



Human and National Security Working Group Brief

Climate Change Security Risks and Opportunities

Chaired by Gary Roughead and Hilary Tompkins, the human and national security working group of the American Academy of Arts and Sciences' Commission on Accelerating Climate Action focused on the climate crisis, including failing infrastructure, food insecurity, public health problems, and concerns about military bases and training facilities. Much of this brief and accompanying white paper are based on conversations with human and national security experts, conducted across nineteen expert listening sessions and led by the working group chairs and members, with particular contributions from working group member Phyllis Bayer. The working group selected the Colorado River Basin and the Gulf Coast region as case studies emblematic of the multifaceted, diverse effects that threaten national security, including both protracted and

sudden consequences; socioeconomic disparities; unavailability of critical resources such as water, food, and energy; supply chain problems; and national coordination difficulties. Based on the listening sessions, the working group chose to explore three key messages for effective climate action:

1. Many factors impacting national security are interconnected, requiring cooperation among diverse stakeholders and across multiple levels of government.
2. A nuanced understanding of risk is necessary for making informed climate decisions and for effective proactive planning, but data quality and government regulation are inadequate to support risk management.
3. Frontline communities have been historically ignored, making their participation in bottom-up, regional solutions both crucial and difficult.

Interconnection and Cooperation

Consideration of climate mitigation and adaptation through the lens of national security in the United States cannot be done in a vacuum. From China's dominance of the rare earth minerals market that provides them with a near monopoly in solar panel manufacturing to Europe's action against Russian aggression in Ukraine that is creating energy and supply chain shortages, national energy security depends on understanding and responding to signals and crises in the global market.¹ Many of the factors that contribute to national security—such as secure sources of water, food, and energy; effective and resilient supply chains; and environmental justice—are interlinked. For example, low water levels can increase the cost of agricultural production, impact energy generation through hydropower, interfere with cooling for manufacturing and petrochemical processes, and disrupt national shipping corridors.² Localized direct impacts of climate

1. Robert Y. Shum, "Heliopolitics: The International Political Economy of Solar Supply Chains," *Energy Strategy Reviews* 26 (November 2019): 100390, <https://doi.org/10.1016/j.esr.2019.100390>; Anna Holzmann and Max J. Zenglein, "China's Leverage of Industrial Policy to Absorb Global Value Chains in Emerging Industries," in *Economic and Social Upgrading in Global Value Chains* (Cham, Switzerland: Palgrave Macmillan, 2022), 413–436, https://doi.org/10.1007/978-3-030-87320-2_16; and Martin Nerlinger and Sebastian Utz, "The Impact of the Russia-Ukraine Conflict on the Green Energy Transition—A Capital Market Perspective," Swiss Finance Institute Research Paper No. 22-49 (May 8, 2022), <http://dx.doi.org/10.2139/ssrn.4132666>.

2. Christopher A. Scott, Tamee R. Albrecht, Rafael De Grenade, Adriana Zuniga-Teran, Robert G. Varady, and Bhuwan Thapa, "Water Security and the Pursuit of Food, Energy, and Earth Systems Resilience," *Water International* 43 (8) (2018): 1055–1074, <https://doi.org/10.1080/02508060.2018.1534564>.

change often indirectly impact global supply chains, creating additional vulnerabilities for underresourced populations across the globe. Effectively addressing climate change requires adopting a systems-level view.

These interconnections also create barriers to cooperation. In the Colorado River Basin, water sources and uses are regulated by multiple levels of government, creating a complex system with inefficient management and requiring cooperation across states. Competing priorities in federal regulations can also exacerbate existing issues. For instance, the Endangered Species Act may require certain instream flow levels to protect wildlife that depend on those waters, while irrigation districts have obligations to deliver water to their members, and federal reservoirs are subject to management regimes that do not prioritize storage and conservation.³ Along the Gulf Coast, several agencies are actively collaborating on climate data generation, but no one agency has the authority to produce and validate these data.⁴ Reducing friction between agencies and more clearly defining responsibilities will be crucial for better collaboration.

Assessing Risk and Proactive Planning

Climate change requires accurate risk assessments, from the physical risk to infrastructure because of a lack of preventative maintenance to the financial risk of adopting new technologies or shifting to new crops. A recurring theme from the expert listening sessions was the difficulty of appropriately dispersing and apportioning risk. In the Colorado River Basin, agriculture contributes to 80 percent of water use.⁵ Advances in technology, including water recycling, desalination, and regenerative agriculture, could

3. *The Endangered Species Act as Amended by Public Law 97-304 (the Endangered Species Act Amendments of 1982)* (Washington, D.C.: U.S. GPO, 1983); and Frank A. Ward and James F. Booker, "Economic Costs and Benefits of Instream Flow Protection for Endangered Species in an International Basin," *Journal of the American Water Resources Association* 39 (2) (2003): 427–440, <https://doi.org/10.1111/j.1752-1688.2003.tb04396.x>.

4. Timothy Andrew Joyner and Ryan Orgera, "Climate Change Hazard Mitigation and Disaster Policy in South Louisiana: Planning and Preparing for a 'Slow Disaster,'" *Risk, Hazards and Crisis in Public Policy* 4 (3) (2013): 198–214, <https://doi.org/10.1002/rhc3.12034>; and Austin Becker, Satoshi Inoue, Martin Fischer, and Ben Schwegler, "Climate Change Impacts on International Seaports: Knowledge, Perceptions, and Planning Efforts among Port Administrators," *Climatic Change* 110 (1) (2012): 5–29, <https://doi.org/10.1007/s10584-011-0043-7>.

5. Fengwei Hung, Kyongho Son, and Y. C. Ethan Yang, "Investigating Uncertainties in Human Adaptation and Their Impacts on Water Scarcity in the Colorado River Basin, United States," *Journal of Hydrology* 612, pt. A (2022): 128015, <https://doi.org/10.1016/j.jhydrol.2022.128015>.

alleviate some of the strain on the water system. However, adopting these technologies requires farmers to take on risk.⁶ This risk is compounded by long growing cycles that create few opportunities for trial and error, have high start-up costs, and are subject to an ever-changing regulatory space, leaving farmers hesitant to adapt today when better options might become available in subsequent years.⁷

Climate disasters can cause costly, severe, and long-lasting impacts, but the impetus for action is still minimal. For big infrastructure projects in the Gulf Coast, government subsidization of risk can backfire. Many important pieces of infrastructure, such as large ports, are considered “too big to fail” and thus continue to operate under the implicit promise of government intervention in case of climate disaster. If government subsidizes the risk, it disincentivizes forward planning and risk management, which potentially magnifies consequences for surrounding communities.⁸

Finally, considering risk through a national security lens requires understanding global energy policy and carefully balancing efforts to decarbonize with efforts to maintain energy security. As the world transitions to renewable energy, the United States must consider the national security implications of its dependence on other countries for necessary technologies and resources. Additionally, the U.S. workforce will be impacted by any energy transition. Environmental justice issues, such as taking jobs away from communities with limited economic opportunity, must be centered in strategic plans to avoid risk to individual workers and small communities.

Our listening session experts also cautioned that risk assessment requires specific and clear data that are not currently available. While big data has potential for climate forecasting, data quality problems persist.⁹ Regional data collection by universities and other research institutions

6. John Fleck and Brad Udall, “Managing Colorado River Risk,” *Science* 372 (6545) (2021): 885, <https://doi.org/10.1126/science.abj5498>; and Joel Lisonbee, Elizabeth Ossowski, Meredith Muth, Veva Deheza, and Amanda Sheffield, “Preparing for Long-Term Drought and Aridification,” *Bulletin of the American Meteorological Society* 103 (3) (2022): E821–E827, <https://doi.org/10.1175/BAMS-D-21-0321.1>.

7. P. L. Taylor, K. MacIroy, R. Waskom, P. E. Cabot, M. Smith, A. Schempp, and B. Udall, “Every Ditch Is Different: Barriers and Opportunities for Collaboration for Agricultural Water Conservation and Security in the Colorado River Basin,” *Journal of Soil and Water Conservation* 74 (3) (2019): 281–295, <https://doi.org/10.2489/jswc.74.3.281>.

8. Robin Kundis Craig, “Coastal Adaptation, Government-Subsidized Insurance, and Perverse Incentives to Stay,” *Climatic Change* 152 (2) (2019): 215–226, <https://doi.org/10.1007/s10584-018-2203-5>.

9. Thanos Papadopoulos and Maria Elisavet Balta, “Climate Change and Big Data Analytics: Challenges and Opportunities,” *International Journal of Information Management* 63 (2022): 102448, <https://doi.org/10.1016/j.ijinfomgt.2021.102448>.

can provide foundational data to help manage risk and adapt to climate impacts while also creating personal connections between scientists and local communities.

The benefits of data go beyond risk assessment and building community trust, however, and can also help with proactive planning. The importance of climate adaptation planning across all levels of government and industry emerged as a recurring theme during the listening sessions. From military bases to large infrastructure projects, climate adaptation planning not only yields better outcomes for the individual project but can create mindset shifts, educational opportunities, empowerment, and lines of stakeholder communication that can make future adaptation projects more successful.¹⁰

However, current barriers beyond accurate data make adaptation planning difficult. Federally funded projects often must contend with complex federal processes and bureaucracy, as well as shifting congressional priorities. For military installations, the prevalence of short-term budgets precludes multiyear funding for large, transformational infrastructure projects, complicating and frustrating the coordination of military base improvements with municipal and state projects and investments.¹¹ The consequences of a lack of long-term plans are many, including inefficient use of money and continued reliance on procedures known to be ineffective or even harmful. The repetition of such harmful actions, such as dredging sediment to keep waterways active and disposing of it in places that increase coastal loss, is perpetuated because plans for alternative approaches have not yet been implemented.¹²

Justice and Regional Solutions

A key part of improving human security is recognizing that an unequal burden has historically been, and continues to be, placed on under-resourced communities. All entities engaged in climate mitigation and adaptation bear a responsibility to ensure these communities do not continue

10. Austin Becker, Satoshi Inoue, Martin Fischer, and Ben Schwegler, "Climate Change Impacts on International Seaports: Knowledge, Perceptions, and Planning Efforts among Port Administrators," *Climatic Change* 110 (1) (2012): 5–29, <https://doi.org/10.1007/s10584-011-0043-7>.

11. Daniel White, "The National Security Implications of Climate Change," *Journal of International Affairs* 73 (1) (2019): 321–330, <https://jia.sipa.columbia.edu/national-security-implications-climate-change-redefining-threats-bolstering-budgets-and-mobilizing>.

12. Ashley Carse and Joshua A. Lewis, "New Horizons for Dredging Research: The Ecology and Politics of Harbor Deepening in the Southeastern United States," *Wiley Interdisciplinary Reviews: Water* 7 (6) (2020): e1485, <https://doi.org/10.1002/wat2.1485>.

to face the worst climate impacts. Throughout the white paper, the Gulf Coast region and the Colorado River Basin case studies provide recurring themes that suggest barriers to climate action that are applicable to other regions and landscapes as well.

However, the human and national security threats facing each region differ significantly, highlighting the problem of a national strategy that fails to consider regional nuance or to build trust from a local level. In both the Colorado River Basin and the Gulf Coast region, clear winners and losers in climate adaptation can already be identified. In the Colorado River Basin, despite interim renegotiations of the Colorado River Compact, many American Indian tribes still lack quantified water rights and struggle to access clean water.¹³ In the Gulf Coast region, the health impacts of repetitive flooding compound existing risk created by fossil fuel pollution in under-resourced communities along the area known as “Cancer Alley.”¹⁴ This historic context, coupled with continuing disregard for community priorities, has often fueled local communities’ deep distrust of climate efforts. For example, job-creation promises have sometimes led to the hiring of workers from outside the community, in turn driving up local housing prices.¹⁵ Likewise, promises of carbon sequestration have led to companies putting toxic materials into the ground without state agency regulation.¹⁶ As a result, climate misinformation and conspiracy theories are prolific, making trust-building between communities and government agencies difficult.

As local institutions, universities and community nonprofits have an important role to play in building trust between local communities and government agencies. This is especially true when they collaborate with stakeholders to create bottom-up solutions to climate action, in which community members and vulnerable groups are brought into conversation with other stakeholders early in the process and are empowered to lead climate adaptation and mitigation efforts. In the Gulf Coast region, one

13. Suhina Deol and Bonnie Colby, “Tribal Economies: Water Settlements, Agriculture, and Gaming in the Western US,” *Journal of Contemporary Water Research and Education* 163 (1) (2018): 45–63, <https://doi.org/10.1111/j.1936-704X.2018.03269.x>.

14. Simi Kang, “They’re Killing Us, and They Don’t Care’: Environmental Sacrifice and Resilience in Louisiana’s Cancer Alley,” *Resilience: A Journal of the Environmental Humanities* 8 (3) (2021): 98–125, <https://doi.org/10.1353/res.2021.0001>.

15. Madeline Marguerite Byers, “Houston, We Have a Gentrification Problem: The Gentrification Effects of Local Environmental Improvement Plans in the City of Houston,” *Texas A&M Journal of Property Law* 7 (2021): 163–198, <https://doi.org/10.37419/JPL.V7.I2.2>.

16. Celeste Murphy-Greene, ed., *Environmental Justice and Resiliency in an Age of Uncertainty* (New York: Routledge, 2022), <https://doi.org/10.4324/9781003186076>.

example of this is the Terrebonne Parish Adaptation Strategy, which generated parish-wide, community-driven adaptation strategies for residents to prepare for anticipated environmental changes.¹⁷ In general, however, national and regional institutions often fail to capitalize on the very qualities of local institutions—their competence, influence, and the respect afforded to them by local stakeholders—that can help generate confidence in data-driven climate solutions. While identification of other exemplars, such as the State of Louisiana’s Coastal Master Plan, is important, more work is needed at the state and federal levels to turn scattered successes into a national strategy.¹⁸

17. Marla Nelson, Renia Ehrenfeucht, Traci Birch, and Anna Brand, “Getting By and Getting Out: How Residents of Louisiana’s Frontline Communities Are Adapting to Environmental Change,” *Housing Policy Debate* 32 (1) (2022): 84–101, <https://doi.org/10.1080/10511482.2021.1925944>.

18. Eric Nost, “Climate Services for Whom? The Political Economics of Contextualizing Climate Data in Louisiana’s Coastal Master Plan,” *Climatic Change* 157 (1) (2019): 27–42, <https://doi.org/10.1007/s10584-019-02383-z>.

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