

Workshop on
Global Stressors and Systemic Tensions: Demography, Climate & Scarcity

April 18, 2013
9:00 a.m. – 1:00 p.m.
Boardroom, U.S. Institute of Peace
2301 Constitution Ave NW

Workshop Summary

The Pacific Northwest National Laboratory (PNNL) and the U.S. Institute of Peace (USIP)/National Academy of Engineering (NAE) co-sponsored an intensive workshop focused on the heightened security risks from a series of growing vulnerabilities caused by population trends, climate volatility, and potential shortages of water and food on April 18, 2013. The objectives of this event were:

- To begin to answer the “so what?” questions that these trends provoke: How will these trends define new markets, or redefine old ones? What are the implications of these trends for the United States in particular? How should various stakeholders be prepared to address these trends? How does one major trend compare with others, and what are the influences among trends?
- To identify the highest risk conditions and locations to U.S. national security from these global trends and seek opportunities for the U.S. government and other partners to anticipate and reduce these risks.

This workshop was a collaborative effort that supported the Project on Elastic Futures of PNNL’s Center for Global Security and as part of the Natural Disasters/National Security initiative of USIP’s Roundtable on Technology, Science and Peacebuilding with the National Academy of Engineering. To foster an open discussion, the event was held under the Chatham House Rule.

The Center for Global Security is aligned with Pacific Northwest National Laboratory’s National Security Directorate, and catalyzes the development of leading-edge national solutions to emerging and “over-the-horizon” issues, integrating science and technology, policy, and implementation expertise from across the global security community. The vision for this project is to provide deep understanding to PNNL’s National Security Division (NSD) senior management on the potential impact of global trends to affect PNNL’s strategic direction, including capability development. Trends are not destiny, and foresight is different from prediction. While the particulars of any one event are nearly impossible to predict, the trends that create the climate for discrete events can be anticipated. This project will help the laboratory prepare for the world that is likely ahead.

The National Academy of Engineering and the U.S. Institute of Peace have established a Roundtable on Technology, Science and Peacebuilding to use science and technology to make a measurable and positive impact on conflict management, peacebuilding, and security capabilities. The Roundtable is jointly overseen by the National Academies and USIP, and includes senior executives and experts from leading NGOs, government organizations, universities, and corporations. The goals and agenda of the Roundtable are the product of long consultation with members of the peacebuilding and technology communities.

Following workshops in March 2009 and biannual meetings from May 2011 to January 2013, the Roundtable membership adopted five high-impact peacebuilding problems. Current Roundtable issue areas are as follows: Adapting Agricultural Extension to Peacebuilding; Using Data Sharing to Improve Coordination in Peacebuilding, Sensing and Shaping Emerging Conflicts; Harnessing Operational Systems Engineering to Support Peacebuilding, and Linking Global Environmental Stressors to Local Conflict.

Trends and Threats

Future Trends

The discussion began with a presentation on the likely trends in the coming decades. The “bottom line up front” was that “competition and scarcity involving natural resources—food, water, minerals, and energy—are increasingly emerging as security threats.” Social media use in growing urban areas can magnify these disruptions and “relatively ‘small’ events can generate significant effects across regions or the world.”

Natural and policy-induced disruptions to food supplies will probably stress the global food system in the immediate term, resulting in sustained volatility in global food prices. At the same time, agricultural inputs such as water, fertilizer, land, and fuel oil, are becoming more scarce and/or costly, exacerbating upward pressures on food prices. The lack of adequate food will continue to be a destabilizing factor in the future; during the 2008 food-price spike at least 61 countries experienced unrest because of price inflation, and in 38 of these countries protests were often violent.

Risks to water supplies from shortages, poor quality, and floods are growing and will hinder the ability of key countries to produce food and generate energy, undermining global food markets and hobbling economic growth. Water shortages and pollution will almost certainly harm the economic performance of important U.S. trading partners.

China holds a commanding monopoly over world rare earth element supplies, which are essential to civilian and military technologies and to the 21st century global economy. China controls about 95 percent of mined production and refining. Mines in Australia, Brazil, Canada, Malawi, the United States, and Vietnam are expected to be operational in less than five years, but initial processing outside of China will remain limited because of technical difficulties, regulatory hurdles, and capital costs.

Oil prices will remain highly sensitive to political instability in the Middle East, tensions with Iran, and global economic growth. U.S. energy production has been transformed by shale gas and tight oil technological breakthroughs achieved in the past decade. However, the budgets of countries that subsidize domestic fuel consumption will come under greater stress with high oil prices and rising domestic demand. The range between \$80-\$120 for Brent Crude is interesting because prices above this range challenge those countries that subsidize oil as part of their business and prices below it reduces demand for U.S. tight oil.

Climate change, which was defined to include increased severity and frequency of extreme weather events, will influence water availability, food and energy production, or critical infrastructure. In 2012 total volume of arctic sea ice shrank to the smallest amount ever observed in the satellite age, and ice-free summer seasons could happen within a few decades. Further, warming temperatures are not solely a high-latitude phenomenon. Many areas of the world have experienced abnormally warm weather or droughts.

When coupled with demographics that aggravate these trends, a perfect storm is emerging: natural resource stress, poor governance, high youth rates, chronic unemployment, and technology that shares frustrations quickly can be a recipe for security breakdown.

National Security Threats

A second presentation began by projecting that projected climate change poses a serious threat to U.S. national security and can be a threat multiplier in both already-volatile regions and those that are currently stable. This projection dovetails with the findings from the recent National Research Council Report on *Climate Change and Social Stress*, which encourages analysts to “expect to be surprised.” Events once

considered rare will become increasingly more frequent, with impacts felt far away from the geographical location of the shock.

Modeling the interaction connections between climate conditions and vulnerabilities will be crucial to accurately forecasting security outcomes. In Africa, climate change will exacerbate the erosion of effective governance, the spread of disease, the migration of displaced peoples, and the effects of economic collapse. In the Middle East, climate change will threaten water security and could increase the pressure on trans-border migration. In Asia, sea level rise threatens to inundate coastal settlements and agricultural land, while the loss of glacier-fed rivers could lead to diversion by upstream states and inflame border tensions. In the Arctic, a shrinking polar cap is opening new maritime shipping routes and providing access to energy, mineral, and fisheries resources.

One country that will feel the impacts of climate change particularly acutely is Pakistan. The country has a prominent agricultural sector that makes up 23 percent of GDP and 44 percent of the labor force, but faces sharp tradeoffs in water allocation geographically and between farming and power generation. The flow of the Indus River, which irrigates much of Pakistan, is likely to decrease as the Karakoram Glacier shrinks. Rising ambient temperatures will also affect growing cycles while increased precipitation variability will lead to droughts in some regions and floods in others. From a security perspective, these vulnerabilities could interact with the internal protests that are already occurring over repeated power outages.

Even more than Pakistan, Bangladesh is perhaps “the most vulnerable country to climate change.” It is the eighth most populous country in the world and one of the most densely populated. The World Bank noted that “among Bangladesh’s most significant obstacles to growth are poor governance and weak public institutions.” Climatically, much of Bangladesh’s land area is less than one meter above sea level, and the Intergovernmental Panel on Climate Change (IPCC) reports that the country will lose 17-20 percent of its land mass by 2050. If sea levels rise one meter it would displace over 20 million Bengalis. Many would try to relocate internally, but international tensions could rise if many seek refuge in India. Bangladesh’s larger neighbor has already erected a fence and border guards will use lethal force against those who come too close.

The security situation could change quickly. In March 2013 Adm. Samuel Locklear, Commander of U.S. Forces Pacific, said that “If it goes bad, you could have hundreds of thousands or millions of people displaced and then security will start to crumble pretty quickly.” Scenarios such as these are particularly worrisome because American response mechanisms, such as the airstrip at Diego Garcia, are also vulnerable to many of the same climate risks as the Asian states that the United States would be trying to support.

Global Modeling

In discussion, one participant said succinctly that “global climate models suck” because scientists understand some variables well and others poorly. Modelers make their best effort to estimate these variables, but different starting points through the same model still lead to different answers. The recent controversy over estimates of climate variability, as noted in *The Economist* and other venues, could significantly undercut the credibility of the climate science community with policymakers. However, regardless of disagreements about modeling mechanisms, the reality remains that the climate is warming and the jet stream is becoming more volatile.

Climate models need to integrate with models of societal stability, and both require finer levels of granularity. Key questions include: what types of data do we need to bring to bear? Can we use models to

support decision-making at a regional level? How does culture and history factor in, and how should that be modeled?

The payoff for these efforts would be that if analysts could better model places like Bangladesh and Pakistan then policymakers might be able to better understand what activities would give the “biggest bang for the buck.” For example, high-payoff items might include educating women or building better water delivery systems so that women did not have to stand in line all day. Based on a complete understanding of the system, policymakers could identify the optimum leverage points. A major component to resolving these global challenges will be choices in human behavior.

Water, Food and Energy

Water is an extremely local issue. Within a single country some areas may have lots of water while other areas have droughts. Further, those countries that lack water on a large scale nationally can import “virtual water”, or water-based products, by selling other products internationally. Countries like Yemen become particularly worrisome from a humanitarian perspective because they are running short on water and have nothing to sell. Others, like Pakistan, export their people to send remittances that can be used to purchase “virtual water” products.

The solutions to water problems are well within technical reach. One of the largest ways to improve water security would be to use it efficiently for agriculture. One participant said that “if every country could be as efficient as Israel in its use of water then you wouldn’t have a water problem.” However, the incentives for efficient water use do not always align. In India, for example, farmers are never sure about when they will have electricity, so they pump as much as they can when they do have energy. This approach is hugely wasteful, and taking on the problem will also require eliminating the contributing factors to overuse such as subsidized fuel that encourages over-pumping.

Fracking consumes a significant amount of water, a potential challenge to its adoption worldwide. This challenge could be overcome if necessary by using brackish water, which is more complicated to use. This is important for China because it may not have sufficient freshwater to meet its drilling needs. However, though China may be able to overcome this constraint, one participant noted that many of the above-ground factors in the United States are not replicable worldwide.

Similarly, solutions to food issues are deployable with the political will. These issues include infrastructure, packaging, genetically modified organisms (GMOs) that can improve production rates, and fertilizer. Planning can overcome these issues, but one participant noted that these problems are national security concerns precisely because no one is currently planning to mitigate them.

More broadly, it remains to be seen to what ends U.S. policymakers should be encouraging partners to develop political will. While the United States may want others to be good global citizens, it cannot hold them to the same standards. Similarly, even if political will develops, it remains to be seen whether partners are able to execute their strategies. The UN, for example, knows that Yemen is running out of water, but most of the programs in-country are very near-term. Development aid needs to encourage local policymakers to make the right choices. One participant said that India has all the answers and all the money, but there is a local saying that “there is no better business than a good drought.” The near-term payoffs do not align with sustainable development.

Managing Threats on a Global Scale

During the Cold War the United States was willing to devote billions of dollars to protecting against a low probability but high consequence bolt-out-of-the-blue threat. Game theory and mutually-assured destruction were strong models that were ready foundations for policy, and diplomats could work with partners to implement the theories. Today, however, the public has limited appetite for threats that are

low, or increasingly medium, probability and potentially high consequence. Part of the difference between the Cold War and today is that the types of threats are different and that the public is overwhelmed by the inundation of threats. Further, the public's ability to take action is limited because good behavior in one place is likely offset by bad behavior somewhere else. One participant noted that despite this reality, there is still strong participation in recycling programs and in some ways this has made cities strong. In terms of policy implementation, the threats of today lack the same theoretical faith as the ideas of the Cold War. Part of the issue may be modeling, but part may be that there is less faith in development. One participant stated that key question remains whether the developed world should take responsibility for making everyone good global citizens. For example, what are the Chinese or the Indians thinking about their role internationally? How do they conceive of their own global citizenship, and to what extent do they believe that they should be helping others achieve the same ends?

Responses

Envisioning the Worst Case

The first presentation asked what the worst could look like, and how can we develop responses to mitigate this scenario. Based on the amount of carbon already emitted, the planet will certainly experience some of the effects of climate change. How much remains to be seen, but the outlook is not hopeful with carbon control politically unfeasible and activities like recycling contributing very little to overall carbon reduction goals. Therefore, foreign policy thinkers must deal with the threats that are already fated and prepare for the worst.

Natural scientists and national security analysts view the world through different lenses. While scientists reserve judgment until they reach a high level of confidence, policy practitioners must make choices under imperfect information, consider worst-case scenarios, and make judgments about inherently variable human behavior. Therefore, it may be valuable to conceive of Mother Nature as an enemy that could inexorably pressure humankind into turning against each other.

Constructing Responses

The second presentation noted that the international community has responded to risks before, and the question now is whether collectively we are prepared to respond to tomorrow's risks. The U.S. Government, academia, and the United Nations, among others, have all developed frameworks to address today's complex threats. These include cooperative threat reduction (CTR), peacebuilding, counterinsurgency, and a whole of government approach. Participants were encouraged to consider whether these were sufficient, if elements were missing, whether old approaches can be repurposed to address new issues, and what new gaps will be created by the future pressures that the coming trends will create.

New pressures are already changing old programs. In the past five years, for example, the threat model for CTR has changed, and the program now looks at material and human factors. There is also a growing discussion on metrics to help stakeholders understand the value created over the past 25 years' worth of effort. Lastly, the historical divide between national security issues and development issues is blurring. Topics such as radicalization and resource use incorporate elements of each, and solutions come from combined efforts.

Establishing a Narrative

One participant noted that a storytelling narrative is important. Fear is rarely a narrative that mobilizes, as he recently saw at an event on the power of the media to move millions of people. Another participant suggested that events such as Pearl Harbor or 9/11 were counterarguments, though these were distinguished as real acts as opposed to hypothetical ones.

It remains an open question what the narrative for resilience looks like. Part of the issue may be that there is not yet agreement on the problem. When some discuss climate change, there are still questions in people's minds. One individual recently participated in an HBO documentary that investigated stories of climate change, and the crew was very clearly looking for compelling human stories to help explain the environmental issues. Drama can help humanize what we consider today as technical challenges. Another participant noted that anything has to pass what he termed the "Glen Beck" test: there is a fierce skepticism around wrapping soft security around hard security. Disaster risk reduction as a framing approach works. If packaged correctly the term goes beyond climate change and applies to natural disasters and terrorism, among others. A participant added that recently there was a study on national security strategies worldwide that now discuss climate change.

Linkages Between Defense and Development

There is an increasing convergence of development and defense because the challenges are becoming more interrelated. Using language that works in the defense world will be useful, particularly in the United States. For example, "building partner capacity" is a defense term, in terms of making governments more resilient to security threats. At the same time, policymakers must guard against militarizing aid. Another participant noted that one area of discussion within the G-8 Global Partnership was how to bring in partners to meet their needs while meeting security goals.

Noting the 2012 National Research Council study on *Climate Change and Social Stress*, one participant suggested that she would like to see an analytical application of stress tests for states. She added that she had been recently thinking about why the Defense Threat Reduction Agency (DTRA) only focuses on chemical, biological, radiological, nuclear, and high explosive threats when other types of threats also pose a risk to the United States. Many of these institutions could be expanded. The whole-of-government approach for counterinsurgency was originally applied in the context of Iraq and Afghanistan, but now it is also applied to non-traditional threats. There is also some thinking at the working levels within DOD and the IC about how to take structures from one set of threats and apply it to others. This is also true in homeland security: DHS' mission will be increasingly broadened to look at other threats in a systematic way.

One participant described that thousands of smaller actions can come together to form larger ones. Texas had a record drought in 2011 and the lack of water for hydropower led to blackouts. Texas took away the water rights of farmers, which supposedly never could happen. This incentivizes technologies that use less water. Incidentally, lower-water technologies also create fewer climate emissions, so dealing with water issues just happens to mitigate climate change. Extrapolating from this scenario, China plans to double or triple water use in the energy sector. Accessing shale gas would limit water demand and require China to divert less water from India towards its northern breadbasket, thereby potentially mitigating international tensions. He recommended searching for areas of opportunities because this is where we can take most effective action.

The Role of Resilience

A participant said that building resilience to threat is development. In public health, for example, development leaders do not deal in vertical silos, but with common drivers. The quality of a government and social cohesion also underscore this point. The challenges are converging through a shared geography of security, poverty, and demographics, but the responses are converging too.

The international community knows that disaster risk reduction works, but nobody does it well because no one invests in it. 3.5 percent of total international aid is spent on natural disaster issues. Of this 3.5%, 65% is emergency response, 21.8% is reconstruction and rehabilitation, and 12.7% is disaster prevention and preparedness. Risk reduction measures are specific actions to mitigate the impact of threats. While everyone knows that an earthquake will be a problem, questions such as "for whom?" and "where in

particular?” often remain to be answered. For example, he described stones in Japan that are high on mountainsides dating from the early 1800s. The stones say “do not build below this line because we had a tsunami,” but a survey of the valley below shows a region flattened by the 3/11 earthquake and tsunami. He noted that there are only natural hazards; they become disasters when we make a mess of the situation. Good governance means in part using risk information to build in appropriate places.

One caveat is that risk reduction does not work well in a conflict country because risk reduction is fundamentally a governance issue. That said, it is possible to yield a significant gain by putting the money where it makes the most sense. Japan is coming out with a new model in May that describes how risk reduction helps GDP. One dollar in reduction saves a country \$1-7 in response. The United States spends \$40 billion on humanitarian aid but nothing on resilience.

This point is essential for program administrators. The current Millennium Development Goals (MDGs) are risk-blind. If development aid is going to build a school, then it should be built to risk-resistant standards. The loans could also include this conditionality, or interested governments could start international financing mechanisms that invest in resilience systematically. Further, the MDGs set goals around avoidable mortality. Future policymakers could easily set goals for avoidable mortality from disasters or armed violence.

Those who work in humanitarian response limit themselves from thinking about development, though some argue that they should focus on preserving lives “worth living” and this bleeds into development. Recovery should be a strategic opportunity to embed resilience by “building back better.” Thailand and Cambodia are two examples of countries that are starting to take this seriously. Thailand is building superb roads, but it did not require factories along the roads to build to the same height. When there were floods, the facilities shut down, disrupting global supply chains.

There is a move afoot to dedicate more resources to disaster risk reduction. In recent years government aid budgets have been taxed by complex emergencies. One participant noted the Ashdown Report for the British humanitarian emergency program. DFID (UK), USAID, and EUAID are all dedicating part of their budgets to resilience. She said that “we can’t keep funding an ambulance at the bottom of the cliff. Response has historically been “purely” about tents and water, but we will always be doing that if we don’t put a fence at the top of the cliff.

A significant challenge is that there can be incentives, particularly in a capitalistic society, that run counter to resilience. For example, how many spare beds should a hospital that is a business have? Who should pay for additional resilience? If a firm is only planning to run a business for ten years then it can be worth it.

One participant highlighted the importance of translating resilience into implementation. At the end of the day, it comes down to market. This is an impediment in the United States. The United States has just in the past three or four years begun to address recovery and resilience. He has talked with National Institute of Standards and Technology about addressing standards to incorporate a dynamic definition of resilience. More often, resilience is only addressed after a disaster. However, he noted that he did not have solutions on how to apply these concepts to places like Egypt.

The politics of rebuilding better and enforcing standards are difficult. Both New Zealand and Haiti were hit with massive earthquakes, but the death tolls varied by orders of magnitude. One question is how to create political capacity to address resilience.

A second participant agreed and emphasized that it is easy to talk about “building back better” in Joplin, MO, but much harder in Haiti or Cairo. He emphasized that it is crucial to have individuals who understand the broader context of these regions as part of any team. He compared it to the debate surrounding nuclear weapons states and non-nuclear weapons states: much of the world does not understand why 5% of the global population uses 20% of the world’s water.

One participant said that she was confident that with the right support and advice even the poorest countries can build back better. In Haiti, for example, the newest residents live at the bottom of ravines, and they will rebuild. To help build back better there was a partnership between the private sector and donors that gave aid with conditions. First, contractors were required to attend a course that teaches about the importance of steel in foundation construction. Upon graduation they would be given an electronic certificate for building materials which can only be redeemed at an authorized supplier of real steel. These limitations helped donors avoid catalyzing corruption.

Next Steps

Several participants offered concluding thoughts. One suggested that follow-on meetings should include cultural anthropologists and sociologists, a point that the organizers agreed with. Another suggested that analysts need to be “strategically selective” because we cannot do it all. But how?

Risk mapping that creates a matrix of risk variables juxtaposed with places would be a useful prioritization tool. Matrices could be developed that explore national security, humanitarian, or technical perspectives.

On modeling, at a national level climate risk models exist. However, at a subnational level it is more complicated. For example, for Port-Au-Prince the model showed that you could not build anywhere so a political decision needed to be made. There also needs to be risk financing modeling, for which the World Bank would be a great partner. One participant said that the “heavy lift” in modeling is to break through with the math. Prioritizing regions for high-resolution is of limited value because once scientists are able to provide detailed models of specific localities, expanding it to the rest of the world will only be marginally more difficult. He believed that the international community can get the science right. However, the recent revelations about potential errors in the global climate models’ climate variability term could impair scientists’ credibility with policymakers.

International science diplomacy is an important lever, though it is not enough. That said it is an interesting way to get into a discussion that is not as politically sensitive. In some societies this is essential to gaining political traction to move forward. Potential participants could be professional societies like Sigma Xi or national academies.

The workshop closed with all participants thanked for participating and a commitment to circulate the minutes. There was interest in seeing a list of possible next steps for engaging further.