

Dynamic Modeling Requirements for Complex Threats to Climate Security

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Background/Objectives. Academics, non-governmental organizations, and government agencies identify climate change as a growing risk to regional and global security. Specific vulnerabilities associated with climate change include supply chain disruption, food and water scarcity, energy insecurity, extreme weather events, and associated migration. Areas already experiencing conflict and insecurity endure disproportionate exposure to climate hazards, compounding localized threats.

Current assessment frameworks forecast climate security risks in the medium- and long-term, with limited capacity for continuous or near-term projections. These limitations leave populations, resources, and governments vulnerable to abrupt and intersecting changes in environmental and sociopolitical conditions. Objectives of the *Dynamic Modeling Requirements for Complex Threats to Climate Security* project include 1) identifying gaps in existing climate security assessment capabilities, and 2) determining requirements for improved modeling of near-term climate security risks.

Approach/Activities. A comprehensive review has been completed of climate security assessment frameworks currently in use throughout academic research, non-governmental organizations, and government agencies. Through this review, common methodologies and assumptions of climate risk analysis were identified. Past cases of critical climate insecurity—including Hurricane Katrina in the US (2005) and the Arab Spring in the Middle East and North Africa (2010-2012)—are being applied to existing climate security assessment frameworks, with the objective of identifying gaps in existing assessment capabilities and requirements for improved analytical processes.

Results/Lessons Learned. Static assessment frameworks are limited due to the complex nature of climate security. The fixed environmental and sociopolitical scenarios used to complete conventional analyses assume a linear relationship between hazard and risk, with narrow capacity to assess abrupt or intersecting change. Cases such as Hurricane Katrina and the Arab Spring demonstrate the potential for cascading climate and sociopolitical hazards to trigger tipping points in regional security environments. Dynamic modeling capabilities—providing continuous, integrated analysis of evolving environmental and sociopolitical data—are needed to assess near-term risks to climate insecurity.