CLIMATE POLICY LAB

POLICY BRIEF | MAY 2022

Jayashri Lokarajan
Monica Duffy Toft

Climate Change-Induced Disrupting Threats and US National Security

CLIMATE CHANGE THREATS AND US NATIONAL SECURITY CHALLENGES

Climate change is projected to produce more intense and frequent extreme weather events and multiple weather disturbances, along with broader climatological effects, which are likely to pose significant national security challenges for the United States (US) over the coming decades (National Intelligence Council, 2016). These climatological effects are likely to have significant direct and indirect social, economic, political and security implications during the next 20 years, especially as populations continue to concentrate in climate-vulnerable regions (Parthemore, 2008). For instance, climate change-induced extreme weather events impacting the US mainland could endanger the lives of people, damage critical infrastructure including military installations, and require mobilization and diversion of military assets (Busby, 2007). Climate change-induced threats affecting countries outside of the US could catalyze domestic and regional instability through scenarios that could include associated risks such as refugee and humanitarian crises and armed conflict (Busby, 2007).

US President Joseph Biden issued executive orders (EO) in January 2021 placing the climate crisis "at the center of US foreign policy and national security" (Kaufman & Goodman, 2021). The US government needs to continue shaping the narrative and public perception around climate change to educate the American people about the pressing and paramount challenges climate change could bring to US national security and national welfare (Parthemore, 2008). Additionally, the US government needs to review and adapt the existing climate change missions of defense and security establishments to ensure that they are equipped to address the growing national security threat posed by climate change.

This policy brief discusses the role of the US intelligence community in evaluating and mitigating climate change-induced threats to US national security.

In this policy brief, we outline a multi-step approach to enhance US intelligence preparedness for conducting its climate change-related national security mission. This brief covers five specific climate-change induced threats — forced displacement, agricultural disruption, resource/food insecurity, sea level rise, and extreme weather events — and the national security implications that they generate. The brief also defines the role of the intelligence community in evaluating these threats as well as recommendations for how to carve out a comprehensive and integrated climate-focused mission that extends to all agencies while ensuring that climate-change related intelligence is not siloed in any particular agency or government function.

Background

The US Intelligence Community (IC) has incorporated climate change into its analysis and threat assessments for several decades (Gazis, 2021). According to the Director of National Intelligence Avril Haines, the Central Intelligence Agency (CIA) first offered scientists access to classified information and asked them to review satellite images of environmental changes on the continents. Since then, services within the US IC have been alerting policymakers about the impact of climate change through intelligence and intelligence products. For instance, climate change-related issues are included in the US National Intelligence Council's (NIC) multi-decade forecast called the "Global Trends Report" that is issued every four years (National Intelligence Council, 2021). The "Annual Threat Assessment of the U.S. Intelligence Community Report", which presents a collective view of the US' 18 intelligence agencies, also includes a section on climate change (Office of the Director of National Intelligence, 2021). More recently, the 2020 National Defense Authorization Act created a new Climate and Security Council to ensure that intelligence analysis is informed by the best possible science and projections (Conger, 2019).

In 2021, the Biden Administration published an Interim National Security Strategic Guidance that states that the US and the world have to act aggressively to avert the most dire climate change consequences (Kaufman & Goodman, 2021). President Biden also issued an EO requesting a National Intelligence Estimate (NIE) be conducted on the national and economic security impacts of climate change. The EO directed the Secretary of Defense in coordination with other agencies to produce an analytical assessment on the security implications of climate change (Femia & Werrell, 2021). NIEs are considered the most authoritative analyses undertaken by the US IC as they are designed to provide policymakers with detailed data, information, and evidence-based analysis, without regard to whether the analytic judgements conform to current US policy (Kaufman & Goodman, 2021).

Intelligence collection on threats related to climate change is multifaceted, but one key area of intelligence that has become more prominent in recent years when discussing the climate change-security nexus is geospatial intelligence (GEOINT). GEOINT is the analysis and visual representation of security matters on Earth, produced through imagery intelligence and geospatial information (IC Deep Dive, 2020), and is led by the US National Geospatial-Intelligence Agency (NGA) (IC Deep Dive, 2020). It can help to better monitor and understand climate change and provide well-integrated, accurate and timely data, technologies, human insight and methodologies to better predict crises and build problem-specific solutions (GEOINT and Climate Change: Informing National Security Decision-Making, 2021). GEOINT has significant potential to become a new model for intelligence gathering and cooperation among US intelligence agencies as well as with external stakeholders and foreign intelligence partners.

ANALYTICAL FRAMEWORKS TO ASSESS CLIMATE THREATS

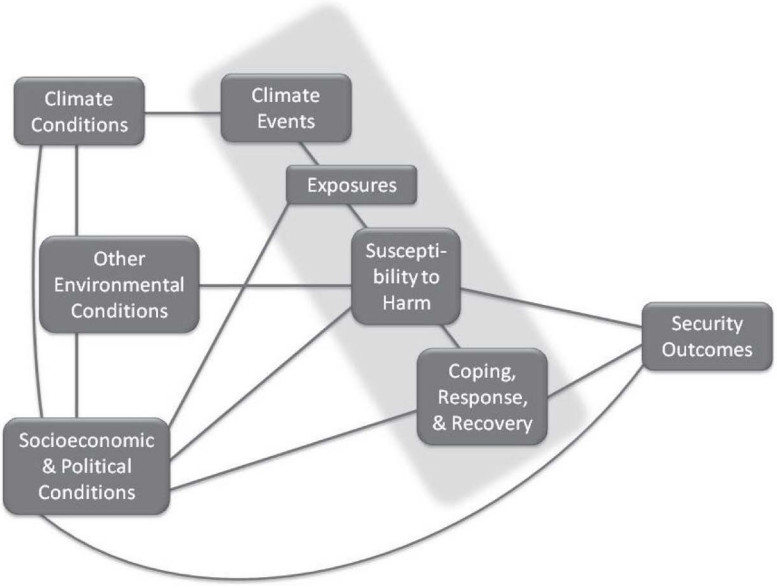
The NIC identified seven pathways where the effect of climate change will impact the US' national security (National Intelligence Council, 2016). These are:

- Threats to the stability of countries
- Heightened social and political tensions that pose security risks for the US
- Adverse effects on food prices and availability
- Increased risks to human health
- Negative impacts on investments and economic competitiveness
- Stress on military operations and basing
- Potential climate discontinuities and secondary surprises

Academic research has tried to capture these and other risks in more comprehensive schematic modeling that addresses probability of events, harms, and ongoing vulnerabilities. Steinbruner et al. propose a more comprehensive schematic model that highlights the links between climate events and outcomes influencing national security. They refer to this model as the "EEV+", which expands on an "events, exposure, and

vulnerability" framework (EEV) used by the Intergovernmental Panel on Climate Change (IPCC) by including conditions that precede an event and by elaborating on the concept of vulnerability to specifically reference the included elements of susceptibility, coping, response, and recovery (Steinbruner et al, 2013) (See Figure 1).

Figure 1: The schematic EEV model proposed by Steinbruner et al. shows the links between climate events and outcomes of national security concerns. The shaded area corresponds to the event-exposure-vulnerability model mentioned by the IPCC (Steinbruner et al, 2013).



The extent of disruption triggered by a climate event is influenced by: the interaction of the event; pre-existing climatic, environmental, socioeconomic, and political conditions; the exposures of places, populations, or life-supporting systems; and their vulnerability, including both susceptibility and deficits in coping, response, and recovery systems.

Schematic models like the EEV+ will serve as useful frameworks for policymakers and the US IC in understanding the national security implications of climate change because they map out climatic events as well as exposures, susceptibilities and the likelihood of effective coping, response and recovery strategies (Steinbruner et al, 2013). Furthermore, these schematic models will help intelligence agencies understand more comprehensively where each of the four society-disrupting threats place in the process, in order for them to design the most effective and tailored response and recovery strategies.

However, one area that the EEV+ model does not address and which the US IC needs to incorporate into its frameworks, is a multi-level perspective on how countries respond to climate change-induced events at the national/state, regional and international levels. This perspective will be particularly useful when examining how the US' adversaries and allies are responding to climate change and how their responses at each level could generate national security implications for the US.

Broad Implications of Climate-Induced Risks

A multi-level perspective that incorporates climate-induced risks can assist intelligence agencies to generate sharper insights surrounding usual policy questions, such as evaluating other countries' domestic and geopolitical status, diplomatic effort, and foreign policy objectives. For example, in considering a climate change-induced food disruption in China, intelligence-gathering and evaluation would center on understanding how such a disruption would impact Chinese domestic political and economic policymaking and its foreign policy objectives and diplomacy, such as the Belt and Road Initiative. At the extreme, assessment of what kind of military responses might be adopted would need to be examined and how various scenarios of outcomes might generate national security risks and/or opportunities for the United States and its interests worldwide.

There are many climate-associated risks that merit investigation. We mention five risks to illustrate the importance of integrating such issues into the US intelligence as vital to US national security.

1. Forced displacement: Individuals forcibly displaced by climate change, also often broadly categorized as "climate refugees" or "environmental refugees", currently lack any formal definition, recognition or protection under international law even as the scope of their predicament becomes clearer (McDonnell, 2018) (International Organization for Migration, 2021).

A. Expectations are that these numbers will grow over time, adding to the direct pressures on border security and global humanitarian assistance. Any impact on global humanitarian assistance would be of particular concern to the US Department of Defense (DOD) given its significant role in such efforts globally. (La Shier & Stanish, 2017).

B. Indirect risks, such as disruptions to the global economy due to mass migration or forced displacement, would also have significant consequences for the US (La Shier & Stanish, 2017). For instance, if the US' key allies and economic partners continue to opt for maintaining greater social and cultural cohesion at the expense of immigration and more extensive economic and fiscal reforms, these nations will continue looking inward, exacerbating internal tensions, and indirectly putting further pressure on the US to take responsibility for the forcibly displaced communities (National Intelligence Council, 2001).

C. Finally, there is the additional threat that an influx of displaced individuals in specific locations could spark or worsen armed conflicts (Guy at al, 2020).

2. Agricultural disruption: The effects of climate change, such as drought or extreme rainfall (National Intelligence Council, 2016), have the potential to negatively affect agricultural production via the location, timing and productivity of crop, livestock, and fishery systems on local, national, and global scales (Melillo et al, 2014).

A. Globally, climate change will impact the stability of food supply chains and create new food security challenges for the US, especially as the world seeks to feed 9.8 billion people by 2050 (United Nations, 2017).

B. Effects of climate change internationally, such as increases in temperatures, changes in precipitation patterns, extreme weather events and reductions in water availability, could result in reduced agricultural productivity.

C. Furthermore, an increase in the frequency and severity of extreme weather events can also interrupt the transportation and supply of agricultural produce to top export destinations like the US, resulting in spikes in food prices (US EPA, n.d).

3. Resource/food insecurity: As both a consequence and a driver of conflict, food insecurity creates a cyclical, self-perpetuating system that leads to prolonged conflict (Forman & Maxey, 2015). For example, changes in climate that stress agricultural production have driven migration, urbanization, and shifts in land use as coastal plains become more vulnerable to flooding (Forman & Maxey, 2015).

A. In countries with weak political institutions, climate-induced threats to food security increase the risk of social disruption, migration or large-scale political instability (National Intelligence Council, 2016). Such scenarios have the potential to result in armed conflict either within the countries or in the broader geographical regions, which will pose direct and indirect national security threats for the US, including the need for the US military to respond to these foreign crises if affected countries are overstretched and do not have the adequate resources.

B. Addressing food insecurity can be part of the US' efforts to stabilize fragile and conflict-prone areas (Welsh, 2021). Instability in these areas can have significant consequences for the US' national security, and thus pursuing foreign agricultural policy or diplomacy to enhance the US' influence with friends and allies where food insecurity is a major issue (e.g. the Middle East,

Africa, emerging economies in Asia) would be pertinent (Goldstein & Oken, 2021). However, major competitors like China have also been utilizing this strategy — of courting vulnerable regions prone to food insecurity — to expand their global influence (Goldstein & Oken, 2021). China has taken leadership positions in four major United Nations (UN) agencies, including the UN Food and Agriculture Organisation (Welsh, 2021).

4. Sea level rise: Of the various climate-change induced threats to society, sea level rise is particularly worrisome for the US military due to the stress on military operations and basing (National Intelligence Council, 2016).

A. The US military depends on safe and functional bases to protect the national security of the country (Union of Concerned Scientists, 2016). However, rising sea levels will increasingly threaten military capabilities and facilities on both US and foreign territories, including military bases and training ranges (National Intelligence Council, 2016). There are about 1,774 US military sites across the globe covering 95,471 miles of coastline under the US military's responsibility (Parthemore et al, 2016). Climate change-induced sea level rise will threaten the stability of the coastline and operating environment for these sites. For example, major transportation, command and control, intelligence, and deployment hubs may face unrelenting erratic outages, or curtailment of operations in the future, due to sea level rise and storm surge (Parthemore et al, 2016). A group of scientists also found that an approximately three-foot increase in sea level would threaten 128 coastal DoD installations in the United States as well as the livelihoods of the people (both military and civilians) who depend on them. Forty-three percent of the installations are naval installations and are valued at roughly US $100 billion (Union of Concerned Scientists, 2016).

5. Extreme weather events: These are projected to increase in severity and frequency over the next several decades, and this will increase the likelihood of direct national security risks for the US.

A. There will be a greater burden on the US military and its allied partners' capacity to respond to such extreme weather events and deliver appropriate humanitarian and disaster relief, either in the US or abroad (National Intelligence Council, 2001) (La Shier & Stanish, 2017). The US may also be called upon more frequently to respond to climate change-induced security crises overseas if its counterparts in affected countries are overstretched — further straining the US' military resources and capabilities.

B. Climate change-induced extreme weather conditions could also be highly disruptive to training operations that rely on reliable access to land, air and sea-based training facilities because these extreme weather conditions will increasingly threaten military infrastructure and facilities on both US and foreign territories (Parthemore et al, 2016). For instance, US Air Force bases in the Arctic region, which host early warning radar systems and communication equipment, are impacted by the thawing permafrost and coastal erosion that are damaging seawalls, runways and infrastructure (Eversden, 2021). In a 2018 report based on a preliminary Screening Level Vulnerability Assessment Survey (SLVAS) of US DoD sites worldwide, about 10 percent of the sites indicated that they were affected by extreme temperatures, and about six percent attributed it to flooding from storm surges and wildfire (US Department of Defense, 2018).

C. These strains on the US' military infrastructure and capabilities, especially international sites that are of strategic importance, will have significant consequences for the US' global security posture and its own national security, potentially motivating adversarial nations to ramp up their own military posture with significant implications for specific regions and alliance partners.

Improving the Level of Scientific and Technological Expertise to Evaluate Climate Threats

While US threat assessments recognize the importance of climate change, policymakers have acknowledged that more attention needs to be given to systematic assessments of climate-related threats. Notably, Special Presidential Envoy for Climate Secretary John Kerry has pointed out that the US IC needs to provide policymakers with a stronger decision advantage on climate change in order for the US government to lead the world on addressing this threat (Walton & Power, 2021). This would require the IC and related agencies to improve their level of scientific and technological expertise to complement the intelligence process. Scientific expertise has been critical to modern US intelligence agencies since their inception (Barnes, 2021). However, intelligence and security challenges have evolved since the Cold War and require a different range of scientific expertise in areas that have not received sufficient resources and attention over the years (Barnes, 2021). Furthermore, addressing the national security threats posed by climate change requires individuals with unique and multi-disciplinary skillsets who are able to provide a more holistic understanding and analysis of the science surrounding climate change as well as the potential national security implications.

What is needed is better mapping to identify and develop new capabilities that will boost intelligence efforts to tackle the climate change threats and opportunities, forging new relationships and lines of communication within the US government, in the private sector and with allies and adversaries globally (Walton & Power, 2021).

Intelligence sharing on this issue also remains a work in progress, given the IC's fundamental policy dilemma of whether information should be shared on a "need-to-know" or "need-to-share" basis (Best, 2011). While intelligence efforts are never risk-free, technological advancements can help establish greater accountability for the use of classified intelligence information acquired by the IC. The scientific foundations of climate change and the global impact of its threats and effects require deeper external collaboration, such as with foreign intelligence partners, academics, scientists, and companies in the private sector. Each stakeholder would be able to bring a unique set of insights that others might not be able or have access to. For instance, the IC should consider establishing formal collaborations with the academic community to improve each other's data collection and learn from the research methods they have each developed and implemented as part of their analysis (Mach & Kraan, 2020).

POLICY RECOMMENDATIONS

Climate change intelligence should be integrated into traditional security threat assessments, including assessments of its potential to change the posture and policies of adversarial nations, and emerging threats from other globalized challenges, biohazards, cyber capabilities and weaponized information (Walton & Power, 2021). We offer the following policy to improve mission planning and implementation processes in a manner to deepen integration of evaluation and preparedness related to threats and national security challenges and opportunities arising from climate change.

We propose a multi-step approach as a starting point to better integrate climate change knowledge, intelligence, and climate-induced threat assessment into the intelligence process.

Clarify US Intelligence's climate change mission.

Based on the criticisms thus far, it is important for the US IC to re-evaluate and clarify its climate change mission, considering the growing number of national security threats and opportunities emanating from the effects of climate change. This will ensure that the IC accords climate change the right level of attention and resources that it requires across its 18 agencies. As climate change intensifies, climate research and assessment are increasingly being tailored to inform decision-making by different levels of the government, private sector and communities

(Mach & Kraan, 2020). As such, the US IC needs to ensure that it consistently provides policymakers with nuanced intelligence and insights that will become a decision advantage for them to lead worldwide efforts to address related risks.

Identify climate change intelligence tasks and responsibilities so that intelligence agencies can leverage their unique capabilities to complement ongoing efforts by scientists and policymakers.
These intelligence activities could include scientific data collection and analysis, including support of scientific and wider academic communities' research efforts, such as the use of geospatial intelligence to help address any existing gaps on climate change-related data.

The intelligence agencies should hire internal scientists and collaborate with academic scientists to help evaluate the impact of climatic effects on a range of select entities and issues utilizing their existing intelligence collection and analytical capabilities. Subject matter should include geospatially-informed topics such as drought, wildfire, flooding, hurricanes, sea level rise, agricultural production, and permafrost loss. US intelligence agencies should also utilize internal capabilities to generate broader and more comprehensive insights on how international and local mitigation and adaptation efforts could influence other countries' foreign policies as well as their how countries respond strategically and militarily to climate-induced threats such as natural disasters, sea level rise, food insecurity, and human dislocation, and what this would mean for the US' national security. For example, the Russia-Ukraine crisis has highlighted the importance of targeted intelligence on how greenhouse gas mitigation efforts (either at the national/state, regional and international levels) affect global commodity producers such as agricultural or oil exporters, and the relevant impact on America's alliances and national security.

Establish specific climate change-related collaborations with science agencies such as the National Oceanic and Atmospheric Administration (NOAA) and United States Department of Agriculture (USDA).
Through such collaborations, scientists and geographic information system modelers from the scientific agencies could work closely with intelligence analysts and specialists to deepen both sides' knowledge and expertise on climate change. These collaborations should be structured bureaucratically on a permanent, continuous basis, without being limited to specific projects. It would also be advisable for various intelligence agencies to hire their own internal specialists with scientific and/or multi-disciplinary backgrounds related to climate change to lead collaborations with other science agencies to best leverage cross-fertilization of information exchange and joint assessments.

Establish a comprehensive understanding of the climate change-intelligence nexus by identifying how to better integrate climate change science and technology input within the overall intelligence cycle.
While the IC has already been working on integrating climate change as an issue of interest within the intelligence cycle, there needs to be major re-evaluation on whether the current efforts to integrate intelligence collection and analysis on climate change are producing the results to meet evolving needs and requirements within different branches of the US government. This includes mapping how its existing collection and analytical capabilities can continue supporting this mission, identifying and developing new capabilities that will boost the IC's efforts to tackle climate change-induced threats, as well as forging new relationships and lines of communication across the US government, with the private sector and academia and with allies and adversaries globally (Walton & Power, 2021).

Review and integrate insights from evaluations of climate science and climate-induced threats with broader intelligence assessments.

In other words, the intelligence process needs to map out a comprehensive strategy for mission implementation across all 18 agencies that includes climate risks. This is another crucial step for the IC to ensure that it accurately maps its implementation plans to meet its requirement needs. To facilitate this process, responsible agencies should tap climate scientists within its agencies to actively collaborate with external scientists and academics to organize insights that can be gained from schematic models that allow for examination of effects of specific climate change-induced threats, such as forced displacement and food insecurity. Such modeling can help pinpoint specific vulnerabilities and exposures that the IC could help policymakers address more effectively.

Build in routine reviews of how well they are fulfilling intelligence mission objectives and meeting stakeholders' needs related to climate change, including the ability to provide US policymakers with the decision advantage.

Evaluation of intelligence success regarding climate change should not be limited to adequate responses to direct climate change events and conditions but also provide insights that allow the US to protect and improve national security and gain economic and strategic opportunities from changing global dynamics. •

References

Barnes, Julian E. 2021. "Spy Agencies Turn to Scientists as They Wrestle With Mysteries." *The New York Times*, July 8, 2021 last updated October 2021. Accessed August 12, 2021. https://www.nytimes.com/2021/07/08/us/politics/intelligence-agencies-science.html.

Best, Richard A. 2011. "Intelligence Information: Need-to-Know vs. Need-to-Share." *Library of Congress, Congressional Research Service*, June 6, 2011. https://sgp.fas.org/crs/intel/R41848.pdf

Busby, Joshua W. 2007. "Climate Change and National Security: An Agenda for Action." *Council on Foreign Relations Press*; No. 32. https://www.cfr.org/report/climate-change-and-national-security.

Campbell, Kurt M., and Christine Parthemore. "National Security and Climate Change in Perspective." In Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change, edited by Kurt M. Campbell, 1–25. Brookings Institution Press, 2008. http://www.jstor.org/stable/10.7864/j.ctt1262fp.4.

Conger, Jack. 2019. "U.S. Congress Continues to Address Climate Change in Defense and Intelligence Legislation." *The Center for Climate & Security*, Accessed August 15, 2021. https://climateandsecurity.org/2019/12/congress-continues-to-address-climate-change-in-defense-and-intelligence-legislation/.

Eversden, Andrew. 2021. "'Climate Change Is Going to Cost Us': How the US Military Is Preparing for Harsher Environments," *Defense News*, August 9, 2021, accessed September 30, 2021. https://www.defensenews.com/smr/energy-and-environment/2021/08/09/climate-change-is-going-to-cost-us-how-the-us-military-is-preparing-for-harsher-environments/.

Femia, Francesco, and Werrell, Caitlin. 2021. "The Center for Climate and Security Applauds the Biden Administration's Executive Actions on Climate Change." *The Center for Climate & Security*. January 27, 2021, accessed August 15, 2021. https://climateandsecurity.org/2021/01/the-center-for-climate-and-security-applauds-the-biden-administrations-executive-actions-on-climate-change/.

Forman, Johanna Mendelson; Maxey, Levi. 2015. "Should Food Security Be a National Security Issue?" *Stimson Center,* April 22, 2015, accessed August 7, 2021. https://www.stimson.org/2015/should-food-security-be-national-security-issue/

Gazis, Olivia. 2021. "U.S. Intelligence Touts New Emphasis on Climate Change, Calling It an 'Urgent National Security Threat.'" *CBS News,* April 23, 2021*,* accessed August 12, 2021. https://www.cbsnews.com/news/climate-change-national-security-threat-us-intelligence/.

"GEOINT and Climate Change: Informing National Security Decision-Making." 2021. USGIF, June 2, 2021, virtual. Lecture panel. https://usgif.org/event/geoint-and-climate-change-informing-national-security-decisionmaking/.

Goldstein, Gordon; M, Oken, Erik R. 2021. "America's New Challenge: Confronting the Crisis in Food Security," *Council on Foreign Relations*, April 22, 2021, accessed September 29, 2021, https://www.cfr.org/blog/americas-new-challenge-confronting-crisis-food-security.

Guy, Kate at al. "A Security Threat Assessment of Global Climate Change: How Likely Warming Scenarios Indicate a Catastrophic Security Future." Product of the National Security, Military, and Intelligence Panel on Climate Change. Edited by Femia, Francesco and Werrell, Caitlin. *The Center for Climate and Security*, an institute of the Council on Strategic Risks. Washington, DC. February 2020.

Kaufman, Holly; Goodman, Sharon. 2021."BRIEFER: Climate Change in the U.S. National Security Strategy: History and Recommendations." *The Center for Climate & Security*. Last modified June 29, 2021. Accessed August 15, 2021. https://climateandsecurity.org/2021/06/briefer-climate-change-in-the-u-s-national-security-strategy-a-brief-history/.

Kerry, John. (2021). "Climate Change, Intelligence, and Global Security." Virtual discussion moderated by Dr. Calder Walton at Harvard Kennedy School Belfer Center for Science and International Affairs. https://news.harvard.edu/gazette/story/2021/04/john-kerry-discusses-relationship-between-climate-change-and-security/

La Shier, Brian, and James Stanish. 2017. "The National Security Impacts of Climate Change." *EESI*. Environmental and Energy Study Institute. Accessed June 17, 2021. https://www.eesi.org/papers/view/issue-brief-the-national-security-impacts-of-climate-change.

Mach, Katharine J; Kraan, Caroline M. 2021. "Science–policy Dimensions of Research on Climate Change and Conflict." *Journal of Peace Research* 58, no. 1 (2021): 168-76. https://journals.sagepub.com/doi/full/10.1177/0022343320966774

McDonnell, Tim. 2018. "The Refugees The World Barely Pays Attention To." *NPR*, June 20, 2018, Accessed August 8, 2021. https://www.npr.org/sections/goatsandsoda/2018/06/20/621782275/the-refugees-that-the-world-barely-pays-attention-to.

Melillo, Jerry, M., Terese Richmond, Gary Yohe (eds). 2014. Climate Change Impacts for the United States: The Third National Climate Assessment. US Global Change Research Program.

"IC Deep Dive: Learn the 6 Types of Intelligence." 2020. *US Intelligence Careers*, Accessed August 10, 2021. https://www.intelligencecareers.gov/blogs/learn-6-types-of-intelligence-2020.html.

International Organization for Migration, 2021. "Environmental Migration, Environmental Migration Portal." *International Organization for Migration,* Last modified 2022. Accessed August 8, 2021. https://environmentalmigration.iom.int/.

National Intelligence Council. 2001. "Growing Global Migration and Its Implications for the United States." *NIE* (Series); 2001-02D. 2001. https://irp.fas.org/nic/migration.pdf

National Intelligence Council. 2016. "Implications for US National Security of Anticipated Climate Change." *National Intelligence Council,* Accessed July 30, 2021. https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2016/item/1629-implications-for-us-national-security-of-anticipated-climate-change.

National Intelligence Council. 2021. "Office of the Director of National Intelligence - Global Trends." National Intelligence Council, Accessed August 15, 2021. https://www.dni.gov/index.php/gt2040-home/introduction.

Office of the Director of National Intelligence. 2021. "2021 Annual Threat Assessment of the U.S. Intelligence Community." Last modified, April 13, 2021, Accessed August 15, 2021. https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2021/item/2204-2021-annual-threat-assessment-of-the-u-s-intelligence-community.

Parthemore, Christine at al. 2016. "Military Expert Panel Report: Sea Level Rise and the U.S. Military's Mission." Edited by Shiloh Fetzek, Caitlin E. Werrell, and Francesco Femia. The Center for Climate & Security. Accessed August 8, 2021. https://climateandsecurity.org/militaryexpertpanel/.

FOR ACADEMIC CITATION:

Lokarajan, Jayashri; Toft, Monica Duffy, "Climate Change-Induced Disrupting Threats and US National Security." Policy Brief, Climate Policy Lab, The Fletcher School at Tufts University, May 2022.

ABOUT THE AUTHORS:

Jayashri Lokarajan is a former graduate researcher with the Climate Policy Lab at The Fletcher School at Tufts University.

Monica Duffy Toft is a Professor of International Politics and Director of the Center for Strategic Studies at The Fletcher School at Tufts University.

FUNDING FOR THIS RESEARCH:

This policy brief is part of a wider research project on Climate Change and U.S. National Security supported by Deloitte. Any errors or misrepresentations are the sole responsibility of the authors.

Steinbruner, John D., Paul Stern, Jo L. Husbands (eds). 2013. Climate and Social Stress: Implications for Security Analysis, National Academies of Science, https://nap.nationalacademies.org/catalog/14682/climate-and-social-stress-implications-for-security-analysis

US EPA, n.d. "Climate Impacts on Agriculture and Food Supply, Overviews and Factsheets," *US EPA,* accessed September 29, 2021, https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-agriculture-and-food-supply.

US Department of Defense. 2018. "Climate-Related Risk to DoD Infrastructure Initial Vulnerability Assessment Survey (SLVAS) Report." *Department of Defense,* January 2018. https://www.preventionweb.net/publication/climate-related-risk-dod-infrastructure-initial-vulnerability-assessment-survey-slvas.

Union of Concerned Scientists. 2016. "The US Military on the Front Lines of Rising Seas, Growing Exposure to Coastal Flooding at East and Gulf Coast Military Bases." Union of Concerned Scientists, July 27, 2016, Accessed August 8, 2021. https://www.ucsusa.org/resources/us-military-front-lines-rising-seas.

United Nations. 2017. "World Population Projected to Reach 9.8 Billion in 2050, and 11.2 Billion in 2100." *UN DESA, United Nations Department of Economic and Social Affairs.* Last modified June 21, 2017, Accessed August 7, 2021. https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html.

Walton, Calder; Power, Sean. 2021. "Report: Climate Change, Intelligence, and Global Security." *Belfer Center for Science and International Affairs*. Last modified, May 2021, Accessed August 10, 2021. https://www.belfercenter.org/publication/report-climate-change-intelligence-and-global-security.

Welsh, Caitlin. 2021. "Food Insecurity Crises at Home and Abroad: Why Biden Must Lead on Both," Center for Strategic & International Studies. Last modified January 26, 2021, Accessed September 30, 2021. https://www.csis.org/analysis/food-insecurity-crises-home-and-abroad-why-biden-must-lead-both.