risk remained imminent. Hence, the study analyzes the vulnerabilities of Senegal in terms of not only climate change-related problems but also the threat of terrorism spreading from the other Sahel countries. The first section focuses on the impacts of climate change in Senegal and the Sahel in general, as well as the mitigation and adaptation policies adopted by the government of Senegal. The second section delves into the security problems and terrorist activities in the Sahel, which implies a potential threat for Senegal. Finally, the last section investigates why the deepening impacts of climate change might create new security risks for Senegal, including the threat of terrorism.

2. Existing Problems and Climate Change in The Sahel and Senegal

The Sahel is affected by "political and governance crises, unequal distribution of wealth, and lack of access to resources, opportunities, and basic services" (UN, 2018), and the intertwined security risks in the region consist of various dimensions. Major contributors to the insecurity in the Sahel include gangs involved in looting, smuggling, drug trafficking, poaching, trafficking in minors, irredentists and rebels throughout the region, and religiously motivated terrorist organizations (Eljarh, 2016). Moreover, coups in the region have weakened the ability of states to meet the basic needs of their citizens. Additionally, political unrest and a reduction in the number of United Nations peacekeeping forces in the region have increased the likelihood of conflict (EIU, 2024: 2). The climate crisis undoubtedly exacerbates these security threats. In terms of environmental issues, climate change creates new challenges in the Sahel, and with its semi-arid climate, the region is one of the climate hotspots. Observers argue that population growth and climate change could intensify violence and conflicts, potentially leading to migration and displacement (UN, 2018: 8). The potential displacement of people who live in low-lying areas in the region also becomes a substantial problem for states and their citizens. Furthermore, regional countries have especially been susceptible to food and water shortages, and projections indicate that climate change and existing vulnerabilities in the Sahel are intensifying food insecurity and political instability (OHCHR, 2022: 8). It is obvious that despite their minimal contributions to global emissions, countries in the Sahel face disproportionate difficulties caused by climate change, with vulnerable communities often bearing the brunt of this burden (OHCHR, 2022: 6-8). For instance, Senegal emitted 11.67 million metric tons of carbon dioxide (CO2) in 2022, which accounts for 0.03% of global emissions (Ritchie & Roser, 2022). In this case, countries face the economic, social, political, environmental, and security costs of a global problem that they are not responsible for, but they have to develop new strategies to cope with. USAID's Climate Change Country Profile underlines

that climate impacts in Senegal, such as rising temperatures, heat waves, high humidity, decreasing rainfall, increased length and intensity of dry spells, and coastal erosion adversely affect infrastructure, food security, nutrition, health, productivity, and economic growth (USAID, 2023: 1).

According to climatic observations, there is an increasing trend in temperatures and a decreasing trend in precipitation due to climate change (Climate Knowledge Portal, 2021). Senegal has been experiencing climate-related risks such as droughts for decades, which, because of heavy reliance on rain-fed agriculture, create an increasing threat to the food security and livelihoods of especially smallholder farmers (WFP & OXFAM, 2016: 11). Senegal's extensive agricultural lands are severely affected by climate change, and smallholder farmers, especially women, are becoming more and more vulnerable as a result of unpredictable weather patterns. Women and other vulnerable groups, especially in rural areas where agriculture is the main source of income, suffer disproportionately from the negative effects of climate change. Unpredictable rainfall patterns, rising temperatures, and frequent droughts have worsened food security and water scarcity, which has a direct impact on vulnerable groups' daily lives and financial stability. Women, who make up a large share of the agricultural labor force, are particularly vulnerable because they are typically in charge of obtaining water and food, as well as maintaining family farms. In addition to putting their crops at risk, the changing environmental conditions force them into a cycle of increased labor with diminishing returns, thereby jeopardizing their positions within their families and communities (Climate Champions, 2024). Therefore, gender inequality and poverty, which are substantial problems in Senegal (Maisonnave & Mamboundou, 2022), would be aggravated by the impacts of climate change. Nawrotzki and Bakhtsiyarava (2017) suggest that the agricultural dependence of the country increases sensitivity to droughts. They underline that the strongest negative effects of droughts on international outmigration emerged in the southwestern region of Senegal bordering Gambia, where groundnut production is intensive. Their study also shows that an increase in excessive precipitation could cause negative impacts on crop production and livelihoods, thus leading to an approximately four times higher probability of international migration (Nawrotzki and Bakhtsiyarava, 2017). Moreover, Senegal's coastal regions have seen significant changes due to both climatic factors and human-caused events. Environmental changes such as flooding, coastal erosion, soil salinization, deterioration of mangroves, and shifting fishing patterns threaten the livelihoods of people working in the fishing industry (Zickgraf, 2019).

Despite its minimal responsibility in the climate crisis, as a part of the international community and climate action, Senegal signed the Paris Agreement on April 22, 2016, ratified it on September 21, 2016 (UN Climate Change, n. d.), and presented its first

Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat in December 2020. According to Senegal's NDC, the assessment of the various impacts and vulnerabilities at the national level shows that all the key economic sectors remain directly or indirectly exposed to the impacts of climate change; this vulnerability concerns communities, ecosystems, infrastructure and the national economy, meanwhile increasing temperatures would negatively affect economic growth and poverty (République du Sénégal, 2020: 11). In this line, Senegal pledged to reduce "greenhouse gas emissions of 5% and 7%, respectively, by 2025 and 2030, compared with the reference situation (business as usual) for the unconditional target", and added that "this reduction could be increased to 23% and 29%, respectively, by 2025 and 2030, compared with the reference situation, if Senegal receives the support of the international community with substantial funding" (République du Sénégal, 2020: 3). Moreover, in order to realize this contribution, Senegal aims to increase carbon storage by realizing projects in the agriculture and forestry sectors; implement energy transition with the integration of renewable energies and the reinforcement of energy efficiency; improve solid and liquid waste management; and enhance industrial processes (République du Sénégal, 2020: 21).

Senegal's priority action plan for 2024-2028, which was adopted in 2023 as the fundamental document forging the social, economic, and environmental strategy of the country, emphasizes the development of inclusive and sustainable growth to transform Senegal through the acceleration of industrialization and promoting a resilient and competitive economy (République du Sénégal, 2023: 50). However, the plan also underlines that economic activity, particularly in the primary sectors, remains highly vulnerable to the adverse effects of climate change (République du Sénégal, 2023: 98). In this regard, the plan highlights security challenges in the Sahel (République du Sénégal, 2023: 43). Additionally, it is emphasized in Senegal's statement on behalf of the Least Developed Countries (LDCs) at COP28's Global Climate Action High-Level Event in Dubai in December 2023 that the people in LDCs suffer the most from the impacts of climate change, despite their minimal contribution to the problem. The statement underlines that without climate action, the adverse effects will further exacerbate the numerous problems already faced by people, deepening inequality and perpetuating poverty cycles (UNFCCC, 2023).

3. Terror and Security Risks in The Sahel

Although Senegal is relatively stable as one of the constitutional democracies in the Sahel and Sub-Saharan Africa, it experienced an interior conflict in the southern part of the country. The activities of the *"Mouvement des Forces Démocratiques de Casamance"* (MFDC- Movement of Democratic Forces of Casamance) in the Casamance region posed a crucial security threat for Senegal between 1982 and 2014 until the peace agreement between

government and MFDC was signed (Ouédraogo, 2018). Despite Senegal's low-level conflict in Casamance, the Sahel has encountered a variety of political and social conflicts, in addition to terrorist activities. Center for Preventive Action states that "since gaining independence in the 1960s, many countries in the Sahel have experienced violent extremism due to the confluence of weak and illegitimate governance, economic decline, and the worsening effects of climate change" (CFR-Center for Preventive Action, 2024). The borderlands of Burkina Faso, Mali, and Niger are particularly prone to violence since the collapse of the Libyan state in 2011. The extent of the conflict in the Sahel can be clearly seen in Map 1.

Map 1. Conflict Regions in the Sahel (CFR-Center for Preventive Action, 2024)

Here, in the tri-border region (zone des trois frontières), also named Liptako Gourma, armed groups have proliferated, and community clashes have increased since 2012 (IPSA, 2024). In time, rival religiously motivated extremist groups have emerged in the region. After DAESH affiliated Boko Haram split into two, its JAS faction (Jama'atu Ahlis-Sunna Lidda'Awati Wal-Jihad) has launched major offensives against the group's other faction, IS West Africa Province (ISWAP). The IS in the Sahel (ISS), formerly known as the IS in the Greater Sahara (ISGS)[12], is an operationally independent subgroup of ISWAP based in the Lake Chad Basin and covers groups affiliated with the IS. The groups affiliated with al-Qaeda formed Jama'at Nasr al-Islam wal Muslimin (The Support Group for Islam and Muslims, JNIM) and in conflict with ISS for territorial consolidation. While ISS struggles for supremacy against JNIM to establish a transnational caliphate, it resorts to tactics of armed clashes with rival extremist groups and government forces, attacks, looting, and forced disappearances (Bere, 2024).

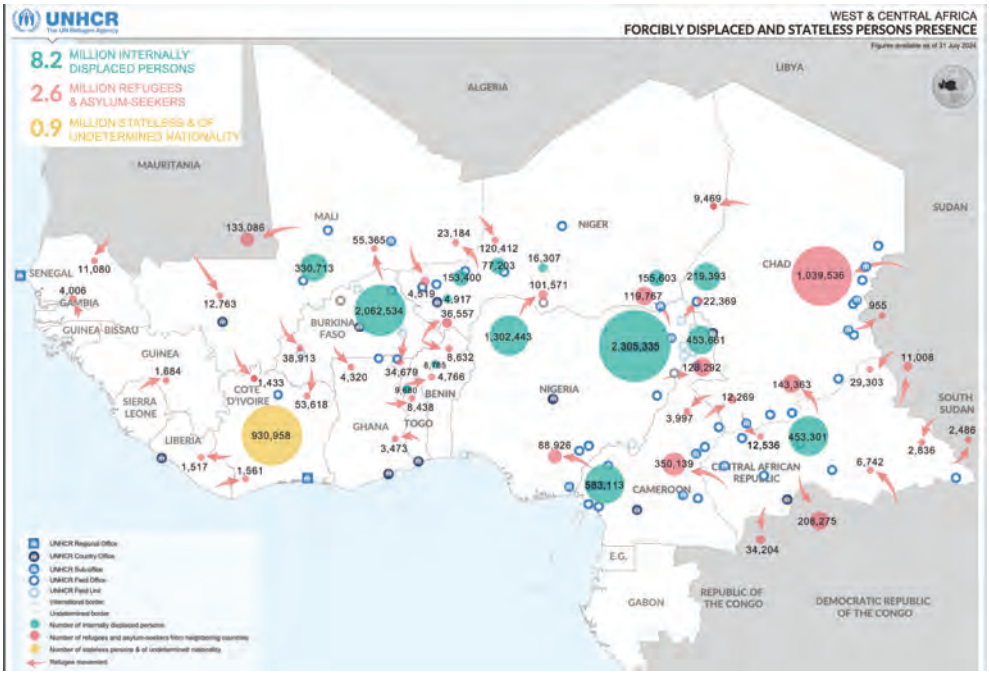
[12] The IS in the Sahel was formed by dissidents who shifted allegiance from al-Qaeda to DAESH.

JNIM has created "a strategic blueprint that includes a combination of guerrilla warfare, strategic use of violence, governance and population control, economic warfare, and media and propaganda operations" (ACLED, 2023). They have also used a wide range of violent methods, such as "targeted assassinations, kidnappings, complex attacks, and large-scale military campaigns," as well as "improvised explosive devices (IEDs), land mines, rockets, and mortar fire" to carry out their plans (ACLED, 2023). Both JNIM and ISS target communities that they consider to be supporters of the other. However, ISS uses excessive violence without discriminating between the military and civilians. ISS does not negotiate with so-called "enemies"; in contrast, al-Qaeda affiliates exercise both more restraint in their attacks and tend to be more prone to negotiation with local ethnic communities (Bere, 2024: 65).

While terrorism in West Africa is snowballing, traditional security approaches and military tools cannot cope with the different tactics and strategies armed groups develop in the region. International terrorists find fertile ground for an ideal recruitment opportunity and gradually expand their impact area, where politics, religion, and sectarian fanaticism overlap in deeply fragmented societies. Bere (2024: 71) states that ISS has been mostly operating in the landlocked, impoverished countries of the arid, semi-desert Sahel region, with fast-growing populations, the large majority of which are "below 25 years old, and in need of education, employment, and economic opportunities, thus constituting a great reservoir of potential militants". ISGS has also exploited community-based dynamics, local conflicts, ethnic grievances, state fragility, and security weaknesses in three countries to recruit fighters and mobilize local supporters. Especially ethnic and nomadic Fulani and Doussak communities in Niger and Mali became hostile to their governments after they sided with other communities, such as Tuaregs, in inter-community conflicts. Thus, ISGS responded to the protection demand of the discontented Fulani and Doussak communities and successfully recruited militants from the latter (Bere, 2024: 71). Black *et al*. (2022: 39) state that "extremist groups then take advantage of the situation, fomenting conflict between farmers and pastoralists and using desperation as a recruiting agent, commonly for young men". Degraded environmental conditions are another factor in these conflicts. Droughts, historical rivalries, and a demographic surge of competing ethnic tribes pit Fulani herders, Hausa peasants, and nomadic pastoralists such as Tuaregs against each other. Three distinct groups carry out attacks by taking advantage of unfavorable social dynamics and relationships. As of October 31, 2020, some 1.4 million people were said to be displaced in the region, escalating tensions among local populations as well as impairing the needs of populations already susceptible to poverty, climatic shocks, and unequal access to resources (IPSA, 2024). Due to the conflict, displaced people and migratory flows have

posed significant challenges in the region. Climate change and food shortages have led to a shift in local communities towards creative adaptation, with mobility being a common coping strategy. However, displacement has fostered anger and grievances, particularly among the Tuaregs, who have developed revanchist ideals. The large-scale recruitment of Libyan militias exposed Sahelian Tuareg refugees to revolutionary ideologies and combat expertise, which empowered them to launch rebellions in north Mali and north Niger. Most of these rebellions were initially planned in Libya. Following the fall of the Gaddafi regime, the Sahelian diaspora returned to northern Mali, fueling the Tuareg insurrection that led to Mali's state collapse in 2012 (Raineri, 2022: 10).

The Sahel is a principal transit point for migrants traveling from sub-Saharan Africa to northern coastal states and Europe. However, displacement and migration due to violence magnify the rate of population influx and create pressure on coastal African states that cannot respond. The migratory flows in the Sahel have affected several countries in the region, as shown on Map 2.



Map 2. Migration in the Sahel (UNHCR Operational Data Portal, 2024)

Raga *et al.* (2023) warn against the potential spillover effects of the conflict and terrorism in the Sahel and note the already observable impacts in Côte d'Ivoire, Ghana, Senegal, and Togo. The potential spread of terrorism is imminent, and extremism is encroaching towards the Western Sahel, affecting the coastal countries. The economic

and social spillover effects of the conflict and terrorism will be devastating to populations since government authorities lose control over territories to armed and extremist groups. As conflict and terrorism encroach on the West, it causes loss of life and forced displacement. Basic and vital social services in the education and health sectors are disrupted. Public institutions and governments lose ground and weaken against the challenge of armed groups and their leadership. The conflict situation affects everyday life and creates an obstacle to the economic and social development of the countries and local communities because it prevents trade, free movement, and communication between the people in the region and the outside world (Raga *et al*., 2023). Furthermore, as environmental degradation, the climate crisis, and conflict coexist in the Sahel, the destructive impacts have become more intense. Ineffective governance, overexploitation of water for livestock, ill-conceived irrigation projects, increasing population pressure, and persistent conflict in the area between Senegal and Lake Chad contribute to social and economic instability. Diminishing rainfall and drought across the Sahel is exacerbating the conditions and increasing the risk of conflict. Erosion, lack of waste management, and the destruction of marine biodiversity profoundly affect the coastline. The potential cases of the Ebola epidemic, malaria, and sexually transmitted diseases, as well as the inadequate supply of health services, affect life quality and expectancy and contribute to instability. These conditions provide a foundation for terrorist groups to increase their influence. Terrorism is obviously a serious threat in the Sahel. Sporadic security incidents occur along Senegal's southeast border with Mali. Attacks by violent extremist groups in Mali are spreading to Senegal. Possible risks to Senegal include potential attacks and the potential use of Senegal as a source for financing, recruitment, and procurement (Toupane, 2021). Once considered an exceptionally peaceful state, terrorism-related deaths have increased by almost 50% in Senegal since 2022 (Counter Extremism Project, 2024). Senegal considers penetration by foreign fighters linked to Boko Haram, al-Qaeda, and ISIS a prominent risk to national security. Moreover, the conflict between the rebels and the Central African government, as well as the homegrown insurgents in the desert north of Chad, could create further security risks in the region. Widespread corruption and the proliferation of small arms in the Sahel exacerbate security concerns.

4. The Nexus of The Climate Crisis and Terrorism in Senegal

Although Senegal is politically stable in comparison to its neighbors, the risks posed by climate change could negatively affect this stability, given the country's existing socioeconomic and political vulnerabilities. As climate change exacerbates extreme weather events, Senegal witnesses longer dry seasons, drought, heat waves, bushfires, and decreasing rainfall. Furthermore, as a low-lying country, Senegal must address rising sea levels, coastal erosion, and flooding. Therefore, the climate crisis has threatened human health, agricultural activities, fisheries, household incomes, settlements, and

biodiversity. People in affected areas of origin, destination, and transit claim that climate change is undermining their already limited enjoyment of many human rights (OHCHR, 2022: 6-8). In areas like the Sahel, where there are significant flaws in the rule of law and governance, extreme poverty, and high levels of climate variability, ecological challenges have the biggest influence on conflict. After a natural disaster such as a flood or drought, these areas are more vulnerable to conflict, particularly when long-term climatic volatility is a factor. As climate change's long-term effects begin to manifest, it is very likely that the impact will grow (Institute for Economics and Peace, 2023).

Given the political, social, economic, and climate vulnerabilities of Senegal and the Sahel, it is possible that multidimensional security risks could serve as a catalyst for terrorism in the country. Senegal ranks 84th on the Global Peace Index, meaning that the state of peace is medium (Institute for Economics and Peace, 2024a), and ranks 89th on the Global Terrorism Index, indicating that terrorism has not affected the country (Institute for Economics and Peace, 2024b). However, scientific projections predict that the climate crisis has the potential to aggravate socioeconomic, political, and environmental vulnerabilities in the Sahel and Senegal. Environmental security risks range from food insecurity due to climate change since agriculture depends on rainfed pasture farming to a lack of hygiene and access to potable water and the accumulation of trash and debris along the coastline and Atlantic Ocean (World Food Programme, 2024; Tavares *et al*., 2020). One of the biggest disaster risks in Senegal is flooding, which frequently affects urban low-income communities. The expansion of urban populations has resulted in the establishment of informal settlements in low-lying, peripheral areas with restricted soil absorption capacity. The absence of drainage infrastructure in these areas raises the risk of flooding even more. 39% of homes in coastal areas lack access to public sanitation services, and 74% of them are at risk of erosion—a problem that will only get worse as sea levels rise and storms get worse. By 2100, sea levels are expected to rise by up to one meter, endangering the lives of over 100,000 people who live in low-lying areas (GFDRR, 2016). These vulnerabilities might create a vacuum that pulls the instabilities and terrorist activities out of the neighborhood.

Renard (2008) examines the relation between climate change, terrorism, and radicalization by identifying causal factors. Before the impacts of climate change, he reveals the root causes of terrorism, and he summarizes these factors such as poverty, inequalities, level of education, population movements or migration, regime (in) stability, and regime type (Renard, 2008: 21-27). He also indicates the main facilitators of political violence. Accordingly, horizontal and vertical cleavages in society, weak and failed states, regime type and openness, globalization, availability of weapons, diasporas, urbanization, and forms of unrest are among the permissive factors (Renard, 2008: 27-31). Further, he underlines the role of precipitant events, which are unexpected developments that occur at global or individual levels, motivating or nourishing terrorist

groups and activities (Renard, 2008: 31-34). He adds that the level of grievances and opportunity costs or deprivation affects the possibility of violence and terrorism (Renard, 2008: 36-37). He regards climate change as an aggravator of terrorism in relation to the structural causes of terrorism. Poverty, inequalities, migration, and state failure due to increasing grievances exacerbated by climate change might play a role in creating available conditions for terrorism to intensify. Therefore, Renard (2008: 42) states that "climate change can potentially have a *growth effect* on the number of would-be terrorists, by increasing the number of deprived people around the globe. Climate change is also likely to have an impact on permissive factors". In this context, the risk of conflict due to the deprivation or grievances caused by climate change, the activities of diasporas formed by migrants affected by environmental and climate degradation, the state's insufficient and/or inefficient capacity to respond to environmental degradation and socioeconomic grievances, and the creation of uncontrolled slums or ghettos can become the main factors underscoring the link between climate change and terrorism (Renard, 2008: 42-44). Renard hence takes into account the threat-multiplier impact of climate change by reminding the variability of consequences. Consequently, he emphasizes the importance of mitigation and adaptation efforts through multilateralism (Renard, 2008: 50-53). According to Mavrakou *et al.* (2022: 905), the relation between climate change and terrorism "is largely driven by intermediary factors such as climate change's effects on livelihoods and socioeconomic conditions; political, social, and economic stability; individual and group psychology; and the amplification of other existing vulnerabilities, among others," and they propose a flowchart to assess this relation, which can be seen in Figure 1. In this study, Renard's framework, along with this chart, is used for analyzing the impacts of climate change on the potential risk of terrorism in Senegal.

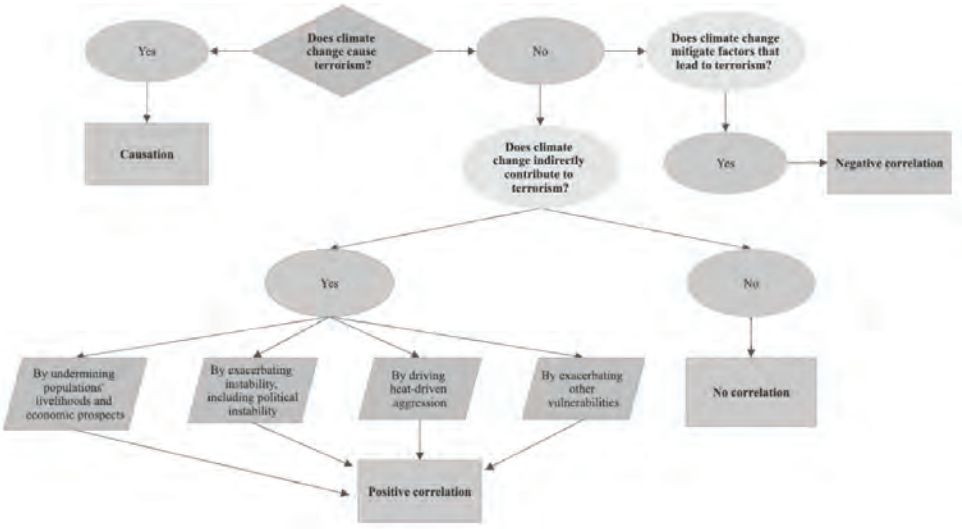


Figure 1. The Flowchart to assess climate change-terrorism link (Mavrakou *et al*., 2022: 910)

Even though the economic performance of Senegal has slightly improved, poverty and inequality remain challenging not only for the economy but also for the security of the country. The rate of unemployment in the country is 23.2% (ANSD, 2024). Despite the positive indicators in the agriculture sector along with fisheries and tertiary sector, 37.5% of the population, especially living in rural areas, struggle with poverty (World Bank, 2024d), and 5.6% of the population lives in extreme poverty (ANSD, 2024). The agriculture-based economy cannot stop malnutrition, and 1.3 million of the total 18 million population "faced acute food insecurity" in 2023 (World Food Programme, 2024). Since agriculture, which is the most important economic sector in Senegal, is highly sensitive to climatic anomalies, climate risks such as droughts and floods have the potential to deepen environmental degradation, poverty, and food insecurity, which requires comprehensive policies to reduce the vulnerabilities and improve the living conditions of vulnerable populations (Nébié *et al*., 2021). Moreover, fishing as another strategic sector for Senegal confronts important challenges. Unsustainable, illegal, and excessive fishing activities exploit one of the main resources strategic for alimentation and the local and national economies, and these activities also threaten the sustainability and integrity of the marine ecosystem (Seiyefa & Oyosoro, 2024).

The "Political Ecology" approach suggests that the 1970s and 80s environmental crises disrupted the economic fabric, and social organization and severed inter- and intra-ethnic ties (Raineri, 2022: 12). Raineri resorts to the "Political Ecology" mechanism to explain the escalating violence and conflicts in the Sahel with wider repercussions affecting the Mediterranean Basin. Climate change seriously threatens the delicate balance between productive systems and natural ecosystems that has long supported "the traditional way of life of Sahelian populations" by causing meteorological unpredictability (Raineri, 2022: 7). In Raineri's words, "customary mechanisms of social integration and conflict regulation" are becoming less and less responsive to new circumstances because the social structure is unstable (Raineri, 2022: 7). This means that people are losing their rights, and their complaints remain unresolved. Also, the competition to redistribute the "goods and bads" that come from changes in climate and society makes violent conflicts more likely. Raineri explains that customary institutions no longer work as a legitimate threshold for conflict regulation as they have lost prior authority and respect among populations. The outbreaks of armed violence in the Sahel over the last decades can be partly attributed to this long-term trend, originating from the intersection of environmental, economic, social, and political crises. Thus, the return of the armed Tuareg refugees exposed to revolutionary ideologies and combat experience due to their large-scale recruitment in Libyan militias first triggered Mali's state collapse in 2012. Then, the large-scale violence spread all over the region, undermining the local institutions' authority and capacity for managing interethnic conflicts in the face of conflicting entitlement claims (Raineri, 2022: 7).

While considering the conflicts and humanitarian crises in the Sahel, Senegal's vulnerability to terrorism becomes a crucial risk for the country. Respectively, as the impacts of the climate crisis in the Sahel and Senegal have severely aggravated, the socioeconomic, political, and environmental vulnerabilities of the country increased. Considering Renard's and Mavrakou *et al.*'s frameworks, climate change poses an imminent challenge for Senegal. Although Senegal has a democratic political system, poverty and other problems that might be aggravated due to the climate crisis increase the fragility of the political stability. State capacity might remain incapable of sustaining basic services. As in line with Renard's claims, the grievances of people who are deprived of basic needs such as water or food and public services could cause social protests. Such protests and grievances have the potential to lead some illegal groups to mobilize discontented individuals for their aims. Moreover, the Sahel has been an important source of migration due to violence in the region as well as aggravated impacts of climate change such as drought. Senegal, with its relative stability, is one of the destinations for migrants. However, existing economic vulnerabilities in Senegal can be exacerbated by new migratory burdens, in addition to the potential of internal migration as a result of rising sea levels, decreasing fish stocks, and/or drought. In that case, internal and international migrants might dwell in the periphery of urban areas, and new disputes could arise between different social and ethnic groups. The possibility of these disputes turning into a conflict poses an important risk for Senegal. Furthermore, as some individuals linked to terrorist groups can be disguised within the migrants, the terrorist turbulence in the Sahel might spread into Senegal through the migratory flows.

Along with the economic and social costs of climate change in Senegal, these secondary impacts related to the climate crisis and political turbulence in the Sahel increase the social, political, economic, and environmental vulnerability of the country. As Mavrakou *et al.* (2022) indicate, climate change will continue to degrade livelihoods, economic activities, and the well-being of mostly disadvantaged groups. While existing vulnerabilities are aggravating, new vulnerabilities are also created, especially due to diminishing resources, degrading the environment, deepening inequalities, and increasing economic costs. Despite the relatively stable political system in Senegal, multilayered vulnerabilities might trigger social unrest and create new political challenges for the government. Additionally, even though terrorist attacks linked to the instability in the Sahel have not occurred in Senegal (Counter Extremism Project, 2024), this does not mean that the violence and conflict remain outside of Senegal's border. Climate change might multiply the risk of instability and terror in Senegal.

5. Conclusion

Although the link between climate change and terrorism is vague and controversial, it is obvious that the climate crisis multiplies existing vulnerabilities, risks, and threats, whereas terrorism is one of the increasing risks amid these intermingled vulnerabilities.

The root causes of terrorism are backed not only by historical and/or ideological factors but also by socioeconomic, political, or environmental inequalities and the unanswered grievances of certain social groups. In this regard, climate change can be assumed to be a catalyst for terror because it exacerbates social, economic, political, and environmental problems and deepens the vulnerabilities and social discrepancies. In the case of Senegal, the destructive impacts of climate change are already being observed, especially food and water security, which are challenged by drought, and sea level rise threatens the living areas, well-being, and economic activities of coastal residents. Due to these impacts, an internal migration flow is imminent for Senegal. On the other hand, despite the political turbulence and violence in the Sahel, Senegal is a relatively stable country free of violent conflicts. However, the spread of violence in the periphery poses a critical risk for the country. Even though Senegal can maintain stability through its political process and security policies, the risk of migration from the Sahel is likely to occur due to the conflicts and reduced access to the vital resources. Therefore, the burden of migration and the risk of infiltration by terrorist groups need to be taken into account by Senegalese decision-makers.

The climate crisis, by intertwining with other crises, creates a power vacuum. In this line, the security implications of the climate crisis are among the crucial threats. However, it should be taken into consideration that these security threats posed by climate change, including the increasing risk of conflict and terrorism, require new political approaches other than conventional security policies. The interdependency between the root causes of the problem and the exacerbation of these factors by climate change should be tackled with holistic approaches. Senegal, with its historical democracy experience and its economic, social, and political stability, is an exceptional example in the mayhem of the Sahel. However, this stability is precarious, and the climatic catastrophe may shatter this fragility. Despite the minimum contribution of Senegal to this crisis, it is one of the vulnerable states that have to cope with the existential risks of this problem. Therefore, Senegal's adaptation strategies along with mitigation policies are crucial for reducing the destructive impacts of climate change and guaranteeing peace and security in the country. Further, the transboundary impacts and interdependent nature of the climate crisis also require international cooperation and common strategies. Additionally, Senegal can be a pioneer to increase international awareness about developed states' responsibility to raise climate funds, especially for developing and less-developed countries, which are more severely affected by the impacts of climate change. Hence, Senegal could contribute to climate action and regional peace collectively. In this regard, Senegal's efforts to deepen regional and international cooperation are valuable.

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PART III: Case Studies
CHAPTER 8

Climate Change and Terrorist Organizations' Use of the Environment As a Tool: Forest Sabotage by the PKK Terrorist Organization in Türkiye

Aslıhan Alkanat*

Abstract

Terrorist organizations use environmental terrorism especially after the Cold War by taking advantage of food insufficiency, drought and migration caused by climate change. In this way, they aim to create an area of dominance for themselves and to recruit terrorists for their organizations, as well as to weaken the political authority. In addition to terrorist organizations such as DAESH, Al-Qaeda and Boko Haram, the PKK terrorist organization also uses similar strategies. The PKK, which mostly carries out forest sabotage among its acts of environmental terrorism, increases and decreases its acts of environmental terrorism periodically. This study focuses on the PKK's environmental terrorism activities and seeks answers to the questions 'How does the PKK conduct its environmental terrorism activities in Türkiye and what is the relationship between the PKK's environmental terrorism activities and climate change?'. The study also analyses the PKK's environmental terrorism activities in Türkiye using a mixed methodology and both qualitative and quantitative analyses. The argument of the study is that the PKK's main goal is to weaken the state's control in the region. Additionally, by causing these fires, the PKK also seeks to damage the economy. Through these actions, the PKK aims to make the country more insecure, thus creating a psychological cost for the public. Finally, the organization also aims to give a message to its supporters that it is still active against Türkiye through its actions.

Keywords: *Climate change, environmental terrorism, forest sabotage, PKK*

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1. Introduction

In addition to military security, issues including environmental security, human security, and gender security started to appear in the literature in the post-Cold War era as a result of the international system's expanded definition of security. Given the shifting environment, it is obvious that states and the international community have made climate change a priority. In connection with this, as terrorist organizations started to change their strategies in the post-Cold War period, many different concepts such as new warfare and asymmetric warfare, started to be discussed in the literature. Terrorist organizations began to use the environment as a tool within the framework of these new war strategies and threatened the national security of states. Environmental terrorism acts, which have been increasing since the 1990s, are also very important in terms of accelerating climate change.

After briefly discussing the environmental terrorism committed by terrorist organizations around the world, the study mostly discusses the acts of environmental terrorism committed by the PKK terrorist organization[13] in Türkiye. The study focuses on some of the environmental terrorism activities of the PKK terrorist organization, which has used environmental terrorism as a method since the 1990s, especially in the recent years, and emphasizes forest sabotage, which is the most preferred environmental terrorism method of the organization. Although the author discusses the activities of terrorist organizations around the world, the study is limited to the PKK terrorist organization in terms of its subject matter. In this framework, a qualitative analysis is conducted using mixed methodology and supported by quantitative data.

The study seeks to answer the question, "How the PKK operates it environmental terrorism activities in Türkiye, and what is the relationship between the PKK's environmental terrorism activities and climate change?". The main argument of the study is that the PKK has mostly used forest fire as a strategy of environmental terrorism since the 1990s. At the same time, while carrying out forest sabotage, the PKK takes advantage of the dry and hot weather in summer, which is the result of climate change, and it makes forest fires more difficult to control. The most significant aim of the PKK is that it tries to damage state sovereignty in the region. At the same time, the PKK aims to cause economic damage through these acts of environmental terrorism. With forest fires and sabotages, the PKK not only spreads its influence throughout the country but also tries to position civil society organizations against the state and criticize them regarding the fires.

[13] The PKK, which began its terrorist activities in 1978 under the leadership of terrorist leader Abdullah Öcalan and carried out its first armed terror act against Turkish Security Forces in 1984, targeting military outposts in Eruh and Şemdinli. The PKK, a Marxist-Leninist and ethnic separatist terrorist organization, is recognized as a terrorist organization by many countries as well as international organizations such as NATO and the EU. The PKK targets civilians, soldiers, police officers, women and children in terrorist attacks and is also known for its involvement in criminal activities. The terrorist organization generates income through drug and arms trafficking and conduct terrorist activities in many countries, including Türkiye, Iraq, Syria and Iran (Republic of Türkiye, Ministry of Foreign Affairs).

In this study, the link between climate change and terrorism is discussed first. Then, the concept of environmental terrorism, which is a method used by terrorist organizations and which is very essential in terms of environmental security, is discussed. In addition to this, it is given information on how terrorist organizations use environmental terrorism methods in the international system in terms of environmental terrorism, and then, the PKK's activities of environmental terrorism in Türkiye is briefly mentioned and the terrorist organization's forest sabotage will be focused on. As it is seen in the literature as well, the most commonly used method of environmental terrorism by the PKK is forest sabotage. In the study, some of the forest sabotages carried out by the PKK is included chronologically. It will be explained how and for what purposes PKK carries out forest sabotage, especially in recent years. It should be mentioned at this point that PKK's terrorist activities, which has always defined itself as an 'ecological actor', cannot be labeled as such because it damages the natural environment and ecology. In conclusion, the study includes discussions on the impact of the PKK's environmental terrorism activities on the natural environment and climate change.

2. The Relationship Between Terrorism and Climate Change

Given the literature on the relationship between terrorism and climate change, it is possible to say that it is a new research field as it has only recently begun to be studied. The relationship between climate change and terrorism is mostly interactive. For example, a comprehensive study conducted across 159 countries from 1970 to 2015, using data from the Global Terrorism Database (GTD), establishes a positive correlation between rising temperatures, terrorist attacks, and associated fatalities. The findings indicate that as temperature increases, there is a corresponding rise in the number of terrorist attacks and deaths resulting from them, which aligns with the broader literature on the impact of climate on conflict (Craig et al., 2019; Kaur & Trifan, 2023).

On the other hand, when we look at the relationship between terrorism and climate change, it is stated that people living in the regions most affected by climate change also suffer more from weak government, poverty, and terrorist attacks. It is clear that terrorist organizations carry out terrorist acts relatively frequently in countries with limited resources and weak governance, where climate change is felt relatively more, and that they recruit more easily due to this weakness of authority. Thus, it can be said that climate change also negatively affects the national security of countries. A study found that rising temperatures in Nigeria are also increasing terrorist incidents and that for every 1°C increase in the region, terrorist acts increase by 4 to 6% (Price & Elu, 2016). In another example, Afghanistan warmed by 1.8°C between 1950 and 2010, more than twice the global average. Climate change has led to social and political instability in the country, which in turn has been linked to an increase in terrorist incidents (Schwartzstein,

2017). These data show that climate change is a significant security issue for both the international system and states.

One example of the relationship between climate change and terrorism is Boko Haram's terrorist activities. In this context, Boko Haram terrorist organization, which mostly carried out terrorist acts near Nigeria region, targeted citizens who earn economic income from farming and fishing in the country's north. The terrorist organization took advantage of the fact that most people in this region were unemployed due to the prolonged drought caused by climate change and started to control the region and recruit terrorists for the organization (Kaur & Trifan, 2023).

A similar situation can be seen in DAESH terrorist organization in Syria. It is stated that the DAESH uses forest fires as a method of environmental terrorism by using the dry, hot and windy weather caused by the effect of climate change. It tries to justify its activities by claiming that farmers in the region refuse to pay the so-called taxes imposed by the terrorist organization (Kaur & Trifan, 2023). Considering the DAESH's activities, the long years of drought in Syria and the Assad government's failure to provide any support to farmers caused citizens to migrate to urban centers. There, the DAESH took advantage of the vacuum to establish its dominance and targeted water facilities in the region. The DAESH extended its acts of environmental terrorism to Iraq, where it closed local dams and threatened Shiite citizens with cutting off water supply to their regions (Spadaro, 2020).

Finally, when the link between climate change and terrorism is analyzed, the increasing climate crisis causes environmental terrorism acts to cause more damage to the ecosystem. This is because the spread of drought due to the impact of the climate crisis causes forest fires to be more effective and have greater consequences. At the same time, the decrease in agricultural production due to drought further increases food insecurity, while terrorist organizations' attacks on water resources cause more people to struggle with water scarcity (Merzdorf, 2019). Therefore, the increase in the climate crisis will cause environmental terrorism acts to cause more permanent and major damage to the ecosystem. In this context, UN Secretary-General Antonio Guterres drew attention to the link between climate change and terrorism by defining climate change as an "aggravating factor" in terms of terrorism in a speech he made in 2021 ("Climate change 'aggravating factor for terrorism': UN chief," 2021).

3. Terrorist Organizations' Use of The Environment and Environmental Terrorism

The fact that the use of the environment as a tool by terrorist organizations was not initially defined as a security issue, caused a security gap in the protection of the environment for states and the international system. The lack of human deaths as a result of attacks on the environment (even if the targets and objectives were different) was an important factor

in this regard. However, the fact that terrorist organizations such as PKK, Boko Haram, Al-Qaeda, and the DAESH have increased their acts of terrorism against the environment and natural resources and that these attacks have cost states billions of dollars, has shown the importance of the problem. At the same time, arson attacks by many terrorist organizations have become a phenomenon that effects climate change (Chalecki, 2024).

With many terrorist organizations using the environment as a tool, the concept of environmental terrorism has started to be used in the literature. First of all, it is necessary to mention two concepts that are often confused and used interchangeably. These are eco-terrorism and environmental terrorism. In eco-terrorism and environmental terrorism, the aim of the terrorists' actions is different from each other. Eco-terrorist organizations carry out acts of sabotage against human activities, such as construction and industrial projects, with the aim of preventing environmental destruction and protecting the planet. These actions often target companies or organizations that harm the environment. The main difference between eco-terrorists and environmental terrorists is the difference in the target element. While eco-terrorists target elements that harm the environment, environmental terrorists target environmental resources to gain dominance over them. Thus, environmental terrorism is carried out by anti-environmentalists for political or ideological purposes, in contrast, eco-terrorism is carried out by eco-terrorists to defend the environment and protect the ecosystem. According to eco-terrorists, the target element is human-created resources, and the aim of eco-terrorists is specifically to prevent development (Chalecki, 2024).

The eco-terrorist organization ELF, which attacked the Vail Ski Resort in 1998 on the grounds that it was destroying nature, was labeled a "domestic terrorist threat" by the Federal Bureau of Investigation (FBI) in 2001. Then, with Operation Backfire, which started in the US state of Oregon, the US arrested members of ELF and ALF who committed acts of terrorism in the field of environment and animal rights by carrying out sabotage activities (The Federal Bureau of Investigation, 2008). The FBI has also stated that the second biggest threat to the country is posed by eco-terrorist organizations such as the ELF and ALF. In 2012, the FBI stated that eco-terrorists have committed more acts of terrorism than any other terrorist organization, and that between 2003 and 2005 alone, eco-terrorist acts in the U.S. caused over $12 million in damages alone (Carson, LaFree, & Dugan, 2012).

Daniel M. Schwartz has written one of the first studies in the literature on environmental terrorism, which differs from the concept of eco-terrorism in terms of its goals and objectives. In his article titled *"Environmental Terrorism: Analyzing the Concepts"* (Schwartz, 1998), the author claims that Saddam Hussein intentionally caused two oil spills in the Gulf after the air campaign against Iraq during the 1991

Gulf War and states that two weeks later, around 600 oil wells were blown up on Saddam Hussein's orders. He even mentions that the then US President George Bush used the term "environmental terrorist" to describe Saddam Hussein. As a result of this event, it is stated that new debates on the conceptualization of environmental terrorism have started with the degradation of the environment by turning it into a tool of war. In the related article, it is mentioned that in environmental terrorism, sometimes the environment is treated only as a symbolic target, while in other cases, it can cause great ecological damage to the environment. The author makes a distinction by stating that these large-scale terrorist acts should be distinguished from other symbolic acts. Within the conceptual framework of environmental terrorism, the author includes acts that cause major ecological disasters while causing greater social concern. At the same time, the author states that the concept of environmental terrorism should be used for acts in which the environment is ecologically degraded or threatened by terrorists (Schwartz, 1998).

One of the main debates in the literature on environmental terrorism is the difference between those who pollute the environment and those who commit acts of environmental terrorism. In this regard, we can refer to article titled *"A Comparative Study of Environment and Terrorism As Environmental Terrorism: Security For The Environment From Terrorism"* by Areena Parveen Ansari (Ansari, 2019). The author has made a categorization primarily to show the difference between terrorist and attacker/polluter. The categorization is shown in Table 1 (Ansari, 2019):

Table 1: The difference between terrorist and attacker/polluter

Terrorist	*Attacker/Polluter*
A person, usually a member of a group, who uses or advocates terrorism.	A person who is a member of a group whose practice causes pollution either directly and indirectly.
A person who terrorizes or frightens others.	A person who pollutes, contaminates, and damages the environment.
A member of a radical ideological group aims to spread terror for their hidden gain.	A member of an Economic group aims to pollute for their corporate, fiscal or financial gain or sometimes for another purpose.
A partisan or militant who terrorizes people by harming them physically, mentally, economically, politically etc.	An agent or partisan who exploits the natural resources by various means just like by burning down the forest, by contaminating the water, cutting of the tress, emission of harmful gases etc.
Of relating to or having the characteristic of terrorism or terrorists: terrorist tactics.	Of relating to, or characteristic of pollution or polluter: polluter tactics.

Source: (Ansari, 2019: 3)

When the definitions of the concept of environmental terrorism are examined, terrorist organizations aim to damage environmental resources in order to put pressure on the government and thus create fear in the society. Acts of violence against the environment or private property in order to deprive society of environmental resources fall within the scope of environmental terrorism. We can say that the main feature that separates the environmental actions of terrorist organizations from attacker/polluter is that they are politically and economically motivated and aimed at creating fear in society.

Terrorist organizations have several different motivations for resorting to environmental terrorism methods. The psychological motivation of terrorist organizations is to undermine public trust in the political will by creating fear and anxiety in society. Organizational motivation is to consolidate the legitimacy and local authority of the organization against the state and other terrorist organizations. The operational motivation of terrorist organizations is to use the scarcity of natural resources for recruitment (Remmits & Torossian, 2021). Thus, by using the environment as a tool, terrorist organizations actually become a part of the conflict. In general, Berkowicz lists the actions of organizations using environmental terrorism strategies as follows (Berkowicz, 2011):

> *"... - target the environment (damage water supply, food chain). Harmful alien species can be deliberately introduced in order to undermine agriculture.*
> *- harm/destroy living organisms and property (i.e. destroy a dam, nuclear plant).*
> *- release chemical/biological weapons into the atmosphere. Lag-time between onset of an attack and awareness or detection, and difficulty in establishing the sources(s) of a release is an advantage.*
> *- create sufficient environmental damage to induce refugee flight and cross-border spillover…"*

Since forest sabotage is one of the most preferred environmental terrorism tactics by terrorist organizations and has an accelerating effect on climate change, forest sabotage has been the focus of this study. In many parts of the world, terrorist organizations use forest fires as a method of environmental terrorism. For example, it is stated that the use of forest fires as a terrorist activity in the U.S. has caused great damage both politically and economically. In this context, on June 25, 2004, the FBI warned against forest fires that Al-Qaeda could start in Colorado, Utah, Montana, and Wyoming in the U.S (Baird, 2005). It also stated that such forest fires would cause great damage to the country's economy, create fear among U.S. citizens and put pressure on the government to change its policies (Baird, 2005). Especially after the 9/11 attacks, the US Forest Service's Forest Fire Prevention Campaign against pyro-terrorism was updated and reorganized to address vulnerabilities in the context of terrorist acts against forests in the country (Baird, 2005). In addition to the U.S., in Estonia, for example, in 2006, an extremist organization

calling itself "Forest Incinerators", disturbed by the non-removal of Soviet monuments in the capital, called for the burning of all forests (Deshpande, 2009). According to the United Nation's Global Fire Monitoring Center, 13% of the forests burned in Estonia were sabotaged (Deshpande, 2009). In other words, the organization called "Forest Incinerators" also carried out acts of environmental terrorism and forest sabotage for political purposes. In addition to all these examples that can be multiplied, environmental terrorism acts are also carried out by the PKK terrorist organization in Türkiye, and the organization causes great damage to the ecosystem by sabotaging forests.

4. Forest Fires in Türkiye

Forest fires are a serious environmental problem that threatens the ecosystem. Especially in regions with a Mediterranean climate, including Türkiye, the risk of forest fires increases due to hot and dry summers. There is a reciprocal relationship between climate change and forest fires. Drought caused by climate change causes forest fires to increase and spread rapidly, especially in the summer months. In addition, the increase in carbon gas emitted into the ecosystem as a result of forest fires accelerates global warming. At the same time, the destruction of forests also affects the rainfall pattern, further triggering climate change. Türkiye has a serious risk of forest fires due to its Mediterranean climate. The coastline from the Hatay Province to the Mediterranean and the Aegean is the most risky region in terms of forest fires. The Figure 1 shows the risk areas for forest fires in Türkiye:

Figure 1: Map of Türkiye's Fire-Sensitive Areas

Source: (Elvan, Birben, Özkan, U. Y., et al. (2021).

In Figure 1 showing the fire-sensitive areas of Türkiye; the regions shown in red indicate the riskiest parts against forest fires and the green color represents the very low risk degree fire sensitive areas. As can be seen from Figure 1, the Aegean and Mediterranean coastline and the Marmara region are also in the category of forest fire sensitive areas.

Considering the fire-sensitive areas of Türkiye, the cause of the fires is also important. Although there are many varied reasons for forest fires, human-caused forest fires are more prominent. According to the data published by the General Directorate of Forestry; the numerical data of forest fires in Türkiye according to their causes are shown in the Table 2:

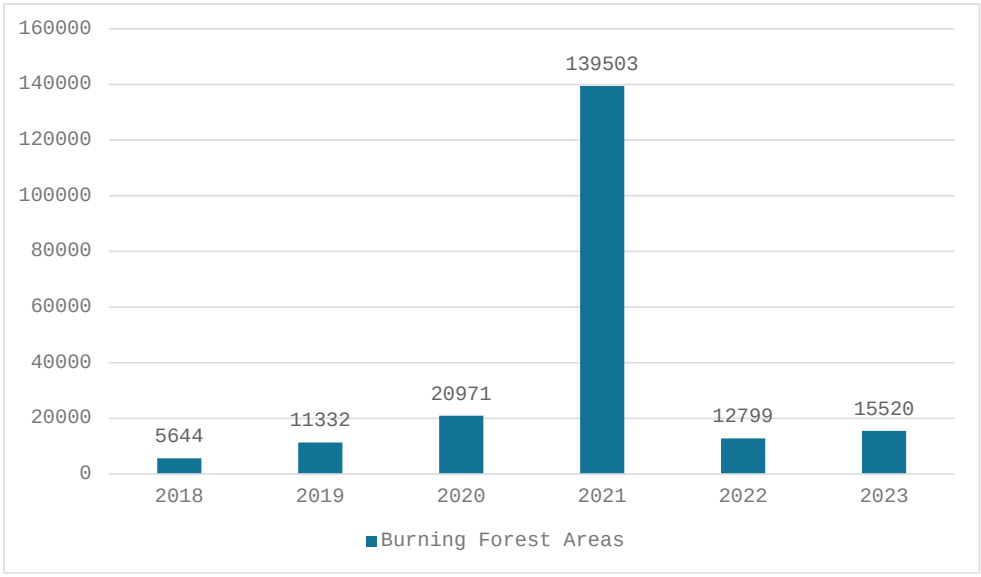
Table 2. Distribution of forest fires between 1988-2023 according to causes

Year	*Amount of burnt area*	*Numbers of forest fires*								
			Intentional		*Negligence-Accident*		*Natural (Lighting)*		*Unknown*	
	Hectare	*Number*	*Number*	*Hectare*	*Number*	*Hectare*	*Number*	*Hectare*	*Number*	*Hectare*
1988	18 210	1 372	-	-	-	-	-	-	-	-
1989	13 099	1 633	-	-	-	-	-	-	-	-
1990	13 742	1 750	-	-	-	-	-	-	-	-
1991	8 081	1 481	-	-	-	-	-	-	-	-
1992	12 232	2 117	-	-	-	-	-	-	-	-
1993	15 393	2 545	-	-	-	-	-	-	-	-
1994	30 828	3 239	-	-	-	-	-	-	-	-
1995	7 676	1 770	-	-	-	-	-	-	-	-
1996	14 922	1 645	-	-	-	-	-	-	-	-
1997	6 317	1 339	193	923	696	3 389	78	37	372	1 968
1998	6 764	1 932	249	1 655	1 163	3 713	53	20	467	1 376
1999	5 804	2 075	279	1 926	1 151	2 808	203	126	442	944
2000	26 353	2 353	410	4 417	1 384	19 017	132	167	427	2 752
2001	7 394	2 631	251	651	1 629	4 247	188	735	563	1 761
2002	8 514	1 471	218	509	809	7 287	181	261	263	457
2003	6 644	2 177	258	665	1 317	4 520	120	694	482	765
2004	4 876	1 762	242	748	1 033	3 093	128	233	359	802
2005	2 821	1 530	272	402	867	2 084	140	48	251	288
2006	7 762	2 227	166	206	1 315	5 873	330	543	416	1 139
2007	11 664	2 829	292	1 705	1 642	7 994	407	243	488	1 722
2008	29 749	2 135	377	797	1 018	26 283	330	699	410	1 970
2009	4 679	1 793	231	792	884	3 082	333	105	345	700
2010	3 317	1 861	146	526	861	1 851	281	69	573	871
2011	3 612	1 954	153	283	1 067	2 368	130	39	604	922
2012	10 454	2 450	197	1 615	936	5 780	373	334	944	2 725
2013	11 456	3 755	260	1 478	1 419	4 051	258	138	1 818	5 789
2014	3 117	2 149	127	85	801	1 682	328	77	893	1 273
2015	3 219	2 150	138	167	794	1 198	257	95	961	1 759
2016	9 156	3 188	157	240	990	5 222	310	170	1 731	3 524
2017	11 993	2 411	151	619	721	7 146	259	84	1 280	4 144
2018	5 644	2 167	92	148	693	2 216	413	141	969	3 139
2019	11 332	2 688	124	686	883	6 529	372	373	1 309	3 744
2020	20 971	3 399	72	718	1 156	8 285	312	197	1 859	11 771
2021	139 503	2 793	110	46 147	1 001	46 879	353	208	1 329	46 269
2022	12 799	2 160	86	4 722	830	5 428	358	517	886	2 132
2023	15 520	2 579	92	663	1 133	11 259	399	365	955	3 233

Source: The General Directorate of Forestry, Forestry Statistics.

The General Directorate of Forestry has started to keep detailed data on the causes of forest fires since 1997. According to the causes of forest fires, negligence and accidents are the most common causes. In addition, forest fires in the unknown cause category have the largest share especially in recent years. Among the forest fires between 1988 and 2023, the year with the highest number of forest fires was 2013 with 3755 forest fires. In terms of the area burned in forest fires, the year in which the most forest area was burned was 2021 with 139503 hectares. The distribution of burnt forest areas between 2018 and 2023 is shown in the graphic 1:

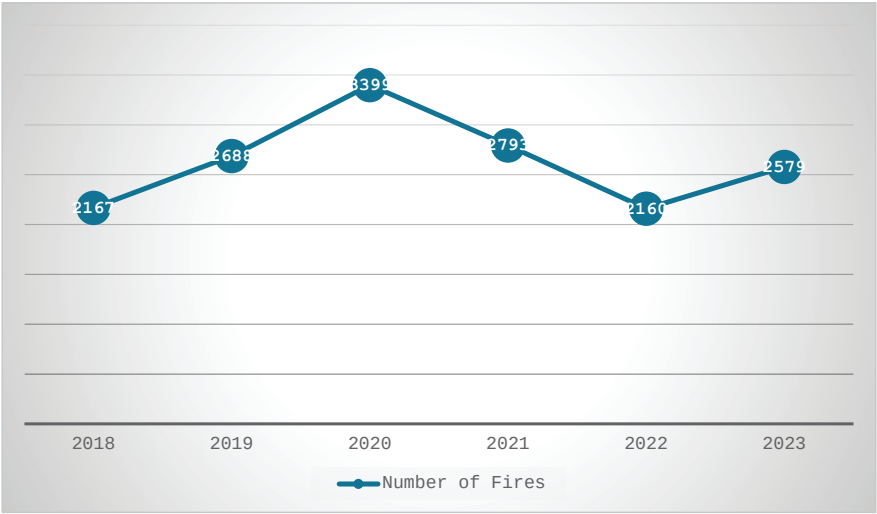
Graphic 1: Burning forest areas in Türkiye between 2018-2023 (hectare)



Source: The General Directorate of Forestry, Forestry Statistics

According to the Graphic 1 on the area burned by forest fires between 2018 and 2023, 2021 was an extraordinary year in terms of area burned. Among the causes of forest fires, intentional, negligence-accident and unknown causes each led to the burning of approximately 46,000 hectares. In terms of the number of fires, although fewer fires broke out in 2021, more areas were burned.

Graphic 2: Number of Forest Fires in Türkiye Between 2018-2023



Source: The General Directorate of Forestry, Forestry Statistics

Regarding the number of forest fires in Türkiye between 2018 and 2023, the highest number of forest fires occurred in 2020 with 3399 forest fires. While the number of forest fires increased steadily between 2018 and 2020, a decrease was observed between 2020 and 2022. Finally, an increasing trend was observed again in 2023, but not as large an increase as in 2020. As can be seen in the table 2, although there are various causes of forest fires, human-caused factors are particularly prominent.

In this section on forest fires in Türkiye, it is necessary to briefly mention the legal scope of the offence of fire forest. There are also provisions on the offence of fire forest in the Law No. 3713 on Counterterrorism of Türkiye. In this context, according to the statement in Article 4(c) of the Counterterrorism Law *"Intentional offences of setting of fire forest defined in the fourth and fifth paragraphs of Article 110 of the Forest Law No. 6831 dated 31/8/1956"* are considered within the scope of "offences committed for terrorist purposes" (Law No. 3713 on Counter terrorism, Article 4, 1991). According to the fourth and fifth paragraphs of Article 110 of the Forest Law, which is referenced by this law, "anyone who burns state forests as part of the activities of an organization formed to commit crimes against state security shall be sentenced to life imprisonment and a judicial fine ranging from twenty thousand to twenty-five thousand days" (Turkish Forestry Law, Article 110, 1956). Thus, forest sabotage committed by terrorist organizations is considered and punished as a terrorist crime. This study discusses the forest sabotage carried out by the PKK terrorist organization in high fire risk areas during the summer months and the social, economic and political consequences of these forest fires.

5. PKK and Environmental Terrorism

Environmental terrorism methods, which are frequently used by terrorist organizations around the world, especially in recent years, have been used by the terrorist organization PKK in Türkiye. Although the PKK mostly conducts forest sabotage among its acts of environmental terrorism, it also conducts many attacks on power plants, oil and natural gas pipelines, buildings, and factories in addition to forest sabotage. With these acts of environmental terrorism, the PKK aims to weaken the political will, create fear in the society, accelerate the impact of climate change, recruits from the regions where they conduct forest sabotage, and cause economic damage to Türkiye. The organization started to use environmental terrorism as a strategy in the 1990s (Güngörmez & Alkanat, 2019).

There are some factors that differentiate the PKK from other terrorist organizations in its tendency to commit acts of environmental terrorism. The PKK cannot achieve the regional influence in Türkiye that terrorist organizations such as the DAESH and Boko Haram have achieved because of their acts of environmental terrorism in different countries. The most important reason for the PKK to engage in environmental terrorism is that the organization has lost its capacity to conduct terrorist attacks. With these acts of terrorism, the PKK aims to establish an area of penetration for itself. Thus, as the organization is gradually losing all its power against the Republic of Türkiye's counter-terrorism operations, it is trying to maintain its existence through acts of environmental terrorism. This is because The Turkish Armed Forces (TAF), which has successfully gained momentum in the fight against terrorism for years, has severely restricted the PKK's mobility through military operations within and across Türkiye's borders. This has led the PKK to resort to environmental terrorism. At the same time, the PKK wants to build public and international perception that it is still strong by using environmental terrorism methods.

While the PKK's forest sabotage is the subject of this study, other acts of environmental terrorism committed by the PKK should also be briefly mentioned. The PKK, which conducted many major forest sabotage attacks in the 1990s, also carried out many attacks on oil and natural gas pipelines and water facilities. For example, in 1993, Reuters reported that the PKK's attacks on oil pipelines prevented oil exploration. It is also known that in 1998, the PKK blew up three oil pipelines in Türkiye (University of Maryland, 2010). In recent years, the PKK has carried out many acts of environmental terrorism in addition to forest sabotage, such as the attack on and destruction of an oil pipeline in Mardin in October 2020 (Republic of Türkiye Ministry of Interior, 2021).

There are many reasons why the PKK, which has committed many acts of environmental terrorism, has resorted to forest sabotage more frequently. The most important reason for the PKK to conduct forest sabotage is that forest sabotage can be carried out with fewer people, is less costly, and is less likely to be caught. At the same time, while conducting these forest sabotages, the organization takes advantage of the effect of climate change

and makes it difficult to extinguish fires in the region by preferring windy and dry hot weather in the summer months. In this way, the PKK aims to create fear and anxiety in society while at the same time increasing distrust in the political will. As a result of all this, we can also say that the PKK plans to establish influence in the regions where forest fires occur by causing unemployed people to migrate to other regions. This is because all terrorist organizations that use the effects of climate change use these methods to recruit new members and dominate drier regions.

Forest sabotage carried out by the PKK increases and decreases periodically. The data on forest sabotage committed by the organization in the 1990s can mostly be obtained from the statements of captured terrorists. In this period, the organization did not undertake forest sabotage as a strategy. The organization, which started to undertake forest sabotage for a period starting in the 2010s, has started a strategy of not undertaking forest sabotage, especially in recent years, due to the increasing environmental awareness in Türkiye and around the world. The organization mostly outsources these forest sabotages to subcontractor groups such as the Children of Fire Initiative, People's United Revenge Militia (HBIM), etc. Thus, acts of environmental terrorism, which are rejected by the PKK's so-called leadership, are undertaken by subcontractor groups, sending the message that the organization is still strong.

HBIM, which is affiliated to the PKK-supported The People's United Revolution Movement (HBDH), carries out acts of environmental terrorism in fire-sensitive areas in Türkiye. For example, in July 2019, HBDH conducted forest sabotages in the Dalaman and Milas districts of Muğla and the Kartal district of Istanbul and claimed responsibility for these forest sabotages. The HBIM, which claimed responsibility for these forest sabotages in a statement released by the PKK-affiliated ANF news agency, targeted the political authority and foreign tourists. The statement called on tourists "not to come to Türkiye for vacations" in order to reduce tourism revenues (Güngörmez & Alkanat, 2019). The aim was to create an unreal discourse of Türkiye as a so-called "unsafe country for tourists".

The Children of Fire Initiative, which is a special unit under the umbrella of PKK and carries their asymmetric act against society, nature, or civil servants, came to the agenda with its acts of environmental terrorism, especially in 2019. The Children of the Fire Initiative mostly announces and claims responsibility for its terror attacks on the PKK-affiliated Nuce Ciwan news agency. For example; the organization carried out sabotage in forested areas in Bursa and Istanbul on December 20, and started a fire in forested areas along with many agricultural lands on December 23 (Nuce Ciwan, 2020). Similarly, the organization carried out forest sabotage in Çekmeköy, Istanbul, on November 22 (Nuce Ciwan, 2019e), and carried out forest sabotage in Mersin on October 13-16, and in Antalya on October 20 (Nuce Ciwan, 2019d). It carried out forest sabotage in Istanbul on October 2, a thousand decares of forest area in Kırıkkale on October 1, and in Çorum on September

25 (Nuce Ciwan, 2019c). It also simultaneously set forest fires in Çanakkale, Muğla, İzmir and Balıkesir on September 9 (Nuce Ciwan, 2019b), simultaneously set forest fires in Mersin, Afyon and Balıkesir on September 10 (Nuce Ciwan, 2019b), and sabotaged forested areas in Istanbul on September 19 (Nuce Ciwan, 2019b). The organization, which came to the agenda in 2019, announced that it burned 1778 areas in 1056 places in 2019 alone. The organization burned 90 tons of cotton, 5500 acres of wheat fields, 600 acres of olive groves, 8 thousand acres of reeds, touristic areas and haystacks. Although the PKK has not directly claimed responsibility for these acts of environmental terrorism, the Children of Fire Initiative, a subcontractor organization of the PKK, has claimed responsibility for these sabotages (Nuce Ciwan, 2022). The list of forest fires that the Children of Fire Initiative has come to the fore in Türkiye and published as a "balance sheet" in the summer months, especially in the most fire-sensitive regions of Türkiye, is shown in the Table 3:

Table 3: Forest fires committed by children of the fire initiative between July 11 and August 24, 2019

Date	*Act of Terrorism*
11th of July	A forest area was burnt in Fethiye district of Muğla.
21st of July	6 hectares of forest area was burnt in Nazilli district of Aydın.
22nd of July	A forest area was burnt in Şile district of Istanbul.
	A forest area was burnt in Gazipasa district of Antalya.
23rd of July	In Manavgat district of Antalya, the area including the district governor's residence was burnt.
24th of July	A forest area was burnt in Soma district of Manisa.
4th of August	4 hectares of forest area was burnt in Foça district of Izmir.
7th of August	A forest area was burnt in Mumcular locality of Bodrum district of Muğla.
10th of August	100 hectares of forest area was burnt in Eceabat district of Çanakkale.
11th of August	A large forest area was burnt in the Doruk locality of Hisardere neighbourhood in Iznik district of Bursa.
	10 hectares of forest area was burned in Papaz Bay, Kumluca district of Antalya.
	A forest area was burnt in the Deliktaş locality of the Başmakçı district of Afyonkarahisar.
	A forest area was burnt in Bozyazı district of Mersin.
	The forest area around Göçbeyli Village in Pendik, Istanbul was burnt.
12th of August	Forest areas and police housing were burned in the Marmara district of Balıkesir.
17th of August	A large area of forest was burnt in Selçuk district of Izmir.
18th of August	A forest area was burnt in Gümüldür neighbourhood of Menderes district of Izmir.
	The area between Yağcılar and Demircili neighbourhoods of Urla district of Izmir was burnt.
	A forest area was burnt in Bornova district of Izmir.
	Starting in Karabağlar district of Izmir, 500 hectares of land was burnt.

19th of August	A forest area was burnt in Beldibi region of Marmaris district of Muğla.
22nd of August	A forest area was burnt in Marmaris district of Muğla.
	A forest area was burnt in Edremit district of Balıkesir.
24th of August	A forest area was burnt in Banaz district of Uşak.
	A forest area was burnt in Keşan district of Edirne.
	A forest area was burnt in Tarsus district of Mersin.
	8 hectares of forest area was burnt in Gediz district of Kütahya.

Source: Nuce Ciwan, (August 25, 2019a)

The Table 3 shows the dates and locations of the forest sabotages that the organization has undertaken by publishing them on its website. The PKK took advantage of the effects of climate change by preferring its forest sabotages, especially in the summer months. The organization explains its motivations for committing acts of environmental terrorism in the following words: "*(...) we declare that we, the CHILDREN OF FIRE INITIATIVE, have been carrying out, without interruption for months, the burning forests in Türkiye (...),We say in advance that from now on, (...) we will burn hundreds of hectares of forests in Türkiye. What we have done is the guarantee of what we will do"* (Nuce Ciwan, 2019a). In this statement, the organization clearly stated that they would carry out many forest sabotage attacks in the Aegean, Mediterranean, and Marmara regions of Türkiye in response to the forest fires in the Eastern Anatolia and Southeastern Anatolia regions of Türkiye. It also announced that it would continue its acts of environmental terrorism. The organization has been carrying out many different acts of forest sabotage in this way for years, taking advantage of the dry weather, especially during the hot summer months. Thus, it causes more areas to burn, makes it more difficult to extinguish the fires, and aims to create fear in society because it is on the agenda.

The PKK has three different motivations for committing these acts of environmental terrorism. Firstly, the PKK aims to damage Türkiye's economy and create an image in the international media that Türkiye is an "insecure country" for tourists. Secondly, through its acts of environmental terrorism, the organization aims to create an image among its base that it still has the capacity to conduct attacks against Türkiye. This is because the TAF's counter-terrorism operations both beyond and within Türkiye's borders have weakened the organization's capacity to carry out terrorist attacks. Thirdly and finally, it aims to create fear in society by making the environment the target and instrument of terrorism.

We have already mentioned that one of the PKK's motivations is to prevent foreign tourists from entering Türkiye, thus causing economic damage to the country. The Aegean and Mediterranean regions, which the PKK particularly prefers, can be considered the

center of Türkiye's summer tourism. For this reason, the PKK's primary target is the forests in these regions. Through acts of sabotage against these forests, the organization aims to create a perception, especially for foreign tourists, that Türkiye is not a safe country. Therefore, it wants to reduce the share of tourism, which is important for the Turkish economy. The Table 4 shows the proportional contribution of tourism income to GDP between 2000 and 2016:

Table 4: Percentage of tourism income in GDP in Türkiye (% of GDP)

Years	*Tourism Income (GDP %)*
2000	3,8
2001	6,9
2002	6,5
2003	5,5
2004	5,2
2005	5
2006	4,3
2007	4,5
2008	4,2
2009	4,3
2010	4,2
2011	N/A
2012	3,2
2013	4,6
2014	N/A
2015	N/A
2016	0,2

Source: Table 4 has been compiled and organized by the author based on the referenced sources; (TÜROFED, 2010, p. 20; TÜROFED, 2011, p. 6; TÜROFED, 2018a, p. 48; TÜROFED, 2018b, p. 9)

Considering the data in the Table 4, direct contribution to GDP data for some years was not available. The fact that data up to 2016 is available is important to see the share of tourism income in GDP, even though it does not cover the period when the PKK maximized forest sabotage. The most striking data in the table is the significant decline in 2016. The most important reason for this is the coup attempt by the Fetullahist Terrorist Organization (FETO) in Türkiye on July 15, 2016. After the coup attempt,

which took place during the summer period when Türkiye receives the highest number of tourists, the number of tourists entering the country dropped significantly due to the perception that Türkiye is a so-called insecure country, and its contribution to GDP also decreased significantly. With a similar strategy, the PKK terrorist organization aims to affect the number of tourists entering Türkiye through its terrorist acts and at the same time to cause economic damage to the country. Similarly, the table below shows Türkiye's tourism revenues between 2001 and 2023:

Table 5 Total tourism income in Türkiye 2001-2023 (in billion US Dollars)

Years	*Total tourism income in Türkiye 2001-2023*
2001	10,45
2002	12,42
2003	13,85
2004	17,08
2005	20,32
2006	18,59
2007	20,94
2008	25,42
2009	25,06
2010	24,93
2011	28,12
2012	29,69
2013	33,14
2014	35,14
2015	32,49
2016	22,84
2017	27,04
2018	30,55
2019	38,93
2020	14,82
2021	30,17
2022	46,48
2023	55,87

Source: (Statista, June 24, 2024).

The Table 5 shows Türkiye's tourism income in billion dollars between 2001 and 2023. In this table, it is seen that Türkiye's tourism income recovered rapidly, especially after the pandemic. The year 2020, the year with the highest decline in recent years, was due to the Covid-19 pandemic that affected the entire world. Another periodically lowest data belongs to 2016. In 2016, the reason for such a large decline was the coup attempt conducted by the FETO terrorist organization, as mentioned earlier. This clearly shows that terrorist acts have an impact on tourism.

Within the framework of all these data, although the PKK terrorist organization defines itself as an "ecological actor", it causes great damage to the ecosystem by using environmental terrorism methods." The most common method of environmental terrorism used by the PKK is forest sabotage, but the organization periodically claims or deliberately avoids claiming responsibility for these sabotages. For example, the so-called leadership of the PKK have also made statements calling on their terrorists to carry out forest sabotage. Murat Karayılan, one of the so-called leadership of the PKK; *"Two or three youths may well gather and do something. They may say 'we don't have a weapon' but their weapons are lighters and matches,"* (Daily Sabah, 2021) referring to sabotage. Similarly, Şemdin Sakık, one of the so-called leadership of the PKK, used the expression *"If we run out of weapons, we will go to Bodrum and burn their yachts, go to Antalya to burn their greenhouses, go to Istanbul to burn their cars and go to Izmir to burn their forests"* (Daily Sabah, 2021). However, depending on the context, PKK deliberately avoids claiming responsibility for forest sabotage by its subcontractor groups.

This strategy allows the PKK to create its image as an 'ecological actor' while secretly engaging in destructive forest sabotage operations. It is difficult to access all the data on the organization's forest sabotage. Because the organization, which can burn thousands of hectares of forests even with one person, does not officially claim responsibility for these forest sabotages, it is difficult to access this data outside of the PKK affiliated websites. However, it is believed that a huge portion of the number of forest fires in the "unknown cause" category, which has increased significantly in recent years in the data of the General Directorate of Forestry, is carried out by autonomous groups affiliated to the PKK. Therefore, while the organization aims to achieve its political, economic, and social goals through acts of environmental terrorism, it also aims to maintain its perception as an "ecological actor" to gain support in the international system by not officially claiming responsibility for these sabotages.

6. Conclusion

Terrorist organizations take advantage of the extreme heat, drought, food insufficiency, and migration movements caused by climate change to create a stronghold area for themselves. Terrorist organizations, which act more actively in regions vulnerable to climate change, also benefit from climate change by resorting to environmental terrorism methods. In the international system, many terrorist organizations such as the DAESH, Al-Qaeda, and Boko Haram aim to weaken the political authority in the regions where they are located, to provide them with a space for action, and to recruit terrorists for the organization at the same time with this strategy. Similarly, the PKK terrorist organization, which is addressed within the scope of the study, also commits acts of environmental terrorism. At the same time, through acts of environmental terrorism, the PKK aims to make the city centers more insecure, thus creating a psychological cost on the public and preventing the entry of tourists into the country, thus causing economic damage to Türkiye. Finally, the organization also aims to give a message to its supporters that it is still active against Türkiye through its actions.

The PKK has engaged in environmental terrorism since the 1990s. These acts include many different targets, such as energy infrastructure, water and electricity facilities, and forests. Among these acts of environmental terrorism, the PKK mostly carries out forest sabotage. Some of the reasons why the PKK especially conducts forest sabotage are that it is easy to go in and leave the forests, it can be conducted with fewer people and more easily, and it is more difficult or impossible to catch the perpetrator.

For all these reasons, the PKK uses environmental terrorism methods while at the same time conducting these acts with political, economic, and social motivations. Politically, the PKK top management aims to weaken the Republic of Türkiye by not claiming responsibility for the forest fires, claiming that these fires are carried out for economic rent, and thus aiming to weaken the political authority. At the same time, it aims to make it more difficult to extinguish the fires by conducting forest sabotage in the summer months when the dry heat is at its highest. However, the forest fires are undertaken by subcontractor groups affiliated with the PKK. Thus, the PKK not only achieves its political, economic, and social objectives by having subcontractor groups undertake the forest fires, but also aims to create an image in the international media that the PKK is an "ecological actor" since the PKK does not undertake the fires.

In addition to its political motivation, the PKK also aims to damage tourism, one of Türkiye's most important sources of income, through forest sabotage. The PKK aims to portray Türkiye as an "insecure country" by setting forest fires in the Aegean and

Mediterranean regions of Türkiye, which are especially popular for summer tourism and are also the most vulnerable areas to fire, in order to reduce the number of foreign tourists entering the country. Thus, the aim is to cause serious economic damage to Türkiye with the decrease in the number of tourists.

The PKK's social motivation is that the organization wants to create a perception that it has the capacity to struggle against the Republic of Türkiye. As the PKK is incapable of conducting terrorist attacks due to the successful operations of the TAF against the PKK, the organization aims to create this image through acts of environmental terrorism. The organization, which causes fear in society, also aims to maintain its legitimacy and power against its supporters through acts of environmental terrorism.

Finally, the PKK terrorist organization aims to damage Türkiye politically, economically, and socially by carrying out forest sabotage as a form of environmental terrorism. The PKK conducts forest sabotage through subcontractor groups such as the Children of Fire Initiative. The organization carries out some forest sabotage according to the political conjuncture, but mostly does not carry out forest sabotage due to the increasing environmental awareness in society, especially in recent years. However, it accomplishes these goals through subcontractor groups. The organization, which conducts forest sabotage in fire-prone areas in the hottest and driest weather, especially by taking advantage of the effects of climate change, causes major damage to nature and the ecosystem, contrary to the image of an "ecological actor" it wants to create. Moreover, the PKK does not lag behind terrorist organizations such as the DAESH and Boko Haram, which are often discussed in the literature in terms of the damage they cause to the ecosystem.

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Conclusions

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Today's nations are suffering from climate change, which is making our living environments dangerous. Even though nations have different levels of development, they are affected by security threats. Intense droughts, water scarcity, severe fires, rising sea levels, flooding, melting polar ice, catastrophic storms, and decreasing biodiversity are among the many of the effects of climate change. In addition to these effects, climate change has a significant impact on critical infrastructures in our communities, including food distribution systems, energy, water, and sewerage transmission lines, and transportation networks. Economic conditions degrade, poverty and inequality rise, especially among underprivileged groups in society, political tensions rise, and public services are disrupted, thereby endangering public safety and security. They also make the consequences of continuing conflicts on displacement more challenging. Consequently, a number of cross-border crises and complex security problems could result from these threats to national security. Climate change is therefore regarded as a threat multiplier. But doing so necessitates examining the issue of climate change from a wider perspective on security.

The edited book seeks to address the changing environmental conditions in the context of counter-terrorism, based on this analysis. It was conducted with the participation of numerous researchers in their respective fields, coordinated by the NATO COE-DAT and within the scope of its project. Accordingly, the following are the results obtained from all chapters of the study:

1. More people than ever before believe that climate change poses a new, direct, and complex threat to national security. When considering its effects, especially through severe weather events, the situation is considered to be potentially harmful. As a result, the future of humanity and our planet might be in danger.

2. Regardless of the level of development, all nations are affected by the consequences of climate change. Their instability and insecurity would unavoidably deepen when climate insecurity is coupled with other humanitarian, political, and economic

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issues. Competition for limited resources, mass migration, poor healthcare, social unrest, the efficiency of non-state actors, inefficient governance, economic collapse, and energy problems are some of the effects of climate change. Therefore, each country is redefining its relevant institutions and organizations, national security policies and strategies, and organizing them accordingly in response to the direct or indirect effects it experiences. In accordance with their capabilities, they strengthen and increase their readiness to respond to disasters wherever and whenever they happen, especially to disaster management. They also undergo internal transformation to become adaptable and capable of dealing with changing circumstances.

3. Vulnerable groups are disproportionately affected by climate change, especially those whose livelihoods depend on natural resources. Food insecurity, poverty, and inequality may increase in impacted areas as a result of its disruption of agricultural production, decreased crop yields, and water scarcity. This could lead to a worsening of social instability and the creation of conditions that support radicalism and violence. Those who are socially vulnerable—caused by concerns like food insecurity, economic instability, and displacement—are more vulnerable to the influence of extreme ideas. The risks are exacerbated when societies' ability to recover around and adapt diminishes. As a result, it may make conflict, instability, and the emergence of extremist organizations that take advantage of resource conflicts and disputes more likely. These kinds of organizations are becoming more prevalent as an asymmetrical power factor and a threat in societies that are experiencing the effects of climate change globally, as stated by the case studies discussed in Part III of this book.

4. Changes in climate-related issues are thought to indirectly lead to war or ethnic divisions because of the vulnerability of some regions; they will put depending and fragile states in an unstable condition and raise the likelihood of conflict inside their borders. Regions with poor governance and impoverished and vulnerable communities are at a disadvantage when it comes to dealing with climate change and natural disasters, as demonstrated by the case studies in the study. In the event of drought, weak states are especially vulnerable to violent conflicts and competition for limited resources. Because of this, it is observed that the Middle East and Africa are more vulnerable to the adverse consequences of climate change. It has been noted that terrorist groups take use of the deprivation process to reach more people, particularly those impacted by drought and water scarcity brought on by climate change. Armed terrorist groups' acts in vulnerable areas are increasingly endangering the state's legitimacy. Also, international and

regional security may be impacted by the actions of non-state armed players that are expanding into new areas.

5. Therefore, addressing the security implications of climate change is crucial to maintaining international peace and stability in the face of a rapidly changing global environment. We all have a responsibility to do everything within our power to reduce the damages caused by climate change. To mitigate its consequences and create a more secure and sustainable future for everybody, the international community must work together. Countries can deal with the effects of climate change and develop climate resilience by implementing strategies and policies that are based on training, strategic planning, capacity building, and financing for successful implementation.

6. As a military alliance, NATO's effectiveness in addressing climate change and its impacts is becoming increasingly important. In the context of environmental security, the Alliance has been tackling climate change issues that have the potential to cause violence, regional tensions, and humanitarian catastrophes for decades. The Alliance supports with disaster relief, focuses on environmental risks to military operations and overall security, including environmental factors that affect energy supplies, and seeks to increase military energy efficiency by the utilization of innovative technologies. In this regard, NATO has been reshaping its organization in recent years to align with institutional priorities and current trends. Briefly, NATO continues to operate in an extremely challenging security environment; many of these difficulties are made worse by climate change. In order to maintain peace and stability, the Alliance must be ready for the effects of climate change and must keep up its determined and effective efforts to combat terrorism that is indirectly brought on by climate change.

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