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# A Responsibility to Prepare: Governing in an Age of Unprecedented Risk and Unprecedented Foresight

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## SUMMARY

The world in the 21st century is characterized by both unprecedented risk and unprecedented foresight. Climate change, population shifts and cyber-threats are rapidly increasing the scale and complexity of risks to international security, while technological developments are increasing our capacity to foresee those risks. This world of high consequence risks, which can be better modeled and anticipated than in the past, underscores a clear responsibility for the international community: A "Responsibility to Prepare." This responsibility, which builds on hard-won lessons of the Responsibility to Protect (R2P) framework for preventing and responding to mass atrocities, requires a reform of existing governance institutions to ensure that critical, nontraditional risks to international security, such as climate change, are anticipated,[1] analyzed and addressed systematically, robustly and rapidly by intergovernmental security institutions and the security establishments of nations that participate in that system.

A Responsibility to Prepare agenda should be developed and adopted by all nations, while adhering to the overarching principle of "climate-proofing" security institutions at the international, regional and national levels. That climate-proofing would include routinizing, integrating, institutionalizing and elevating attention to climate and security issues at these bodies, as well as establishing rapid response mechanisms, and developing contingencies for potential unintended consequences.

Such an agenda – focused as it is on reforming security institutions - would ensure that critical nontraditional challenges, such as climate change, are appropriately managed as global security risks, rather than as niche concerns. A practical fulfilment of the goals and principles articulated in this Responsibility to Prepare framework would increase the likelihood of a more stable global governance systems in the face of rapid but foreseeable change.

## A RESPONSIBILITY TO PREPARE

The geopolitical landscape features a diverse set of intersecting risks. Some of these risks, such as tensions among power centers, disputes over geographical boundaries, and political instability, have been with human civilization for millennia – vexing the councils of regional and world order from ancient Rome to Westphalia to New York. Other risks, such as nuclear weapons and cyber threats, are relatively recent. In some cases, as with rapid climate change, the risks are unprecedented in human history - a history of rises, falls and reorganizations that occurred during a period of relative climatic stability. This presents a unique challenge to human civilization and global governance. However, what unifies the challenge of governance across time and space is both uncertainty and the inability (or unwillingness) of societies to recognize and adequately prepare for change. In the annals of history, the fog of war, the "unknown unknowns," and the "black swan events" have sometimes upended seemingly stable systems of government, but a failure to prepare for more predictable events has also been a common cause of political instability, and, sometimes, collapse.

Today, the international order, consisting of sovereign nation-states participating in a web of international and regional security institutions, is experiencing great uncertainty in the face of rapid climatic, technological and social change, but also possesses a growing capacity to reduce uncertainty – including an ability to more accurately foresee unprecedented changes. That is a primary feature that differentiates the 21st century from past periods of disruption – the ability to harness scientific and technological tools to better predict, monitor, and prepare for a range of plausible future scenarios. However, that heightened predictive capacity does not, by itself, lead to preparedness.

The leaders of nation-states, and of the institutions that underwrite regional and international security, must have compelling rationales for preventing and responding to these risks in a responsible fashion – rationales that can help them transcend local political and economic pressures. The challenge of unprecedented, potentially globally destabilizing phenomena such as climate change presents one such rationale.

In the face of a rapidly changing climate system, as well as a range of other rapid demographic, social and technological changes, nation-states and intergovernmental security institutions have a responsibility to use their enhanced predictive capacities to manage and minimize these risks. This combination of "unprecedented risk" and "unprecedented foresight" underlines the case for a "Responsibility to Prepare,"– a responsibility to build a resilient world order against a more reliably foreseeable future, while also creating a buffer, or governance shock absorber, for those risks that we still cannot imagine. A failure to meet this responsibility could significantly strain state sovereignty and the international system built on it.

## UNPRECEDENTED RISKS

Perhaps no issue underscores this Responsibility to Prepare more than climate change. The relatively stable climatic period geologists call the Holocene (beginning at approximately 11,701 BP),[2] a climatic period which[3] includes the advent of agriculture; the rise and fall of empires and monarchies; the birth of the nation-state; and the invention of rocket ships and computers, is making way for a new epoch: The Anthropocene.[4] The Anthropocene is characterized by human-induced changes in the climate[5] that are happening at an extremely rapid rate in terms of geologic and civilizational time,[6] and are unprecedented in history."[7] These changes, including the melting of the glaciers and polar icecaps, extreme rainfall variability, and sea level rise – are all changes that disrupt the foundations of the socio-political and economic

institutions that undergird civilization as we know it. Simply put, these changes affect the basic resources that support human livelihoods, nations and the global order those nations participate in.[8]

As the impacts of climate change and our understanding of them have increased, a growing body of research demonstrates that climate change is both a direct threat to international security and a "threat multiplier" in the international security landscape.[9] Most directly, climate change impacts security by decreasing the readiness of security institutions. Military installations built at sea level, for example, must now contend with the rising ocean along with their mission. While militaries have always had to contend with the weather, climate change is altering their operational environment in significant ways.[10] Equipment, training, interoperability, and infrastructure all need to be recalibrated and adjusted. These nuts-and-bolts matters present challenges, but they are not insurmountable.

The indirect implications of climate on security are, on the other hand, far more challenging due to their complex manifestation as a "threat multiplier."[11] The impacts of climate change are not hermetically sealed within neat equations and charts. They are diffuse, exacerbating stresses to the critical resources that underpin national and global security, including water, food, and energy systems. Climate change, therefore, adds additional stress to already stressed geostrategic landscape.[12]

Over time, climate-driven stresses on natural resources can degrade a nation's capacity to govern, including its ability to meet its citizens' demands for basic resources or prosperity (e.g., food, water, energy, employment) – also known as its "output legitimacy."[13] This threat to output legitimacy can contribute to state fragility, internal conflict, and potentially, state collapse.[14] Seen through this lens, climate change may present a serious challenge to state sovereignty in a number of places around the world.[15]

Threats to food security from a changing climate, for example, present a serious challenge to the global agricultural system built during the 20th century on the foundation of a millennia worth of development. As natural resources within the territory of food producing nations are strained, modern states have often turned to the global market to make up for their inability to meet domestic demand for food. Increasingly, however, that global food market is vulnerable to price fluctuations driven in part by an increase in the frequency and intensity of extreme weather events sometimes thousands of miles away[16] – a phenomena referred to as the "globalization of hazards."[17] This presents a catch-22 for some nations – grow your own food and risk straining your water resources in the face of accelerating rainfall variability (increasing the vulnerability of populations with agricultural livelihoods), or rely on a volatile global market. Poor or increasingly limited choices along this continuum can contribute to political turmoil, as we've seen with bread riots in rural parts of Egypt, and agricultural devastation in Syria.[18] In both of these instances, stresses to food security, in combination with other political, economic and environmental factors, contributed to state and regional conflicts that have escalated into crises of great international concern.

Other climate-related threats to state stability are more direct. Consider island nations and sea level rise. Rising sea may inundate entire low-lying states and coastal populations. This includes island states such as the Maldives and large swathes of countries, such as the low-lying coastal zones of Bangladesh.[19] For small island nations, climate change and sea level rise present an existential threat (and thus the possibility of a total loss of sovereignty). The international community has no experience in managing the disappearance of nations as a result of environmental processes.[20] In fact, there are no international legal norms designed to account for such an eventuality, including no formal recognition of "climate refugees" or "environmental refugees."[21] The loss of entire states or large zones within states might contribute to a mass increase in stateless peoples in the international system, which could present both a humanitarian and international political and security crisis of the highest order.[22]

The implications of a rapidly-changing climate, coupled with other demographic, economic and technological shifts, contribute to an era of unprecedented risk. However, some of those same dynamics – particularly rapid technological change – have also contributed to unprecedented foresight. This is a foresight that must be properly employed in order to adequately manage risk in this complex and dynamic era.

## UNPRECEDENTED FORESIGHT

Despite the unprecedented risk of climate change, there is a small silver lining that provides the foundation for a Responsibility to Prepare. Namely, climate change, especially when compared to other drivers of international security risks, can be modeled with a relatively high degree of certainty.

Consider, for instance, the first accurate climate change model is from 1967, a half a century ago, and for the most part, the climate is changing as the model predicted.[23] A political scientist in 1967 would have had a much more difficult time predicting the current international security landscape. Other climate models have also shown prescient prediction capabilities.[24] Strikingly, where inaccuracies have occurred, they have often been characterized by an *underestimation* of the rate and severity of change, showing a milder picture than what eventually emerged.[25] Subsequent technological and scientific refinements have led to more complex models, and ultimately a strong record of accurate predictions of the rate and scale of global climatic changes under emissions scenarios that ultimately materialized. While significant uncertainties in predicting local-scale climatic changes and ecological interactions remain, existing projections from climate models paint a fairly clear picture of what the future holds for the global climate, which provides a basis for governments and societies to plan accordingly. These models have also allowed us to better plan for low probability, high impact events, such as massive releases of methane from thawing permafrost, or changes in the Gulf Stream.[26] After all, low probability events happen all the time. Today, our climate models can help project the implications of these low probability events, which means that we can prepare for them

Importantly, our foresight tools projecting social, economic and political change are also getting better, though much room for improvement remains.[27] The political scientist from 1967 would be astounded by the computing power available to analysts for measuring the complex interlinkages between the physical and social sciences. In the field of predicting state instability, for example, three different tools utilized by the U.S. government - Fuzzy Analysis of Statistical Evidence (FASE—US Army), Integrated Crisis Early Warning System (ICEWS—US Army) and the Political Instability Task Force (PITF—CIA) have by one measure been assigned a success rate of 80%.[28]

However, though our climate models are robust and our predictive tools for social, political and economic change are improving,[29] these tools do not by themselves enhance preparedness. Without committed, well-resourced institutions regularly delivering and translating climate information to decision-makers; without climate information being better integrated into the tools for predicting state fragility or conflict; and without entities dedicated to interpreting climate-related risks and issuing warnings to decision-makers in a systematic and compelling way, governments and intergovernmental institutions will continue to be underprepared for these risks.

The case of Syria is an illustrative example. Up until the conflict began in the small farming town of Dara'a, Syria was considered by most political analysts to be immune to the Arab Spring and the broader unrest occurring in the region. In "The Obamians,"[30] J. Mann describes the Obama Administration's process for predicting which Middle Eastern countries were at risk of political instability during the Arab Spring:

> *"Administration officials hurriedly made a list of which countries in the Middle East were most at risk of large-scale political turmoil, and which were least at risk. That list turned out to be wrong in many cases...At the bottom were the nations where any widespread demonstrations for democracy were judged to be improbable: Saudi Arabia and Syria. "No one was focused on Syria, because it seemed far less likely than other states in the region," - Deputy Secretary of State] James Steinberg*

This was not, however, due to a lack of information about the fragility of the Syrian state. A UN report,[31] a *New York Times* article,[32] a story from the IRIN news service,[33] and a prescient warning from IISD[34] all documented an extreme drought in the country from 2007-2010 (the most extreme in the nation's history of record), which contributed to the displacement of almost 2 million Syrians. The problem was that these reports were not being integrated into predictive analyses of the region, and, most importantly, not being communicated to key decision-makers at the highest levels of international governance. Thus, the international community was largely caught by surprise when political turmoil erupted in the country.[35]

That said, context is key. Compared to other international security risks that occur primarily in the domain of rational or irrational human choice, such as when, or if, a nuclear weapon might be detonated, we are generally quite good at seeing what's coming on the climate horizon. Reliable projections show us that global sea levels will continue to rise (though within a wide range), glaciers and the Arctic ice caps will continue to melt, diseases will spread more widely, rainfall variability will increase, and water supplies will be significantly strained.[36] All of these impacts, occurring simultaneously and rapidly, will alter the geostrategic landscape. At the same time, the models and monitors that project and measure these changes, respectively, will likely continue to become more reliable with increasing data and technological advancements. As such, the ability to see into the climate future underscores a responsibility to prepare for that future. It provides an opportunity to strengthen the architecture of global governance to absorb and mitigate these highly probable futures.

## THE ELEMENTS OF A RESPONSIBILITY TO PREPARE

The combination of an unprecedented global risk and an unprecedented ability to forecast that risk creates a clear responsibility for governments and intergovernmental institutions to prepare. This concept of a "Responsibility to Prepare" builds on hard-won lessons of the Responsibility to Protect (R2P) agenda, which has made great strides in driving action by intergovernmental institutions to prepare for, prevent and respond to mass atrocities. To fully realize a Responsibility to Prepare, leaders of the international community should collaboratively advance international Responsibility to Prepare goals and principles that nations around the world can adopt and adapt to their own circumstances.

### Responsibility to Prepare Goals

Fulfilling a Responsibility to Prepare begins with defining the goal at hand, which is to systematically address climate-security risks at a whole-of-international security landscape level (national, regional and international) in a way that decreases the probability of instability and conflict. The complex, transnational and cross-sectoral nature of climate risks demand such a comprehensive approach, but it must be clearly articulated and systematized into a set of goals and principles that nations and intergovernmental institutions can adopt, measure and promote, in order to avoid the paralysis that overwhelming - or "wicked problems" - can create. Such an agenda must also be adaptable to unique local or regional circumstances, as is practical and appropriate, and the process for agreeing to these goals and principles should empha-

size buy-in from as many nations as possible. However, to ensure coherence and focus, a Responsibility to Prepare agenda should adhere to one overarching, guiding goal: Climate-proofing security institutions at all levels of governance in order to increase the capacity of states to absorb and reduce climatic stresses.

**Responsibility to Prepare Principles**

The essence of the Responsibility to Prepare is to ensure that security institutions, in concert with foreign policy and development bodies, are able to withstand climatic stresses through routinizing, integrating, institutionalizing and elevating attention to climate and security issues, as well as developing rapid response mechanisms and developing contingencies for unintended consequences. These principles should inform all Responsibility to Prepare goals developed and agreed upon by governments.

***Routinizing:*** Climate change is happening now, and affects nearly all aspects of society, yet that reality is not reflected in the routine activities of governance bodies responsible for security. Doing so would help break climate change out of its traditional cage within environment and development ministries and broaden the aperture of security institutions to include this complex risk. Routinizing attention to climate in security institutions could range from providing regular intelligence briefings on the subject to decision-makers, to consistently holding dialogues and forums on the subject. At the UN Security Council (UNSC), for example, a commitment to regular Arria Formula dialogues on the subject, more consistent measures for information flow and monitoring of critical climate and security hotspots (such a Resolution 2349 (2017) on the Lake Chad Basin),[37] as well as more robust statements and resolutions that build on past actions on climate and security from 2007-2017,[38] would help ensure that the issue is resilient to changing political winds, and always on the UNSC radar.

***Institutionalization:*** How climate change impacts security is not deeply understood within and across governments. In this context, the issue requires institutional centers to conduct climate security analysis and inform decision-makers. As was illustrated previously in the case of the 2007-2010 drought in Syria, the international community is often unprepared for risks, including climate-driven risks, not necessarily because of a lack of information, but because that information is not being delivered to decision-makers in a systematic way and they are not aware of its relevance to their remit. Had, for example, the scattered reports of drought and mass displacement of peoples in Syria during that time period been fed into an institution committed to warning of these trends, the country's political instability might have been foreseen and, possibly, mitigated. Creating multiple institutional centers to collect and interpret information, using the best analytical tools available, and then regularly delivering recommendations for action to decision-makers would go a long way in increasing preparedness for such eventualities and strengthen efforts for conflict prevention. Institutionalizing attention to the issue is also important for closely monitoring slow-onset stresses related to climate change that could gradually erode state stability and might be more difficult to detect than more dramatic or episodic changes. At the international security level, for example, the establishment of semi-independent "Climate Security Crisis Watch Centers," staffed by expert analysts watching for climate and security hotspots, and issuing regular recommendations for action to the UN Security Council, could ensure that the intergovernmental security community is more prepared for both slow- and quick-onset climatic changes affecting security. These Climate Security Crisis Watch Centers could also be replicated at the regional level (at institutions such as NATO and the African Union, for example) and at the national level, within or across defense, intelligence and foreign affairs institutions. At each level, these centers could either be new structures, or integrated into existing early-warning systems.

***Elevation:*** In some cases, warnings related to nontraditional security risks are delivered to governments by analysts, but not at a high enough level. This is often based on a particular issue not being prioritized within a government or intergovernmental institution, or the issue not being presented in a fashion that appropriately contextualizes the risks as they pertain to other geostrategic priorities. In this context, elevating such issues within governing bodies is critical for ensuring preparedness. Within the UN system, for example, the establishment of a senior Climate Change and Security position, reporting directly to the UN Secretary General (SG) and communicating regularly to the UN Security Council (UNSC), would go a long way toward ensuring that these issues were heard at the highest levels. Such an individual could be responsible for overseeing the work of the aforementioned Climate and Security Crisis Watch Centers, and delivering recommendations to the UNSC. Equivalent positions at regional and national levels would also be important.

***Integration:*** In order to ensure that climate and security issues are not treated as a special-interest concern, security institutions should integrate climate change trends into their analyses of other critical security priorities. This is the "just add climate" approach, justified by the nature of the threat and the simple fact that changes in the climate, acting as a threat multiplier, will affect the entire geostrategic landscape. For example, the questions of how climate change intersects with health security, conflict, international terrorism, nuclear proliferation, and maritime security, are all critically important, but may be missed if such analysis sits solely in the kind of specialized centers described above. Practically, this could involve embedding climate and security analysts across issue siloes within governments and intergovernmental institutions, or creating interagency structures to facilitate such integration.

***Rapid response:*** Though the approaches above are designed to facilitate preventative solutions, there will undoubtedly be future cases of climate-exacerbated dynamics that demand immediate attention from the security community. Developing scaled warning systems that identify long, medium and short-term risks, and that include clear "triggers" for emergency action on climate and security, would help ensure that foreseeable events are acted upon with commensurate levels of urgency. This is particularly important for anticipating low probability/high impact risks, and creating a governance capacity to prepare for "unknown, unknowns" or "black swans."[39] The aforementioned Climate Security Crisis Watch Centers, for example, could employ such a rapid response system when communicating to the UNSC. Regional security institutions and national governments could also consider adopting these mechanisms, separately or in coordination with the international centers.

***Contingencies for unintended consequences:*** Despite best efforts, unintended consequences of solutions to these risks may inevitably arise. Governments should seek to identify these potential eventualities and develop contingencies for addressing them. For example, emissions reductions commitments could increase incentives for the development of nuclear power in regions of the world with limited regulatory infrastructure, which could, in turn, increase nuclear proliferation risk. Unilaterally-deployed geoengineering solutions, particularly in the absence of international norms to regulate their use, could also result in new and unpredictable disruptions to climate, water, food and energy systems. These are foreseeable possibilities that security institutions can identify and attempt to prevent sooner rather than later. Facilitating or institutionalizing cross-sectoral/ interagency coordination to hedge against these unintended consequences, as suggested in the "integration" section above, would be a good start.

## CONCLUSION

The destructive Thirty Years' War compelled European monarchs to establish a nation-state system at Westphalia in 1648. The globally devastating First and Second World Wars ultimately precipitated the creation of an international order centered on the United Nations, and its enforcement arm, the UN Secu-

rity Council – a system designed to protect the sovereignty of states against external aggression and decrease the likelihood of conflict between states.[40] This is the world order we are still living in today.

However, given the rapid rate of climatic change and the increasing stress on global security that is likely to follow, this order will have to adapt – and adapt quickly. The difference between today and major global disruptions of the past is that we can spot impending disasters earlier and more easily. Though the risks are unprecedented, our foresight is unprecedented as well. Technological developments have given us climate models, and predictive tools, that enhance our ability to anticipate and mitigate risks. We need to better utilize those tools, and better integrate them into international, regional and national security institutions in order to manage this new world.

However, the window of opportunity to strengthen global governance in a significantly altered geostrategic environment is narrowing. Stalled or delayed actions may result in diminishing returns, and, in the worst-case scenarios, difficult and potentially inhumane choices in the face of continued strains on natural resources and political will. This scenario is preventable.

Whether or not the response to climate risks from the international security community will be commensurate to the threat remains to be seen. However, in the 21st century we cannot lean on the excuse that we did not see the threat coming. We do see it coming, and that foresight makes the Responsibility to Prepare an ironclad one.

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[1] Leon Fuerth, 'Operationalizing Anticipatory Governance,' *Prism 2*, No. 4, available at: http://cco.ndu.edu/Portals/96/Documents/prism/prism_2-4/Prism_31-46_Fuerth.pdf

[2] Mike Walker et al., 'Formal Definition and Dating of the GSSP (Global Stratotype Section and Point) for the Base of the Holocene Using the Greenland NGRIP Ice Core, and Selected Auxiliary Records,' *Journal of Quaternary Science*, 24, no. 1 (January 2009): pp3–17.

[3] J. R. Petit et al., 'Climate and Atmospheric History of the Past 420,000 Years from the Vostok Ice Core, Antarctica,' *Nature* 399 (June 1999), pp 429–36.

[4] Colin N. Waters et al., 'The Anthropocene Is Functionally and Stratigraphically Distinct from the Holocene,' *Science* 351, no. 6269 (2016), available at: http://science.sciencemag.org/content/351/6269/aad2622

[5] Jerry M Melillo, Terese Richmond, and Gary W. Yohe, 'Highlights of Climate Change Impacts in the United States: The Third National Climate Assessment,' *U.S. Global Change Research Program*, 2014, available at: http://nca2014.globalchange.gov/node/1961.

[6] NASA, 'Climate Change: Vital Signs of the Planet: Evidence,' available at: http://climate.nasa.gov/evidence/.

[7] S. Solomon et al., 'Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis,' *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*, Cambridge, United Kingdom and New York, NY, USA, Cambridge University Press, 2007; NASA, 'Climate Change: Vital Signs of the Planet: Evidence,' available at: http://climate.nasa.gov/evidence/

[8] Caitlin E. Werrell and Francesco Femia, 'Climate Change, the Erosion of State Sovereignty, and World Order,' *The Brown Journal of World Affairs*, Vol. 22, No. 2, April 1, 2016, available at: https://www.brown.edu/initiatives/journal-world-affairs/222-spring%E2%80%93summer-2016/climate-change-erosion-state-sovereignty-and-world-order

[9] Resources, The Center for Climate and Security, available at: http://climateandsecurity.org/resources/u-s-government/

[10] Keys, R. et al. 'Military Expert Panel Report: Sea Level Rise and the U.S. Military's Mission,' *The Center for Climate and Security*, September, 2016, available at: https://climateandsecurity.org/militaryexpertpanel/

[11] 'National Security and the Accelerating Risks of Climate Change', *CNA Military Advisory Board*, Washington DC, May 2014, available at: https://www.cna.org/cna_files/pdf/MAB_5-8-14.pdf

[12] Michael McElroy and D. James Baker, *Climate Extremes: Recent Trends with Implications for National Security*, Cambridge, MA, Harvard University Center for the Environment, October 2012; W. Neil Adger et al., 'Human Security,'

*IPCC Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge, United Kingdom and New York, NY, USA, Cambridge University Press, 2014, pp. 755–91, available at http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Chap12_FINAL.pdf; Patrick M. Cronin, ed., 'Cooperation from Strength: The United States, China and the South China Sea,' *Center for New American Security*, Washington, DC, 2012; Elizabeth Rosenberg, David Titley, and Alexander Wiker, 'Arctic 2015 and Beyond: A Strategy for U.S. Leadership in the High North,' Policy Brief, *Center for New American Security*, Washington, DC, December 2014.

[13] Vivien A. Schmidt, 'Democracy and Legitimacy in the European Union,' in The Oxford Handbook of the European Union, ed. Erik Jones, Anand Menon, and Stephen Weatherill, Oxford, Oxford University Press, 2012.

[14] Rüttinger et al. 'A New Climate for Peace,' *adelphi, International Alert, the Wilson Center, Institute for Security Studies*, 2015, available at: https://www.newclimateforpeace.org

[15] Werrell and Femia, 'Climate Change, the Erosion of State Sovereignty, and World Order,' 2016

[16] Michael B. Kelley, 'Emerging Markets Could Be Devastated By A Literal Perfect Storm,' *Business Insider*, March 6, 2013, available at: http://www.businessinsider.com/emerging-markets-vulnerable-to-weather-2013-3.

[17] Troy Sternberg, 'Regional drought has global impact.' *Nature*, 472, 169, April 2011, available here: http://www.nature.com/nature/journal/v472/n7342/full/472169d.html?foxtrotcallback=true

[18] Caitlin E. Werrell, Francesco Femia and Troy Sternberg, 'Did We See It Coming? State Fragility, Climate Vulnerability, and the Uprisings in Syria and Egypt', *SAIS Review of International Affairs*, Volume 35, Number 1, Winter-Spring 2015, pp. 29-46, available at: https://muse.jhu.edu/article/582525

[19] Yasuaki Hijioka, Erda Lin, and Joy Jacqueline Pereira, 'Chapter 24: Asia,' *Climate Change 2014: Impacts, Adaptation, and Vulnerability*: *IPCC 5th Assessment Report*, Cambridge and New York, Cambridge University Press, 2014.

[20] Jenny Grote Stoutenburg, *Disappearing Island States in International Law*, Leiden, The Netherlands, BRILL, 2015.

[21] Benjamin Glahn, "'Climate Refugees'? Addressing the International Legal Gaps," *International Bar Association*, June 2009, available at: http://www.ibanet.org/Article/Detail.aspx?ArticleUid=B51C02C1-3C27-4AE3-B4C4-7E350EB0F442.

[22] Werrell and Femia, 'Climate Change, the Erosion of State Sovereignty, and World Order,' 2016

[23] Ethan Siegel, 'The First Climate Model Turns 50 and Predicted Global Warming Almost Perfectly,' *Forbes*, March 15, 2017, available at: https://www.forbes.com/sites/startswithabang/2017/03/15/the-first-climate-model-turns-50-and-predicted-global-warming-almost-perfectly/#5b3a8afa6614

[24] Cowtan, K., Z. Hausfather, E. Hawkins, P. Jacobs, M. E. Mann, S. K. Miller, B. A. Steinman, M. B. Stolpe, and R. G. Way (2015), 'Robust comparison of climate models with observations using blended land air and ocean sea surface temperatures,' *Geophys. Res. Lett.*, 42, 6526–6534, doi:10.1002/2015GL064888. Cited in, Nuccitelli, D. 'Climate models are even more accurate than you thought,' *The Guardian*, July 31, 2015, available at: https://www.theguardian.com/environment/climate-consensus-97-per-cent/2015/jul/31/climate-models-are-even-more-accurate-than-you-thought

[25] I. Allison, N. L. Bindoff, R.A. Bindschadler, P.M. Cox, N. de Noblet, M.H. England, J.E. Francis, N. Gruber, A.M. Haywood, D.J. Karoly, G. Kaser, C. Le Quéré, T.M. Lenton, M.E. Mann, B.I. McNeil, A.J. Pitman, S. Rahmstorf, E. Rignot, H.J. Schellnhuber, S.H. Schneider, S.C. Sherwood, R.C.J. Somerville, K.Steffen, E.J. Steig, M. Visbeck, A.J. Weaver, "The Copenhagen Diagnosis, 2009: 'Updating the world on the Latest Climate Science,'" *The University of New South Wales Climate Change Research Centre (CCRC)*, Sydney, Australia, pp 60, available at: http://www.copenhagendiagnosis.com; Ann Stark, 'Climate Models Underestimate Global Warming by Exaggerating Cloud "Brightening,"' *Lawrence Livermore National Laboratory*, April 7, 2017, available at: https://www.llnl.gov/news/climate-models-underestimate-global-warming-exaggerating-cloud-brightening

[26] Stefan Rahmstorf, Jason E. Box, Georg Feulner, Michael E. Mann, Alexander Robinson, Scott Rutherford & Erik J. Schaffernicht, 'Exceptional twentieth-century slowdown in Atlantic Ocean overturning circulation, *Nature Climate Change*, Number 5, pp 475-480 (2015), available at: https://www.nature.com/nclimate/journal/v5/n5/full/nclimate2554.html; Lui, Wei et al, 'Climate Model Suggests Collapse of Atlantic Circulation is Possible,' *Scripps Insitution of Oceanography*, January 4, 2017, available at: https://scripps.ucsd.edu/news/climate-model-suggests-collapse-atlantic-circulation-possible; Shea, Shannon Brescher, 'Defrosting the World's Freezer: Thawing permafrost,' *United States Department of Energy, Office of Science*, June 13, 2017, available at: https://science.energy.gov/news/featured-articles/2017/06-13-17/

[27] Fetzek, S., B. Mourad, C. Briggs, K. Lewis. 'Why and how to use foresight tools to manage climate security risks,' *Planetary Security Initiative & The Center for Climate and Security*, April, 2017, available at: https://www.planetarysecurityinitiative.org/sites/default/files/2017-04/PB_Why_and_how_to_use_foresight_tools.pdf.pagespeed.ce.8LZUyRqu8Y.pdf

[28] J. Eli Margolis, 'Estimating State Instability,' *Studies in Intelligence*, Volume 59, Number 1, March 2012, pp. 13-24.

[29] *Ibid*

[30] J. Mann, 'The Obamians: The Struggle Inside the White House to Redefine American Power,' *Viking Press*, 2012

[31] Wadid Erian, Bassem Katlan, and Ouldbday Babah, 'Drought vulnerability in the Arab region: Special case study: Syria,' *2011 Global Assessment Report on Disaster Risk Reduction*, UNISDR, 2010

[32] Robert F. Worth, 'Earth is Parched Where Syrian Farms Thrived,' *The New York Times*, October 13, 2010, available at: http://www.nytimes.com/2010/10/14/world/midleeast/14syria.html?_r=2&adxnnl=1&adxnnlx=1330449407-yAipXrd1kQsKbG2Bb5A61A&pagewanted=1
[33] *IRIN*, 'Syria: Why the water shortages?', March 25, 2010, available at: http://www.irinnews.org/report/88554/sYriA-Why-the-water-shortages
[34] Oli Brown and Alec Crawford, 'Rising Temperatures, Rising Tensions: Climate Change and the Risk of Violent Conflict in the Middle East', International Institute for Sustainable Development, Winnipeg, 2009. Accessed at https://www.iisd.org/pdf/2009/rising_temps_middle_east.pdf
[35] Caitlin E. Werrell and Francesco Femia, 'The Nexus of Climate Change, State Fragility and Migration,' *Angle Journal (Imperial College London)*, November 26, 2015, available at: https://anglejournal.com/article/2015-11-fragile-states-the-nexus-of-climate-change-state-fragility-and-migration/
[36] IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)], IPCC, Geneva, Switzerland, pp151.
[37] UN Security Council. 'Security Council Strongly Condemns Terrorist Attacks, Other Violations in Lake Chad Basin Region, Unanimously Adaption Resoution 2349 (2017),' *UN Press*, March 31, 2017, available at: https://www.un.org/press/en/2017/sc12773.doc.htm
[38] Search, UN Security Council, The Center for Climate and Security website, accessed on August 5, 2017 at: https://climateandsecurity.org/?s=Un+Security+Council&submit=
[39] Francesco Femia, Christine Parthemore, Caitlin Werrell. 'The inadequate US response to a major security threat: Climate change,' *The Bulletin of the Atomic Scientists*, July 20, 2011, available at: http://thebulletin.org/inadequate-us-response-major-security-threat-climate-change
[40] Stanley R. Sloan, *NATO, the European Union, and the Atlantic Community: The Transatlantic Bargain Challenged*, Lanham, MD: Rowman & Littlefield Publishers, 2005