GLOBAL SECURITY INITIATIVE

Climate Risk Reduction at the National and Sub-National Level
October 26th, 2015

The Security and Sustainability Forum
www.ssfonline.org

Chris Boone
Dean of the School of Sustainability, Arizona State University

Edward Saltzberg
Managing Director of the Security and Sustainability Forum
The Global Climate Security Series

www.securityandsustainabilityforum.org/GSI

- Peace, Conflict and the Scale of the Climate Risk Landscape
  SSF Archive:  www.ssfonline.org

- Climate Risk Reduction at the National and Sub-National Scale

- Climate Security and the 4Ds of Defense – November 18, 2015

- Decision Making and Climate Security for Business

- Global Governance in the Face Group of Non-Traditional Risks
Supporting Partners
Upcoming Webinars

SSF Webinar Schedule
Register at: www.ssfonline.org

More SSF /ASU Webinars Coming Up:

• Urban Resilience in the Era of Climate Change - October 29th
• Using "Living" Flood Maps to Prepare Coastal Communities - November 9th
• Climate Security and the 4Ds of Foreign Policy - November 18th

Join SSF to receive updates and registration info. on upcoming programs!
• **Opening:** Ed Saltzberg will introduce Chris Boone and the agenda, and direct the audience on submitting panel questions

• **Introduction:** Moderator Chris Boone will introduce the speakers

• **Panel PowerPoint Briefings:**
  I. United States: David V. Adams
  II. Middle East and North Africa: Francesco Femia and Caitlin Werrell
  III. Central and South Asia: Swathi Veeravalli
  IV. Arctic: **CDR David Slayton, USN (ret)**

• **Panel Discussion Questions**

• **Audience Questions** (add on the Go to Webinar window)

• **Panel Summary and Closing**

  Take the exit survey!
Christopher Boone is Dean of the School of Sustainability, Arizona State University. His research contributes to ongoing debates in sustainable urbanization, environmental justice, vulnerability, and global environmental change. He is a scientist for the urban Long Term Ecological Research projects based in Baltimore and Phoenix and sits on the scientific steering committee for the Urbanization and Global Environmental Change project.

Chris the author of two books on urban sustainability, *City and Environment* and *Urbanization and Sustainability*, and is the associate editor for the journals *Frontiers in Ecology (Urban Ecology)* and *Current Research on Cities*. He also serves on the editorial board of the *International Journal of Sustainable Development* and *Environment Justice*. For Cambridge University Press, he is co-editor of the book series, *New Directions in Sustainability and Society*. At ASU, he has taught classes on sustainable urbanization, urban and environmental health, principles and methods of sustainability, environmental justice, interdisciplinary methods for socio-ecological research, and sustainable design (Innovation Space).
National Security and Climate Change

David V. Adams
Director for Health Security and Climate Resilience Policy
National Security Council Staff

October 26, 2015
Framing the Issue

The Case for Action

Recognizing climate change as an issue of national security

Current and near-term actions
The Case for Action: What the scientists tell us

Climate change, once considered an issue for a distant future, has moved firmly to the present.

- 2014 National Climate Assessment (NCA) nca2014.globalchange.gov

Throughout the 21st century, climate-change impacts are projected to slow down economic growth, make poverty reduction more difficult, further erode food security, and prolong existing and create new poverty traps, the latter particularly in urban areas and emerging hotspots of hunger.

- IPCC 2014
Climate change is a threat to our homeland security, our economy, infrastructure, and the safety and health of the American people.

Climate change constitutes a serious threat to global security, an immediate risk to our national security. And make no mistake, it will impact how our military defends our country. And so we need to act -- and we need to act now.

- President’s Remarks at US Coast Guard Commencement, 2015
And, today, we face no greater long-term challenge than climate change.

Climate change is a direct threat to the prosperity and safety of the American people.

Under President Obama, we have put combatting climate change at the very center of our national security agenda.

- National Security Advisor Susan Rice, October 2015
Climate Change and National Security

Measured against the array of global threats we face today – and there are many, terrorism, extremism, epidemics, poverty, nuclear proliferation, all challenges that respect no borders – climate change belongs on that very same list. It is, indeed, one of the biggest threats facing our planet today.

– Secretary of State John Kerry remarks, March 12, 2015
Climate Change and National Security

Climate change is an urgent and growing threat to our national security, contributing to increased natural disasters, refugee flows, and conflicts over basic resources like food and water.

The present day effects of climate change are being felt from the Arctic to the Midwest.

Increased sea levels and storm surges threaten coastal regions, infrastructure, and property. In turn, the global economy suffers, compounding the growing costs of preparing and restoring infrastructure.

- White House, National Security Strategy, February 2015
The impacts of climate change could directly affect the Nation’s critical infrastructure.

In U.S. coastal regions, rising sea levels, higher storm surge, and increased erosion could damage or destroy critical infrastructure.

In Western States, higher temperatures and more frequent or severe heat waves could buckle railways, damage roads, and strain power systems.

- Department of Homeland Security, Climate Change Adaptation Roadmap, June 2012
“The impacts of climate change may increase the frequency, scale, and complexity of future missions, including defense support to civil authorities, while at the same time undermining the capacity of our domestic installations to support training activities.”

- QDR, 2014
Climate change can significantly add to the challenges of global instability, hunger, poverty, and conflict. Food and water shortages, pandemic disease, disputes over refugees and resources, more severe natural disasters – all place additional burdens on economies, societies, and institutions around the world.

- Defense Secretary Hagel, Halifax International Security Forum (DoD Arctic Strategy) Nov 2013
“[Climate change] trends could restrict the supply of secure, sustainable and affordable energy critical to the nation’s economic growth.”

<table>
<thead>
<tr>
<th>Key climate impacts projected by region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate impact</td>
</tr>
<tr>
<td>Increasing temperatures and heat waves</td>
</tr>
<tr>
<td>Increasing heavy downpours</td>
</tr>
<tr>
<td>Decreasing water availability</td>
</tr>
<tr>
<td>Increasing wildfire</td>
</tr>
<tr>
<td>Increasing sea level rise and storm surge</td>
</tr>
<tr>
<td>Increasing frequency of intense hurricanes</td>
</tr>
<tr>
<td>Permafrost thaw</td>
</tr>
</tbody>
</table>
Infrastructure Considerations
“Even as we work domestically and internationally to minimize the effects of climate change, the effects are already apparent in the Arctic.”

-National Strategy for the Arctic Region, May 2013
Economic Impacts
(Billion Dollar Weather/Climate Disasters 1980-2012)
The Administration’s position is clear

The impacts of climate change present a current and growing threat to our national security.

The U.S. is taking a leading role on the international stage in galvanizing commitments to reducing emissions.

While we work on that front, more is needed by way of adaptation and resilience.
Framing Resilience

Climate Action Plan, June 2013

Three focus areas:

- Cut carbon pollution in America
- Prepare the US for climate impacts
- Lead international efforts to address global climate change
Presidential Policy Directive 8
National Preparedness

Aim: “strengthening the security and resilience” of the United States through “systematic preparation for the threats that pose the greatest risk to the security of the Nation...”

Includes:
- National Preparedness Goal
- National Preparedness System (5 Frameworks)
  - Prevention, Protection, Mitigation, Response, and Recovery
Community Engagement

Regional climate resilience exercises and workshops
State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience
Climate Action Champions
Resilience AmeriCorps
Engaging faith-based communities
Community Solutions Task Force
Climate Preparedness Exercises

- Focus on community resilience to climate impacts, and integration of regional Federal partners and community planners
- **2014**: Full day workshops in Houston, Ft Collins, Anchorage, and Hampton Roads
- **2015**: 2-day seminar in Miami FL (FEMA and Florida International University) to support climate adaptation and preparedness planning and exercises.
- Future regional workshop planning continues
Climate Resilient International Development

- Executive Order 13677

- Requires the integration of climate-resilience considerations into all United States international development work to the extent permitted by law

- Beginning October 1, 2015, agencies with direct international development programs and investments should screen new investments for climate-related risks and vulnerabilities unless an exemption or exclusion is justified.
Federal Flood Risk Management Standard (FFRMS)

“It is the policy of the United States to improve the resilience of communities and federal assets against the impacts of flooding. These impacts are anticipated to increase over time due to the effects of climate change and other threats. Losses caused by flooding affect the environment, our economic prosperity, and public health and safety, each of which affects our national security.”

- Executive Order 13690
FFRMS

Directs federal agencies to update their flood-risk reduction standards and develop implementation plans.

Ensures that agencies expand from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk and ensure that projects funded with taxpayer dollars last as long as intended.
NSC and Federal agencies are reviewing Federal wildfire-related policies to increase the resilience of Federal assets in the WUI.

Partnering with U.S. Fire Administration to host a meeting with fire chiefs committed to enhancing resilience from climate-related impacts at the WUI.
El Nino Planning

• Potential for severe El Nino-related flooding in areas having recent wildfires and drought.

• Given forecasting uncertainty, current predictions show an approximately 95% chance that El Nino will continue through the Northern Hemisphere winter 2015 – 2016, gradually weakening through Spring 2016.

• NSC is leading an effort to improve community resilience:
  – Working with Federal agencies to develop a short-term flood preparedness action plan that outlines Federal agency actions and assistance.
Drought

U.S. Drought Monitor

October 20, 2015
(Released Thursday, Oct. 22, 2015)
Valid 8 a.m. EDT

Drought Impact Types:
- Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g., agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g., hydrology, ecology)

Intensity:
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast advisories.

http://droughtmonitor.unl.edu/

http://www.drought.gov
Drought

- Impacts currently affecting almost 80 million Americans

- Potentially drought impacts include:
  - US food supply
  - Integrity of critical infrastructure
  - Economy
  - Energy costs
  - Health effects

- NSC is leading coordination activities with Federal agencies to develop policy actions that enhance long-term drought resilience.
And thinking more strategically....

- Impacts of climate on coastal areas
- Mass migration
- Water rights, flows, availability
- Emerging infectious diseases
- Increased impacts on military missions
A Catch 22 or an Opportunity?

Climate change and instability in the Middle East and North Africa
The cases of Syria and Egypt

Francesco Femina and Caitlin E. Werrell
Co-Directors
The Center for Climate and Security
www.climateandsecurity.org
Climate Change manifests itself primarily through water and food.

Admiral Titley, USN (ret): “It’s all about the water”

- Variability
  - Too much
  - Too little
  - Wrong place, wrong time
  - Wet where it was dry
  - Dry where it was wet
  - Drier where it was dry
  - Salty where it was fresh
  - Change in chemistry

And the food: Increased water insecurity due to climate variability, both globally and in the Middle East and North Africa (MENA), has a significant effect on food security in the region.
Syria: Drought

- 2007-2010: Worst drought in Syria’s history of records

- 2011 Global Assessment Report on Disaster Risk Reduction (GAR):
  - Farmers: Of those most vulnerable, 75% suffer total crop failure
  - Herders in northeast: Lose 85% of their livestock, affecting 1.3 million people

Livelihoods decimated

- 2009 UN and IFRC: 800,000 Syrians lost entire livelihood as a result of the droughts

- 2010 UN: 2-3 million driven into extreme poverty

- 2011 GAR: 1 million Syrians left “extremely food insecure” by droughts

Internal displacement

• October 2010: UN estimates 50,000 families migrated from rural areas just that year, “on top of the hundreds of thousands of people who fled in earlier years.”

• January 2011: crop failures just in farming villages around Aleppo lead “200,000 rural villagers to leave for the cities.”

• Total 2007-2011: 1.3 – 1.5 million people displaced, most move to urban areas.

Climate change

- 2011 NOAA: High likelihood winter drying from 1971-2010 in Mediterranean littoral and Middle East linked to climate change. Syria one of driest.

- 2015 Kelley et al: 2007-2010 drought 2-3x more likely due to climate change

- IFPRI climate model: If current rates of global greenhouse gas emissions continue, yields of rainfed crops in Syria may decline “between 29 and 57 percent from 2010 to 2050.”

Sources:

Reds and oranges highlight lands around the Mediterranean that experienced significantly drier winters during 1971-2010 than the comparison period of 1902-2010

Climate change

Natural resource mismanagement

- Heavily-subsidized water-intensive wheat and cotton farming
- Encouragement of inefficient irrigation techniques: e.g. flood irrigation – 60% of water used is wasted
- Over-pumping of groundwater: Syria’s National Agricultural Policy Center: increase in wells tapping aquifers from “just over 135,000 in 1999 to more than 213,000 in 2007...caused groundwater levels to plummet in many parts of the country...”
- 2007: Syria consumed 19.2 billion cubic metres of water - 3.5 billion more than the amount of water replenished naturally
- Some evidence of well-drilling contracts awarded on sectarian basis

Demographics & desertification

- Over-grazing of land
- Rapidly growing population
- Rising demand for meat from growing and increasingly affluent population
- Contributes to land degradation and water insecurity

Pressure on urban areas

- Context: Syrian cities coping with influxes of Iraqi refugees since 2003, steady influx of Palestinian refugees, and from 2007-2011, around 1.5 million Syrian farmers and herders

- Cities already experiencing serious water infrastructure deficiencies – e.g. Damascus water network leaks up to 60 percent of the water it carries, according to local authorities


Rural communities & unrest

• Role of disaffected rural communities in early Syrian opposition movement prominent compared to equivalents in other “Arab uprising” countries.

• 2011: Rural farming town of Dara’a focal point for protests in early stages of the opposition movement – a place especially hard hit by five years of drought and water scarcity

Egypt

- Produces little of its own food/essential staples (bread)
- Depends on stability of global wheat market
- Net grain importer (one of 8 of 10 MENA nations most dependent on global wheat market)
- Bread subsidies insufficient to control price

### Per Capita Top Wheat Importing Countries, Percent Income Spent on Food and Average Age

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Metric tons per million people</th>
<th>Income US$</th>
<th>Food expenditure as percentage of income</th>
<th>Percentage of population under 25y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UAE</td>
<td>370.65</td>
<td>47,400</td>
<td>8.7</td>
<td>31.1</td>
</tr>
<tr>
<td>2</td>
<td>Libya</td>
<td>242.80</td>
<td>12,062</td>
<td>37.2</td>
<td>47.4</td>
</tr>
<tr>
<td>3</td>
<td>Israel</td>
<td>238.96</td>
<td>27,085</td>
<td>17.6</td>
<td>43</td>
</tr>
<tr>
<td>4</td>
<td>Jordan</td>
<td>173.61</td>
<td>4,435</td>
<td>40.7</td>
<td>54.4</td>
</tr>
<tr>
<td>5</td>
<td>Algeria</td>
<td>101.43</td>
<td>4,477</td>
<td>43.7</td>
<td>47.5</td>
</tr>
<tr>
<td>6</td>
<td>Tunisia</td>
<td>89.33</td>
<td>4,160</td>
<td>35.6</td>
<td>43.2</td>
</tr>
<tr>
<td>7</td>
<td>Yemen</td>
<td>86.84</td>
<td>1,230</td>
<td>45</td>
<td>65.5</td>
</tr>
<tr>
<td>8</td>
<td>Egypt</td>
<td>81.28</td>
<td>2,771</td>
<td>38.8</td>
<td>52.4</td>
</tr>
<tr>
<td>9</td>
<td>Iraq</td>
<td>76.70</td>
<td>2,625</td>
<td>35</td>
<td>60.6</td>
</tr>
<tr>
<td>10</td>
<td>Cuba</td>
<td>70.50</td>
<td>5,000</td>
<td>n/a</td>
<td>34.6</td>
</tr>
</tbody>
</table>

Drought in China and Russia

- 2010 drought in China
- 2010 heat wave in Russia (more likely due to climate change)*
- Wheat harvests devastated
- China and Russia purchase significant amount of wheat on global market
- Global wheat prices spike – Egypt affected

*Sources:


Rural bread riots coincide with Tahrir square

- Bread prices rise 300% in Egypt
- Bread subsidies regime corrupt, does not affect price of bread in rural areas
- At least three major reported bread riots in 2011
- May have broadened appeal of uprising beyond urban areas

Sources:

Werrell, Femia and Sternberg, “Did We See it Coming? State Fragility, Climate Vulnerability, and the Uprisings in Syria and Egypt,” SAIS Review of International Affairs, Volume 35, Number 1, Winter-Spring 2015, pp. 29-46

Syria and Egypt: Environmental Security Drivers

- Environmental security variables and attendant impacts generally missing from analysis of Syria and Egypt fragility
- Complexity
- Outdated predictive tools and indices?

Syria: Immune to the Arab uprisings?

- Many political & intelligence analysts predict Syria is immune to drivers that precipitated the Arab uprisings in Tunisia, Egypt, Libya.
- Obama administration: Developed list of nations likely to be at risk of large-scale political turmoil: Syria at bottom of list.
- “No one was focused on Syria, because it seemed far less likely than other states in the region...” – U.S. Deputy Secretary of State James Steinberg

Catch-22...

Self-sufficient, or dependent on global food market, countries are vulnerable to climate risks.

- Syria by 2050: Rainfed crops decrease up to 57%
- Nile Delta:
  - 30-40% Egypt’s agriculture production
  - 30% Egypt labor force agrarian
  - Alexandria Egypt – 0.5 meter rise seas would displace 2 mil people.

Sources:


Or opportunity...

• Solutions could be leveraged for conflict-resolution
• Historical precedent of cooperation between conflicting parties over scarce water resources, in particular*
• Resources devoted to climate adaptation in the region must become a higher development and security priority
• Climate adaptation should become a new form of development and security assistance
• Alternatives to water-intensive crop production, and flood irrigation

Lessons for analysis

• Environmental/natural resource security variables are unexplored potential drivers of unrest in Syria and Egypt

• More research needed to disentangle lines of causality

• Environmental security/natural resource variables need better integration into indices and predictive tools on state fragility, conflict, global risks, etc.

Table 1: Ten Global Risks of Highest Concern in 2014

<table>
<thead>
<tr>
<th>No.</th>
<th>Global Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fiscal crises in key economies</td>
</tr>
<tr>
<td>2</td>
<td>Structurally high unemployment/underemployment</td>
</tr>
<tr>
<td>3</td>
<td>Water crises</td>
</tr>
<tr>
<td>4</td>
<td>Severe income disparity</td>
</tr>
<tr>
<td>5</td>
<td>Failure of climate change mitigation and adaptation</td>
</tr>
<tr>
<td>6</td>
<td>Greater incidence of extreme weather events (e.g. floods, storms, fires)</td>
</tr>
<tr>
<td>7</td>
<td>Global governance failure</td>
</tr>
<tr>
<td>8</td>
<td>Food crises</td>
</tr>
<tr>
<td>9</td>
<td>Failure of a major financial mechanism/institution</td>
</tr>
<tr>
<td>10</td>
<td>Profound political and social instability</td>
</tr>
</tbody>
</table>

Source: Global Risks Perception Survey 2013-2014. Note: From a list of 31 risks, survey respondents were asked to identify the five they are most concerned about.

Questions?

• Francesco Femia: ffemia@climateandsecurity.org

• The Center for Climate and Security: www.climateandsecurity.org

• Climate and Security 101: www.climatesecurity101.org


• Werrell, Femia and Sternberg, “Did We See it Coming? State Fragility, Climate Vulnerability, and the Uprisings in Syria and Egypt,” SAIS Review of International Affairs, Volume 35, Number 1, Winter-Spring 2015, pp. 29-46
Conflict Environment Rapidly Evolving Systems
Modeling the Relationship between Environmental Change, Climate and Conflict

SSF Webinar Series:
Climate Risk Reduction at the National and Sub-National Scale

Swathi Veeravalli, PI
Demetra Voyadgis, PM
Sarah Becker, PhD
Michelle Hamilton, PhD
Joshua Parker, PhD
Heather Speight
Jacqueline Wooddell

Geospatial Research Laboratory
26 October 2015
ROAD MAP

- Climate Security and Stability: a Complex Operational Military Planning Problem

- Using S&T to Assist the Military
  - Bangladesh Case-Study
  - South Asia Regional Implications

- Civil-Military Coordination: Climate Security and Disasters Training Course
Climate Security concerns the direct and indirect security implications of climate change. By placing strains on the infrastructure and resources necessary for the viability of the nation-state system and the well-being of its populations, and by physically changing the geostrategic environment, climate change presents a risk to both national and international security.

Human Security is a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity.

Environmental Security is a process where solutions to environmental problems contribute to national security objectives (Environmental Protection Agency, 1995) of increasing stability and decreasing instability.
“Climate change is a threat to our national security and if left unchecked, will increase instability and conflict in the most volatile regions of the world. In nearly every crisis precipitated by climate change, the military will be called upon to respond with disaster relief and recovery assistance, or to maintain vital supply lines that are the backbone of our economy. This places a direct burden on our military.”
What Happens to Stability when the Climate Changes?

How Flexible is Military Planning when the Climate Changes?

What is the Role of Science & Technology when the Climate Changes?
Conceptual Framework: Disaster Risk Management

Context:
- Economic
- Social
- Political
- Demographic Pressure
- Land Degradation

Climate Change Impacts:
- Temperature
- Rainfall
- Drought
- Flood
- Sea-Level Rise

Vulnerability:
- Disasters
- Resource Scarcity:
  - Food & Water Security
  - Health Issues

DRM Actions:

Better Outcomes:
- Strengthened Human Security
- Improved Environmental Security
- Greater Political Stability

Disaster Risk Management:
- Prevention & Mitigation
- Preparedness
- Response
- Recovery
WHY BANGLADESH?

Youthful Age Structures, 2000 & 2030
The Demographic Arc of Instability
median age <25.0

NOAA/NESDIS SST Anomaly (degrees C), 10/22/2015
Potential land loss and population exposed in Asian countries for selected magnitudes of sea-level rise and under no adaptation measures (modified from Nicholls and Mimura, 1998; Mimura et al., 1998).

<table>
<thead>
<tr>
<th>Country</th>
<th>Sea-Level Rise (cm)</th>
<th>Potential Land Loss (km²)</th>
<th>Population Exposed (millions)</th>
<th>Population Exposed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>45</td>
<td>15,668</td>
<td>5.5</td>
<td>10.9</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>29,846</td>
<td>14.8</td>
<td>20.7</td>
</tr>
<tr>
<td>India</td>
<td>100</td>
<td>5,763</td>
<td>7.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Indonesia</td>
<td>60</td>
<td>34,000</td>
<td>2.0</td>
<td>1.9</td>
</tr>
<tr>
<td>Japan</td>
<td>50</td>
<td>1,412</td>
<td>2.9</td>
<td>0.4</td>
</tr>
<tr>
<td>Malaysia</td>
<td>100</td>
<td>7,000</td>
<td>&gt;0.05</td>
<td>2.1</td>
</tr>
<tr>
<td>Pakistan</td>
<td>20</td>
<td>1,700</td>
<td>n.a.</td>
<td>0.2</td>
</tr>
<tr>
<td>Vietnam</td>
<td>100</td>
<td>40,000</td>
<td>17.1</td>
<td>12.1</td>
</tr>
</tbody>
</table>

Table 1. Top 15 Most Exposed Countries Worldwide

<table>
<thead>
<tr>
<th>Country</th>
<th>Exposure (%)</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vanuatu</td>
<td>63.66</td>
<td>1</td>
</tr>
<tr>
<td>Tonga</td>
<td>55.27</td>
<td>2</td>
</tr>
<tr>
<td>Philippines</td>
<td>52.46</td>
<td>3</td>
</tr>
<tr>
<td>Japan</td>
<td>45.91</td>
<td>4</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>42.61</td>
<td>5</td>
</tr>
<tr>
<td>Brunei Darussalam</td>
<td>41.10</td>
<td>6</td>
</tr>
<tr>
<td>Mauritius</td>
<td>37.35</td>
<td>7</td>
</tr>
<tr>
<td>Guatemala</td>
<td>36.30</td>
<td>8</td>
</tr>
<tr>
<td>El Salvador</td>
<td>32.60</td>
<td>9</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>31.70</td>
<td>10</td>
</tr>
<tr>
<td>Chile</td>
<td>30.95</td>
<td>11</td>
</tr>
<tr>
<td>Netherlands</td>
<td>30.57</td>
<td>12</td>
</tr>
<tr>
<td>Solomon Islands</td>
<td>29.98</td>
<td>13</td>
</tr>
<tr>
<td>Fiji</td>
<td>27.71</td>
<td>14</td>
</tr>
<tr>
<td>Cambodia</td>
<td>27.65</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: Bündnis Entwicklung Hilft and UNU-EHS, 2014
Bangladesh Climate Security
Regional Solutions

Moving from conventional to unconventional
“In many ways, the emergency is the product of a perfect storm of meteorological, political and religious factors in Karachi.” (NYT, 2015)
CLIMATE CHANGE, DISASTERS, AND SECURITY TRAINING COURSE
The training course is a collaborative initiative between the following partners:

- Engineer Research and Development Center and the Institute for Water Resources, U.S. Army Corps of Engineers

- Environmental Security Branch of the Africa Command, U.S. Department of Defense

- Joint Environment Unit of the United Nations Environment Programme/UN Office for the Coordination of Humanitarian Affairs

- Environmental Law Institute
THANK YOU

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Physical Scientist

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The Changing Arctic:
"Russia, the Arctic and our next ... National Security Blunder"

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Challenges and Opportunities

“The past year has marked a notable increase in Russian military assertiveness on the world stage, including in the approaches to the homelands.”

• Increased Commercial and Military activity in the North
• Vulnerability related to human safety, environment, and vessels/installations
• Maritime & Commercial Operations Challenges - limited infrastructure, low temperatures with ice and icing, polar lows, conflicting interests among stakeholders
• Challenges where multi-tasking capacity is needed: SAR, Spill Response, Salvage, Law enforcement
• Joint operation with cross-institutional coordination and multinational task-forces in demand

“Russian heavy bombers flew more out-of-area patrols in 2014 than in any year since the Cold War.”
New Access to Resources
Ship Traffic in the Arctic

- Passenger Ships
- Oil and Gas Transport
- Fishing Vessels
- Cargo Transport
Operational Maritime Risks

- **Transit Risks**
  - Vessel source pollution due to normal operations or accident
  - Vessel stranding ice or uncharted rock – need rescue
  - Whale strikes

- **Oil and Gas Extraction Risks**
  - Vessel stranding
  - Vessel source pollution
  - Oil Rig, Pipeline, floating production/storage/offloading units or Transfer Vessel Risk(s)
    - Fisheries/wildlife damage & cleanup costs

- **Tourism**
  - Vessel source pollution
  - Vessel stranding ice or uncharted rock – oil loss
  - Pax. Evacuation.
  - Whale strike
What if this...

Happens here...

Or here...

In these conditions...or worse!
# Major Icebreakers of the World

## Russia
- Total: 37
- 4 under construction
- 6 planned

## Sweden
- Total: 7

## Finland
- Total: 7

## Canada
- Total: 6
- 1 planned

## USA
- Total: 5
- 1 planned

## Denmark
- Total: 4

## China
- Total: 3
- 1 planned

## Argentina
- Total: 1

## Australia
- Total: 1

## Chile
- Total: 1

## Estonia
- Total: 2

## Germany
- Total: 1
- 1 planned

## Japan
- Total: 1

## South Korea
- Total: 1

## South Africa
- Total: 1

## Latvia
- Total: 1

## Norway
- Total: 1
- 1 planned

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**KEY**

- **Red**: Active icebreaker
- **Blue**: Under construction
- **Yellow**: Operational
- **Green**: Planned

**COLOR GUIDE**

- **Red**: Active icebreaker
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Panel Discussion Questions

• Is there a clear causal connection between climate change and state fragility? Between climate change and conflict?

• Is there a danger, when talking about the connections between climate change and instability, that we could absolve governments of the responsibility to provide for their publics? In other words: is it possible that unresponsive governments could use climate change as an excuse for their country’s ills?

• We often talk about how climate change can create new security risks. But how does climate change affect more traditional, geostrategic risks? In places like the Arctic, the MENA region, Asia?

• What can be done, on a macro scale, to mitigate the security impacts of climate change in these regions? And on a micro scale?

• Do climate risks to military infrastructure affect our ability to conduct military and humanitarian operations?

• What, specifically, is the US doing to address the security risks of climate change?

• How can we better anticipate and plan for the security implications of climate change in these areas? 1.

• How do climate and security risks within the nations/ regions you’re talking about, potentially have broader global security implications?

• Are there climate dynamics outside each nation/region you spoke about that could have significant implications for security within the nation/region you covered? In other words, might climate hazards in one place be globalized?
Peace, Conflict, and the Scale of Climate Risk Landscape

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Upcoming Webinars

SSF Webinar Schedule
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More SSF Webinars Coming Up:

• Urban Resilience in the Era of Climate Change - October 29th
• Using "Living" Flood Maps to Prepare Coastal Communities - November 9th
• Climate Security and the 4Ds of Foreign Policy - November 18th

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