

# Competition and Collaboration in the Environmental Security Domain

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## Abstract

Rising temperatures are redrawing the map of global power. *Climate space*, the environmental security landscape within this new geopolitical system, demands a fresh approach to securing our future. Analyzing the US–China dynamic in this domain, this study traces how security strategies have evolved (culminating in the 2022 *US National Security Strategy*) to address climate-induced threats. It then explores the delicate dance between competition and collaboration necessary for environmental security in this emergent system. Notably, cooperation—even with rivals—becomes key to national security. This challenges traditional thinking, potentially requiring a paradigm shift where securing the environment supersedes geopolitical rivalries. Creating a controlled space for competition within environmental security could be a critical step toward this paradigm shift, ultimately safeguarding national interests in a climate-altered world.

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Climate change, as an emergent phenomenon, alters the dimensions of the geopolitical system. Over the past half-century, the impacts of climate change have garnered increasing international attention. In 1974, the UN General Assembly tasked the World Meteorological Organization (WMO) with studying climate change. In 1979, the WMO convened a World Climate Conference, alerting nations worldwide to “foresee and prevent potential man-made changes in climate that might be adverse to the well-being of humanity.”<sup>1</sup> In 1988, the WMO, in collaboration with the UN Environment Programme (UNEP), established the Intergovernmental Panel on Climate Change (IPCC) to review science-based knowledge of climate change and recommend response strategies.

The IPCC’s first assessment report in 1990 found that greenhouse gas emissions were a likely contributor to global warming. It characterized *climate change* as “a challenge with global consequences and requiring international cooperation.”<sup>2</sup> This report facilitated negotiations leading to the UN Framework Convention on Climate Change (UNFCCC) in 1992, providing a structure for such cooperation. By

<sup>1</sup> John W. Zillman, “A History of Climate Activities,” *World Meteorological Organization, Bulletin* 58, no. 3 (2009), <https://public-old.wmo.int/>.

<sup>2</sup> IPCC. “History of the IPCC,” n.d., <https://www.ipcc.ch/>.

2023, the IPCC's Sixth Assessment Report declared climate change to be "a threat to human well-being and planetary health."<sup>3</sup>

Concurrently, China's ascent as a regional and global power was reshaping the dimensions of the geopolitical system. In 1971, the current government of China gained recognition as China's representative in the UN. By 2010, China's gross domestic product surpassed that of Japan, making it the world's second-largest economy. Around 2014, China's navy became the largest military fleet globally in terms of the number of vessels.<sup>4</sup> In 2023, the US Department of Defense (DOD) summarized the trajectory of Chinese military modernization: "The PLA's [People's Liberation Army] evolving capabilities and concepts continue to strengthen the PRC's [People's Republic of China] ability to 'fight and win wars' against a 'strong enemy (强敌)' (a likely euphemism for the United States), counter an intervention by a third party in a conflict along the PRC's periphery, and project power globally."<sup>5</sup>

China and the United States currently stand as the world's largest national economies, boasting gross domestic products (GDP) of USD 18 trillion and USD 26 trillion, respectively. Together, they constitute 46 percent of the global economy.<sup>6</sup> These economic powerhouses also underpin the largest national defense establishments, estimated to be funded at USD 292 billion and USD 877 billion, making up 48 percent of the world's total.<sup>7</sup> Additionally, both countries are the planet's leading contributors to greenhouse gas emissions, with 12 gigatons and 5 gigatons of CO<sub>2</sub> emissions, respectively, accounting for about 46 percent of the world's total in 2022.<sup>8</sup>

The US security sector has historically grappled with the challenges of great-power rivalry since the Revolutionary War. However, the emergence of climate change presents a novel and distinctive challenge. In 2021, US Secretary of Defense Lloyd Austin labeled climate change as an existential threat, stating, "Today, no nation can find lasting security without addressing the climate crisis. We face all kinds of

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<sup>3</sup> Intergovernmental Panel on Climate Change, *AR 6 Synthesis Report: Headline Statements*, 2023, <https://www.ipcc.ch/>.

<sup>4</sup> Andrew Scobell and Alex Stephenson, "Five Things to Know About China's Armed Forces," United States Institute of Peace, 2 August 2023, <https://www.usip.org/>.

<sup>5</sup> *Military and Security Developments Involving the People's Republic of China, 2023*, Report to Congress (Washington, DC: US Department of Defense, 2023), v, <https://media.defense.gov/>.

<sup>6</sup> "The 20 countries with the largest gross domestic product (GDP) in 2022" *Statista*, 2022, <https://www.statista.com/>.

<sup>7</sup> *SIPRI Military Expenditure Database*, 2023, <https://www.sipri.org/>.

<sup>8</sup> IEA, "CO<sub>2</sub> Emissions in 2022," March 2023, <https://www.iea.org/>.

threats in our line of work, but few of them truly deserve to be called existential. The climate crisis does.”<sup>9</sup>

If climate change is recognized as a transnational threat to human existence and, consequently, national security, it is indeed reshaping the dimensions of the geopolitical system, as discussed below. Climate change disrupts traditional conceptions of national security by reconfiguring the geopolitical system and making traditional security concepts and practices, evolved and attuned to historical cases, less relevant to the emerging situation.

This study delves into the challenges and potential collaborations between rivals within the emerging security paradigm. It traces the evolving understanding of climate change within the US security sector over the past 40 years, ultimately framing it as a security issue. The examination extends to the contemporary response to China’s ascent as a global power, as reflected in US national security documents.

Subsequently, the study introduces and applies the concept of an environmental security domain, situated within the broader geopolitical system. This lens is employed to scrutinize the US national security strategy as it grapples with diverse security threats. The study poses a pivotal question: “Can a national security strategy be sustainable if it embraces traditional geopolitical competition between rival powers while simultaneously pursuing cooperation to address a global existential threat?”

### **Climate Change, China, and US National Security Strategy**

Before the current century, climate change received minimal attention from the US security sector. Its primary focus on environmental issues was twofold: assessing their impacts on military readiness and operations, and engagement in humanitarian assistance and disaster relief missions.

Climate change initially entered the national discourse not as a security concern but as a scientific endeavor. The first US DOD document to recognize climate change as a potential security threat was published in 2000, during the Clinton administration. Titled *U.S. Department of Defense: Climate Change, Energy Efficiency, and Ozone Protection*, it asserted, “Changes in the global climate and depletion of the Earth’s stratospheric ozone protection layers can have national and global implications, particularly on environmental, political, social, and economic structures. . . . As climate change affects the structures mentioned above, DoD is work-

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<sup>9</sup> David Vergun, “Defense Secretary Calls Climate Change an Existential Threat,” *DOD News*, 22 April 2021, <https://www.defense.gov/>.

ing to understand where and under what circumstances environmental issues may contribute to economic, political, and social instability and conflict.”<sup>10</sup>

A decade later, the Obama administration issued the inaugural American policy document characterizing climate change as a security threat. The 2010 *Quadrennial Defense Review* (QDR) identified climate change as a “key issue” shaping the future security environment.<sup>11</sup> The DOD’s perspective was further elucidated in the same year in the *National Security Strategy*, proclaiming, “The danger from climate change is real, urgent, and severe. The change wrought by a warming planet will lead to new conflicts over refugees and resources; new suffering from drought and famine; catastrophic natural disasters; and the degradation of land across the globe.”<sup>12</sup>

The 2010 QDR did not depict China as a security threat, nor did it adopt a policy of strategic competition. However, it acknowledged the potential for conflict arising from China’s growing influence in regional and global affairs. Instead, the QDR emphasized cooperation, asserting, “Our relationship with China must therefore be multidimensional and undergirded by a process of enhancing confidence and reducing mistrust in a manner that reinforces mutual interests.”<sup>13</sup> Similarly, the 2010 *National Security Strategy* proclaimed, “We will not agree on every issue, and we will be candid on our human rights concerns and areas where we differ. But disagreements should not prevent cooperation on issues of mutual interest, because a pragmatic and effective relationship between the United States and China is essential to address the major challenges of the 21st century.”<sup>14</sup>

Five years later, in 2015, the Obama administration’s *National Security Strategy* elevated the management of climate change to one of eight national strategic goals.<sup>15</sup> While acknowledging China as a potential competitor, the document aimed to moderate potential conflict, stating, “While there will be competition, we reject the inevitability of confrontation. At the same time, we will manage competition from a position of strength while insisting that China uphold international rules and norms on issues ranging from maritime security to trade and human rights. We will closely monitor China’s military modernization and expand-

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<sup>10</sup> *Climate Change, Energy, and Ozone Protection* (Washington, DC: DOD, 2000), <https://p2infohouse.org/>.

<sup>11</sup> *Quadrennial Defense Review* (Washington, DC: DOD, February 2010), 84, <https://dod.defense.gov/>.

<sup>12</sup> *National Security Strategy* (Washington, DC: The White House, May 2010), 47, <https://history.defense.gov/>.

<sup>13</sup> *National Security Strategy*, 2010, 60.

<sup>14</sup> *National Security Strategy*, 2010, 43.

<sup>15</sup> *National Security Strategy* (Washington, DC: The White House, February 2016), 12, <https://obamawhitehouse.archives.gov/>.

ing presence in Asia, while seeking ways to reduce the risk of misunderstanding or miscalculation.”<sup>16</sup>

The Trump administration marked a significant shift in tone and perspective in its security strategy documents. The 2017 *National Security Strategy* declared a “competitive world,” in which, “China and Russia challenge American power, influence, and interests, attempting to erode American security and prosperity.”<sup>17</sup> In 2018, the *National Defense Strategy*, succeeding the *QDR*, assessed that, “China is a strategic competitor using predatory economics to intimidate its neighbors while militarizing features in the South China Sea.”<sup>18</sup> It emphasized, “Long-term strategic competitions with China and Russia are the principal priorities for Department.”<sup>19</sup> However, neither document acknowledged climate change as a security threat, and Pres. Donald Trump withdrew the United States from the UNFCCC’s Paris Accords.

Upon assuming office in 2021, the Biden administration reentered the Paris Accords and issued Executive Order 14008, positioning climate change at the forefront of US foreign policy and national security:

The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents. Domestic action must go hand in hand with United States international leadership, aimed at significantly enhancing global action. Together, we must listen to science and meet the moment.<sup>20</sup>

The administration aimed to address the dual challenges posed by the rise of China and the emergence of climate change by formulating a security strategy that simultaneously embraced competition in the traditional security domain and cooperation in the environmental security domain. The 2022 *National Security Strategy* declared, “We will prioritize maintaining an enduring competitive edge over the PRC. . . . At the same time, the PRC is also central to the global economy and has a significant impact on shared challenges, particularly climate change and global

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<sup>16</sup> *National Security Strategy*, 2016, 24.

<sup>17</sup> *National Security Strategy of the United States of America* (Washington, DC: The White House, December 2017), 2, <https://history.defense.gov/>.

<sup>18</sup> *Summary of the 2018 National Defense Strategy of the United States of America* (Washington, DC: DOD, 2018), 1, <https://history.defense.gov/>.

<sup>19</sup> *Summary of the 2018 National Defense Strategy of the United States of America*, 4.

<sup>20</sup> Executive Order 14008, Tackling the Climate Crisis at Home and Abroad, 27 January 2021, <https://www.regulations.gov/>.

public health. It is possible for the United States and the PRC to coexist peacefully, and share in and contribute to human progress together.”<sup>21</sup>

In the pursuit of national security, the United States Government has presented a strategy that seeks to balance competition and cooperation across various domains of the geopolitical system. This undertaking is challenging and, perhaps, inherently contradictory. In his cover letter to the 2022 *National Security Strategy*, Pres. Joe Biden acknowledged the difficulty, stating, “We are in the midst of a strategic competition to shape the future of the international order. Meanwhile, shared challenges that impact people everywhere demand increased global cooperation and nations stepping up to their responsibilities at a moment when this has become more difficult.”<sup>22</sup>

The challenge primarily arises from the emergence of a new, unprecedented type of security threat within the geopolitical system. Throughout history, nations have engaged in competition with rivals and cooperation with allies. However, if climate change is recognized as an existential crisis for humankind, then cooperating with rivals becomes essential to achieve national security goals. This concept of collaboration with rivals contradicts traditional security strategies.

### **Approach: The Environmental Security Domain in a Complex Geopolitical System**

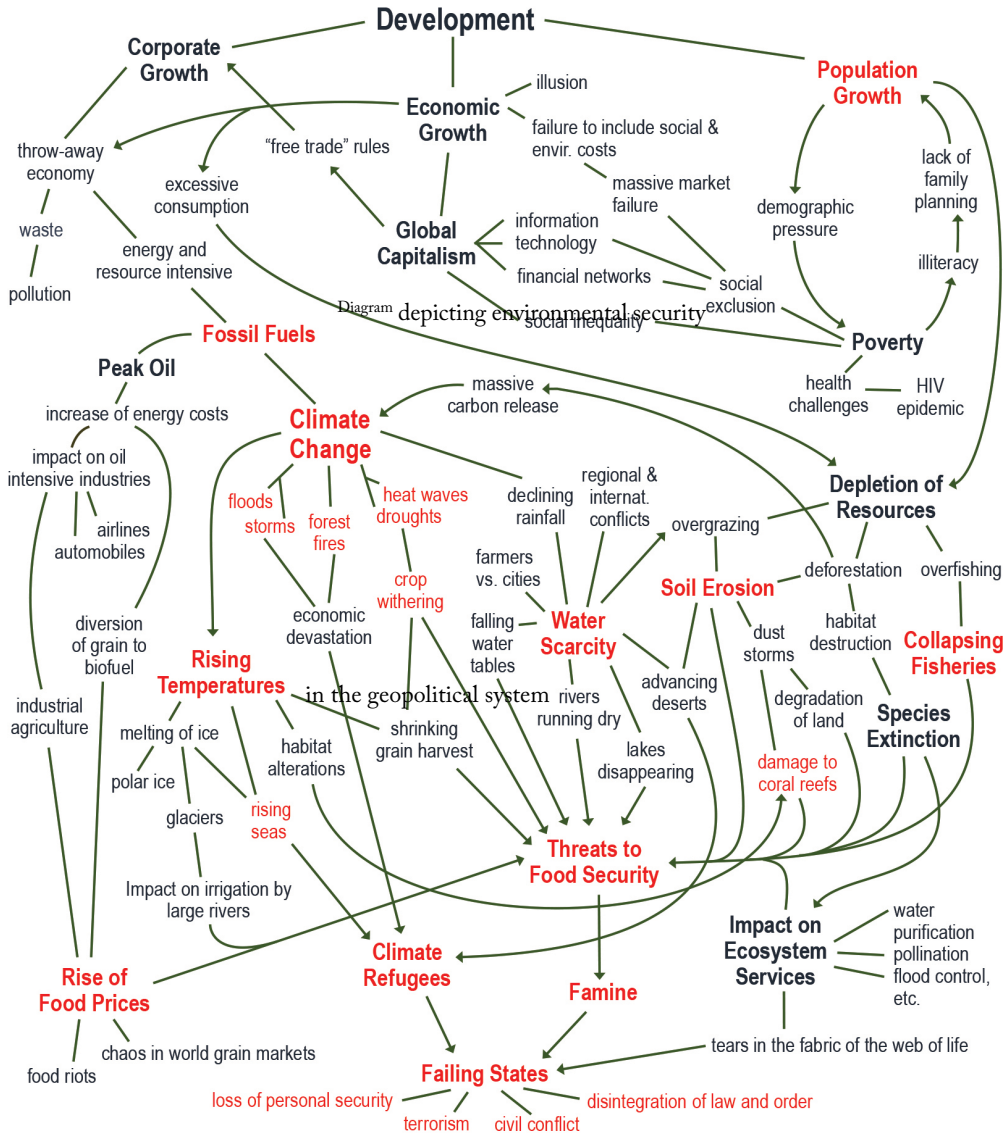
To gain a deeper understanding of the security challenges posed by climate change, envisioning the components of a geopolitical system proves beneficial. Figure 1 illustrates a conceptual diagram of the global system, where nations actively pursue their geopolitical interests. The diagram emphasizes elements intricately linked to environmental security, profoundly affected by climate change. While various choices for selecting and interrelating elements in the model exist, this representation, influenced by Fritjof Capra’s model, encapsulates the concept that climate change significantly influences the geopolitical system.<sup>23</sup>

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<sup>21</sup> *National Security Strategy* (Washington, DC: The White House, October 2022), 23–24, <https://www.whitehouse.gov/>.

<sup>22</sup> Joseph Biden, cover letter to *National Security Strategy*, 12 October 2022, <https://www.whitehouse.gov/>.

<sup>23</sup> Adapted from Fritjof Capra, “Interconnectedness of World Problems: A Conceptual Map,” n.d., <http://slideplayer.com/>.



**Figure 1. Environmental security in the geopolitical system.**<sup>24</sup>

<sup>24</sup> While its focus is on the security impacts of climate change, this discussion uses the term *environmental security* throughout, except where cited sources use the term, *climate security*. UNEP’s website (Home/LEO Thesaurus) states that “Environmental security examines threats posed by environmental events and trends to individuals, communities or nations.” <https://leap.unep.org/>. As illustrated in figures 1 and 2, climate change is an environmental trend, and its human and societal impacts are felt through events presented by the related environmental phenomena such as drought and sea level rise. Given a systems approach to the security issues presented by climate change, the term *environmental security* seems to be most appropriate to the discussion.

To analyze environmental security issues within this intricate system, it is crucial to concentrate on the variables of utmost relevance and establish connections between environmental phenomena and their observable security consequences. Figure 2 introduces a conceptual model of such a domain.

The primary security threat posed by climate change is the escalation and heightened intensity of natural disasters resulting from global warming effects. The upper section of the model underscores the relationships between environmental phenomena and their impacts on human security. It asserts that national security is closely tied to the human security of the population, and the stability of regions and the globe is influenced by conditions at the national level.

The lower portion of the model outlines the actions available to policy makers to counter these threats. Its components align with the well-known disaster management cycle, with the addition of knowledge creation as a fitting response to an emerging threat. The arrows connecting the upper and lower sections signify that observations of phenomena and their impacts inform policy, and policy implementation can effectively manage the impacts of climate change.

The variables within the framework model are categorical, necessitating analysts to select and define specific variables of interest from within relevant categories that address the specific problem at hand. The depicted categories are not exhaustive but representative, and they are not necessarily discrete. Like other elements in the complex geopolitical system, they may possess overlapping or indistinct boundaries that fluctuate over time.

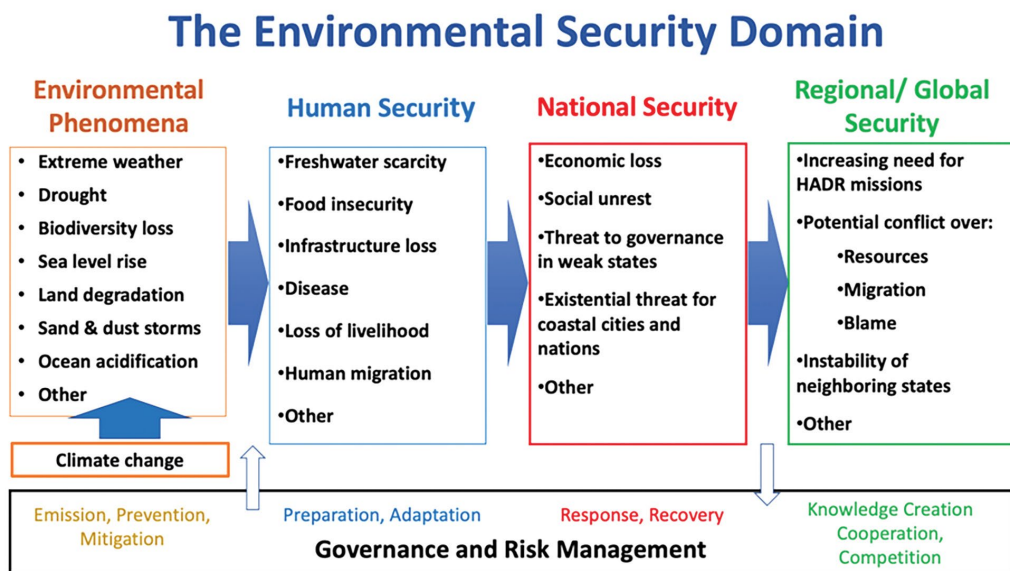


Figure 2. A Conceptual model of the environmental security domain



## Exploring the Environmental Security Domain

The conceptual model of an environmental security domain establishes a framework to examine the intersections of climate change and the rise of China within a complex geopolitical system. It facilitates the exploration of potential security strategies involving both competition and cooperation within this domain. It is important to note that this discussion of competition and cooperation in the environmental security domain is exploratory. Given the numerous variables in the domain, a comprehensive study is not feasible in this preliminary exploration.

### *Mitigation of Environmental Phenomena*

Climate change alters various environmental phenomena in ways that pose threats to human well-being and societal stability. A few examples include heat trapped by greenhouse gases causing thermal expansion of the oceans and melting ice caps, leading to sea level rise and coastal inundation. Warmer oceans result in increased evaporation, precipitation, and subsequent flooding. Elevated air temperatures can directly impact human health. As atmospheres and oceans are fluid and global, greenhouse gas emissions from any location can have environmental impacts elsewhere.

How do nations cooperate or compete to enhance their security by mitigating the destructive phenomena associated with climate change? The UNFCCC has served as an arena for cooperation in the environmental security domain since its ratification in 1992. The United States played a significant role in crafting the convention. Later, US Vice Pres. Al Gore played a crucial role in negotiating the 1997 Kyoto Protocol, which proposed legally binding limits on greenhouse gas emissions for developed countries but not for developing ones, including China. Although the US government signed the protocol, the Senate did not ratify it, fearing it conferred an unfair advantage to China.<sup>25</sup>

In November 2015, the Paris Accords to UNFCCC sought to overcome this concern by replacing mandated emission targets with intended nationally determined contributions (INDC) proposed by each signatory. The accords were enabled by an advance agreement by Pres. Barack Obama and Chinese president Xi Jinping, “emphasizing their personal commitment to a successful climate agreement in Paris and marking a new era of multilateral climate diplomacy.”<sup>26</sup> The United States

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<sup>25</sup> Aarthi S. Anand, “The Importance of Being Factual: The U.S., China, and the Future if the Kyoto Protocol,” *Duke Environmental Law and Policy Forum* 24, no. 1 (Fall 2013), 8, <https://scholarship.law.duke.edu/>.

<sup>26</sup> “U.S.-China Joint Presidential Statement on Climate Change” (press release, The White House, 25 September 2015), <https://obamawhitehouse.archives.gov/>.

joined the agreement through executive action in September 2016. However, in January 2017, President Trump announced the US withdrawal from the accord, citing the competitive advantage it granted to China. In August 2022, climate collaboration faced a similar fate in the realm of geopolitical competition when China suspended its dialogue with the United States on climate issues in response to Speaker of the House Nancy Pelosi's visit to Taiwan.

Unregulated competition in other domains poses a threat to environmental security, particularly activities that increase greenhouse gas emissions. China's ascent to industrial power and domestic prosperity under a fossil fuel regime, mirroring the historical rise of the West, has inevitably intensified the climate threat. If nations persist in pursuing such gains through unrestricted or unsustainable development, such competition will contribute to an escalating climate threat.<sup>27</sup>

The DOD and its component services have committed to reducing greenhouse gas emissions in alignment with national goals, although they fundamentally prioritize mission objectives over emission reduction. As Assistant Secretary Ravi Chaudhary articulated in his cover letter to the *2023 Air Force Climate Campaign Plan*, "The Department of the Air Force exists for one purpose—deter our nation's adversaries—and if called upon, fly, fight, and win across multiple air and space domains." He further emphasizes, "Ultimately, this [Climate] Campaign Plan is about warfighting and responding at the point of effect for theater commanders."<sup>28</sup> This plan, akin to other DOD plans, concentrates on adapting facilities and operations to enhance the pursuit of traditional security goals under changing climate conditions. Climate mitigation assumes a lower priority. In essence, at the present time, environmental security is subordinate to traditional security, and structural preferences favor strategic competition over environmental cooperation.

There are, however, constructive ways to conceptualize competition among rivals in managing environmental phenomena. In other words, "friendly" competition can yield net positive benefits for rivals and global stakeholders. As an illustration of soft power, nations may engage in competition to surpass rivals in meeting or exceeding the emission goals of the Paris Accords or in providing assistance to developing nations to adapt to climate change.

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<sup>27</sup> This discussion is based upon the author's understanding of the science-based assessments of the Intergovernmental Panel on Climate Change (IPCC). Summary information may be found at: IPCC, "Summary for Policymakers," in *Climate Change 2023: Synthesis Report, 2023*, <https://www.ipcc.ch/>.

<sup>28</sup> *Department of the Air Force Climate Campaign Plan* (Washington, DC: Department of the Air Force, July 2023), i, <https://www.af.mil/>.

## ***Human Security—Preparation and Adaptation***

Governments have consistently prioritized preparedness for natural disasters, and security sector agencies have long shouldered responsibilities for disaster preparedness. In the United States, Congress assigned flood control projects nationwide to the Army Corps of Engineers in 1936.<sup>29</sup> Responsibilities in other areas, such as food security, rest with civil sector agencies like the Department of Agriculture.

The complexity of the geopolitical system and its interconnections between development and security has led to evolving boundaries and missions for the security sector over time. USAID, for instance, highlights on its website that “US-AID and the Department of Defense have been partners since the 1960s.”<sup>30</sup> Today, USAID officers serve on US Indo-Pacific Command’s (USINDOPACOM) staff, and in August 2023, USAID Administrator Samantha Power addressed the command’s Chiefs of Defense Conference, discussing “how defense and development actors can work together to combat perhaps the greatest threat to lasting peace: the existential threat of climate change.”<sup>31</sup> Between 2014 and 2018, USAID provided nearly USD 400 million in climate adaptation assistance to developing nations. Funding was briefly halted during the Trump administration but resumed under Congressional initiative in 2020.<sup>32</sup> Thus, adaptation can be a cooperative security enterprise.

At the international level, several United Nations agencies leverage members’ assets to offer development assistance. For instance, the UNFCCC established a Green Climate Fund to support mitigation and adaptation projects in developing countries, funding USD 2 billion in new projects in 2023.<sup>33</sup> The United States has been a significant contributor to this fund.<sup>34</sup>

While the policy framework exists for American mil-to-mil cooperation in climate adaptation projects, a web search reveals few, if any, ongoing projects with rival nations. The 2023 *U.S. Air Force Climate Campaign Plan*, for instance, commits to collaborating with allies and partners to “strengthen international collaboration

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<sup>29</sup> Joseph L. Arnold, *The Evolution of the 1936 Flood Control Act* (Washington, DC: Office of History, United States Army Corps of Engineers, 1988), <https://www.publications.usace.army.mil/>.

<sup>30</sup> USAID, “Office of Civilian-Military Cooperation,” n.d. <https://www.usaid.gov/>.

<sup>31</sup> Samantha Power, “Administrator Samantha Power Speaks at the U.S. Indo-Pacific Command Chiefs of Defense (CHOD) Conference” (speech, USAID, 16 August 2023), <https://www.usaid.gov/>.

<sup>32</sup> “Climate Change: ‘USAID Is Taking Steps to Increase Projects’ Resilience, but Could Improve Reporting of Adaptation Funding,” GAO-20-555 (Washington, DC: GAO, July 2020), <https://www.gao.gov/>.

<sup>33</sup> “Green Climate Fund: USD 736 million for new projects and readiness strategy to accelerate climate action” (press release, Green Climate Fund, 26 October 2023), <https://www.greenclimate.fund/>.

<sup>34</sup> Joe Thwaites, “Green Climate Fund Pledge Tracker,” National Resources Defense Council, 5 October 2023, <https://www.nrdc.org/>.

on climate change through military-to-military engagements and bilateral and multilateral agreements.”<sup>35</sup> However, its cover letter emphasizes that the USAF exists for the singular purpose of deterring the nation’s adversaries, and the plan does not address potential cooperation with rival China.

Development assistance can evolve into a competitive enterprise. In 2021, Jennifer Hillman and Alex Tippettt urged the United States to challenge China to “green” its Belt and Road Initiative (BRI).<sup>36</sup> In 2022, USINDOPACOM’s Center for Excellence in Disaster Management observed that China is seeking increased geostrategic influence in Oceania by providing assistance to countries concerned about the impacts of climate change. The report recommended that the United States should compete with China for such influence, noting that “the U.S. has so far established a better track record of supporting climate initiatives and could stand apart by increasing investments in climate-related activities.”<sup>37</sup>

In contrast, in 2018, Scott Morris of the Center for Global Development observed that Cold War competitive pressures were resurfacing in response to China’s BRI. He suggested that “Rather than seek to lure countries away from China’s money,” US policy would do well to recognize it as a reality and seek to reform its problematic features. Achieving that,” he advised, “will require cooperation, with like-minded countries—of which there are many—and with the Chinese themselves.”<sup>38</sup>

Morris’ perspective suggests a distinction between benign and destructive competition. Similar to competitive sports or international military games, rules-based competition can mitigate the destructive elements of unbridled competition and foster positive outcomes for all competitors in the geopolitical environment. One can envision, for example, robust military-to-military agreements to cooperate in a rules-based competition aimed at enhancing developing nations’ preparation and adaptation to the threats of climate change.

### ***National Security—Response and Recovery***

In the environmental security domain, national security hinges on the effectiveness of mitigation and adaptation strategies employed by multiple actors. If miti-

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<sup>35</sup> *Department of the Air Force Climate Campaign Plan, 2.*

<sup>36</sup> Jennifer Hillman and Alex Tippettt, “The Climate Challenge and China’s Belt and Road Initiative,” *Council on Foreign Relations* (blog), 31 March 2021, <https://www.cfr.org/>.

<sup>37</sup> Emilio A. Moreno, “China’s Foreign Humanitarian Assistance as a Tool of Strategic Influence in Oceania,” *Center for Excellence in Disaster Management & Humanitarian Assistance*, January 2022, 13, <https://www.cfe-dmha.org/>.

<sup>38</sup> Scott Morris, “What happens when development cooperation becomes development competition,” *Brookings Commentary*, 16 November 2018, <https://www.brookings.edu/>.

gation and adaptation measures fail to reduce the threat, disaster relief becomes the responsibility of national governments. Conventionally and in practice, international disaster relief is provided upon the request of sovereign states and is subject to their coordination and regulation.<sup>39</sup>

In the United States, the security sector has long played a crucial role in humanitarian assistance and disaster relief (HADR) missions. Military resources, including equipment, personnel, and expertise, have frequently been vital assets for responding to natural disasters. In the late nineteenth century, the US Army Corps of Engineers first engaged in domestic disaster relief missions in reaction to catastrophic floods in the Mississippi River Valley and Johnstown, Pennsylvania.<sup>40</sup> Throughout the first half of the twentieth century, the War and Navy Departments routinely contributed supplies and provided transportation for humanitarian aid overseas. Between 1900 and 1945, US military personnel participated in relief efforts for survivors of floods, earthquakes, and tropical storms in numerous nations worldwide.<sup>41</sup> HADR missions, managed in-country by USAID, now stand as standing missions for US combatant commands.

In China, flood fighting and emergency rescue are the responsibilities of 19 national teams, with the PLA and the Armed Police Hydropower Troops serving as the main task force.<sup>42</sup> The PLA has held the responsibility to assist in major natural disasters since the founding of the PRC in 1949.<sup>43</sup> Since 2003, China has deployed an International Search and Rescue Team in response to natural disasters globally.<sup>44</sup> In the twenty-first century, China and the United States have consistently engaged in cooperative disaster response training. From 2005 through 2020, the US Army Pacific (USARPAC) and the PLA conducted an annual Disaster Management Exchange (DME) to explore how they might respond to a large-scale

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<sup>39</sup> See for example, International Committee of the Red Cross, "Guidelines for the Domestic Facilitation and Regulation of International Disaster Relief and Initial Recovery Assistance," November 2007, <https://www.icrc.org/>.

<sup>40</sup> US Army Corps of Engineers, "A Brief History," n.d., <https://www.usace.army.mil/>.

<sup>41</sup> Julia F. Irwin, "The Origins of U.S. Foreign Disaster Assistance," *American Historian*, n.d., <https://www.oah.org/>.

<sup>42</sup> Ministry of Water Resources, People's Republic of China, *Flood Control, Drought Relief and Disaster Mitigation in China*, undated, sections 1.3 and 2.2, <http://www.mwr.gov.cn/>.

<sup>43</sup> Dou Ding, "PLA's Disaster Relief Works: Review and Reform," *East Asian Policy* 2, no. 3 (July–September 2010), 49–57, <https://research.nus.edu.sg/>.

<sup>44</sup> Steven A. Zyck, "Crisis preparedness and response: the Chinese way," *ODI Creative Commons*, n.d., <https://odi.org/>.

natural disaster in a third country.<sup>45</sup> Recent “exchanges have included field exercises, or practical field exchange.”<sup>46</sup> China and the United States also regularly participate in multinational exercises, notably Cobra Gold, hosted by Thailand.<sup>47</sup>

However, cooperation for disaster response in the environmental security domain has been influenced by other events in the geopolitical arena. During the Trump administration, from 2017 through 2020, DME remained the sole bilateral exercise between the two nations.<sup>48</sup> The exchange was conducted remotely in 2020, during the COVID epidemic, and was not held in 2021.<sup>49</sup> In 2022, in response to Speaker of the House Nancy Pelosi’s visit to Taiwan, China suspended the exchange and also canceled bilateral climate change talks at the national level. Thus, environmental security cooperation was subordinated to competition in the broader geopolitical arena.

Nevertheless, such pauses in environmental security cooperation have proven to be reversible. In November 2022, Climate Envoys John Kerry and Zhenhua Xie resumed informal climate discussions, and in November 2023, announced that the rivals would resume formal climate talks.<sup>50</sup> Subsequently, President Biden and President Xi agreed to resume mil-to-mil communications, including at the combatant command (COCOM) level, so we might expect a resumption of DME in 2024.

### ***Regional and Global Security—Knowledge Production***

Both China and the United States engage in global-level treaties and agreements to address the threat of climate change. In fact, bilateral agreements between the US and Chinese governments have frequently preceded and facilitated international agreements. In November 2014, for instance, President Xi and President Obama

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<sup>45</sup> Angela Kershner, “China, US Disaster Management Exchange,” *PACOM News*, 15 January 2015, <https://www.pacom.mil/>; and Oliver Schuster, “US-China hold 15th Annual Disaster Management Exchange,” US Army, 27 November 2019, <https://www.army.mil/>.

<sup>46</sup> For a short video of the 2019 exercise, see, First Army, “U.S.–China Disaster Management Exchange,” 23 November 2019, <https://www.first.army.mil/>.

<sup>47</sup> Li Jiayao, “Cobra Gold 2022 HADR Exercise Wraps Up,” *China Military*, 3 March 2022, <http://eng.chinamil.com.cn/>; and Grant Peck, “Thailand, US resume Cobra Gold exercises at full scale,” *Military Times*, 28 February 2023, <https://www.militarytimes.com/>.

<sup>48</sup> Caitlin Campbell, *China Primer: U.S.–China Military-to-Military Relations* (Washington, DC: Congressional Research Service, 4 January 2021), <https://crsreports.congress.gov/>.

<sup>49</sup> Kevin Knodell, “American Troops Train Remotely With Chinese Army From Schofield,” *Honolulu Civil Beat*, 10 November 2020, <https://www.civilbeat.org/>; and *Military and Security Developments Involving the Peoples’ Republic of China, 2022* (Washington, DC: DOD, 29 November 2022), 157, <https://media.defense.gov/>.

<sup>50</sup> Christian Shepherd, “In a breakthrough, U.S. and China agree to restart climate talks,” *Washington Post*, 15 November 2023, <https://www.washingtonpost.com/>.

agreed on approaches to the management of climate change, laying the groundwork for the Paris Accords a year later.<sup>51</sup>

On several occasions, these rivals have returned to the negotiating table after lapses caused by geopolitical conflicts. In January 2021, the Biden administration announced that the United States was rejoining the Paris Accords and, in April, hosted a virtual Leaders Summit on Climate attended by 40 world leaders, including President Xi. In November 2022, Xi and Biden announced a return to cooperation following China's withdrawal from climate discussions, which were suspended in response to Speaker Pelosi's visit to Taiwan. As reported by *Climate Home News*,

The US government's summary of the meeting said: "President Biden underscored that the United States and China must work together to address transnational challenges—such as climate change." The Chinese government's summary said the two sides "agree to work together to promote the success of Cop27" and that climate change is one of their "common interests" and is "inseparable from the coordination and cooperation between China and the United States."<sup>52</sup>

Because climate change is an emergent phenomenon and only partially understood, and because mitigation and adaptation strategies can benefit from new technologies, science-based research and development (R&D) become a critical enterprise for addressing environmental security. American and Chinese research institutions have been actively involved in climate-related R&D, spanning from basic research and climate modeling to technology development and the dissemination of renewable energy systems. Working individually, Chinese and American scientists have made significant contributions to IPCC reports.<sup>53</sup>

Chinese and American researchers have also collaborated on issues of climate change. For instance, in 2016-17, Georgetown University and Tsinghua University convened a Georgetown US-China Research Dialogue on Climate Change.<sup>54</sup> In 2021 however, David G. Victor observed that, "Ten years ago, . . . the two countries funded joint research projects and exchanged best practices with regulators and

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<sup>51</sup> "U.S.-China Joint Announcement on Climate Change" (press release, The White House, 11 November 2014), <https://obamawhitehouse.archives.gov/>.

<sup>52</sup> Joe Lo, "Biden and Xi unshackle Cop27 climate teams to formalise talks," *Climate Home News*, 14 November 2022, <https://www.climatechangenews.com/>.

<sup>53</sup> Robert McSweeney, "Analysis: The gender, nationality and institution of IPCC AR6 scientists," *Carbon Brief*, May 2028, <https://www.carbonbrief.org/>.

<sup>54</sup> Georgetown University, Initiative for U.S.-China Dialogue on Global Issues, "Research Group: Climate Change," <https://uschinadialogue.georgetown.edu/>.

academics . . . today that cooperation is gone.”<sup>55</sup> As with national-level climate discussions, joint R&D projects have declined and revived depending on the course of geopolitical competition. In July 2023, in their meeting at Sunnylands, California, climate envoys Kerry and Xie agreed to conduct a policy dialogue on the climate crisis and to “support enterprises, universities, and research institutions of both sides to engage in discussions and collaborative projects.”<sup>56</sup>

Indeed, numerous opportunities exist for cooperative actions to bolster environmental security. These opportunities encompass joint HADR mission planning and execution, proactive planning for climate migration, coordinating support for recovery in affected states, and collaborative research and development across various disciplines. Cooperation between China and the United States has taken place in all these areas—and has at times been disrupted by conflicts in the geopolitical arena. However, these cooperative initiatives have generally been low-key and tentative, and as of now, there have been no sustained and intense research collaborations for environmental security between the rivals.

## **Discussion**

Robert Litwak, Director of International Security Studies at the Woodrow Wilson Center, observed that “New York Times columnist Thomas L. Friedman [has] stated that the central challenge of climate change to humanity is now ‘to manage what is already unavoidable and avoid what will truly be unmanageable.’ To that compelling formulation can be added a corollary reflecting the new nexus: avoiding unconstrained geostrategic competition is a prerequisite for managing the climate threat.”<sup>57</sup>

Litwak here evokes the fundamental way in which climate change is reshaping the geopolitical system: Competition to achieve strategic advantage ceases to be advantageous when its pursuit increases the systemic threat to national security. In the emergent geopolitical system, achieving national security requires constrained competition and cooperation—not only with partners but also with rivals. This seemingly paradoxical situation represents a challenging adjustment to strategic thinking and the conduct of international relations.

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<sup>55</sup> David G. Victor, “Rebuilding US–Chinese cooperation on climate change: The science and technology opportunity,” *Brookings*, 28 October 2021, <https://www.brookings.edu/>.

<sup>56</sup> “Sunnylands Statement on Enhancing Cooperation to Address the Climate Crisis” (press release, Department of State, 14 November 2023), <https://www.state.gov/>.

<sup>57</sup> Robert S. Litwak, “Geostrategic Competition and Climate Change: Avoiding the Unmanageable,” *Insight and Analysis*, 5 September 2021, <https://www.wilsoncenter.org/>.



Over the past decades, US national security strategy has responded to a growing awareness of the dilemma in a series of discontinuous adjustments toward managing the climate threat. The second Obama administration proposed the securitization of climate change and emphasized cooperation with China to address the threat. The Trump administration denied that climate change comprised an existential threat and withdrew from the Paris Accords. The Biden administration has articulated a national security strategy that advocates competition with China across traditional security issues while simultaneously pursuing cooperation to address the transnational threat of climate change.

But how can a national security strategy pursue cooperation to confront a global existential threat while simultaneously embracing traditional geopolitical competition between rival powers? The Biden administration's early climate discussions with China illustrate the dilemma. As reported by Litwak:

Contrasting positions on the nexus—the linkage between geopolitical competition and climate change—were evident in an exchange between Chinese Foreign Minister, Wang Yi and former Secretary of State John Kerry, . . . during his visit to China in August 2021. Wang warned that cooperation on climate change “cannot possibly be divorced” from other geopolitical tensions, while Kerry countered that climate change is neither “a geostrategic weapon” nor “ideological” . . . but “a global, not bilateral, challenge.”<sup>58</sup>

Robert Daly, Director of the Kissinger Institute on China and the United States, observed the ongoing dilemma in 2023, “The broader context of competition makes it difficult for China and the U.S. to engage in any productive form of cooperation on climate change. . . . In fact, both sides are likely to seek military, economic, or political advantages based on the other's climate policies.”<sup>59</sup>

It appears that a fundamental framework, or security paradigm, of geopolitical competition inhibits or subordinates cooperation toward mutually beneficial goals. Indeed, within the U.S. security sector, a competitive mindset often frames the discussion of issues in the environmental security domain. For example, Richard Kidd, Deputy Assistant Secretary of Defense for Environment and Energy Resilience, recently stated that “China has made it very clear that clean energy technology also results in geostrategic power.” Accordingly, “The Defense Department is

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<sup>58</sup> Litwak, “Geostrategic Competition and Climate Change.”

<sup>59</sup> Robert Daly, “China's Climate Security Vulnerabilities,” Wilson Center, 11 April 2023, <https://www.wilsoncenter.org/>.

investing in a range of technologies that will help keep pace with or stay out in front of China.”<sup>60</sup>

As another example, a recent (2023) US Army War College publication advised,

Climate change offers the United States a unique opportunity to flex soft power in Southeast Asia. . . . To counter China’s influence and grow U.S. influence in the region, Indo-Pacific Command should actively plan for operations to respond to and combat climate change. . . . Envisioning climate change within the framework of competing for influence in the region provides opportunities for engagement with nations reticent about closer military cooperation and leverages US-Chinese competition for the betterment of the world.”<sup>61</sup>

Similarly, a recent study sponsored by USINDOPACOM’s Climate Change Impacts Program addressed the topic of “Great Power Competition and Climate Change” in this way: “Climate change adds another layer of complexity to this competition as countries compete to secure resources and influence vulnerable communities (while others look to exploit these communities).”<sup>62</sup>

Cooperation with China to address transnational issues is a salient element of U.S. national security strategy. Yet, in practice, given an underlying competitive framework, security sector collaborations for environmental security are mostly limited to projects with allies and partners. The *Department of Defense Climate Action Plan*, for example, designates one of its five lines of effort to “Enhance adaptation and resilience through collaboration.” It calls for cooperation with allies and partners, but it overlooks the possibility of cooperation with rivals such as China as if they do not share common interests in environmental security.<sup>63</sup>

Although the highest-level U.S. security policy documents acknowledge climate change to be an existential threat, the security sector as a whole has yet to experience a paradigm shift that sees cooperation with rivals as a principal mission and pathway to national security. The concept of a paradigm shift can be helpful toward

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<sup>60</sup> David Vergun, “U.S. Should Not Surrender Clean Energy Technology to China, DOD Official Says,” *DoD News*, 25 August 2022, <https://www.defense.gov/>.

<sup>61</sup> Catherine A. Reppert, “Climate Change: An Opportunity for INDOPACOM,” *Parameters* 53, no. 1 (2023), 78–79, <https://press.armywarcollege.edu/>.

<sup>62</sup> Joseph Green et al., *Indo-Pacific 2050 Climate Change Impact Analysis* (Honolulu: Pacific Disaster Center, 2023), 54, <https://www.cfe-dmha.org/>.

<sup>63</sup> *Department of Defense Draft Climate Adaptation Plan*. Report Submitted to National Climate Task Force and Federal Chief Sustainability Officer (Washington, DC: DOD, 1 September 2021), <https://www.sustainability.gov/>.

resolving the dilemma that a fundamental framework of unconstrained competition inhibits cooperation toward mutually beneficial goals.

A *paradigm* is a fundamental framework of knowledge—assumptions, principles, and methods—within which the members of a knowledge community work. Thomas Kuhn characterized a paradigm as knowledge expressed through practice—a community’s way of knowing and doing things. Paradigm shifts, then, require more than a change in policy. They involve a radical and integral change in professional understanding and practice—in our way of doing things.<sup>64</sup>

As we have seen, US–China relations in the geopolitical domain have been characterized by a competition of rivals in a largely zero-sum game. Cooperation for mutual benefit has been subordinate to the contingencies of competition. The logic of an emergent, global, existential threat implies the possibility, even a necessity, of a paradigm shift in the security sector’s knowledge and practice, where win-win cooperation becomes the fundamental relationship and competition the subordinate relationship. Such a seismic change in worldview cannot be an easy one.

According to Kuhn, paradigm shifts are not simple events, nor is the adoption of a new paradigm merely a subject of logical persuasion, in part because the integrity of a paradigm is based on the historically successful practices and vested interests of the knowledge community. Comparative evaluation of paradigms is complicated because knowledge that makes rational sense within the historical paradigm may be incoherent in the emergent paradigm and vice versa. There may be no external criteria or authority for the comparative evaluation of alternative paradigms. Sometimes a generational change is required for a knowledge community to change its way of knowing things. Kuhn quotes an observation of Max Planck, “A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.”<sup>65</sup>

Kuhn’s concept of a paradigm shift in scientific knowledge and practice serves as an exemplar that elucidates the dilemma of security practice, as identified by Litwak and others. It emphasizes that there are significant intellectual, social, and psychological barriers to the security sector’s adoption and implementation of a strategy that calls for cooperation between rivals—or even recognition that a change in security practice is desirable or needed. It implies that we should anticipate

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<sup>64</sup> Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 50th ed. (Chicago: University of Chicago Press, 2012).

<sup>65</sup> Kuhn, *The Structure of Scientific Revolutions*, 151.

significant inertia and resistance to change, even if change seems to be logically entailed, because such entailment is paradigm-dependent.<sup>66</sup>

In the case at hand, however, there are some factors that may facilitate the possibility of a paradigm shift:

1. There is an external referent for the comparison of candidate paradigms—the empirical impacts of climate change on the environmental security domain. If science-based climate change scenarios are predictive, the existential threat to security will become increasingly clear, and the motivation for a paradigm shift increasingly impactful to security professionals.
2. Certain traditional security issues, such as the strategic accessibility of the Arctic Ocean, its resources, and sea routes, mean that the security sector has a vested interest in aspects of climate change. These elements of the traditional paradigm provide a kernel for the continuity of perspective in the face of a broader paradigm shift.
3. The knowledge and practices of the security sector are part of the larger society and are subject to the influence of other knowledge communities, for example, that of the environmental science research community. These stakeholders can influence security sector professionals, their knowledge, and, ultimately, their practice through agencies such as the IPCC assessment reports and DOD representation at the annual conferences of the parties to the UN Framework Convention of Climate Change.
4. A new security paradigm need not (and should not) abjure competition. It must only recognize a need to constrain competition where such competition is destructive to the environmental security domain.<sup>67</sup>

These factors provide touchstones that can bridge the gap between the traditional ways of knowledge and practice for national security and the shifts required for effectively managing security challenges in the emergent geopolitical system.<sup>68</sup>

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<sup>66</sup> The contentious paradigm shift in security strategy advocated by Brig Gen William (Billy) Mitchell in the 1920s, in the face of emergent airpower, provides an exemplar.

<sup>67</sup> Such constraint has historical precedent, most notably in the negotiation of nuclear arms limitations and test ban treaties.

<sup>68</sup> It should be noted here that climate change is not the only systemic trend impacting the geopolitical system that indicates a growing need for cooperation between rivals to achieve national security in the face of emergent and existential transnational threats. This is a rich subject for further research and analysis.

## A Way Ahead

In a July 2023 editorial, William J. Burns, Director of the US Central Intelligence Agency, observed, “These two threats—geopolitical and transnational—are impossible to disentangle. Competition makes cooperation more difficult. But we’re going to have to have both.”<sup>69</sup> This statement captures the essence of the security dilemma resulting from emergent climate change and its impact on the geopolitical system.

Litwak argues that it is impossible to have both unconstrained strategic competition and cooperation, proposing a corollary that avoiding unconstrained geostrategic competition is a prerequisite for managing the climate threat. The history of US–China rivalry in the environmental security domain suggests that the traditional security paradigm—ways of thinking about security sector knowledge and practice—is incompatible with the need for rivals to cooperate. Applying the insights of Kuhn, we suggest that managing the emergent threat of climate change will require a paradigm shift of security sector knowledge about how to manage geopolitical rivalry in the emergent geopolitical system—a shift to a paradigm where competition between rivals is constrained and subordinate to cooperation in the environmental security domain.

But how is such a change in our knowledge and practice to come about? In the absence of some mystical transformation of professional perspective or the too-slow process of generational change in the face of ever-mounting environmental disasters, how is such a shift to be achieved?

This review of the environmental security domain suggests a potential entry point that aligns with traditional knowledge and practice, specifically the differentiation between benign and destructive competition. In a 2022 article, Michael Spence examined this differentiation, arguing that,

Anxiety about Sino-American competition, particularly in the technological domain, reflects a belief on both sides that a national-security-based, largely zero-sum approach is inevitable. This assumption steers decision-making in an unconstructive, confrontational direction and increases the likelihood of policy mistakes. In reality, there are good and bad forms of strategic competition. To understand the benefits of good

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<sup>69</sup> William J. Burns, “CIA Director Burns: What U.S. intelligence needs to do today — and tomorrow,” *Washington Post*, 7 July 2023, <https://www.washingtonpost.com/>.

competition – and how to reap them – one need only consider how competition fuels innovation within economies<sup>70</sup>

A parallel argument can be made for the case of environmental security.

Competition within the environmental security domain exacerbates the existential risks of climate change, leading to a lose-lose outcome. On the other hand, benign competition fosters innovation to enhance environmental security, exemplified by the mitigation of environmental disasters or the improvement of adaptation to their increasing destructiveness, resulting in a win-win outcome. Rivals engaging in benign competition can enhance their own security as well as the security of the entire geopolitical system. This increased environmental security may even reduce drivers for conflict, such as resource scarcity or climate-induced migration. Conversely, the pursuit of destructive competition degrades the geopolitical system as a whole and heightens a nation's vulnerability to the threats of climate change.

The security sector, including the armed services, excels at benign competition with rivals. In 2019, the United States sent 250 military athletes to compete in the Military World Games, a quadrennial event held that year in Wuhan, China.<sup>71</sup> In 2014 and 2016, China was invited to participate in the Rim of the Pacific (RIMPAC) exercise, although in 2017, the Pentagon disinvited the PLA Navy in protest against China's militarization of shoals in the South China Sea.<sup>72</sup>

The US and Chinese security sectors have cooperated in the past when it was perceived to be in their mutual interest. According to the US Congressional Research Service (CRS), from 1979 to 1989, facing a mutual threat from the Soviet Union, the two nations "generally engaged in high levels of military cooperation," which the United States suspended after the Tiananmen Square crackdown. CRS also describes manifold military-to-military ties that resumed in 1993, but which have been sporadically interrupted by competitive retribution for political or economic events. Even so, the United States and China have cooperated in military operations in the face of a mutual security threat, such as antipiracy patrols in the Gulf of Aden.<sup>73</sup>

The DOD possesses the technical skills, organizational infrastructure, manpower, and equipment to conduct joint missions to mitigate, adapt, and respond to

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<sup>70</sup> Michael Spence, "Good U.S.-China Strategic Competition," *Project Syndicate*, 2 May 2022, <https://www.project-syndicate.org/>.

<sup>71</sup> US Department of Defense, "Military Athletes Take World Stage," 24 October 2019, <https://www.defense.gov/>.

<sup>72</sup> Tara Copp, "China was just uninvited from a massive naval exercise. Here's why," *Military Times*, 23 May 2018, <https://www.militarytimes.com/>.

<sup>73</sup> Campbell, *China Primer*.

climate-related disasters and consequent threats to human and national security. They have long accepted HADR missions as second-level priorities and train for such missions with allies, partners, and even rivals, depending on geopolitical exigencies. However, they have not yet embraced a new security paradigm challenging the geopolitical axiom that rivals compete while partners collaborate. Planning and doctrine at the combatant command level and below still favor environmental security cooperation with allies and partners, with collaboration with rivals considered the conditional exception while competition remains the default posture.

In the quest for international cooperation to surpass geopolitical competition, consensus among national governments and populations that climate change poses an existential threat to national security is essential. This perception is evident through the growing political influence of IPCC reports, the incremental progress of international agreements under UNFCCC, and an increasing public awareness of extreme weather events linked to climate change. The resumption of cooperation between the US and Chinese governments on climate issues after suspending collaboration in pursuit of unrealized geopolitical advantage also underscores this evolving perception.

Achieving a higher level of trust among rivals is a prerequisite for the inherently conservative security sector to take the risk of a paradigm shift toward cooperation with rivals. Distrust and assumptions of illicit intent prevail on both sides, making it challenging yet crucial for national security in the changing geopolitical system to establish greater mutual trust. This trust could be built, in part, on a shared understanding that climate change is reshaping the geopolitical landscape.

One strategy to enhance confidence and reduce mistrust in 2024 is to leverage the renewed military-to-military dialogue between China and the United States. Exploring the establishment of competitive climate challenges or “games” could be a promising avenue—cooperation within competition for common benefits in national security. Numerous forms of such competitions or challenges are possible, ranging from research competitions by military and other national laboratories to competitive civil engineering projects addressing sea-level rise in small island nations, or contests aimed at reducing operational fossil fuel consumption. Cooperation in competition could seamlessly transition to competitive cooperation, with participation in exercises like RIMPAC and Cobra Gold extending to pre-planned cooperation in actual HADR missions. Competitive research and development projects could pave the way for collaborative initiatives. Structuring an arena for constrained competition among rivals in the environmental security domain might serve as a valuable step toward a broader security sector paradigm shift, ultimately benefiting national security within the emergent geopolitical system shaped by climate change. ♣

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