

THE CLIMATE AND
SECURITY
ADVISORY GROUP

CLIMATE AND SECURITY FELLOWSHIP PROGRAM

RISKS BRIEFERS

SEPTEMBER 2019



THE CENTER FOR
CLIMATE AND
SECURITY



environmental change & security program

U.S. service members with Joint Task Force - Leeward Islands and members of the U.S. Agency for International Development's Disaster Assistance Response Team unload supplies from a U.S. Army CH-47 Chinook helicopter at the port of Roseau, Dominica, Sept. 30, 2017. At the request of USAID, JTF-LI has deployed aircraft and service members to assist in delivering relief supplies to Dominica in the aftermath of Hurricane Maria. The task force is a U.S. military unit composed of Marines, Soldiers, Sailors and Airmen, and represents U.S. Southern Command's primary response to the hurricanes that have affected the eastern Caribbean.

U.S. MARINE CORPS / SGT. MELISSA MARTENS

In response to increasing interest in career pathways for climate and security practitioners, the Climate and Security Advisory Group (CSAG) has developed a community-wide Climate Security Fellowship Program and is pleased to announce the 2018 class of CSAG Climate and Security Fellows.

The CSAG Climate and Security Fellowship program is the first professional organization for emerging leaders seeking meaningful careers at the intersection of climate change and security. The program connects established climate security experts with prospective future leaders through a year-long mentorship program. CSAG Climate Security Fellows gain experience through research and writing, field trips and outings, and networking with experts and practitioners. Ultimately, fellows will play a leading role in expanding the climate and security network of the next generation and solving some of the most complex risks the world faces.

The CSAG Fellowship program would like to thank all of the climate and security experts who briefed the group this year including: Hon. Sharon Burke, Dr. Phil Brown, Brigadier General Stephen A. Cheney, USMC (Ret), Hon. Sherri Goodman, Dr. Marcus King, Vice Admiral Dennis McGinn, US Navy (Ret.) and Major General Munir Muniruzzaman (Ret.) We would also like to thank all of those who met with and supported the Fellows during the field trip to Norfolk, Virginia including: Rear Admiral Ann Phillips, US Navy (Ret.) and Captain Joe Bouchard, US Navy (Ret.).

Last but certainly not least, we extend a big thank you to the manager of the program, Esther Babson; to Julia Burnell, who was an enormous help; and to the David Rockefeller Fund for their support and vision - three years in the making!

The opinions expressed in this report are those of the authors and do not reflect the positions of the affiliated organizations.



CONTENTS

- 5 INTRODUCTION
CAITLIN WERRELL & FRANCESCO FEMIA
- 6 CSAG 2018-2019 FELLOWS
- 10 CLIMATE CHANGE, DISPLACEMENT, AND THE INTERNATIONAL RESPONSE
ELIZABETH AREVALO
- 15 INCORPORATING HEAT-STRESS AS A RISK TO MILITARY READINESS
CHRISTOPHER GAULIN
- 20 SECURING THE HOMELAND WHEN NEW HOMES ARE NEEDED,
CLIMATE CHANGE MIGRATION, DISPLACEMENT, AND RELOCATION IN U.S. CITIES
VICTORIA HERRMANN, PHD
- 25 THE CHALLENGE OF WATER SECURITY FOR DOMESTIC U.S. DEPARTMENT OF
DEFENSE INSTALLATIONS
ERIN HYLTON
- 31 SAFETY IN THE DUST: SECURITY AT THE U.S.-MEXICO BORDER, GIVEN A
BACKGROUND OF DROUGHT AND STORMS
CYAN JAMES
- 35 THE BITING TRUTH: HOW VECTOR-BORNE DISEASES POSE A GREATER THREAT TO
NATIONAL SECURITY IN THE COMING ERA OF CLIMATE CHANGE
VICTORIA "TORI" JOHNSON
- 40 HOW SECURITY COOPERATION AND BUILDING PARTNERSHIP CAPACITY
PROGRAMS CAN MITIGATE CLIMATE RISK
JESSICA OLCOTT
- 43 AIR FORCE INSTALLATION FLOODING: A CASE FOR INCREASED FUNDING TO
ENSURE MISSION READINESS
PATRICK SCHLECKER
- 48 A FAST-CHANGING ARCTIC SECURITY ENVIRONMENT
EZRA SHAPIRO
- 53 FRONTLINE STATES: RESPONDING TO THE PROBLEM OF SINKING PACIFIC ISLAND
NATIONS
ROHIT SUDARSHAN

INTRODUCTION

This report compiles a series of forward-thinking analysis from the inaugural class of Climate and Security Advisory Group (CSAG) Fellows. The CSAG Fellows spent a year meeting with top climate and security experts, and considering the security implications of climate change in the context of their work, both inside and outside government, their studies, and the pressing security issues facing the world today. Some fellows saw firsthand the impact of a changing climate on Naval Station Norfolk, and all witnessed the relevance of climate security risks to their day-to-day professional experiences.

The task for this report was clear: write a short brief on a climate security matter that is interesting and requires much more attention. The resulting report is therefore a window into how emerging leaders within the climate security field view the critical issues of the present and future, and what to do about them.

It is not unprecedented for the security community to miss key trends because of a focus on other pressing matters of the day. Perhaps this report will help ensure that the climate security topics within its pages do not go unnoticed.

Congratulations to the 2018-2019 CSAG Fellows for a job well done. May they continue to shed light on this important field, and may the security community heed their concerns.

Caitlin Werrell & Francesco Femia
Co-Founders
The Center for Climate and Security

CSAG FELLOWSHIP PROGRAM FELLOWS

2018-2019

Elizabeth Arevalo

Elizabeth is a Legislative Assistant for Congressman Ted Lieu advising him on a several policy issues including those related to energy and the environment, transportation, and immigration. Prior to working for Congressman Lieu she served as a Legislative Fellow for Senator Joe Donnelly. Elizabeth received a BA in Political Science with minors in Business Economics and Italian from the University of Notre Dame. She was born and raised in Los Angeles.

Christopher Gaulin

Christopher Gaulin is an active duty Army Officer and Instructor at the United States Military Academy at West Point. He teaches cadets in an introductory geography and earth science course and is a course director for a course in geomorphology. Chris' operational Army assignments include the 25th Infantry Division and 10th Mountain Division where he deployed to both Afghanistan and Iraq. He is a 2017 graduate of the Army's Strategic Leadership Broadening Seminar at Chapel Hill, NC. Chris graduated and commissioned from the United States Military Academy, West Point where he earned a Bachelor of Science degree in Environmental Geography. Chris recently graduated from Boston University with a Master of Arts in Geography where he studied the role of climate change in military security operations at home and abroad. Specifically, his research addressed risks to training installations and servicemembers from a variety of hazards including extreme heat stress.

Victoria Herrmann

Dr. Herrmann is the president and managing director of The Arctic Institute, a nonprofit organization dedicated to Arctic security research. She is also a National Geographic Explorer, she also works with coastal communities on human security in relation to climate change adaptation and relocation. As lead researcher for the America's Eroding Edges project, she traveled across the United States and US Territories interviewing 350 local leaders to identify what's needed most to safeguard coastal communities against the unavoidable impacts of climate change. Her current project, Rise Up to Rising Tides, is creating an online matchmaking platform that connects pro bono experts with climate-affected communities. Dr. Herrmann teaches sustainability management at American University; science communication at the University Centre of the Westfjords, Iceland; and public speaking at National Geographic Sciencetelling Bootcamps. She was previously a Junior Fellow at the Carnegie Endowment, a Fulbright Awardee to Canada, a Mirzayan Science and Technology Policy Fellow at the National Academies of Sciences, and a Gates Scholar at the University of Cambridge, where she received her PhD in Geography.

Erin Hylton

Erin Hylton is a Senior Water Policy Analyst with Concurrent Technologies Corporation, where she provides contract support to the Office of the Deputy Assistant Secretary of the Air Force for Environment, Safety and Infrastructure to develop a water resource management program that takes a risk-based approach to achieve water assurance for mission assurance. A Marshall Scholar, Erin holds an MSc in Hydrology and Sustainable Development from Imperial College London and an MSc in Water Science, Policy and Management from the University of Oxford. Her research has largely focused on water security, with fieldwork in India investigating basic sanitation technologies and in Brazil examining a program to provide informal settlements with reliable, piped access to safe water. Erin previously worked on issues of climate change, environment, and development for the U.S. State Department, the U.S. Environmental Protection Agency, the Brookings Institution, and ICLEI – Local Governments for Sustainability and led the University of Maryland, College Park chapter of Engineers Without Borders.

Cyan James

Dr. Cyan James is a writer and researcher trained in public health and science communication. Beginning as an American Association for the Advancement of Science (AAAS) Science & Technology Policy Fellow, Dr. James has supported the Under Secretary of Defense for Research and Engineering (OUSD(R&E)) Human Systems Directorate, where she developed Department of Defense research and science oversight portfolios in human performance, synthetic biology, and Arctic science and technology. She also planned and organized the DoD Arctic Science & Technology Synchronization Workshop, held in May 2018 in partnership with NORAD-USNORTHCOM and the Cold Regions Research and Engineering Laboratories (CRREL). A graduate of the University of Washington, Dr. James has also been a Sage Bionetworks Scholar, a Christine Mirzayan Science and Technology Policy Fellow at the National Academies, and an AAAS Emerging Leader in Science and Society Fellow. She has published more than twenty-five pieces in academic journals, newspapers, periodicals, and literary journals and has taught at the University of Michigan and at Cornish College of the Arts.

Victoria Johnson

Victoria is a research specialist for CNA in the Safety and Security Division. Victoria works on a wide spectrum of projects supporting the Federal Government. Much of her work over the past year has been focused on addressing lessons learned from the 2017 hurricane season. She was stationed at the US Department of Health and Human Services, Secretary's Operations Center during landfall of the 2017 hurricanes, and later was deployed to Puerto Rico and Orlando for a collaborative study with the National Academies of Science and MIT on food/water/fuel supply chain resilience. Her other work focuses on countering domestic terrorism threats. Before coming to CNA Victoria worked for the Wilson Center's Environmental Change and Security Program while finishing up her BA in environmental policy and Russian Eurasian studies at Colorado College. At Colorado College Victoria was a student leader in the environmental science department working to integrate unmanned aerial vehicles (UAVs) in environmental data collection practices. She wrote her senior paper on the uses for UAVs for climate change monitoring and data collection.

Molly Jones

Molly Jones is a Senior Associate at The Asia Group, where she provides strategic support for clients across South Asia. In this role, she advises clients on geopolitical dynamics and develops corporate strategies for market entry and expansion across various sectors, including energy and climate. Molly also helps advance a range of corporate social responsibility (CSR) programs in the region to promote women's empowerment and sustainability. Prior to joining The Asia Group, Molly was a Fulbright Anne Wexler Scholar at Australian National University. Over the course of this fellowship, Molly conducted research on the security and sustainability dimensions of the U.S. rebalance to the Asia-Pacific. Molly previously served as a Research Analyst at NORC at the University of Chicago, an independent not-for-profit policy analysis and research institution. She was a part of a small team in the Security, Energy, and Environment Department that worked to improve disaster resilience in partnership with the American Red Cross, well as assessed the impacts of Superstorm Sandy in New York with the Associated Press and the Rockefeller Foundation. Molly graduated from Georgetown University's School of Foreign Service with a Bachelor of Science in Science, Technology, and International Affairs, and she received a Master of Public Policy from Australian National University, where she was a Fulbright Anne Wexler Scholar.

Jessica Olcott

Jessica Olcott is a Research Analyst in the Operations Evaluation Group at the Center for Naval Analyses. Her work is focused on the nexus of complex security challenges, including: maritime domain awareness, chemical, biological, radiological, and nuclear (CBRN) emergency preparedness, and naval and civil affairs. She is also an expert in East Central Europe and Western Balkan security, and served as a 2016-2017 Fulbright Clinton Public Policy Fellow in Pristina, Kosovo. While embedded with the Plans and Policy Directorate in the Ministry of the Kosovo Security Forces, her analysis focused on transition planning, gender and ethnic minority integration, strategic communication, and strategic planning. Prior to joining CNA, Ms. Olcott spent approximately five years managing, executing, and evaluating Defense Threat Reduction Agency (DTRA) foreign consequence management and building partnership capacity programs. As an expert in Homeland Security Exercise and Evaluation Program (HSEEP) conduct, she supported 14 bilateral exercises in seven countries, and managed more than 20 security cooperation missions in nine countries in U.S. European Command (USEUCOM) and U.S. Africa Command (USAFRICOM). Ms. Olcott holds a B.A. in Political Science and International Studies from West Virginia Wesleyan College and an M.S. in International Affairs with a concentration in Human Rights and International Law from Florida State University.

Patrick Schlecker

Mr. Schlecker is a Senior Consultant and Project Manager at Markon Solutions. Mr. Schlecker developed Markon's High Water offering by utilizing a network of international environmental and security experts including oceanographers, emergency planners, defense officials, engineers, and sea level experts. His passion for securing organizations from environmental changes has driven his management consulting career and work in national security. Mr. Schlecker also supports the global asset program for one of Markon's Defense Clients and leads business development capture for Markon's Innovation and Tech Integration practice. Mr. Schlecker received his B.A. in international studies from Dickinson College and focused his thesis on security impacts of climate change in the Arctic. Mr. Schlecker is trained in NOAA's Office of Coastal Management courses, received a certificate in Disruptive Strategy from Harvard Business School (HBX) and is a certified Scrum Master.

Ezra Shapiro

Ezra is a second-year graduate student at the Georgetown University Edmund A. Walsh School of Foreign Service, where he is pursuing a master's degree in Security Studies with a concentration in U.S. national security policy. Ezra specializes in the Arctic, energy security and the link between climate and national security. Before moving to Washington, Ezra served a three-year tour of service in U.S. Army Alaska. While there, he served as an infantryman and partook in a multinational military summit attempt of Denali, North America's highest mountain. He holds a bachelor's degree in political science and history from Binghamton University.

Rohit Sudarshan

Rohit Sudarshan is a Management and Program Analyst with the Office of Budget and Travel at the U.S. Department of Treasury. Recently, he completed a Fulbright Public Policy Fellowship at the Ministry of Foreign Affairs and Trade in Samoa. His ten months in the South Pacific Islands were marked by attention to the harmful impacts of climate change, particularly with regards to environmental migration and the need for environmental infrastructure. As a Fulbright Scholar, Rohit researched how the financial savings from temporary migration schemes for South Pacific residents can be invested in local development projects. Originally from Cincinnati, Ohio, Rohit received his Bachelor's degree in political science from Kenyon College and a Master's in Law and Diplomacy from The Fletcher School at Tufts University where he wrote a thesis on the impact of Filipino remittances on economic growth in the Philippines. His time in Washington included job experiences on the Asia Team at NDI where he focused on democracy promotion programs in Cambodia, Nepal, and Thailand. Additionally, at CSIS, Rohit worked on the Project for Prosperity and the Project on U.S. Leadership in Development, two initiatives that supported innovative forms of development aid.

CSAG 2018 Fellows



CLIMATE CHANGE, DISPLACEMENT, AND THE INTERNATIONAL RESPONSE

ELIZABETH AREVALO

Climate change acts as a threat multiplier and destabilizer throughout the world threatening the national security of the United States. As the global temperature warms, sea levels rise, droughts worsen, desertification becomes more common, and weather patterns shift. These slow-onset changes coupled with more frequent extreme weather events serve to make valuable resources like water scarcer, worsen food insecurity, and make certain areas temporarily or permanently uninhabitable. Moreover, they threaten to exacerbate existing divisions in weak states contributing to greater fragility.

One of the effects of a changing climate is the occurrence of increased migration within states and across national borders. In 2016, the U.S. Office of the Director of National Intelligence released a report stating, “Climate-related impacts will also contribute to increased migration, which can be particularly disruptive if, for example, demand for food and shelter outstrips the resources available to assist those in need....Over 20 years, the net effects of climate change on patterns of global human movement and statelessness could be dramatic, perhaps unprecedented.”¹ Further, as individuals are forced to relocate, migration will create stressors for the host cities and countries and those unable to move will be increasingly vulnerable to the impacts of climate change and exploitation.

In order to address climate change displacement, the United States and other nations should consider creating an international framework to accommodate an increase in displaced persons, invest in programs to improve adaptation and resilience in places suffering from climate change impacts, and engage in significant actions to reduce greenhouse gas emissions.

THE SCALE OF DISPLACEMENT

According to the Internal Displacement Monitoring Centre (IDMC), in 2016, 23.5 million people became displaced internally due to weather-related disasters such as floods, storms, and wildfires. In the Philippines, nearly six million people were displaced due to Typhoons Nock-Ten and Haima. Across the globe, Hurricane Matthew wreaked havoc in the Caribbean and the United States displacing more than 2.1 million people and destroying homes, infrastructure, and agriculture.² While climate change increases the frequency of extreme weather events, it is also important to note that the extent of devastation caused by the disasters is also linked to “populations’ exposure to natural hazards.”³

The statistics from IDMC do not include the number of individuals forced to relocate due to slow-onset changes in climate such as sea level rise and changing rain patterns that will cause additional migration. The World Bank has predicted that more than 143 million individuals in sub-Saharan Africa, South Asia, and Latin America will become internal climate migrants by 2050 if no actions are taken.⁴ Millions more will likely be forced from home and migrate across national borders.



North African Refugees Being Disembarked From an Italian Coast Guard Vessel in Sicily. IMMIGRATI LAMPEDUSA

CHALLENGES OF ADDRESSING DISPLACEMENT

Lack of Legal Framework for Dealing with Climate Migrants

The 1951 UN Refugee Protocol was adopted to acknowledge the right of an individual to seek protection elsewhere when fleeing one's country because of a "wellfounded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion."⁵ This convention is grounded in the principle of non-refoulement meaning that those fleeing persecution should not be returned to a country in which they are endangered. Significantly, the definition of a refugee does not include individuals who are forcibly displaced due to environmental factors. Debate remains over whether or not the definition of refugee should be expanded to include those fleeing for environmental reasons.⁶

Further, the international community has only engaged to a limited degree in ways to address climate migrants. In December 2018, the vast majority of UN Member countries adopted the Global Compact for Safe, Orderly and Regular Migration. The document recognizes climate change and disaster as factors impacting migration and the need to improve adaptation and resilience.⁷ That same month, the UN General Assembly adopted the Global Compact on Refugees acknowledging that "environmental degradation and natural disasters increasingly interact with the drivers of refugee movements," but that they are not the causes of movements.⁸ Finally, the Paris Agreement called for recommendations for dealing with climate migrants.⁹

One of the few ways in which the United States currently provides relief to those suffering from extreme weather events is through Temporary Protected Status (TPS). Under TPS, the Secretary of Homeland Security provides relief to foreign nationals residing in the United States if their home country is unsafe because of an armed conflict or environmental disaster. Those beneficiaries are able to remain in the United States for a limited period of time, typically until the dangerous conditions subside. The relief, though, is only temporary and does not apply to individuals living in the foreign nations at the time of designation meaning that those likely to be most impacted are not cared for adequately. While providing relief to many suffering from disasters, TPS is not a substitute for larger strategies to deal with climate migrants.

Multi-Causal Nature of Displacement

Another challenge of responding to displacement caused by climate change is that displacement often occurs for multiple reasons.¹⁰ At times, climate variability may drive urbanization after which an individual may migrate across a national border due to non-climate related factors including violence or poverty. Some experts have described this phenomenon as “step migration.” Drought in the Dry Corridor of Central America, for example, has left many farmers unemployed. As a result, many farmers have migrated internally to cities that are often crime-ridden. Soon after arriving in these cities, many leave the country moving north towards the United States as a result of crime or other factors.¹¹ In an April 2019 *New York Times* article detailing the impact of climate change on farming conditions in Central America, the article noted that “Climate change is rarely the sole factor in the decision to migrate. Violence and poverty are prime drivers, but climate change can be a tipping point, farmers and experts say.”¹²

This multi-causal nature of displacement raises numerous questions about the ability of governments identify this particular displaced population. Policymakers must consider whether climate-related factors should be given similar weight to those related to violence or persecution, especially if comparing this population to refugees. The lack of a clearly defined population may make shaping any international agreements increasingly difficult.

Tensions Between Communities

As the U.S. Government Accountability Office noted in a 2019 report, the influx of new migrants “to a city may put pressure on existing resources, resulting in tensions between new migrants and residents, or between the population and its government.”¹³ Further, the tensions created by displacement may be further exacerbated by the unwillingness of some governments to accept migrants, including refugees, in recent years. For example, in fiscal year 2018, the United States settled only 22,491 refugees compared to 84,994 settled in fiscal year 2016.¹⁴ Across the European Union, wealthy nations, such as Italy, are also turning away those seeking refuge.¹⁵ These types of government policies caution against expecting many governments welcoming individuals displaced by climate events.



Kutupalong refugee camp in Cox's Bazar, Bangladesh. The camp is one of three, which house up to 300,000 Rohingya people fleeing inter-communal violence in Myanmar. FOREIGN AND COMMONWEALTH OFFICE / FLICKR

SOLUTIONS

The aforementioned *World Bank* report, which suggested 143 million individuals could become displaced by 2050, also noted that that number could be reduced by 80 percent with appropriate adaptation and mitigation measures.¹⁶ Countries should develop a multi-pronged approach to limit the impacts of climate change and displacement. First, the international community should coordinate efforts to study and manage an increased in displaced persons whether it be through existing frameworks, such as the U.N. Refugee Convention or Paris Agreement, or adopt new policies. Second, nations should integrate climate change planning into their own policies and invest in resilience measures to anticipate internal and cross-border displacement. Third, wealthier nations may use development as a tool to improve resilience in more vulnerable places. Programs such as Feed the Future, an initiative of the United States government, strive to reduce food insecurity and poverty to increase stability in other countries and can be used as a model for future action.¹⁷ Finally, all countries should engage in serious steps to reduce greenhouse gas emissions.

CONCLUSIONS

Much uncertainty remains regarding the extent of displacement resulting from climate change. Further, the lack of a clear international framework for managing climate migrants and the tensions created between migrants and the communities that accept them create additional difficulties for addressing migration. Individual nations must take steps to reduce greenhouse gas emissions and the international community should come together to develop plans to accommodate an increase in displaced persons while also promoting adaptation and resilience strategies.

ENDNOTES

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INCORPORATING HEAT-STRESS AS A RISK TO MILITARY READINESS

CHRISTOPHER GAULIN

BACKGROUND

Over the past decade and to vary degrees of fidelity, the Department of Defense (DoD) has assessed the relative vulnerability of its assets and missions to climate change. DoD's recent vulnerability assessments have largely applied to infrastructure and the 2019 Report on Effects of a Changing Climate to the Department of Defense only considered "mission critical" sites with limited assessment of training installations.¹ When assessing sites, some of the more prevalent but less visible risks involve the safety and readiness of servicemembers as they train for and execute their assigned missions. One hazard not directly addressed by the recent DoD report, but inherent in several of the ones that were, is increasing temperatures. Increases in average and extreme temperatures contribute to drought, wildfire, thawing permafrost, and health risks to personnel.²

Extreme heat and humidity can increase the incidence of heat injuries and illness in military personnel and others who work outdoors, posing a direct threat to these servicemembers.³ This is especially true when considering that military personnel conduct intensive training and operate with restrictive clothing and heavy gear. An increase in the number of hot days will increase the exposure of servicemembers to these risks.

WET BULB GLOBE TEMPERATURE AND HEAT INDEX

The number of degraded training days can be used to quantify the impact of climate change on readiness. Lost training time is caused by severe heat stress potential, or "black flag" days, which occur when the wet bulb globe temperature (WBGT) exceeds 90° F.⁴ The WBGT a method for considering the true feel of the temperature by also including humidity, wind speed, and solar radiation in direct sunlight as these are the conditions a working service member will face. As the temperature reaches progressively higher heat categories, or "flag" levels, additional restrictions to training are enforced in accordance with various regulations, technical bulletins, and other local policies.^{5,6} Operating in these high temperature conditions increases the likelihood of hot weather illness and requires additional planning, training, and logistical support such as having coolers filled with ice water-soaked bed sheets or trained medical personnel on hand to mitigate these risks. Training at higher intensities during high heat index levels requires a significant rest to work ratio and increases water consumption requirements. The additional rest time requirements can reduce time available for service members to perform training tasks, especially when wearing standard combat equipment.⁷ Increased water consumption and the need to have cooling measures on hand increase the load servicemembers must transport on training and combat missions (see chart on page 16).

Work/Rest and Water Consumption Table

Applies to average sized, heat-acclimated Soldier wearing ACU, hot weather. (See TB MED 507 for further guidance.)

Easy Work	Moderate Work	Hard Work
<ul style="list-style-type: none"> • Weapon Maintenance • Walking Hard Surface at 2.5 mph, < 30 lb Load • Marksmanship Training • Drill and Ceremony • Manual of Arms 	<ul style="list-style-type: none"> • Walking Loose Sand at 2.5 mph, No Load • Walking Hard Surface at 3.5 mph, < 40 lb Load • Calisthenics • Patrolling • Individual Movement Techniques, i.e., Low Crawl or High Crawl • Defensive Position Construction 	<ul style="list-style-type: none"> • Walking Hard Surface at 3.5 mph, ≥ 40 lb Load • Walking Loose Sand at 2.5 mph with Load • Field Assaults

- The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hrs of work in the specified heat category. Fluid needs can vary based on individual differences (± ¼ qt/hr) and exposure to full sun or full shade (± ¼ qt/hr).
- **NL** = no limit to work time per hr.
- **Rest** = minimal physical activity (sitting or standing) accomplished in shade if possible.

Heat Category	WBGT Index, F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)
1	78° - 81.9°	NL	½	NL	¾	40/20 min	¾
2 (green)	82° - 84.9°	NL	½	50/10 min	¾	30/30 min	1
3 (yellow)	85° - 87.9°	NL	¾	40/20 min	¾	30/30 min	1
4 (red)	88° - 89.9°	NL	¾	30/30 min	¾	20/40 min	1
5 (black)	> 90°	50/10 min	1	20/40 min	1	10/50 min	1

- **CAUTION: Hourly fluid intake should not exceed 1½ qts.**
- **Daily fluid intake should not exceed 12 qts.**
- If wearing body armor, add 5°F to WBGT index in humid climates.
- If doing Easy Work and wearing NBC (MOPP 4) clothing, add 10°F to WBGT index.
- If doing Moderate or Hard Work and wearing NBC (MOPP 4) clothing, add 20°F to WBGT index.

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OBSERVED AND PREDICTED CHANGES IN WBGT

WBGT is observed and measured at training locations using a three thermometer system. However, this information is only used locally and not recorded or tracked over time. It is also possible to use weather station data to predict and calculate approximate heat stress. Using North American Land Data Assimilation System (NLDAS-2) primary forcing data consisting of temperature, insolation, wind, and humidity for the years 1979 to 2018, there is a clear trend in the impacts of higher heat category days.⁸ Climate projections indicate that temperatures in the mid-century and beyond will continue to rise. One study conducted in 2016 and based on an unmitigated carbon emission scenario (RCP 8.5) predicts an increase in number of heat category five days across the U.S by the end of the 21st century. The largest change is seen in the Southeast (75 more days) and southern Great Plains (55 more days), and the least change will occur in the U.S. Northwest (18 more days).⁹ The increase in days expected in the Southwest will contribute to already frequent heat category days and the region could experience more than 200 days a year when the index reaches category five (black flag) for at least part of the day. Much of the Southeast and Southwest will be subject to 30-80 days a year when intense training will have work time constraints regardless of the hour of day, meaning the minimum daily WBGT will always be above the 78° F.¹⁰



INDOPACOM service members continue to aid FEMA operations on Saipan and Tinian as they recover from the second-worst storm ever to hit U.S. soil. INDOPACOM / DVIDSHub

APPLICATION TO TRAINING RISK

More than 70,000 new army recruits and 37,500 marines began basic training in FY2017.¹¹ Many of these recruits conduct basic training during the summer months following high school graduations and almost all of them conduct training in the continental Southeast. In addition to army and marine basic military training, cadets and midshipman from the service academies conduct training in New York, Maryland, and Colorado during the summer months between academic semesters. These new servicemembers are generally young and of varying levels of physical fitness. This age group has the highest incidence of heat related injuries, more than six in one thousand, according to the Defense Health Agency.¹² Heat exhaustion and heat stroke can have lasting effects on servicemembers and increases their susceptibility in the future¹³. As average and extreme temperatures rise around these training locations, the risk of heat illness or injury increases.

IMPLICATIONS FOR OVERALL MISSION VULNERABILITY

Recent DoD vulnerability assessments have not quantified risk to readiness while considering heat as a hazard.¹⁴ Changes in temperature, however, are among the most certain projections available and can be applied to training bases to determine the impact heat stress will continue to have on training.¹⁵ This is especially true for combat units operating dismounted under heavy loads. The most recent DoD report on vulnerable sites did not include any marine installations where marine infantry forces train. Field training in a variety of environments

is essential to the readiness of combat forces and there are specific outdoor live fire training tasks that individual servicemembers and collective units must accomplish to be considered fully trained.¹⁶ Increasing heat indices threaten the overall readiness of the armed forces by limiting time available to certify and train on all mission essential tasks. Competing with other requirements, this further loss of training time forces commanders to assume risk by training in hotter conditions and foregoing training in secondary tasks and drills.

Understanding the future loss of available training days, particularly for the basic military training programs and unit readiness training centers is important for managing readiness. A significant decrease in available training days may require the relocation of training units or a change in the annual distribution of training classes. It will be imperative for the DoD to consider heat related illness in conjunction with other risk factors of climate vulnerability. Existing studies from the Strategic Environmental Research and Development Program (SERDP) provide a foundation and framework for quantifying this risk and identify issues in data collection. Reliance on field measurements alone may not suffice for accurate and location specific WBGT impacts. Like many other vulnerability areas, data on the frequency, duration, and impact to training through casualties or lost time and resources should be recorded for further assessment. Only through standardization and expansion of these efforts will the DoD be able to move beyond high-level assessments like those produced over the last few years to produce effective risk-weighted vulnerability assessments.

The DoD must also respond to these risks by reducing the likelihood of these hazards through continuing efforts to reduce contribution to warming. As a leader in energy resilience and energy consumption, the DoD is postured to implement renewable, low-carbon sources of energy across its domestic installations. Additionally, improvements to energy efficiency and renewable power will safeguard service-members deployed in operational assignments who will then be less reliant on enemy-targeted fuel supply lines. Increased heat poses a direct threat to military readiness at home and abroad. DoD and federal leadership have a responsibility to prepare for and mitigate the impacts of this threat in the interest of national security.

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SECURING THE HOMELAND WHEN NEW HOMES ARE NEEDED

CLIMATE CHANGE MIGRATION, DISPLACEMENT, AND RELOCATION IN U.S. CITIES

VICTORIA HERRMANN, PHD

Erosion, subsidence, wildfires, and the impacts of climate change are already causing displacement and urban migration across the United States and U.S. Territories. While most research, planning, and discussion of climate change and storm-induced migration focuses on these displaced coastal communities and human security in the immediate aftermath of a storm, migration is a long, two-way street.

As at-risk coastal and wildfire-country residents retreat inland for safety, families often migrate to nearby cities, with their concentrated resources and economic activity. In the aftermath of Hurricane Katrina in 2005, researchers found that families displaced by the hurricane moved to nearby major regional cities, including Baton Rouge, Atlanta, and Houston.¹ More recently, more than 135,000 Puerto Ricans have relocated to the U.S. mainland since Hurricane Maria hit in September 2017, the majority of whom migrated to cities within Miami-Dade County.²

In order to proactively plan for the homeland security challenges slow and sudden onset disasters bring during a state of emergency, it is incumbent upon U.S. cities to include migration and a widened security perspective in their climate change plans.

THE CLIMATE MIGRATION CHALLENGE FOR CITIES

In the U.S. the largest 20 metropolitan areas alone contribute more than half of the country's total GDP. Climate change shock events that occur in or near American cities not only threaten the sizable local populations of American lives; they also hold the immense potential to cause cascading economic, health, and human security threats across the nation.

“The United States should broaden its lens about how to secure the nation beyond military tools, and ask how the federal government can better support the work of state and local governments here in the United States,” General Raymond Odierno and Michael E. O’Hanlon note in the Brookings Institute publication, *Urban Security is National Security*.³ “There is another aspect to it as well. With larger cities, all dependent on infrastructure that is often vulnerable to natural disaster or cyberattack or terrorist strikes, there is a growing potential for catastrophes so big as to have national-security repercussions. The next storm like Hurricane Katrina might hit a city of ten million.”

From the Great Lakes to the Great Plains, the bellwether for such a storm is already ringing.



The active role played by contingency contracting Soldiers over the last two hurricane seasons led members of the 900th Contracting Battalion to conduct a one-day Defense Support of Civil Authorities exercise to test their contracting knowledge at Fort Bragg, North Carolina. SPC. ANDREA SALGADO RIVERA/U.S. ARMY

In 2018, America experienced 11 billion-dollar weather and climate related disasters, all of which impacted mid-size and major U.S. cities.⁴ Wildfires in the West, drought in the Midwest and hurricanes in the South forced many thousands of American families to leave their homes in search of safety. Some estimates put that number as high as 1.5 million Americans having migrated in the face of such disasters, temporarily or permanently, to other parts of the country in 2017 alone.⁵

In the aftermath of a climate-induced disaster, rural areas generally report larger out-migration responses than urban centers, and with better standards of living and easier access to public services, many of these climate migrants choose to relocate to cities.⁶ Many stay beyond the time of disaster recovery and make cities their permanent homes. In Houston for example, as many as 100,000 Hurricane Katrina evacuees permanently settled in the city ten years later.⁷ But such climate-induced migrants do not affect all sub-populations equally. A recent study of U.S. coastal communities found that the effects of land loss fall disproportionately on non-English speakers, those with low incomes, and those whose livelihoods are tied to natural resources. In urban-urban migration, whereby climate displaced households move from one city to another, individuals in low-income housing are also disproportionately displaced.

A 2015 report from the Center for American Progress notes that affordable housing is ill-equipped to cope with extreme weather events because it is often old, inadequately maintained, and poorly constructed.⁸ In 2008, Hurricane Ike disproportionately displaced low-incoming housing in Galveston Island, Texas into Texan cities; four years later, Hurricane Sandy displaced nearly half of New York City's 40,000 public-housing residents; and as the data is being collected now from the 2018 California wildfires, we can expect a similar displacement imbalance. According to the Los Angeles Times, "Five wildfires over the past 14 months, with November's Camp Fire the most devastating, have destroyed nearly 21,000 homes across six counties. That total is equivalent to more than 85 percent of all the new housing built in those counties over the past decade, according to Construction Industry Research Board building permit statistics."⁹

Often making this urban transition more difficult, cities are comprised of different economic, cultural, and demographic characteristics than more rural communities. The wellbeing of many coastal and rural fire-prone residents exists in an elevated level of vulnerability risk to hazards and potential displacement because climate change impacts are not race, gender, or income neutral. Climate impacts disproportionately affect low-income communities, communities of color, and women. Centuries of economic, social, and environmental injustices have made it difficult for low-income, legacy, and Native American communities to secure financial and technical resources to prepare for displacement, migration, and resentment inland.

Because of this, once climate-displaced households arrive and settle into cities, migrants may become vulnerable to socio-economic discrimination, housing insecurity, psychological and physical health complications, and violence. Each of these vulnerabilities decreases individual resilience to future climate and non-climate disasters, and in turn influences community-level resilience to national security threats.

THE STATE OF CITY CLIMATE CHANGE PLANNING

Effective migration and emplacement to inland cities require a participatory policy planning process inclusive of both coastal displaced and inland receiving communities. Urban migration post-disasters often include housing insecurity, longer commutes or employment searches, environmental and mental health impacts, changing schools. Newly received households require city governments to assist with housing, education, and

employment to adapt to city living and rebuild resilient lives.

By including displacement in their planning, city governments can rise up to proactively address the expected migration of climate change – and make the country more resilient in the process. In including migrants in climate action plans, cities can provide services to newly arrived urban populations at a relatively lower cost than to the rural population thanks to economies of scale, centralized resources, shared networks, and relatively shorter distances for distribution.

To do this effectively, city governments should collaborate with the national and subnational offices, programs, and individuals within the Department of Homeland Security tasked with climate change and natural disaster resilience, response, and recovery.



A banner informs applicants for disaster assistance that a center is now open in the city. Disaster Recovery Centers give those with losses from Hurricane Katrina the opportunity to meet with representatives from the various agencies who may be able to assist them. WIN HENDERSON / FEMA

In the short-term, the Department of Homeland Security, in cooperation with climate security-focused think tanks, could create a security-focused dialogue that can be readily mapped to identify goals and projects to address the security challenges of climate-induced regional migration and urban emplacement. The establishment of a committed forum to discuss displacement, migration, and emplacement for city governments and federal security leaders is a straightforward first step to achieve this. Forums should be piloted in cities within regions of high climate displacement vulnerabilities, namely California;

Louisiana, Texas, and Georgia; Florida & the U.S. Caribbean Territories; and Alaska. This is a low-cost, low-hanging fruit option to jumpstart the inclusion of the homeland security threats of climate migration.

For many U.S. communities, the security tipping point in climate displacement – the point at which in situ adaptation fails and migration ensues – is here. In the decades to come, the field will again tip when climate displacement is characterized by slow onset impacts (sea level rise; land degradation; temperature rise) rather than sudden onset disasters (hurricanes; wildfires; floods).

The Homeland Security Vision put forth in the 2007 National Strategy envisions a national security framework whereby the federal Department works with civil society, state, local, and Tribal governments to achieve a secure homeland that sustains the American way of life. In order to achieve this vision for residents across the U.S. at risk to extreme storm events, wildfires, and floods, the Department of Homeland Security must be proactive in working with subnational and civil society actors to secure regional climate displacement and urban emplacement.



A Modular Airborne Fire Fighting System (MAFFS), a C-130 Hercules plane modified for fire-fighting efforts, releases fire retardant over Shasta County, California, during the Carr Fire in early August 2018. CALIFORNIA NATIONAL GUARD

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THE CHALLENGE OF WATER SECURITY FOR DOMESTIC U.S. DEPARTMENT OF DEFENSE INSTALLATIONS

ERIN HYLTON

"The homeland is no longer a sanctuary."

- 2018 National Defense Strategy of the United States of America

INTRODUCTION: AGING INFRASTRUCTURE, LOOMING THREATS

America's aging water infrastructure needs a trillion dollars of investment over the next 25 years to maintain and expand service to meet demand.¹ If that challenge weren't daunting enough, utility providers are also confronting the growing threats of climate change and malicious physical or cyber attacks that could penetrate the continental United States (CONUS).

Historically, the importance of a resilient water supply for CONUS installations has been obscured behind two assumptions. The first is that forward operating bases are more immediately mission critical. Now, the boundary between a forward operating base and a CONUS installation is becoming blurred, as an increasingly networked force takes on more domestic operational responsibilities. In this context, the U.S. Department of Defense has been placing growing emphasis on readiness and resilience of domestic installations.

The second assumption has been that energy is the predominate mission critical resource for domestic installations. Today, DoD recognizes that water is used for more than mission support activities such as drinking, cooking, sanitation, and landscape irrigation. A denial of water service can have mission-critical impacts. For instance, water is used for cooling data centers that provide global intelligence capabilities, running industrial facilities that produce weapons systems, maintaining aircraft for power projection, and irrigating training fields that are vital for readiness. The historical focus on energy explains why some water policies are nested beneath titles such as "Installation Energy Management"² and "Installation Energy Plans."³

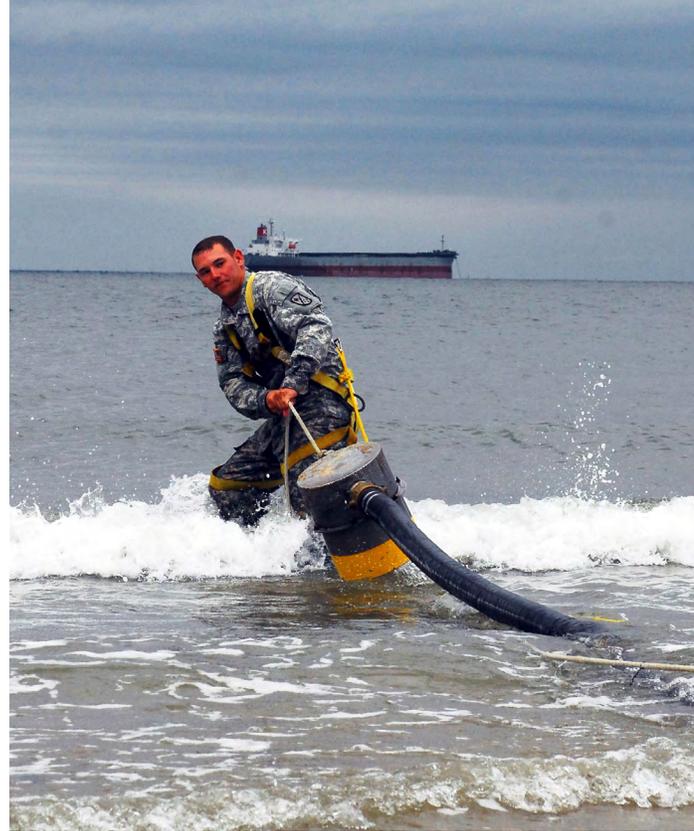
The first DoD policy to specifically recognize the importance of water security as a standalone issue was the 2014 Memorandum on Water Rights and Water Resources Management.⁴ The memo requested information about installations' water rights documentation, water sources, water prioritization plans, and awareness of future water needs. Shortly thereafter, Congress began showing an increasing interest in water-related risks to DoD, requesting reports on installation water security and conservation,⁵ water management practices,⁶ a water technology roadmap,⁷ and a comprehensive DoD water strategy.⁸

WATER SECURITY

To understand the barriers to water security, it is useful to consider the problem in three components: protecting and preserving access to source waters, maintaining water infrastructure, and mitigating the risk of a denial of service.

Protecting and Preserving Access to Source Waters

Installations rely on a combination of groundwater, surface water, and alternative water sources⁹ to supply water of adequate quality and quantity for mission. Growing demand, urbanization, shifts in inter- and intra-annual precipitation, land use changes that affect runoff and recharge, over-abstraction, and pollution are all placing pressure on these water sources. The largest hotspots for water stress are in the West, with the overallocated Colorado River basin in its 19th year of drought¹⁰ and the Ogallala aquifer continuing to decline.¹¹ However, other regions can also be impacted. Indeed, recent reports have already identified Fort Stewart in Georgia,¹² Vance Air Force Base in Oklahoma,¹³ and Mountain Home Air Force Base in Idaho¹⁴ as facing risks from insufficient access to water.



A water treatment specialist with the 40th Quartermaster Company of Schofield Barracks, Hawaii, deploys a Reverse Osmosis Water Purification Unit (ROWPU) intake screen during the Sergeant Major John C. Marigliano ROWPU Rodeo at Joint Expeditionary Base Little Creek - Fort Story. U.S. ARMY / STAFF SGT. MICHAEL BEHLIN

Addressing these water supply challenges will require extensive collaboration. Water resources do not align with legal or administrative boundaries and they are shared by users with competing interests. Installations will need to engage with local communities, major water users, political leaders, and regulatory bodies to negotiate water management solutions. As water sources become increasingly stressed, water rights disputes will also become more common.

Maintaining Water Infrastructure

Although straightforward in theory, fiscal limitations have hindered the ability of the services to recapitalize their aging water infrastructure. These challenges also extend beyond the fenceline. At the current rate of replacement, it will take water utilities 200 years to replace mid-century pipes that are beyond their useful life.¹⁵ To date, water systems have accounted for a small percentage of DoD utility outages.¹⁶ However, if installations and utilities lack the funds to invest in infrastructure upgrades and maintenance, that number will start to rise, increasing the likelihood of mission impacts.



A U.S. Air Force firefighter sprays water at the fire of a simulated C-130 Hercules plane crash during an operational readiness exercise. U.S. AIR FORCE / STAFF SGT. CRAIG CISEK.

Mitigating the Risk of a Denial of Service

Mitigating the risk of a denial of water service is seen through the lens of resilience. Practically, it can involve infrastructure solutions such as diversifying water sources, increasing the number of water connections, or adding water storage; personnel solutions such as training to operate water treatment plants or repair broken infrastructure; exercise solutions such as simulating a pump failure or contaminant plume; or planning solutions such as creating a water distribution prioritization plan or maintaining a close working relationship with the third-party provider.

THREAT MULTIPLIER: CLIMATE CHANGE AND WATER SECURITY

Climate change is a threat multiplier that will impact all three components of water security. The effects of climate change are transmitted primarily through water, whether through shifting precipitation patterns, sea-level rise, or the increased incidence of extreme weather such as droughts and floods. Severe droughts reduce the volume of available surface water, increasing pollutant concentrations and often leading to more dependence on groundwater. Droughts can also damage utility lines as soils contract and expand, increasing leaks and the potential for water main breaks or contamination. On the other end of the spectrum, pluvial and fluvial flooding can constrain base access and freedom of movement for water management personnel and damage vital equipment and real property. Looking to the coast, sea level rise is causing the salinization of once viable freshwater aquifers and contributing to coastal flooding that can disable pump stations or contaminate water sources.

PROGRESS OF THE SERVICES ON WATER SECURITY

DoD has separate policies governing each of the three components of water security. Long-term water supply risk tends to be considered as an environmental, encroachment, or mission sustainment issue, whereas infrastructure maintenance is considered utility management and water resilience is governed under policies on mission assurance and energy resilience.

Although DoD has not defined water security, the Army water security strategy defined it as "the assurance that water (potable and non-potable) of suitable quality will be provided at rates sufficient to fully support the Army wherever it has, or anticipates having, a mission in the future."¹⁷ Today, the Army is focusing on its Net Zero policy, which seeks to have no net impact on watersheds by recharging as much water as is withdrawn,¹⁸ and preparing installations to meet energy and water demands for fourteen days independent of external utility providers.¹⁹



Christopher Woodruff, water resources manager, Fort Irwin Department of Public Works (left) briefs Assistant Secretary of the Army for Installations, Energy, and Environment Katherine Hammack (center) and South Pacific Division Commander Col. Pete Helmlinger (right) on the second phase of the water treatment process at the Irwin Water Works, at Fort Irwin, California. U.S. ARMY CORPS OF ENGINEERS / BROOKS HUBBARD IV

The Air Force recently increased its focus on water security, with the Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health creating a water resource management program that takes a risk-based approach to achieve water assurance for mission assurance.²⁰ Under that program, the Air Force is assigning roles and responsibilities for water resilience, assessing long-term water availability risks, and piloting new analytical tools that will inform development of water resilience projects.

The Navy completed an installation water risk assessment in 2018,²¹ and has been following up on the primary conclusions that more data-informed, site-level analyses are needed to identify and mitigate water-related risks.

POLICY DRIVERS: SHAPING THE FUTURE OF WATER SECURITY

Two recent policies will shape future assessments of and investment in water security and water resilience. The first is the DoD requirement for Installation Energy Plans (IEPs), which will include planning for water resilience.²² The second is the passage of America's Water Infrastructure Act of 2018, which requires community water systems to complete assessments to identify risks to water sources, water infrastructure, and electronic, computer, and financial infrastructure. These risk and resilience assessments will act as a forcing function to consider risks from both natural hazards and malicious threats to water infrastructure, including cyber attacks.

CONCLUSION

The U.S. contains sufficient water to meet the needs of DoD and the American people. With unlimited funding and manpower, any water supply challenge could be overcome by moving water farther, storing it longer, treating it more. However, resource limitations constrain the solution space, making water security ultimately a management challenge based in trade-offs.

For DoD, water is both a critical resource and a crucial enabling system for missions. To improve water security in the context of aging infrastructure, climate change, and malicious actors, DoD needs to preserve and protect access to source waters, invest in infrastructure maintenance, and make its water supply architectures more resilient to denials of service.

As climate change increases the likelihood of extreme weather, the impacts will be felt not only at the tap, but also on the runway, on the range, and in the port. DoD would benefit from formulating a holistic, systems of systems approach to water assurance that bridges the policy silos governing the components of water security and encourages a more integrated approach to installation planning that mitigates the full spectrum of water-related risks.

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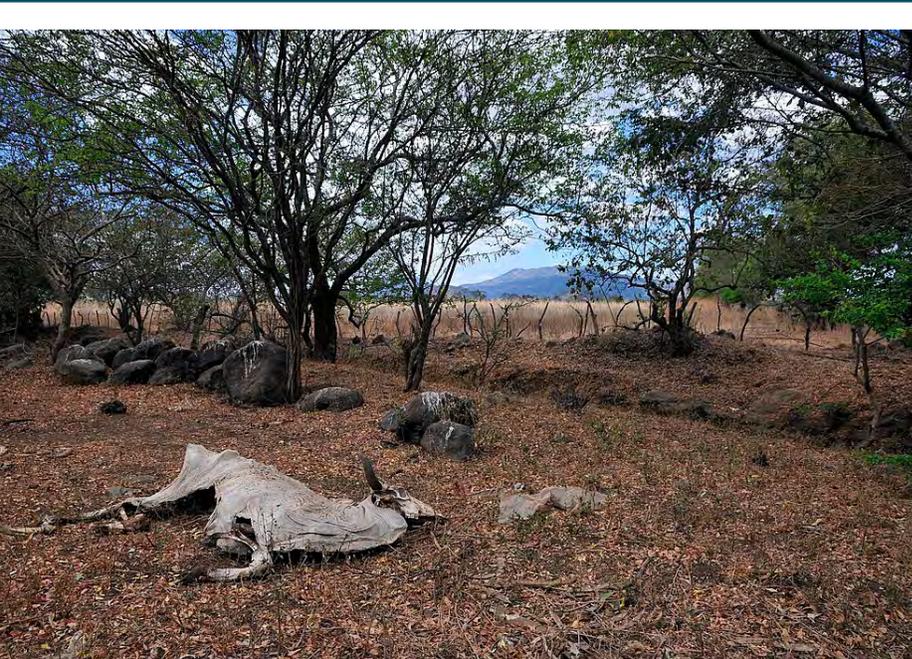
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SAFETY IN THE DUST: SECURITY AT THE U.S.-MEXICO BORDER, GIVEN A BACKGROUND OF DROUGHT AND STORMS

CYAN JAMES

U.S. attention has been riveted to its southern border as controversies flare over how to address immigrants and asylum-seekers. These problems certainly deserve thoughtful consideration and rapid action, but the U.S. approaches being promoted by the current administration—cessation of aid from the State Department to the “Northern Triangle” of Guatemala, Honduras, and El Salvador, increased pressure on Mexico to police the U.S.-Mexico border, and hardening on the U.S. side consisting of more stringent checkpoints, a heightened Border Patrol presence, and more numerous physical borders—will likely falter, since they do not adequately address why immigrants seek to cross the border in the first place.



Dry season in Nicaragua.

THE WHIP OF WEATHER

A significant ‘push’ factor inadequately addressed in U.S. policy and practice is how weather drives migration, and specifically, in this case, how increasingly erratic, severe, and damaging weather pushes people north. The Northern Triangle countries are part of the “Dry Corridor” running through Central America, where 2.81 million people increasingly struggle to achieve food security.¹

Dry periods have long characterized Northern Triangle countries, but within the past ten years, stretches of tempestuous, damaging rains have been alternating with lengthening heat waves, eroding topsoil and rendering the land more vulnerable to drought. These

storm-and-drought cycles are impactful in multiple ways: floods demolish local infrastructure and wash away fertile topsoil, while severe droughts trigger corn and bean crop failures. Warmer nights have also supported rust disease in coffee plants, which has rendered much of the region’s coffee production unprofitable.

The Regional Climate Change Strategy produced in 2010 by the Central American Commission for Environment and Development, part of the System of Central American Integration, expressed these changing conditions succinctly: “The region is already subject to new intense rain and storm systems, major droughts and new unknown extreme phenomena, which are delivering a severe blow to public resources, as well as the social and economic foundations of the countries, and threatens the very democratic governability of the region.”²

WHEN SURVIVAL DEPENDS ON MOVEMENT

When people cannot work and cannot eat, they move. For the Northern Triangle’s countries, where up to 30% of employment opportunities are connected to agricultural production, farmers and their families are moving not from desire but from necessity as changing weather patterns degrade agricultural production capabilities. Aid from Europe and attempts on the part of local governments to feed and employ their citizens have not always proven adequate, and local corruption further undermines governments’ ability to address regional problems. Without adequate wages or food, families are forced to make difficult decisions, and immigrating north at least promises a chance at survival, despite the fact that women and children, who typically suffer greatest under food insecurity, suffer again at the border, where they are vulnerable to theft, rape, coercion, and trafficking.

Weather patterns are not solely responsible for the Northern Triangle’s instability—they are only one factor in the complicated, interlocking series of push and pull factors that motivate more people to attempt border crossings. To overlook the impacts of weather, however, is to take a shortsighted view of recent developments that are not likely to self-correct. Syria and the Sahel have both experienced severe droughts, food shortages, and mounting insecurity, coupled with instability and outbreaks of violence. Both countries illustrate the tolls, both immediate and long-term, of failing to address weather-driven causes of instability at their roots while also demonstrating how ecological shifts in both countries correlate with conflict.³

Severe flooding is one of many devastating effects of climate change, as the Caribbean island nation Dominica experienced in 2011. DESMOND BROWN / IPS



WEATHER-SENSITIVE SOLUTIONS

If the U.S. is serious about shielding its citizens from potential threats related to immigration patterns, it should consider policies and practices that address weather-associated instability below its southern border. When farmers and the villages they supply can trust the land to feed their families, they can invest in where they already live, and will not need to take desperate migratory measures to survive. The U.S. can, therefore, add climate-aware measures to its approach to border security to increase the likelihood that people need not attempt border crossings in the first place.

These measures can be long-term—limiting emissions, offering faster tracks to employment within alternative energy sectors, and participating more fully in climate treaties, including revising agreements that have been causing rural farmers to lose out against large-scale, subsidized American agribusiness—as well as shorter-term, such as supporting projects that mitigate the impacts of drought and help conserve water for when it is most needed. For example, experiments on the border with gabions, metal cages filled with rocks, have already demonstrated initial success in halting water loss and spurring the growth of riparian zones⁴.

SECURITY-MINDED SOLUTIONS

The U.S. also needs to spend its resources wisely. Joint Staff operations director Vice Admiral Michael Gilday informed the House Armed Service Committee that \$235 million was spent by the end of January 2019 to maintain active duty service members and National Guard troops at the southern border⁵. Pressure on the U.S. Army Corps of Engineers, for example, to divert funding from already-appropriated projects represents a reallocation not subject to regular Department of Defense processes and not necessarily aligned with the National Defense Strategy.

As former Secretary of Homeland Security Janet Napolitano reminds us, “To safeguard the American people, as my former department’s mission demands, we must also look beyond the nominal limits of “homeland” security. We should repair the alliances and partnerships that are essential to our homeland security in an ever more dangerous world. We should help alleviate the conditions in Central America that cause so many to flee to the United States.”⁶ The strongest defense of U.S. security against border instability is to align spending with DoD security priorities while supporting localized stability in the Northern Triangle, including support for food security and weather resiliency.

Briefer Backstory

While most of my climate security-related work has concerned the Arctic, I would like to better explore and understand elements of climate security that connect and span the globe. In both the Arctic and in Central America—not to mention many, many other regions around the world—changes in weather patterns and climate are actively spurring families to make stressful changes. These changes produce ripple effects that will in turn drive further change, requiring flexibility and resilience on the behalf of both individuals and policies. While completing a fellowship in public health and risk factors of cancer at the border between Mexico and the United States, I became intrigued by the relationships between prevention, stress, and resilience. To better explore these relationships and how they are impacted by climate change, I have recently moved to South America, where I am writing on climate, the environment, trauma, health, and resilience.

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THE BITING TRUTH: HOW VECTOR-BORNE DISEASES POSE A GREATER THREAT TO NATIONAL SECURITY IN THE COMING ERA OF CLIMATE CHANGE

VICTORIA “TORI” JOHNSON

WHAT ARE VECTOR-BORNE DISEASES AND WHY ARE THEY INFLUENCED BY CLIMATE CHANGE?

The public health consequences of climate change are a growing risk to national security. One of the focal concerns is the increasing rate of infectious diseases. Sustained warmer temperatures in many regions of the world will heighten the threat of naturally occurring diseases through expanding the range of disease vectors. Disease vectors are organisms that transmit vector-borne diseases (VBDs) to humans and other animals. Arthropods are one species of disease vector particularly impacted by fluctuating global temperatures. Arthropod disease vectors are made up of mosquitoes, ticks, fleas, sandflies, and other blood-feeding insects that carry VBDs¹. VBDs transmitted by arthropods will continue to become a greater imposing threat to humans in a new era of climate change.

Arthropods cannot regulate their internal temperatures, therefore they rely heavily on warm climates to thrive and reproduce. Their dependency on warm temperatures makes them highly susceptible to small incremental temporal and spatial changes.² On average global temperatures are supposed to increase by 1.5 – 3.5 degrees Celsius in the coming decades³. This, in turn, will increase the overall population of arthropod disease vectors and expand the area they can inhabit. Sustained warmer temperatures will lengthen the lifespans of most arthropods, as well as increase their biting rates, speed up their lifecycle patterns, and boost their reproduction rates.^{4,5,6} In the coming decades arthropod disease vectors will expand to new regions, bringing with them the dangerous VBDs.⁷ [6] U.S. security strategies must recognize the risk of increased exposure to VBDs and implement solutions in regions affecting the safety of U.S. citizens and members of the U.S. Armed Forces.

CLIMATE PATTERNS INCREASE THE RISK OF VECTOR-BORNE DISEASES IN THE UNITED STATES

In many places across United States, VBDs are already a public health concern. Dengue Fever, Malaria, Chikungunya, Zika virus, West Nile virus (WNV), and Lyme disease, are already national health concerns in areas of the continental U.S. and Puerto Rico⁸. These VBDs, as well as others, are projected to increase in the coming decades in correlation with patterns of warmer temperatures and increased amounts of precipitation.

Since 2004, reported cases of VBDs in America have more than tripled from to increasing tick outbreaks and elevated levels of mosquito populations.⁹ A recent study in *Nature Microbiology* names climate change as a driving factor for the increased amounts of mosquitoes carrying Zika virus in the U.S. The study warns of greater expansion of the Zika virus by 2050 if the world remains on the same trajectory of rising global temperatures.¹⁰

Historical trends over the last few decades reflect a steady increase in average U.S. temperature. Specifically, in the last 30 years more than 76% of cities across the U.S. have experienced warmer weather conditions leading to an overall upsurge in days conducive to mosquito proliferation.¹¹ Warmer regional temperatures bring greater distribution of mosquitos and other arthropods carrying VBDs across the U.S.¹² In some instances, the changes in climate promote spread of diseases not previously of concern in America. Chikungunya, carried by mosquitos, was not seen in the Northern Hemisphere, until 2013, and has become a routinely nationally notifiable disease in the U.S.^{13,14} WNV has been on the rise since its first occurrence in New York City in 1999, and has been increasingly present across the U.S. public healthcare surveillance system each year.¹⁵ Given the current trajectory, experts believe rising temperatures across North America will allow disease vectors carrying WNV to move further north, expanding into Canada by 2080.¹⁶

Mild winter temperatures allow arthropods carrying VBDs to flourish throughout the year. In 2012, Texas state health departments saw a significant increase in cases of WNV due to the unusually warm winters.¹⁷ Similarly, the Centers for Disease Control and Prevention advise about the risk of Lyme disease due to year-round tick outbreaks.¹⁸ Other life threatening VBDs diseases like Chagas, and Leishmaniasis, are carried by sandflies, moving north into Florida due to warmer winter conditions.¹⁹ An increase in VBDs year round will require better surveillance methods and public health sector resources.

Sgt. 1st Class Ronald Lange (left) and Flight Lt. David Nakken (right) observe a representative of the Federated States of Micronesia pouring water into a container June 24. Lange and Nakken are part of a preventive medicine team testing mosquitoes for diseases. U.S. NAVY / MASS COMMUNICATION SPECIALIST 1ST CLASS CARLA BURDT



Members of the U.S. Armed Forces training in regions increasingly exposed to arthropod disease vectors risk becoming infected with dangerous diseases. Behavioral factors play a large part of this risk. Activities such as operating and sleeping outside year-round put service members at risk of contracting VBDs. As climate change increases regional vector-borne disease spatial parameters, precautions to prevent disease outbreak should be considered for future training and readiness doctrine. Advanced research on growing disease vectors in the continental U.S., coupled with a robust vaccine program and personal protective equipment will need to be procedure to ensure safety of those training in areas at risk of VBDs.

VECTOR-BORNE DISEASES OVERSEAS

Perhaps the greatest risk of contracting VBDs falls on the U.S. Armed Forces stationed overseas. In terms of inhibiting mission readiness overseas, VBDs require immense costly treatment, reduce work force power, decrease combat effectiveness, lower the probability of mission success, and lower service member morale. U.S. Armed Forces stationed overseas must prepare to face the implications of increasing VBDs to maintain mission readiness. An example of this has already been seen with the continuous threat of Leishmaniasis disease, carried by sandflies in the Middle East.

Leishmaniasis disease is most abundant in the Middle East and Europe. It has been a concern for troops stationed in Iraq or Afghanistan for years; commonly referred to as the “Baghdad Boil”.²⁰ Temperature and precipitation patterns greatly impact the life cycles of sandflies carrying Leishmaniasis.²¹ As climate change alters long term weather and precipitation patterns, sandflies carrying Leishmaniasis and other VBDs will most likely expand to new areas in the Middle East, while fluctuating from previously recorded lifecycle patterns and biting rates, creating a need to implement additional VBD provisions.²²

The U.S. Department of Defense (DOD) is developing products to control and prevent further VBD outbreaks at overseas installations.²³ U.S. Armed Forces presence in Africa, Asia, Southwest Asia, Middle East, and Caribbean have necessitated further regional VBD monitoring and prevention programs. DOD research addresses overseas risks associated with VBDs, including mapping VBD hotspots and areas where VBDs are already endemic.²⁴ In an era of climate change these surveillance and mitigation strategies will need to reinforce efforts to protect U.S. Armed Forces overseas to equip them to handle increasing infections and diseases risks.

VECTOR-BORNE DISEASES AS A CATALYST FOR INTERNATIONAL POLITICAL HOTSPOTS

Vulnerable and impoverished populations around the world are highly susceptible to VBDs because they lack the healthcare and resources needed for disease protection and mitigation. In these areas, people have limited access to physical protective measures, education, and medical attention. As temperatures rise and precipitation patterns change, impoverished populations will be the first to experience the heaviest burden associated with higher rates of VBDs. For areas already characterized with preexisting regional stability concerns VBDs could be a compiling force multiplier, driving public health system failure, mass migrations, and economic downturn, and other extreme events. VBDs should be assessed as a global health concern and a compounding destabilizer for volatile geopolitical hotspots. Future increases in VBDs must be a consideration when developing U.S. foreign policy initiatives and global aid strategies.

A WARMER WORLD BRINGS A BUZZING FUTURE

The U.S. Armed Forces should recognize climate change as a threat multiplier for the spread of VBDs, and a debilitating component for U.S. Armed Forces in international engagements. On average, warmer temperatures over the next few decades there will likely result in an increase in the number of military personnel exposed to VBDs. Climate change projection data can help initiate surveillance systems for essential regions already experiencing increased risk of VBD exposure. It can also predetermine areas likely to experience warmer, sustained climate patterns that could become a risk of arthropod disease vectors in the future. Climate change and VBD data is an important consideration for national security because it can be used to create geographical distribution of VBDs in regards to current positioning of U.S. Armed Forces installations and future international areas of interest.

Members of the U.S. Armed Forces will be the tip of the sphere when facing the compounding effects of climate change. Preparing for an era of warmer temperatures and shifts in precipitation patterns will bring about an increase of public health concerns. To remain mission ready, members of the U.S. Armed Forces will need to prepare to routinely face increasing encounters with dangerous VBDs at home and overseas.

Two workers walk into a village to fumigate the houses. In the aftermath of intense flooding, the stagnant water is an excellent breeding ground for mosquitoes, increasing the risk of the mosquito-borne diseases such as dengue or malaria. After the 2012 rainy season left thousands of houses under water in the Peruvian department of Loreto. CESVI / Yofre Morales Tapia



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HOW SECURITY COOPERATION AND BUILDING PARTNERSHIP CAPACITY PROGRAMS CAN MITIGATE CLIMATE RISK

JESSICA OLCOTT

Communities, nations, and entire regions will face unprecedented risks, threats, and hazards from climate change that will have direct implications for the U.S. military, foreign policy, and overall security. In States with particularly high exposure to climate change, negative impacts will be acutely felt -- likely exacerbating existing challenges with resources, governance, and institutions that are critical to maintaining stability, mitigating disasters, and building resiliency.¹ While the sheer magnitude of climate change can be paralyzing, there is an existing infrastructure for cooperation in tackling these issues. By leveraging and refocusing existing security cooperation infrastructure, the U.S. can collaborate with key Partner Nations (PN) to proactively develop the resources and policies to institute pragmatic solutions to climate change.

BACKGROUND

Since the end of World War II, the U.S. has used security cooperation (SA), building partnership capacity (BPC) programs, and *security sector assistance* (SSA) as tools to achieve national security and foreign policy goals. Although the U.S. has a long legacy of sponsoring such programs, SC and BPC activities accelerated tremendously following the 9/11 attacks on the World Trade Center. From fiscal year 2006 through fiscal year 2016, the U.S. government has provided more than \$200 billion for programs providing security assistance and security cooperation to foreign countries.² Prior to 2006, BPC was generally associated with counterinsurgency (COIN) operations in Afghanistan and Iraq, but more recently has increased in prominence within U.S. strategy, arguably becoming a central pillar of national security and foreign policy.³

Coast Guard participates in joint Arctic search and rescue exercise.
U.S. COAST GUARD / PETTY OFFICER 2ND CLASS GRANT DeVUYST





Norfolk Naval Base, Virginia. PATRICK SCHLECKER

While the terminology is often conflated and may vary across U.S. government stakeholders, the U.S. government uses all three concepts to mitigate security threats, enhance relationships, and increase PN’s ability to contribute to international missions.⁴ Policy Directive 23 (PPD-23) provides a robust description for security sector assistance (SSA) – the policies, programs, and activities the U.S. uses to: engage with foreign partners and help shape their policies and actions in the security sector; help foreign partners build and sustain the capacity and effectiveness of legitimate institutions to provide security, safety, and justice for their people; and, enable foreign partners to contribute to efforts that address common security challenges in both civilian and military institutions.⁵ Similarly, PPD-23 outlines the goals and policy outlines for SSA, and insists upon a common, collaborative approach to addressing threats.^{6,7} The U.S. strategy for security assistance is set forth as a multiyear plan developed by the U.S. Department of State (DOS) and coordinated with the Department of Defense (DOD).⁸

Meanwhile, *security cooperation* and *BPC* are traditionally defined in DOD terms, and are typically executed by DOD and DOS agents. Generally, both are a broad terms that refer to DOD interactions, programs, and activities with foreign security forces and their institutions which are designed to enhance relationships, share resources, build capacities and capabilities, and help promote U.S. interests and objectives.⁹ These programs range from foreign military sales (FMS) and joint training to good governance activities and civilian-military cooperation. From 1999 to 2009, at least 184 countries were involved in BPC activities at the strategic, operational and tactical level – making the impacts widespread.¹⁰

INTEGRATING CLIMATE-RISK MITIGATION IN SC/BPC

While overall USG investment in SSA, SC, and BPC has declined slightly in recent years, security cooperation is almost always at the top of priorities in key federal doctrine, which makes it an ideal avenue to combat and mitigate climate-risk.¹¹ Climate change is routinely characterized as a “threat multiplier,” so fully implementing a framework that prioritizes climate-risk mitigation can create new areas for cooperation while enhancing existing relationships.

At the strategic level, DOD is already working internally to incorporate climate change into its own planning processes.¹² Similarly, other national level guidance already incorporates some aspects of climate change into their missions including:

- **Joint Regional Strategies** - DOS/United States Agency for International Development (USAID) guidance that sets the vision and direction for U.S. policy and development assistance in each region
- **Integrated country strategies (ICS)** - the core organizing documents for USG foreign assistance activities
- **Theater Campaign Plans (TCP)** - DOD geographic combatant commander's (GCCs) strategic-level guidance on theater priorities and operations

These plans, and the overarching security assistance architecture, could be leveraged to lead the national security community in climate-risk mitigation by organizing its activities by issue area. Specifically, establishing a thematic, climate-risk based approach that aligns engagements and end states to: water-security; food security; sea level rise and coastal degradation; public health; extreme weather events and weather-related disasters; climate-related migration; and combating violent conflict could facilitate more robust interagency cooperation and collaboration, in both the U.S. and abroad.¹³ By using these themes as the overall framework for engagement, SC/BPC can enlist a whole-of-government approach that underscores the complex interdependencies of climate change – ultimately leading to increased resiliency in the very places it is needed most.

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AIR FORCE INSTALLATION FLOODING: A CASE FOR INCREASED FUNDING TO ENSURE MISSION READINESS

PATRICK SCHLECKER

“Failures in infrastructure can have a direct impact by significantly disrupting mission generation capabilities...”

– Air Force 2019 I2S Memorandum

OVERVIEW

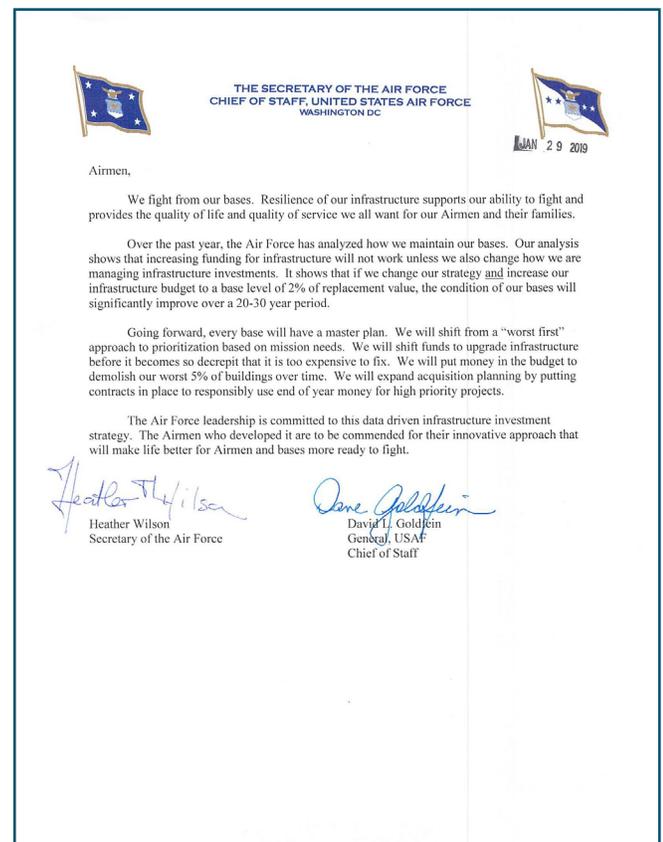
The last two National Defense Authorization Acts (NDAA) and recent Department of Defense (DoD) infrastructure assessments reflect a clear understanding that climate change, and specifically increased flooding, is a national security threat due to its impact on mission readiness.

While new flood standards provide promising strategies for the DoD, they do not account for the backlog of critical projects needed on existing installations. In January 2019, the U.S. Air Force (AF) took a step in the right direction with their Infrastructure Investment Strategy (I2S). The initiative is designed to ensure base resiliency while cutting the exorbitant SRM (Sustainment, Restoration, Maintenance) backlog.¹ However, the flooding caused by Hurricane Michael and Nebraska’s unprecedented bomb cyclone may force the AF to divert funding away from I2S in order to recover Tyndall and Offutt air bases.² While supplemental dollars alleviate the costs, long-term resiliency and SRM projects have been put on the back burner. Without additional funding, the AF faces larger deficits and deteriorating mission readiness.

CASE STUDY: TYNDALL & OFFUTT AIR FORCE BASE VS. SRM FUND

Air Force: SRM Needs

The Air Force has 180 installations worldwide, equating to a total plant replacement value (PRV) of \$263 billion.³ With an expensive global footprint, it’s difficult to keep pace with the maintenance and upkeep of their aging infrastructure. In the January 2019 I2S Memorandum, the AF states “Two decades



AF I2S Memorandum

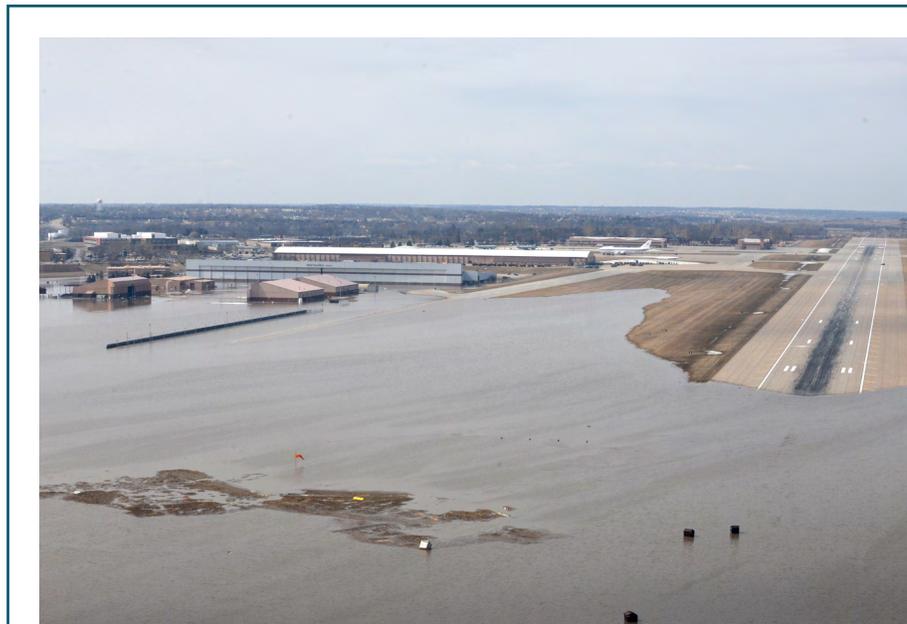
of taking risk in infrastructure created a fiscally unsustainable posture. At currently programmed resource levels, the \$33B in deferred maintenance and recapitalization will triple in the next 30 years.”⁴ If that backlog continues, the AF is at serious risk of diminishing mission-readiness and eroding national security.

Air Force: SRM Investment

The AF determined that increasing their 2020 infrastructure budget to 2% of total PRV (roughly \$5.26B), would result in significant improvements over the next 20 years.⁵ The increase would equate to an additional \$2B in 2020 funds and would cover the minimum required SRM projects needed to maintain mission readiness and cut the backlog to a manageable level by 2047. The investment’s primary focus is on infrastructure resiliency (including climate change impacts), mission-critical preventative maintenance, and eliminating 5% of the oldest total facility square footage.⁵ While worthy of praise, the FY 2020 request is not enough. A National Resource Council report recommended that at the absolute minimum, “budget allocation for routine maintenance and repair...will typically be in the range of 2 to 4 percent of the aggregate replacement value of those facilities”.⁷ With a debilitating backlog and the need for resilient infrastructure, the Air Force must request more than 2% of their PRV to ensure long-term mission readiness.

Air Force: Flooding impacts to SRM/I2S Program

Between October 2018 and March 2019, Tyndall AFB and Offutt AFB experienced two extreme flood events. Since both calamities occurred after FY 2019 budgets were set, there’s no money set-aside for the multi-year recovery. Situated on the panhandle of Florida, Hurricane Michael caused catastrophic damage to hangars and buildings across Tyndall AFB. Officials estimated that the rebuild could cost up to \$5B over five years.⁸ In Nebraska, Offutt AFB experienced a mix of melting snow and an additional “bomb cyclone” which produced record-setting flood levels.⁹ Within hours, 30 buildings, 30 structures, and two aircraft maintenance facilities were under eight feet of water- and 3,000 feet of the base’s runway was submerged.¹⁰



Offutt Air Force Base and the surrounding areas affected by flood waters, March 17, 2019. U.S. AIR FORCE / TSgt. RACHELLE BLAKE

The AF estimates that it will need \$1.2B in FY 2019 and \$3.7B in FY 2020 to begin the recovery process on both bases.¹¹ Unfortunately, a recent \$1.1B Senate supplemental bill for Tyndall will only serve as a band-aid.¹² The AF has already spent \$410M of its 2019 SRM account on Tyndall and had to defer 61 projects across 18 additional bases; all of which impact the I2S program.¹³



Tyndall Air Force Base after Hurricane Michael.
 U.S. AIR FORCE / TSgt. LILIANA MORENO

While the price tag is staggering, mission readiness continues to take a back seat. The impact of deferred projects could spiral into a loss of flight training hours, deferred aircraft repairs, grounded bombers, work stoppages, and impacts to weapon sustainment.¹⁴

The Bigger Picture

While the recovery is underway, attention needs to be focused on preparations for future weather events. Due to a warming climate, extreme flooding events will only increase in rate and severity. Looking at

Offut’s inland flooding example, the government’s National Climate Assessment states that the Midwest faces an exponential increase in flooding due to torrential rain fall, storm events, and higher riverine levels.¹⁵ What would happen to the AF’s mission capabilities if torrential floods hit the recovering base again? Tyndall’s coastal recovery is just as concerning. The mix of sea level rise and increased storm patterns exponentially create a new baseline for recurring floods and storm surge. While the AF plans on rebuilding a resilient Tyndall, it’s hard to believe the vulnerable, multi-year project, won’t be impacted by worsening weather events.

RECOMMENDATIONS:

Request an infrastructure budget equal to 4% of PRV

The Air Force needs a larger budget than 2% of PRV to cover the I2S program and account for inevitable recovery projects. At a minimum, the AF should request an infrastructure budget of 4% PRV.

Requested SRM – 2% PRV	I2S Program – 1% PRV	Recovery Projects 1% PRV
\$5.26B	\$2.63B	\$2.63B

Total: 4% PRV/\$10.52B

The example strategy includes an additional \$5.26B in funding per year, with half allocated to the I2S program. The 1% recovery buffer would allow the AF to decrease their mission critical SRM backlog and implement resiliency strategies, without the risk of dipping into the fund to restore readiness after a disaster.

While much deeper analysis is needed, this is the type of upfront investment needed to maintain mission readiness and save federal tax dollars. The National Institute for of Building Sciences found that owners can save \$6 in future disaster costs, for every \$1 invested in mitigation strategies.¹⁶ To reinforce the argument, in a March 2019 briefing, the U.S. Army Corps of Engineers stated that they save \$10 in flood damages per \$1

invested in mitigation.¹⁷ An additional investment of \$2B by the AF, would lead to a future savings of \$12-20B down the road. Congress must recognize the need for additional investments (>2% PRV) and the national security risks of underfunding the AF's infrastructure budget.

Implement an infrastructure investment strategy that aligns with installation specific resilience programs

In October 2016, the Climate and Security Advisory Group provided recommendations on how the DoD and Congress should use the DoD Climate Change Vulnerability Report. A key recommendation was to require Military Installation Resilience Plans (MIRPs) for vulnerable bases.¹⁸ MIRPs would incorporate an understanding of mission vulnerability, short-term & long-term threats, off-base dependencies, mitigation/adaptation solutions, and associated cost estimates.¹⁹ The services must focus their investments on the assets that are truly critical to mission readiness and include these costs in their future infrastructure strategies.

The DoD needs to update their Climate Vulnerability Assessment

In January 2019, the DoD released their infrastructure vulnerability assessment, focused on the impacts of climate change. Critics pointed out its failure to address the overall cost of mitigation.²⁰ It also omits installations recently devastated by flooding, including Marine Corps Installations and Tyndall AF Base.²¹ Due to the reports' pushback, the Under Secretary of Defense released a response which included the top 10 most vulnerable sites from each service. Yet, the revised report still doesn't address Marine Corps Installations and fails to provide actionable mitigation measures. Future costs must be understood in order to appropriately fund infrastructure investments strategies and address the mission-critical budgetary needs.

CONCLUSION

Due to an exponential increase in recurring weather events, the AF is stuck in a reinforcing feedback loop of pouring money into recovery, deferring mission critical SRM projects, and suspending mitigation strategies. Without more funding, there will be a severe impact on mission readiness in both the short-term (recovery and severe weather events) and long-term (deferred SRM funds and future resiliency). In order to maintain the service's capabilities, the DoD has the extraordinary task of investing in critical SRM projects and long-term resilience strategies, while continuing to recover from worsening climate impacts along the way. If we don't start investing now, the fiscal and national security cost will be much higher down the road.

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A FAST-CHANGING ARCTIC SECURITY ENVIRONMENT

EZRA SHAPIRO

INTRODUCTION

Climate change is transforming the security landscape at the global and regional levels. In many parts of the planet, climate change is a threat multiplier, exacerbating existing trends and tensions. But in the Arctic, climate change is a threat creator: by rendering previously impenetrable areas more navigable and accessible, climate change is turning the High North into a region more prone to competition, tension and militarization.

As sea ice steadily retreats from the Arctic Ocean, its waters are turning from white to blue, opening up economic and strategic possibilities hitherto unavailable. Even now, when the Arctic Ocean remains formidable year-round, countries near and far from the Arctic are trying to establish a toehold in the region.

China and Russia in particular have invested significant effort and resources into building up their polar capabilities. While Russia is the more obvious adversary in the Arctic, China is the greater long-term threat.

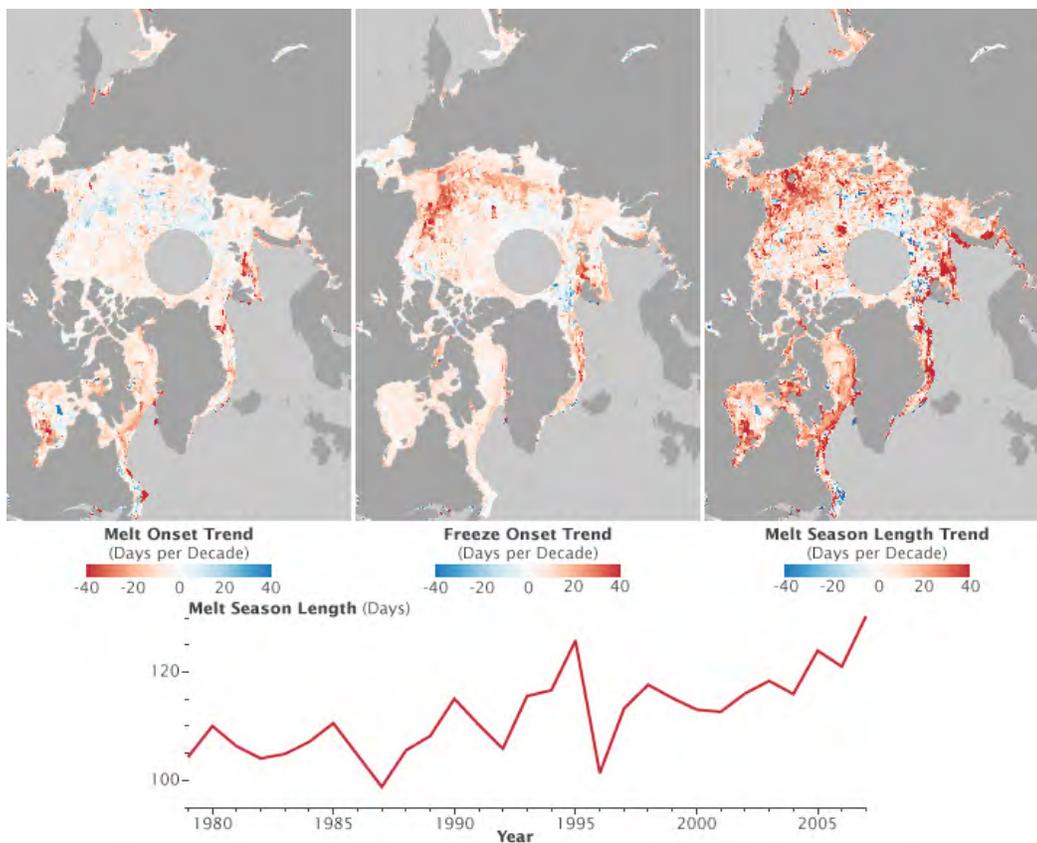
China's interest in the Arctic has grown concomitant to its growing global presence. The State Council Information Office of the People's Republic of China's publication of an Arctic white paper last year underscored that interest. China's public rhetoric on its Arctic policy has been conciliatory, but US policymakers should be concerned about Beijing's ambitions nevertheless. A growing Chinese presence in the Arctic could destabilize the institutional equilibrium of the Arctic Council, threaten US strategic interests, and dilute environmental regulations meant to safeguard the Arctic's vulnerable ecosystem.

A FAST-CHANGING ARCTIC SECURITY ENVIRONMENT

Of all the dramatic changes taking place in the Arctic, none will impact the international security landscape more than the retreat of sea ice in the Arctic Ocean. The UN estimates that Arctic sea ice has declined by 40 percent since 1979 and will be entirely absent in the summer by 2030.¹

The retreat of sea ice is making the region more navigable. Transit time along Russia's Siberian Coast, for example, fell by almost half between 1990 and 2013, in large part because of reduced sea ice conditions along the passageway.²

Three routes across the Arctic—the Northern Sea Route, the Northwest Passage and the Transpolar Route—could shave up to two weeks and millions in shipping costs from routes linking Eastern Asian to European and North American markets.³



Arctic melt trends graph.
NASA EARTH OBSERVATORY /
ROBERT SIMMON

A warmer Arctic offers more than just faster shipping times. It is also a destination unto itself. Vast reserves of oil, gas and minerals lay beneath the ground in the High North—up to 22 percent of the world’s remaining oil and gas reserves, and billions of dollars’ worth of nickel, palladium, copper and other valuable minerals.⁴ Private and national oil companies have invested heavily in exploratory drilling along the Arctic Coast, with Russian companies often leading the charge.

The future of shipping *through* Arctic waterways is unclear, despite their potential to diminish transit times. A host of risks, from unpredictable weather to ice floes, as well as investor wariness about the dangers of Arctic shipping, militate against a sudden boom in inter-Arctic commercial shipping.

Intra-Arctic shipping, though, will increase as the resources there are extracted and exported. Russia’s flagship Yamal LNG project, which began production in 2017 and is still growing, is a portent of the likely future of Arctic shipping.⁵

Although the Arctic might not be on the verge of becoming the next Suez Canal, there are still dangers posed by commodity shipping. Oil and gas extraction is more difficult in the harsh conditions of the Arctic, and an uptick in activity compounds the probability that an accident will occur. And investment in Russia’s extraction projects is a vehicle for growing Chinese influence in the region.

CHALLENGES FROM NEAR AND FAR

The Russian coast’s proximity to Alaska, the Arctic’s importance during the Cold War and Moscow’s bellicosity have all drawn attention to that country’s military buildup in the Arctic. Russian activity should not be overlooked, but neither should the threat it poses be overstated.

China’s activity in the Arctic, though more incremental and subtle than Russia’s, should arouse greater wariness than its northern counterpart. Since declaring itself a “near-Polar power” in its Arctic white paper, Beijing has rapidly built up its maritime polar capabilities, made the Arctic integral to its external and internal narrative, and taken steps to increase its regional influence.

Meeting Energy Needs Through the Arctic

China’s rapid economic growth is singularly fuel intensive. As the U.S. Energy Information Administration reports, “China’s energy consumption is tied to both its rate of economic growth and the size of its energy-intensive manufacturing industries.”⁶ Today, the country imports the most crude oil in the world, and the second most liquid natural gas.⁷ A large portion of its energy imports, however, ships through chokepoints that it does not control and that adjoin politically unstable regions. The Suez Canal, Miyako Straits, Panama Canal, and Malacca Straits—through which China gets 82% of its oil, and which the U.S. could easily shut down in a conflict—constitute vulnerabilities to Beijing’s energy security.⁸

China is therefore eager to diversify the sources of its energy imports, and thereby reduce its reliance on Middle East sources and through waters it does not control. The Belt and Road Initiative generally, and the Polar Silk Road in particular, are in large part an effort to accomplish this diversification.

China’s Globalizing of the Arctic

The numerous mentions of Arctic tourism in China’s Arctic White Paper speaks to the tactical utility of tourism for the state. As it has risen, China has employed tourism as a diplomatic stick and carrot around the world. China’s tourists now spend far more than those from any other country—at \$250 billion a year in 2017, they outspent the U.S. by \$100 billion; Beijing has also curtailed the flow of tourists to countries with which relations have soured. Domestically, images of Chinese tourists—especially at the ends of the earth—serves as a potent symbol of China’s growing global influence.⁹

In addition to increasing its physical presence, China is looking to build its political influence in the Arctic. It has done this by declaring itself a near-Arctic state, joining the Arctic Council as an observer, boosting its regional scientific research presence, and building bilateral economic ties with Arctic littoral states. As a Stimson Center analysis argues, by using what it sees as “unique advantages that are necessary for the development of the Arctic: financial capital, labor resources, and status as one of the largest consumer markets of natural resource,” China hopes to enlarge its physical and economic presence in the Arctic and thereby increase its regional political clout.¹⁰

Deploying the ice camp on sea ice during Chinese CHINARE expedition to the central Arctic in summer 2010. TIMO PALO / WIKIMEDIA



Tangible signs of Beijing's growing footprint in the North can be seen from Russia, where the country is investing lavishly in Russian energy projects, to Greenland, where FDI by China accounted for 11.6% of GDP from 2012-2017.¹¹ Through investing in projects across the High North, China hopes to gain access to the resources located therein, and boost its regional soft power so that it has sympathetic ears for future involvement in Arctic governance.

CONCLUSION AND RECOMMENDATIONS

The Arctic languished as a strategic backwater since the end of the Cold War, but there are encouraging signs that that is changing: after nearly diverting money allocated for a new icebreaker to instead fund Trump's proposed U.S.-Mexico border wall, Congress' 2019 spending bill includes funds for two new ships, and calls for the Coast Guard to have six icebreakers by 2029.¹²

The White House and departments of Defense and State are also rightly giving renewed focus to the Arctic. The former recently released an updated, China-focused Arctic Strategy in the near future. And in May, Secretary of State Mike Pompeo gave a speech at the Arctic Council, in which he said the region was growing in strategic importance and warned of Russian and Chinese activities there; shortly afterwards, the U.S. announced plans to establish a diplomatic presence in Greenland.¹³

These are all good signs, but without an understanding of our regional partners' interests—at the heart of which is recognizing the threat of climate change—the U.S. will remain at a strategic disadvantage. The same Arctic Council meeting at which Pompeo spoke failed to issue a joint communique for the first time in the organization's history—reportedly because the U.S. delegation refused to allow in any mention of climate change.¹⁴

China has been allowed into the Arctic because of its deep pockets, Western sanctions against Russia, and U.S. disengagement from the region. Shaping the future security environment means not just increasing American presence in the region, but also engaging with other Arctic stakeholders on their terms.

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FRONTLINE STATES: RESPONDING TO THE PROBLEM OF SINKING PACIFIC ISLAND NATIONS

ROHIT SUDARSHAN

Among the most graphic and dystopic aspects of climate change is the sinking and submerging of low-lying islands in the Indo-Pacific. The leaders of some of these countries of focus—Kiribati and the Maldives—have used their platform to influence and shape responses from policymakers around the globe. For former President of Kiribati Anote Tong, large scale migration from the Pacific Islands is all but guaranteed. Thus, the priority moving forward for islanders is securing the right “to migrate with dignity” while also encouraging other countries to recognize that Kiribati will not be the first nation “to pay the price for other countries’ bad choices.”¹ In fact, Mohamed Nasheed, former President of the Maldives, referred to these small, sinking Pacific Islands as “frontline states,”² comparing their current significance to that of countries such as Poland and Vietnam during the Cold War and its aftermath.

By labeling small island developing states as “frontline states,” Former President Nasheed underscores an important point that links the fate of these nations and their struggle against climate change with global security. Just as Poland and Vietnam fought ideological and physical threats, so too do small island development states. Their struggle against rising levels, contaminated water, and unpredictable and damaging storm surges foreshadow challenges other nations around the globe will soon face. Global warming, as a “threat multiplier,” means that rising sea levels and catastrophic weather events will exacerbate other threats such as global pandemics and armed conflict. For this reason, larger nations should be incentivized to help. While sinking islands represent a major crisis for the islands themselves, they also represent a “mini crisis” for global leaders such as China, the E.U., and the U.S., forcing them to look at resource management, climate refugees, and greater international cooperation.³

China and the United States represent the two largest economies in the world and had, until recently, worked constructively on global climate change. This culminated in an April 2016 joint declaration from both nations to sign the Paris Climate Agreement. However, recent squabbles on trade and cybersecurity meant these two nations are more adversarial than before. A major consequence of this has been a lack of leadership on climate change policy. The previous paradigm in which the U.S. and China, respectively representing the interests of the developed and developing world, could exchange ideas on climate change is now broken with great costs to the most vulnerable nations and global security.⁴ Fortunately, there are three recommendations that the U.S. and its allies can follow to reduce the dual risks of natural disasters and security threats.



Aftermath of Typhoon Pablo (Bopha) - Cateel, Davao Oriental, Philippines, 2012. SONNY DAY / WIKIMEDIA

RECOGNIZE AND DESIGNATE CLIMATE REFUGEES

There is clear evidence that climate change impacts migratory patterns and that the low-lying coastal areas, especially atoll nations and small island states in the Pacific, face some of the greatest risks.⁵ Recent setbacks to the collective response to climate change include President Trump's withdrawal from the Paris accords, the rising carbon emissions in China that directly contradict a pledge from leader Xi Jinping, and the rescheduling of COP 25 in 2019 due to the recent election of climate skeptic Jair Bolsonaro as President of Brazil.⁶ All of this means that sinking islands are an imminent reality, and there must be a plan in place to deal with the expected millions of climate refugees.⁷ New Zealand has set a good standard by establishing the first ever special refugee visa for Pacific Island residents but has begun with only 100 spots per year.⁸ Larger countries such as the U.S., Canada, and Australia must use this model and establish a climate refugee visa with more annual openings. Indeed, Washington Governor Jay Inslee, who is running for President in 2020, has called increasing the number of refugees to the United States because of climate change.⁹ For the U.S., there already something of a precedent for such action. More than 30,000 Marshallese that have left the Marshall Islands have settled in the U.S. Before fleeing due to rising sea levels, some had left because of the harmful impact of U.S. nuclear testing during the 1940s and 1950s.¹⁰ For the health impacts they suffered, Marshallese were able to move to the U.S. with a "permanent non-immigrant" status. Two other island nations, Palau and Micronesia, were awarded the same status, courtesy of the Compact of Free Association (COFA). Expanding the countries that can take advantage of this status is important. While other Pacific Island nations have not suffered from nuclear testing, the U.S. government considers climate change a national security threat and so COFA could be modernized to include their participation. However, this approach must complement increasing aid to these regions, especially because many Pacific Island migrants tend to experience homelessness when they emigrate.¹¹



Commander Fleet Activities Yokosuka port operations department sailors onboard USS Puyallup, simulate delivering food, clothing, first aid kits to Japanese disaster workers during 33rd annual Bosai Kunren. U.S. NAVY / JOSEPH SCHMITT

USE DEVELOPMENT AID TO COMBAT CHINESE INFLUENCE IN THE REGION

As a secondary suggestion, the U.S. and other military powers must continue to incorporate development into their Indo-Pacific military strategy, following past examples that established climate change as a national security threat. After natural disasters in Southeast Asia, the U.S. military was instrumental on climate risk planning by utilizing military-military and civilian-military engagement.¹² The U.S. military has the funding resources to make disaster risk and climate stability investments that align with its mission. Populist movements have not yet disrupted the public trust of the military within the U.S.¹³ and there is a bipartisan consensus towards confronting China.¹⁴ Thus, efforts to directly combat China's military intrusion in the area as well as their efforts to combat collective climate change policies will have both bipartisan support and the support of the general public. Part of China's success in reducing the ambitions for collective climate action have been its appeals to the economic needs of developing nations. China has referenced the "debts" developed countries owe others based on their history of environmental damage and thus ask for "flexible" rules for other developing nations until they meet certain standards of development.¹⁵ Fortunately, this strategy is less effective among small island developing states largely because these nations lack the interest and capacity to engage in that scale of development as well as the fact that they are low lying and thus see the immense impacts of climate change in the form of storms and cyclones. However, this is gradually changing as China is investing more in this part of the world.¹⁶ A lack of attention and concern for islands in Pacific will move these nations away from being non-aligned towards cooperation with China that may be harmful for their development as well as the planet, underscoring the need for using development aid in this manner.

SUPPORT FOR CARBON NEUTRALITY

At the moment, only some nations in the Pacific—Samoa, the Marshall Islands, Tuvalu, and the Maldives—have continued to maintain their pledge to be carbon neutral in the near future. There will be local costs and cutbacks in education, health care, and some economic development if they maintain this pledge. Improved international aid that targets these expected shortcomings must be the first step to offering support from afar. In addition to managing carbon emissions and pursuing renewable energies, these policymakers must support the efforts of Pacific Island nations that are seeking carbon neutrality. While small islands contribute only a minuscule amount of global emissions, they suffer disproportionately to rising levels. With their livelihoods being immediately at risk, it is important to support any effort on their part to alleviate this suffering. Offsetting these costs will not require too much extra funding given the small size of these Pacific island nations. The Samoan Education budget, for example, would need \$15 to \$20 million in support, and the Samoan government has already pledged almost \$37 million to support the Climate Resilience and Disaster Risk Management.¹⁷ There are long term benefits from this economic assistance and engagement as it enables Pacific Island countries to set a global standard of carbon neutrality, which can encourage future leadership in other climate change policies. COP 23, presided by Fiji, was the first time a Small Island Developing State (SIDS) took a leading role in the negotiations. The result was an elevation in the value of subnational and local actors in reforming Nationally Determined Contributions (NDCs).¹⁸ Continued economic support to these islands will help them follow the footsteps of neighbors like Fiji and give them the international platform to take more leading roles in agenda setting, allowing them to help mitigate the risks of climate-change caused natural disasters.

CONCLUSION

The Cold War saw enhanced U.S. engagement with countries around the world as it feared the influence of communism on the state of the world. As President Nasheed stressed, sinking islands can be seen as similarly relevant to the fate and well-being of other nations far and wide. Supporting local efforts at carbon neutrality gives policy making agency to SIDS while designating climate refugees benefits the livelihood of island residents that are able to leave as well as those that stay. Additionally, increasing development aid helps both Pacific Island interests as well as U.S. security interests by combatting the influence of China and other actors that are failing to take climate change seriously. While the strategy of containment was controversial and opaque, engaging with “frontline states” is constructive and clear.

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