Chapter 8

Climate Change and Great Power Competition in the Age of Environmental Instability

By Jeremy T. Mathis and Natalle Cawston-Gibson

Abstract

This chapter examines the interplay between climate sustainability and ongoing Great Power competition (GPC) among the United States, China, and Russia. Climate change has emerged as one of the most critical global challenges of the 21st century. Its impacts—from rising temperatures and sea levels to increasing droughts and floods—pose significant threats to global security and sustainability. The response to climate change, however, is increasingly influenced by the geopolitical rivalries among the Great Powers. Each has competing interests and strategies for addressing both the causes and effects of climate change and approaches the issue through the lens of national security and strategic advantage. During the Joseph Biden administration, the United States positioned itself as a leader in climate diplomacy, rejoining the Paris Agreement and investing heavily in green technologies. But U.S. climate strategy is complicated by efforts to compete with and counter China's influence, particularly in the realm of clean energy technology. China, as the world's largest emitter of greenhouse gases, has made significant strides in renewable energy but is constrained by its continued reliance on coal and its geopolitical ambitions through the Belt and Road Initiative. Russia, heavily dependent on fossil fuel exports, demonstrates reluctance to transition away from hydrocarbons, even though climate change poses significant risks to its Arctic region. Furthermore, a new U.S. administration under Donald Trump will reshape competition in this area. With campaign promises of U.S. energy dominance and removal from multilateral climate efforts, the new administration will not prioritize climate change initiatives domestically or internationally. GPC increasingly complicates global efforts to combat climate change. Leadership in effective climate action requires that the Great Powers move beyond their strategic rivalries and cooperate to reduce emissions, secure resources, and stabilize vulnerable regions. The future of global sustainability depends on where these powers

can balance their competition with the imperative to address the climate crisis collaboratively. At mid-decade, the prospects for vital enhancements in Great Power collaboration to mitigate climate change remain tantalizingly close but uncertain.

Introduction

Climate change is not only an environmental issue but also a profound geopolitical challenge reshaping the 21st century—a "threat multiplier" that could disrupt multiple facets of the existing global order.[1] Rising global temperatures, changing weather patterns, and the degradation of ecosystems have dramatically heightened the urgency of climate action.[2] Yet achieving global sustainability is far more complex than addressing environmental concerns alone. The Great Power competition (GPC) among the United States, China, and Russia is at the heart of this complexity. These three nations wield immense influence over global political and economic systems, and their actions, or inactions, on climate change have far-reaching consequences for the planet. They are rivals but, at times, reluctant collaborators in addressing the climate crisis, and their geostrategic national interests often conflict with the global need for climate sustainability.

The geopolitics of climate change is deeply intertwined with national security, economic growth, and the global balance of power. For each of the Great Powers, climate change is a threat to the environment and a critical issue of strategic importance. The United States, China, and Russia view climate change through the lens of their own national interests, which often leads to competing priorities and policies. These conflicting interests make global cooperation on climate issues difficult, even though the existential threat of climate change demands a unified global response.

Climate change exacerbates global instability by aggravating resource shortages, driving mass migrations, and threatening food and water security.[3] The interstate competition for limited resources will intensify as regions worldwide experience more frequent and severe natural disasters—ranging from droughts and floods to wildfires and hurricanes.[4] This competition can spark armed conflicts within and among nations as populations scramble to secure access to dwindling resources such as clean water, arable land, and energy. At the same time, climate-induced migrations, as people flee regions rendered inhabitable by environmental degradation, create further pressures on neighboring nations, exacerbating tensions and straining political, social, and economic systems.

The intersection of climate insecurity with global geopolitics creates new risks and opportunities. On the one hand, the inability of countries, especially the Great Powers, to cooperate effectively on climate issues may lead to increased conflict over resources and greater instability in regions already vulnerable to environmental and political stress. On the other hand, the growing recognition of climate change as a global security threat provides opportunities for cooperation, particularly in areas like clean energy technology, disaster response, and climate adaptation strategies. Moreover, geopolitics can inadvertently energize climate change cooperation, such as the European Union (EU) accelerating its clean energy transition by as much as a decade in response to Russia's 2022 invasion of Ukraine.[5] The question is whether the world's leading powers—especially the United States, China, and Russia—can work together to address this shared threat.

The stakes in this geopolitical struggle are enormous. If the Great Powers continue to prioritize short-term strategic gains over long-term environmental stability, the consequences for the planet could be catastrophic. Unchecked climate change threatens to destabilize entire regions, disrupt global supply chains, and create new sources of conflict, from water wars in South Asia to food shortages in sub-Saharan Africa. Moreover, the failure of these powers to lead on climate action could undermine efforts to limit global warming, making it virtually impossible to meet international climate goals like those outlined in the Paris Agreement.

The Triangular Power Struggle

Each of these nations approaches climate change with its own set of national priorities and strategic goals. The United States, under the Biden administration, reasserted its leadership in global climate diplomacy, rejoining the Paris Agreement and committing to ambitious carbon reduction targets. In one of its first acts in January 2024, the second Trump administration gave formal notice that the United States again would withdraw from that agreement.[6] Irrespective of Presidential administration, the United States also views climate change through the lens of its own competition with China, particularly in the realm of clean energy technology, as China controls most of the critical mineral mining and processing. These materials are required for renewable energy technologies, such as solar panels and batteries, and could become a strategic chokepoint of energy transition.[7] These minerals are already becoming weaponized as Great Power tensions rise over technology. On December 3, 2024, Beijing announced an export ban on rare earth minerals critical to manufacturing semiconductors in the United States in response to American trade restrictions.[8] U.S. tariffs on Chinese clean energy technology and domestic U.S. subsidies and tax credits for America's own clean energy products under the 2022 Inflation Reduction Act even prompted China to file a 2024 claim with the World Trade Organization contending that Washington's actions were protectionist in nature.[9] China, the world's largest emitter of greenhouse gases, has made significant investments in renewable energy and green technologies, becoming a global leader in solar power, wind energy, and electric vehicles. Nonetheless, China's climate policies are often driven by its need to balance economic growth with environmental sustainability. As a manufacturing powerhouse lacking domestic oil and gas resources, China continues to rely heavily on coal. Its Belt and Road Initiative (BRI), while promoting infrastructure development in developing countries, has been criticized for contributing to environmental degradation in many of the regions where it operates.

In response, the United States is investing heavily in domestic renewable energy industries to reduce its carbon footprint and maintain its technological edge and reduce its reliance on foreign energy sources. The new Trump administration agenda includes lifting restrictions on U.S. oil and gas production to support its energy dominance approach.[10] While the Trump administration's energy policies are expected to increase overall hydrocarbon production and emissions,[11] the Trump agenda also includes language of "unleash[ing] energy production from all sources, including nuclear."[12] Alongside a potential Department of Energy Secretary Chris Wright advocating for an "all of the above" approach to energy, and the vested interest Trump advisor Elon Musk has in remaining competitive with the

Chinese electric vehicle market, there is hope for continued competition with China in renewables in the next administration.[13]

Russia, in contrast, has been slower to embrace the global shift toward renewable energy. As one of the world's largest exporters of fossil fuels, Russia's economy is deeply tied to oil and gas production, making the transition to a low-carbon future particularly challenging. Yet climate change poses significant risks to Russia, especially in the Arctic, where warming temperatures are melting permafrost, threatening Russian infrastructure. While Russia acknowledges the necessity of climate adaptation, its strategic focus remains on exploiting the economic opportunities presented by the warming Arctic.

This chapter delves into the competition among the Great Powers, examining how their national energy, technology, food, and water security strategies contribute to or hinder global climate sustainability. The ability of these Great Powers to navigate the complexities of climate change and geopolitical competition will shape the future of global sustainability. This chapter also explores regional dynamics in key hotspots where climate change, resource competition, and geopolitical rivalries intersect—regions such as East Africa, the Middle East, and South Asia.[14] In these regions, the impacts of climate change are particularly acute, and the actions of the United States, China, and Russia will play a decisive role in shaping their future stability. The remainder of the decade will tell us a lot about whether the Great Powers can find vital collaboration pathways to counter climate change before it is too late.

The U.S. Approach to Climate Change and Great Power Rivalry

Under the Biden administration, the United States reasserted itself as a global leader in climate diplomacy, clearly departing from the previous administration's approach featuring withdrawal from international agreements and reduced domestic environmental regulations. One of Biden's first actions as President was to rejoin the Paris Agreement, reaffirming U.S. commitment to reducing global emissions. By doing so, the United States positioned itself again as a central player in the worldwide effort to combat climate change, focusing on reducing domestic emissions and pushing for stronger international cooperation. However, the Trump administration may exit the Paris Agreement again and be less concerned with reducing emissions. This shift could reverse this leadership as fossil fuel production is prioritized.[15]

U.S. climate policies, conversely, are not just about addressing environmental issues; they are also deeply intertwined with U.S. strategic rivalry with China. As the world's largest economy and the most powerful military force, parts of the U.S. Government at mid-decade view climate leadership as a vital part of its broader strategy to maintain global hegemony. The Department of Defense (DOD) recognizes climate as a threat multiplier, launching multiple climate adaptation strategies and recognizing the need for climate-informed decisionmaking.[16] Clean energy technology has become a critical battleground in this competition as DOD invests in clean energy for forward operating and domestic energy resilience.[17] The 2023 DOD Operational Energy Strategy not only outlines the department's desire for energy substitution and diversification for operational advantage but also includes supply chain resilience as a line of effort, likely because of China's dominance in green energy components.[18]

The transition to a green economy depends on technologies such as solar panels, wind turbines, and electric vehicles, which require vast amounts of rare earth elements and other critical materials. China currently dominates the global supply chains for these materials, controlling an estimated 70 to 90 percent of rare earth processing capacity.[19] This led to significant concerns in Washington that U.S. reliance on Chinese-controlled supply chains could become a strategic vulnerability. As a result, the United States began investing in developing domestic supply chains and reducing its dependence on Chinese materials in the early 2020s, ramping up rare earth mining and processing within U.S. borders, and collaborating with allies to diversify supply sources.[20]

The Biden administration's climate agenda became deeply connected to the goal of technological dominance. American investments in renewable energy and clean technologies aimed at cutting emissions and securing the economic future of the United States in a world that is transitioning away from fossil fuels. The Inflation Reduction Act allocated billions of dollars to clean energy projects and renewable infrastructure, the most significant U.S. investment in combating climate change. By fostering innovation and supporting green industries, the United States set a course to stay ahead of China in the race for global clean energy dominance. While the Trump administration may shift DOD priorities away from clean energy in general, the Inflation Reduction Act may prove challenging to rescind. As of late 2024, 80 percent of the law's manufacturing investments went to Republican districts, and 18 House Republicans wrote a letter to the speaker in August petitioning to keep energy tax credits.[21] This difficulty could preserve some investments in climate technological dominance in the near term.

Yet the United States faces significant challenges. Domestically, political polarization made climate policy a contentious issue. While the Biden administration pushed for aggressive climate action, resistance from various political factions, particularly from states that rely heavily on fossil fuels, slowed progress. The incoming Trump administration may mobilize and motivate these political factions to further hinder climate action while deregulating industries and increasing fossil fuel production. Despite its leadership in technological innovation, the United States has struggled to convince developing nations to fully embrace its vision for a green future, especially as executive branch policies change drastically between administrations. Many of these countries view China's infrastructure projects through the BRI as more attractive options for economic growth. These diverging interests will likely continue to drive uncertainty for the foreseeable future.

China's Dual Role in Climate Change and Global Influence

China, the world's largest greenhouse gas emitter, also recognized the need to address climate change in the early 2020s for its domestic and international stability. Over the past decade, China has substantially invested in renewable energy, becoming a global leader in solar power, wind energy, and electric vehicles. The country now produces more than 70 percent of the world's solar panels, and its electric vehicle market is the largest in the world.[22] These advancements have allowed China to present itself as a champion of green technology and sustainable development, enhancing its global influence, particularly in the developing world.

But China's approach to climate change is complicated by its continued reliance on coal, the most carbon-intensive fossil fuel. Despite its investments in renewables, China remains the world's largest consumer of coal, accounting for nearly half of global coal consumption. This reliance is driven by China's need to fuel its rapid economic growth and ensure energy security for its vast population. The Chinese government has pledged to peak carbon emissions by 2030 and achieve carbon neutrality by 2060, but critics argue that coal consumption is undermining these goals.

China's broader geopolitical ambitions through the BRI also complicate its climate strategy. The BRI—which aims to build infrastructure and boost economic connectivity across Asia, Africa, and Europe—has been a cornerstone of China's foreign policy. While many international projects under the BRI include renewable energy investments, others involve the construction of coal-fired power plants, highways, and industrial zones that contribute to environmental degradation in host countries. These projects have drawn criticism from environmentalists and policymakers alike, who argue that China is exporting its pollution to the developing world.

Nonetheless, China's leadership in green technology is undeniable. The country's dominance in producing solar panels, batteries, and electric vehicles has positioned it as a key player in the global clean energy transition. This dominance has geopolitical implications, as countries worldwide increasingly depend on Chinese technology to meet climate goals. Moreover, China's ability to offer developing nations affordable renewable energy solutions through the BRI has strengthened its influence in regions like Africa, Southeast Asia, and Latin America, where U.S. influence has waned in recent years.[23]

China's investment in renewables, still, does not erase the competitive, strategic calculus behind its actions. Its climate policy fluctuates with geopolitical tensions. For example, in 2022, Beijing suspended formal dialogue with the United States for over a year because of a politician's visit to Taiwan, signaling that its climate policy is linked to broader considerations.[24] While climate progress and agreement were reached at subsequent talks, China is willing to suspend progress for more immediate goals. China views its dominance in green technology as a means of reducing emissions and expanding its global influence. As countries around the world seek to decarbonize their economies, they are increasingly turning to China for affordable solutions. While the EU, Japan, the United States, and others allege China achieved this "first mover" advantage in climate technology due to unfair trade practices and intellectual property theft, China is beginning to reciprocate these allegations, creating a broader trade war. Despite tensions with these larger nations, Beijing maintains considerable leverage in shaping the global energy landscape through its technology and development projects. For China, climate change is as much about global power projection and relative advantage as it is about environmental sustainability.

Russia's Ambivalence Toward Climate Sustainability

As one of the world's largest producers of fossil fuels, Russia's economy depends on oil and gas exports.[25] In recent years, the contribution of oil and gas to Russia's gross domestic product has typically ranged between 15 and 20 percent, contingent on global energy prices.[26] However, the figure could be much higher when considering the broader impact of the energy sector, including related industries. Regarding government revenue, oil and

gas have accounted for around 30 to 50 percent of Russia's federal budget revenues, and energy exports have represented as much as 60 percent of Russia's total export revenues.[27] This reliance on fossil fuels has made the Kremlin reluctant to commit to significant emissions reductions, as doing so could jeopardize its economic stability. Government officials have even shown mild support for the impact of climate change, arguing it could increase Russia's arable land, make its harsh climate more livable, and create a new Arctic sea route.[28]

Despite this reluctance, Russia is not immune to the impacts of climate change. Melting Arctic ice poses both opportunities and risks for the country.[29] On the one hand, the melting ice is opening new shipping routes through the Northern Sea Route, which could significantly reduce travel times for ships between Europe and Asia. This has the potential to enhance Russia's strategic position in global trade. It is also estimated that the Arctic contains 13 percent and 30 percent of the world's undiscovered conventional oil and natural gas, respectively, as well as fisheries and vast deposits of rare earth minerals.[30] Russia sees climate change as an opportunity to expand its influence in this critical region.

On the other hand, the melting permafrost in Russia's northern regions threatens critical infrastructure, including oil pipelines and military installations, and could lead to environmental disasters if not properly managed. The Kremlin has made the Arctic a strategic priority, investing in infrastructure and military capabilities in the region. Nonetheless, these ambitions are tempered by the environmental risks associated with resource extraction in such a fragile ecosystem. Like other regions, Russia is experiencing increased wildfires and flooding, threats to agriculture and will need to adapt urban environments to warmer temperatures. As its Central Asian neighbors are also impacted by a changing climate, Russian water insecurity and economic downturn could create instability for its vulnerable southern neighbors.

Russia's climate change approach is also shaped by its strategic rivalry with the West, particularly the United States and the European Union. Moscow views efforts to transition away from fossil fuels, particularly in Europe, as a direct threat to its economic interests, as the EU is one of the largest consumers of Russian oil and gas. In response to severe Western financial and commercial sanctions in the wake of its February 2022 invasion of Ukraine, Russia has sought to diversify its energy markets by increasing exports to China and other Asian countries while also investing in nuclear energy as a low-carbon alternative to fossil fuels.

While Russia has made some efforts to address climate change—such as signing the Paris Agreement and developing a national climate strategy—its overall approach remains focused on maintaining its dominance in the global energy market. Russia's reluctance to fully embrace the global shift toward renewable energy has led to tensions with other countries, particularly in Europe, where the push for decarbonization is gaining momentum. Some of Russia's climate efforts have slowed due to its ongoing war in Ukraine, as sanctions hinder clean energy projects, and the urgent need to replace Western goods in the domestic market has led to the deregulation of industries. In 2022, Russia reversed its decision to require auto manufacturers to follow the "Euro 5" standard to "Euro 2."[31] Furthermore, its renewable projects are highly dependent on Western cooperation and trade, and projects like a joint venture with Finnish state-owned energy Fortum to build wind farms have been put on hold due to the ongoing conflict. In 2023, Russia spoke out against phasing out fossil

fuels and updated its climate doctrine to exclude any language mentioning fossil fuels.[32] These actions show the lukewarm approach Russia has toward actual climate mitigation and is currently prioritizing geopolitical goals in Ukraine and economic gains from fossil fuels.

Shared Challenges, Competing Interests

Despite their differences, the United States, China, and Russia share a common interest in maintaining global stability, and climate change is increasingly recognized as a destabilizing force. Extreme weather events, rising sea levels, and resource shortages can trigger conflicts, mass migrations, and economic disruptions that could undermine global security. Yet despite the shared risks, the inability of the Great Powers to cooperate effectively on climate issues threatens to undermine global sustainability efforts.

Intensifying Great Power strategic rivalries have generated conflicting priorities regarding climate action. The United States sees climate leadership to counterbalance China's growing influence, while China views its dominance in green technology as a means of expanding its global reach. Russia, meanwhile, is focused on maintaining its role as a global energy superpower, even as the world moves toward decarbonization. The Trump administration's approach to leadership will similarly focus on international energy dominance based on statements from the incoming Cabinet. Still, nevertheless, its professed "hard on China" approach will need to factor in China's market dominance in climate technologies and influence through energy investment.

These competing interests make it difficult for the United States, China, and Russia to find common ground on climate issues. International forums like the United Nations Framework Convention on Climate Change provide a platform for dialogue. Still, broader geopolitical tensions among these powers often overshadow efforts to cooperate on climate action. For instance, while the United States and China have collaborated on some climate initiatives, such as the 2021 U.S.-China Joint Glasgow Declaration on climate action, their broader strategic rivalry has made sustained cooperation difficult.[33]

In the coming decades, the willingness of these powers to navigate the complexities of both climate change and geopolitical competition will play a critical role in shaping the future of global sustainability. If they can find ways to cooperate, particularly in areas like clean energy technology, disaster response, and climate adaptation, they could help mitigate the worst impacts of climate change and promote global stability. However, if their rivalries continue to dominate their approaches to climate policy, the world risks further environmental degradation and geopolitical instability, especially in regions with the greatest potential for upheaval from environmental instability. Three of these regional hot spots clearly demonstrate the risk of GPC regarding environmental unsustainability brought on by climate change.[34]

Regional Case Studies: Climate Sustainability Amid Geopolitical Rivalry

East Africa: Resource Scarcity, Food Insecurity, and Geopolitical Competition

East Africa is one of the most vulnerable regions to climate change, with rising temperatures, unpredictable rainfall patterns, and frequent droughts wreaking havoc on agricultural production and food security.[35] The region, including Ethiopia, Kenya, and Somalia, has long been susceptible to environmental stressors.[36] Nevertheless, the escalating impacts of climate change exacerbate already fragile political, economic, and social systems. Climate change compounds these countries' challenges by increasing food insecurity, reducing access to water, and intensifying conflicts over resources. In this context, Great Powers are increasingly engaging in East Africa to secure strategic influence and address (and sometimes exploit) the region's vulnerabilities. Their involvement, though, raises questions about whether their actions contribute to or hinder long-term climate sustainability.

East Africa's agricultural systems are primarily rain-fed, making them particularly susceptible to the erratic weather patterns driven by climate change.[37] Droughts, such as those experienced in the Horn of Africa, drastically reduce crop yields and lead to the death of livestock, plunging millions into food insecurity. In countries like Somalia and Ethiopia, where agriculture forms the backbone of the economy and employs a significant portion of the population, these climatic shifts lead to devastating socioeconomic impacts.[38]

The region's water systems are similarly affected by climate change.[39] Increased evaporation, reduced rainfall, and the drying up of water bodies like Lake Victoria have made access to clean water increasingly difficult. In Somalia and Kenya, water shortages have exacerbated conflicts between pastoralist communities and farmers over access to dwindling water supplies, contributing to greater instability and displacement.

This dire situation has led to mass migrations as people flee areas that are no longer habitable or where livelihoods are no longer sustainable.[40] The resulting influx of refugees and internally displaced persons into urban centers or neighboring countries creates additional pressures on already overstretched infrastructure and services.[41] These movements, in turn, heighten political tensions within and among countries in the region, making East Africa a hot spot for humanitarian crises and geopolitical competition.[42]

China's Role in East Africa: Infrastructure and Influence

In recent years, China has dramatically expanded its influence in East Africa through the BRI, which seeks to build infrastructure and enhance connectivity across Asia, Africa, and Europe. East Africa has become a focal point of China's strategic ambitions, with the Chinese government financing and constructing major infrastructure projects such as railways, ports, and energy facilities. For example, the construction of the Kenya Standard Gauge Railway, funded by Chinese loans, has been hailed as a transformative project that could stimulate economic growth and facilitate an expansion of renewable energy capacity.

But China's engagement in the region has not been without controversy. Many of the infrastructure projects financed by China have been criticized for contributing to environmental degradation. Large-scale infrastructure projects often require significant land clearing, the disruption of local ecosystems, and deforestation. Concerns about the envi-

ronmental impact of Chinese-led energy projects, particularly in the hydroelectric and fossil fuel sectors, have also been raised. For instance, China's financing of large dams in Ethiopia and Kenya has been controversial due to the disruption of local water systems and the displacement of communities.[43]

Moreover, China's growing presence in East Africa has raised concerns about the region's mounting debt. Many countries in East Africa have taken on large loans from China to finance infrastructure projects, leading to fears of "debt-trap diplomacy"—the idea that countries could become so indebted to China that they are forced to cede control over key assets. For example, Sri Lanka's ceding of the Hambantota International Port to Chinese control due to an inability to repay debt has served as a cautionary tale for African nations heavily indebted to China. The potential economic strain of repaying these loans, combined with the environmental impact of Chinese-led projects, could exacerbate East Africa's climate vulnerabilities in the long term.

While China's investments have undoubtedly contributed to economic development in East Africa, the Chinese have been primarily driven by strategic interests rather than a desire to address the region's underlying climate vulnerabilities. China's focus on short-term infrastructure development often overlooks long-term sustainability planning, leaving East African nations at risk of increased environmental degradation and economic instability.

The U.S. Strategy: Security and Climate Aid

The United States has long maintained a strategic interest in East Africa, particularly in the context of counterterrorism. Somalia has been a focal point of U.S. military engagement, given the persistent threat posed by al-Shabaab, a militant group linked to al Qaeda. U.S. military operations in the region, often conducted in partnership with African Union forces, have aimed to weaken extremist groups and stabilize fragile governments.

The U.S. approach to East Africa, nonetheless, has often been reactive, focusing primarily on security concerns rather than proactively addressing the root causes of instability—namely, climate change and resource scarcity. While American development agencies and nongovernmental organizations have implemented projects to improve food and water security in the region, these efforts have often been piecemeal and hampered by the broader political instability. For example, in Somalia, while the United States has funded projects to improve agricultural productivity and build resilience against droughts, these efforts have been undermined by ongoing conflict and the inability of the central government to maintain control over large swaths of the country.

In recent years, the United States has sought to integrate climate resilience into its foreign aid programs in East Africa. The U.S. Agency for International Development (USAID) has launched initiatives to promote climate-smart agriculture, improve water management, and strengthen local governments' capacity to respond to climate-related disasters. But these efforts are often overshadowed by broader U.S. military engagement in the region, which has focused more on immediate security concerns than long-term climate adaptation. Additionally, U.S. policies in East Africa have been complicated by China's growing influence. As China's footprint in the region has expanded through the BRI, U.S. policymakers have increasingly viewed East Africa through the lens of GPC. This has led to a greater focus on countering Chinese influence rather than addressing the region's climate

vulnerabilities. For example, U.S. officials have raised concerns about Chinese loans to East African countries and the environmental impact of Chinese projects but have offered few alternatives that address economic development and climate sustainability.

Russia's Growing Presence: Energy and Military Interests

Russia's involvement in East Africa is less pronounced than that of China or the United States. Still, it has steadily increased in recent years, particularly in the energy and military sectors. Russia has signed military cooperation agreements with several East African nations, providing weapons and training in exchange for political support. In addition, Russia has sought to expand its presence in the region's natural resource sectors, particularly in oil and gas exploration.

Russia's engagement in East Africa, like that of China and the United States, has been driven primarily by strategic interests rather than a desire to address climate change. Still, Russia has shown some interest in the region's energy potential, particularly in developing nuclear energy. Rosatom, Russia's state-owned nuclear energy company, has signed agreements with several African nations to aid in developing nuclear power plants. While nuclear energy is often touted as a low-carbon alternative to fossil fuels, developing nuclear infrastructure in East Africa raises significant concerns about safety, environmental impact, and the potential for regional destabilization.

Russia's regional influence is also growing through arms sales and military cooperation, positioning itself as a key player in East African security dynamics. This strategy is particularly evident in countries like Sudan, where Russia has established strong military ties in exchange for access to natural resources. Russia's military presence in the region, though, often contributes to militarizing of resources, particularly water and land, which exacerbates tensions rather than resolving them.

Like China and the United States, Russia's involvement in East Africa raises questions about the long-term sustainability of its projects. While Russia's energy and military partnerships may provide short-term economic benefits for East African nations, they do little to address the region's vulnerability to climate change. Moreover, the militarization of resource competition—partially facilitated by Russian arms sales—could worsen conflicts over water and land, further destabilizing the region.

The Intersection of GPC and Climate Sustainability

The involvement of Great Powers in East Africa illustrates the complex intersection of GPC and climate sustainability. While the United States, China, and Russia all seek to expand their influence in the region, their actions often prioritize strategic and economic interests over the long-term environmental stability of East Africa. As a result, the region risks becoming a battleground for Great Power rivalry, with devastating consequences for its people and ecosystems.

For the Great Powers, the challenge is to move beyond the narrow focus on geopolitical competition and recognize the importance of addressing climate change in their engagements with East Africa. This requires a shift in priorities—from exploiting the region's resources to investing in sustainable development and building local capacity to adapt to climate change. If Great Powers continue to prioritize their strategic interests over the

region's needs, East Africa's climate vulnerabilities will only worsen, leading to greater instability and suffering.

The geopolitical contest among the United States, China, and Russia in East Africa is deeply intertwined with the region's vulnerability to climate change. Each power's engagement—whether through infrastructure development, military cooperation, or energy projects—has far-reaching implications for the region's future stability and environmental sustainability. As climate change accelerates, the need for a more coordinated and sustainable approach to development in East Africa becomes ever more urgent.

The Middle East: Water Wars and Energy Transition

The Middle East is one of the hottest and driest regions in the world, making it exceptionally vulnerable to the impacts of climate change.[44] The region is at the forefront of global environmental challenges with rising temperatures, increasing water scarcity, and dwindling natural resources.[45] These environmental stressors are already contributing to significant social unrest, migration, and conflict in various parts of the region.[46] Countries like Iraq, Syria, and Yemen, which have long struggled with political instability, now face exacerbated environmental challenges that threaten to destabilize their fragile governments further.[47] Wealthier Gulf nations like Saudi Arabia and the United Arab Emirates are responding differently, using their resources to invest in cutting-edge technologies like desalination and renewable energy. Still, even these efforts have limits in a world where competition over scarce resources intensifies.[48]

Amid these environmental challenges, the geopolitical interests of the United States, China, and Russia are shaping the region's response to climate change. Each nation has a strategic stake in the Middle East, driven by economic, political, and security concerns. Yet their interests and actions are increasingly influenced by the growing environmental crises in the region, particularly around water and energy resources. As climate change worsens, the competition among these powers over the region's dwindling resources is likely to become even more pronounced, raising the risk of greater instability and conflict.

Water scarcity is one of the most critical environmental challenges facing the Middle East today.[49] The region's two major rivers, the Tigris and Euphrates, are essential for agriculture, drinking water, and economic activity in countries like Iraq and Syria. However, both rivers are experiencing reduced flow driven by a combination of factors, including climate change, overextraction, and the construction of dams in upstream countries like Turkey. Turkey's Southeastern Anatolia Project, which involves constructing a series of dams on the Euphrates and Tigris rivers, has significantly reduced the water flow into Iraq and Syria, leading to heightened tensions among the three countries.

In Iraq, the reduced flow of the Tigris and Euphrates rivers has contributed to widespread drought, reduced agricultural output, and internal displacement. Local conflicts over access to water resources are becoming more frequent as communities compete for dwindling supplies. This is particularly pronounced in southern Iraq, where the lack of clean water has sparked protests and violence.[50] Syria faces similar challenges, compounded by uncertainty after the fall of Bashar al-Asad and the impact of a long-term civil war, which have both devastated the country's infrastructure and limited its capacity to manage its water resources effectively.

The scarcity of water in the Middle East is not only a regional issue but also one that is increasingly drawing the attention of Great Powers. As climate change accelerates, the potential for conflict over water resources is likely to grow among countries and within them. This raises critical questions about the role of Great Powers in managing these conflicts and addressing the underlying causes of water scarcity.

China's Expanding Footprint: The BRI and Renewable Energy

China's presence in the Middle East has expanded significantly in recent years. As part of the BRI, China has signed agreements with several Middle Eastern countries to develop infrastructure, energy, and technology projects. This includes investments in renewable energy, particularly solar and wind power, critical to the region's future energy security. China's interest in the Middle East is multifaceted. On the one hand, the region is a key source of oil for China's growing economy. China relies heavily on importing oil from Gulf countries like Saudi Arabia and Iraq, and securing these energy supplies is a top priority for Beijing. On the other hand, China is positioning itself as a leader in renewable energy and green technology, and the Middle East represents a significant market for Chinese solar and wind power projects.

China's reliance on oil imports from the Gulf, though, complicates its ability to fully commit to a green energy transition in the region, especially in the remainder of the decade. While Beijing has promoted renewable energy projects as part of the BRI, its broader economic interests in the Middle East, particularly its dependence on oil, limit the extent to which it can push for a rapid shift toward sustainability. Moreover, China's investments in the region often prioritize infrastructure development over environmental protection, raising concerns about the long-term sustainability of its projects.

As China continues expanding its economic footprint in the Middle East, it will increasingly compete with the United States for influence in the region. While the United States has historically dominated the region's oil markets, China's growing presence, particularly in renewable energy, challenges U.S. hegemony. This competition will likely intensify as both powers seek to secure their interests in a region becoming increasingly important in global climate change.

The U.S. Approach: Military Presence and Strategic Interests

The United States has long maintained a significant presence in the Middle East, driven by its strategic interest in securing access to oil, countering terrorism, and maintaining regional stability. While the United States has made some efforts to support renewable energy projects in the region, particularly in wealthy Gulf states like Saudi Arabia and the United Arab Emirates, its primary focus remains on military alliances and energy security.

The United States is heavily involved in the region through its military bases, particularly in countries like Iraq, Qatar, and Saudi Arabia. This military presence is primarily aimed at countering threats from extremist groups and containing the influence of rival powers like Iran and Russia. Nonetheless, as environmental issues like water scarcity and climate change increasingly destabilize the region, the United States grapples with new challenges that cannot be addressed through military means alone.

Despite its strategic focus on energy security, the United States has supported some initiatives to address the region's environmental challenges. Through programs led by USAID and other development agencies, the United States has funded projects to improve water management and promote renewable energy in the region. However, these efforts are often overshadowed by the broader geopolitical priorities that drive U.S. policy in the Middle East.

In the context of GPC, the United States views the Middle East as a key region for securing energy resources and a critical battleground for countering the influence of rival powers like China and Russia. As China expands its economic presence in the region through infrastructure investments and Russia deepens its ties with countries like Iraq, the United States is increasingly focused on maintaining its regional influence. Conversely, its approach to the region's environmental challenges remains limited, and climate change is not yet a central focus of U.S. policy in the Middle East.

Russia's Strategic Interests: Energy and Geopolitical Influence

Russia, like China, is heavily invested in the Middle East's oil and gas sector, particularly in countries like Syria and Iraq, where Russian companies have secured lucrative energy exploration and production contracts. But Russia's interests in the region extend beyond energy. Moscow views the Middle East as a critical geopolitical battleground, particularly in its rivalry with the United States. Russia has established strong ties with countries like Syria, where it provided military support to the Asad regime, and it is increasingly positioning itself as a key player in regional security dynamics.

Russia's approach to the Middle East's environmental challenges is shaped by its broader strategic interests. While Russia has shown little interest in promoting renewable energy in the region, it has capitalized on its oil and gas sector expertise to deepen its influence. Russian energy companies are greatly involved in oil and gas exploration in the region, and Moscow has sought to position itself as a reliable partner for Middle Eastern countries seeking to develop their energy resources.

At the same time, Russia's involvement in the region is shaped by its desire to counter U.S. influence. By deepening its ties with countries like Syria, Iran, and Iraq, Russia is seeking to expand its geopolitical footprint in the region and challenge U.S. dominance. Russia's reliance on oil and gas, however, complicates its ability to address the region's environmental challenges. Like China, Russia's focus on energy security often comes at the expense of long-term sustainability.

The Geopolitical and Environmental Future of the Middle East

As the Middle East grapples with the impacts of climate change, the region's geopolitical dynamics are increasingly shaped by competition over water and energy resources. The United States, China, and Russia all have strategic interests in the region, and their actions are increasingly influenced by the growing environmental challenges facing Middle Eastern countries. Water scarcity will likely become a critical issue in the coming years, raising the potential for conflict within and among countries.

The competition among Great Powers in the Middle East is likely to intensify as climate change worsens. Each of these powers—whether through military presence, economic in-

vestments, or energy partnerships—seeks to secure its interests in a region that is becoming increasingly important in the context of global environmental and geopolitical challenges. Their focus on short-term strategic gains, though, may come at the expense of long-term sustainability, raising the risk of further regional destabilization and conflict.

The future of the Middle East will depend not only on how regional powers address the immediate challenges of climate change but also on how Great Powers engage with the region in a way that promotes sustainability rather than exacerbating environmental and geopolitical tensions. If the United States, China, and Russia can find ways to cooperate in addressing the region's environmental challenges, there may be opportunities for reducing conflict and promoting stability. If their competition prioritizes strategic interests over sustainability, however, the region's environmental crises may only worsen, with profound implications for global security.

South Asia: Water Wars and Rising Tensions

South Asia, home to over 1.7 billion people, is one of the most climate-vulnerable regions in the world. The combination of rising temperatures, shifting monsoon patterns, melting glaciers, and erratic rainfall severely threatens the region's water and food security.[51] Over the last two decades, more than half of the South Asian population, approximately 750 million people, have been affected by climate-related disasters.[52] Countries like India, Pakistan, and Bangladesh, which depend heavily on river systems like the Indus and Ganges for agriculture and daily water needs, are particularly at risk. Climate change has further exacerbated long-standing geopolitical tensions in the region, particularly between India and Pakistan, both of which are nuclear-armed states with a history of conflict. In this context, Great Power competition among the United States, China, and Russia adds new layers of complexity to South Asia's already fragile climate and geopolitical situation.

Water security is perhaps the most pressing climate-related issue in South Asia. The region's two major river systems, the Indus and the Ganges, are critical for the agricultural economies of India, Pakistan, and Bangladesh.[53] These rivers support the livelihoods of millions of people, providing irrigation for crops, potable water, and hydroelectric power. Nevertheless, overextraction, pollution, and the impacts of climate change are putting these rivers under severe stress. As water levels decline, the region faces the growing risk of food shortages, displacement, and economic disruption. Altered precipitation patterns have led to erratic monsoon rains critical for India's agriculture. Unpredictability and uneven rainfall distribution have resulted in droughts and floods, affecting crop yields and food security. For instance, in recent years, states like Maharashtra and Karnataka have faced severe droughts, while others like Kerala have experienced devastating floods.[54] The Indus River, vital for Pakistan's agriculture and potable water, depends on glacial melt from the contested Kashmir region. With glaciers retreating faster due to rising temperatures, the river's flow is becoming increasingly erratic and is exacerbating water scarcity issues; however, there has not been significant conflict over water thanks to one of the most successful resource-sharing treaties.

The Indus Waters Treaty, signed in 1960, has successfully prevented direct conflict over the sharing of the Indus River.[55]Under the treaty, Pakistan was granted control over the western rivers (Indus, Jhelum, and Chenab), while India was given control of the east-

ern rivers (Ravi, Beas, and Sutlej). Nevertheless, the treaty's viability is increasingly being questioned as water scarcity becomes more acute. India's construction of dams and hydroelectric projects on the Indus River, which flows into Pakistan, has raised concerns about the potential for reduced water flow in Islamabad. Pakistan, an agricultural economy heavily reliant on the Indus, views these developments as a strategic threat to its water security.[56] Furthermore, the critical impact of the Kashmir region on water security exacerbates regional competition, as control of this region remains a point of friction between these two states. Reduced water availability and population growth are straining the agricultural sector in both countries, leading to greater competition for resources. As climate change accelerates, the possibility of conflict over water rights in the region becomes more likely. In an area where tensions are already high, water disputes could escalate into more significant confrontations with profound implications for regional stability.

China's Role in South Asia: Infrastructure and Strategic Influence

China's growing presence in South Asia has further complicated the region's climate and geopolitical dynamics.[57] Climate change is intensifying water scarcity in northern China, a region facing significant water stress. Reduced precipitation and overreliance on groundwater extraction are depleting water resources. The Yellow River, a crucial water source, has seen reduced flow rates, affecting agriculture and livelihoods. China is already looking west for more water. China has a vested interest in controlling the Kashmir region, either directly or indirectly.[58] Control over these water sources would enable China to manage water flow and security better. This strategic control would also enhance China's leverage over its biggest Asian rival, India, and bolster its recent efforts to deepen ties with Pakistan.[59]

China's dam construction on rivers flowing into India and Bangladesh has raised significant concerns about water security. For instance, China has built dams on the Yarlung Tsangpo River, which flows from Tibet into India's northeastern state of Arunachal Pradesh, where it becomes the Brahmaputra River. India fears that China's dam-building activities could limit water flow into its territory, affecting agriculture and hydroelectric power generation.

China's growing economic and military ties with Pakistan complicate the region's water and climate issues. Through the expansive Chinese infrastructure investment project known as the China-Pakistan Economic Corridor (CPEC), a key part of the BRI begun in 2015 and continuing at mid-decade, China has significantly invested in Pakistan's infrastructure, including energy and transportation projects. This strategic partnership has deepened the bond between the two countries, with China becoming Pakistan's primary military and economic ally. While CPEC has brought much-needed infrastructure to Pakistan, including renewable energy projects, it has also heightened tensions with India, which views China's expanding influence in its neighborhood as a strategic threat.

Furthermore, China's investments in dam projects within its own territory, such as those on rivers flowing into India and Bangladesh, pose additional concerns. India and Bangladesh have repeatedly expressed apprehension about China's plans to divert river water for its use, which could reduce water availability downstream. These actions exacerbate the region's existing water security issues, adding another layer of complexity to the geopolitical tensions between India and China. The climate vulnerabilities of South Asia are

thus increasingly tied to the strategic calculations of China, as Beijing uses its economic and military power to expand its influence in the region.

The United States in South Asia: A Strategic Partner to India

While the United States is less directly involved in South Asia's water disputes than China, it plays a key strategic role in the region, particularly through its relationship with India. The United States views India as a crucial partner in counterbalancing China's growing influence in Asia, and this strategic partnership has deepened in recent years. In 2021, the United States and India launched the U.S.-India Climate and Clean Energy Agenda 2030 Partnership, promoting bilateral cooperation to meet the goals of the Paris Agreement. This partnership hopes to "mobilize finance" and develop and scale clean energy technology.[60] U.S. policy in South Asia has focused on strengthening India's military and economic capabilities, promoting regional security, and supporting India's efforts to become a leader in renewable energy and climate resilience.[61]

The United States has supported India's renewable energy initiatives through various programs and investments, recognizing that climate change poses a significant risk to regional stability. The broader strategic goals of the United States in South Asia, nonetheless, are often at odds with the need for regional cooperation on water and climate issues. While Washington promotes India as a counterweight to China's influence, it has not been as engaged in fostering multilateral cooperation among India, Pakistan, and China on water resource management. This has limited U.S. ability to contribute meaningfully to addressing the region's climate vulnerabilities. Furthermore, India is struggling to meet its climate goals as it seeks a comprehensive energy partnership with the United States. One estimate found that India will need to install renewable energy 2.5 times its current rate to meet its targets.[62]

Moreover, the United States views South Asia not only as a strategic frontier in its rivalry with China but also as a key partner in counterterrorism efforts, particularly in Afghanistan and Pakistan. This focus on security has often overshadowed the importance of addressing climate-related risks, which are becoming increasingly urgent in the region. As climate change worsens, U.S. engagement in South Asia may need to shift toward a more holistic approach that integrates climate resilience with broader geopolitical goals.

The Role of Russia in South Asia

Russia's role in South Asia is less pronounced than that of the United States and China, but Moscow maintains strategic interests in the region, mainly through its military partnerships with India and Pakistan. Historically, Russia has been India's primary defense partner, supplying the country with advanced military technology and arms. But Russia has also sought to strengthen ties with Pakistan in recent years, particularly in counterterrorism and energy cooperation.

While Russia is not as directly involved in South Asia's water disputes, its growing military and economic presence could impact the broader geopolitical dynamics. Russia's strategic interest in maintaining strong ties with both India and Pakistan puts it in a unique position to potentially mediate regional disputes, including those related to water security.

Russia's primary focus in the region, though, remains on defense and energy, with little emphasis on climate-related issues.

Russia's energy interests in South Asia primarily focus on natural gas and nuclear energy. Since Russia's 2022 invasion of Ukraine, India has doubled its trade with Russia, mostly in Russian crude oil, to the chagrin of Western sanctions regimes.[63] More recent, the Indian government and Putin claimed that Russian oil company Rosneft had invested $20 billion in India.[64] This new cooperation and trade may challenge U.S. influence in the region. Moscow has been involved in several nuclear energy projects in India, providing technology and expertise for developing civilian nuclear power plants. These projects are part of India's broader effort to diversify its energy sources and reduce its reliance on fossil fuels. Russia's involvement in the region's energy sector, though, is also driven by strategic considerations, as it seeks to maintain its influence in South Asia amidst growing competition from China and the United States.

The Future of Water Security in South Asia: Cooperation or Conflict?

The future of water security in South Asia will depend on India, Pakistan, and China's ability to manage their shared water resources cooperatively. But the region's history of conflict and geopolitical competition among the United States, China, and Russia presents significant challenges to achieving climate sustainability. As water scarcity becomes more acute due to climate change, the potential for conflict over water resources will increase, seriously affecting regional stability.

The Indus Waters Treaty, while a critical mechanism for managing water-sharing between India and Pakistan, may not be sufficient to address the escalating water challenges in the region. As India continues to develop its hydroelectric infrastructure and Pakistan grapples with water shortages, both countries must find ways to cooperate on water resource management. At the same time, China's growing influence in South Asia, particularly through its control of upstream rivers and its strategic partnership with Pakistan, will continue to shape the region's water dynamics.

The United States, while less directly involved in South Asia's water disputes, has a role in promoting regional cooperation on climate and water issues. By strengthening its partnerships with India and encouraging multilateral dialogue on water security, the United States can help mitigate the risks of conflict and promote sustainable solutions to the region's climate challenges.

The geostrategic competitive incentives and varying involvement of the Great Powers complicate the region's climate and geopolitical dynamics, making effective climate and water management cooperation more difficult. Achieving climate sustainability in South Asia will require regional cooperation and a broader understanding of how GPC is shaping the region's future. Without concerted efforts to address these challenges, South Asia's water security—and, by extension, its political stability—will remain at risk.

Conclusion: The Path Forward

Great Power competition among the United States, China, and Russia is reshaping global efforts to address climate change, and the situation will become even more complex during a second Trump Presidency. Competition over technology, the wars in Ukraine and

the Middle East, and positioning for global influence have created the conditions for and barriers to cooperation on climate issues. While all three nations recognize the existential threat of climate change, their strategic rivalries often hinder meaningful cooperation on sustainability issues. In key regions like East Africa, the Middle East, and South Asia, the intersection of climate vulnerability and geopolitical competition is creating new challenges for global stability.

To achieve climate sustainability, the Great Powers must find ways to cooperate over the coming half-decade despite their broad and growing strategic differences. Improved climate sustainability will require rethinking national security priorities to include environmental security as a more central component of Great Power foreign policy. Additionally, international institutions must play a more decisive role in facilitating cooperation on climate issues, particularly in regions where climate change is driving instability.

The stakes are high. Without coordinated action, the impacts of climate change will continue to exacerbate global instability, drive mass migration, and fuel conflict. The actions of the United States, China, and Russia in the coming years will determine whether the world can achieve a sustainable climate future or whether evolving Great Power competition must lead to further environmental degradation and global instability.

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