

# EPICENTERS OF CLIMATE AND SECURITY: THE NEW GEOSTRATEGIC LANDSCAPE OF THE ANTHROPOCENE

---

June 2017

Edited by:

Caitlin E. Werrell and Francesco Femia

THE CENTER FOR  
CLIMATE AND  
SECURITY

Sponsored by:

---



In partnership with:

---

**Carnegie Mellon University**  
Civil and Environmental Engineering





# INTRODUCTION

Shiloh Fetzek and Bessma Mourad

---

Multilateral political treaties. Just-in-time supply chains. Internet server infrastructure. Each of these illustrates the complex web of interdependence and reciprocity in our globalized society. The threats and challenges that confront it are often just as complex, with climate change being a particularly wicked problem, as uncertainties are many, impacts are diffuse, and the risks are constantly evolving.

The chapters in this volume explore the nature of epicenters of risk and highlight examples of how climate impacts can intersect, amplify and ripple across countries or regions in unexpected ways. Topics examine the central themes and drivers of the climate and security field – agriculture, energy, water, migration – but also look beyond the climate-conflict nexus, to connect the dots across sectors and examine unanticipated or under-explored climate impacts on the broader geopolitical landscape.

Christine Parthemore explores how the dynamics of nuclear security in the Anthropocene present growing risks and complexities as the world considers how to use nuclear power as a low-carbon energy source. Growth in nuclear capabilities may happen in novel ways, in new regions, and may give rise to complex geopolitical challenges, as with, for example, China’s plans to build floating nuclear reactors in disputed areas of the South China Sea. With fast-breeder reactors planned in countries such as India as a measure to address climate change, weak governance and the risk of theft of nuclear materials by non-state armed groups could create new and challenging risks.

Climate impacts on a range of economic sectors could also scale up into higher-order security challenges, threatening both food security and livelihoods. Much attention has

---

rightly been focused on the effects of climate change on staple and subsistence crops, but fisheries and cash crops are also important areas to examine. Michael Thomas examines the risks fisheries face from the Arctic, to the South China Sea, and to the Great Lakes region in Africa. With fishing rights already a source of competition that has occasionally sparked confrontation between fishing fleets and nations, these dynamics will worsen as climate change exacerbates resource depletion in combination with overexploitation.

Climate change will also dramatically shift the areas suitable for growing some cash crops, including coffee, in the coming decades. Shiloh Fetzek shows that the countries whose economies are most dependent on coffee exports also face underlying security risks. Many of these countries, including the growers and laborers who produce their coffee crops, face potentially devastating economic consequences from climate change that could exacerbate transnational security issues.

The transnational ripple effects of climate impacts on water are also substantial and varied. Troy Sternberg, as well as Marcus King and Julia Burnell explore two particular angles - the risks that are common to geographies whose water source is snow melt from mountain ranges, and how water is being weaponized by non-state armed groups such as ISIS and Boko Haram. The dynamics of water weaponization currently observed in some parts of the world – notably the Middle East and North Africa - could come into play in other regions, potentially with broader geopolitical impacts.

Changing oceans – from sea level rise to a transforming Arctic, as explored by Katarzyna Zysk and David Titley – will also transmit risks across geographies. Small island states and coastal megacities face threats from rising seas, contributing to migration pressures and governance challenges, as outlined by Andrew Holland and Esther Babson, as well as Janani Vivekenanda and Neil Bhatiya. Many coastal megacities are under-equipped for the challenges they face from climate change, and what happens in cities can often destabilize neighboring regions and strategically significant waterways - issues addressed by Adam Goldstein and Constantine Samaras.

While each of these issues may begin as a localized event, they are often interconnected. Migration and health are two examples. Robert McLeman looks at potential increases in forced migration globally, and Kaleem Hawa illustrates the complex intersection of climate change, health and international security.

Any one of these risks - never mind combinations of them - may contribute to the erosion of the social contract between citizens and their governments in a number of states across the world, which can have a significant impact on world order. Francesco Femia and Caitlin Werrell explore this dynamic.

---

The approaches that decision-makers use to manage risk must evolve with the changing nature of risk in a climate-changed world. The last section of this report explore the tools and practices necessary for addressing these epicenters of climate and security. The chapters emphasize preventive modes of governance that will require new and more versatile tools for anticipating, managing, mitigating and eliminating these risks.

Sinead O’Sullivan explores how Earth observation technologies such as satellites and drones can provide data to enhance situational awareness around climate and environmental changes, and support data-driven decision-making to manage epicenters of risk in the Anthropocene. Detailed mapping of the most climate-vulnerable and unstable areas can also help to identify which localities are the highest priority for interventions and shape decision-making and early warning systems to limit the potential for localized disruptions to scale up into regional security issues, as outlined by Joshua Busby.

Finally, foresight tools including vulnerability assessments and scenario building can help to surface potential interactions and combinations of events that can inform risk management decision-making, while advances in the digital age may provide new ways of monitoring and identifying patterns of emerging systemic risk, as outlined by Bessma Mourad and Amy Luers as well as Chad Briggs.

While such complex problems are by their nature difficult to solve, it is necessary to understand, manage, and develop effective approaches to address them. This volume demonstrates the kind of cross-sectorial thinking needed to anticipate and mitigate climate-related systemic risk and the interconnected categories of risk that are increasingly likely in the new geological and geopolitical age.