Global Water Futures: Turkey Field Study

Summary
October 11, 2006

The world is on a countdown toward a period of water crises. Across the planet, skyrocketing demand for water is raising tensions across and within national borders; poor water infrastructure is inhibiting economic growth; and the lack of access to clean drinking water and sanitation facilities is killing thousands of people every day. Whether these trends will lead to conflict or cooperation remains to be seen, but growing imbalances between water supply and demand will certainly shape the geopolitical landscape beyond the security dimension.

For this reason, the Center for Strategic and International Studies (CSIS) has launched a project called "Global Water Futures" to explore water challenges across the world and the solutions to address them. The first phase of the project, carried out in 2005, focused on the full range of policy and technology solutions at a general, global scale. In moving forward in the second phase, our goal is to identify in more specific terms how water availability, water quality, and water management are affecting economic development, public health, stability and security at the regional level, and to determine the best approaches for addressing those issues. In completing this work, CSIS has relied upon and will continue to tap the technical expertise of Sandia National Laboratories (SNL).

In order to reach our goal, CSIS and SNL will visit five diverse countries—Turkey, India, Nigeria or Botswana, China, and Mexico or Brazil—to see first-hand the ways that water has shaped each country's economic, political, and social situation. These countries encompass a wide range of geographic, hydrologic, economic, social, and political traits. Some have a long history of managing their water supply, while others have only recently come to realize they are headed for dislocation. Some face unique challenges, while others have devised distinctive solutions. By exploring such a diverse set of situations, we hope to capture the full spectrum of water challenges facing the world and a broad set of innovative strategies for alleviating them.

The first country we intend to assess is Turkey. From the beginning of our efforts, we have been interested to learn more about Turkey's rich history and current initiatives relating to water management. The country's significant investment in water infrastructure has greatly influenced economic and social development. Turkish capacity for water management far exceeds capacities in many of its neighboring countries and many scholars have pointed to Turkey as a model for other developing countries to follow. Looking to the future, Turkey also faces a number of interesting challenges that will shape its water situation, such as urbanization, rural development, regional political relations, and environmental concerns. All together, Turkey's experience with water management and developing water resources offers an extremely rich case study.

We hope to better understand Turkey's water experience by meeting with as many representatives from as many organizations and sectors as possible. In order to cover the broadest possible territory and meet with as many people as possible, we have planned an ambitious itinerary for the week of November 13th to November 17th. Our team of seven people will begin in Ankara to gain a sense of the central planning process and the broad, overarching issues. We also hope to meet with representatives from the Southeastern Anatolia Project in Ankara. Mid-week the team will make its way to Istanbul and the surrounding area. In this part of the country, we hope to delve into the challenges posed by supplying water and water treatment to a "mega-city" with a growing population. We are interested in exploring these issues from economic, engineering, political and environmental angles and are particularly interested in the Golden Horn Remediation Project. By visiting these two cities, we will gain a look at the inner workings of water resource management from a number of levels—national down to local.

Throughout the entire visit, we hope to speak with government agencies engaged in water management, financing water projects, environmental management, and other water-related issues. We would also be interested in meeting local government officials, representatives of nongovernmental organizations working on social or environmental issues,

private sector representatives working in the water sector, and academics also looking at water issues. Our goal is to construct a picture of past, current, and future water issues by discussing topics such as the role of agriculture in the economy, the development of irrigation to support the agricultural sector, population trends and their implications for water and sanitation management, transboundary rivers and prospects for integrated water resource management, the development of water infrastructure and its effects on economic development, the ongoing efforts of the Southeast Anatolia Project (GAP), and Turkey's advanced capacity for water management, among others.

Upon returning to the United States, CSIS will combine the findings of the field study with significant background research in a short case study report. The report will be disseminated to leaders in U.S. government agencies, the private sector, NGOs, and academia in order to spread understanding and awareness of global water challenges and solutions. In addition, the findings will be consolidated with the conclusions from the other four case study countries in a final report to be released in mid-2008.

About the Center for Strategic and International Studies (CSIS)

Headquartered in Washington, D.C., CSIS is a private, nonpartisan and tax-exempt public policy research institution dedicated to analysis and policy impact. It is the only institution of its kind that maintains resident experts on all the world's geographical regions. It also covers key functional areas, such as international finance, U.S. trade and economic policy, energy, telecommunications and technology.

Its role is to serve the nation by marshalling the best available scholarship and experience to produce understanding, to build on that understanding to generate and test ideas for meeting the problems studied, and, finally, to convey the best of those ideas to the nation's decision makers and the public at large. Its goal is to inform and shape selected policy decisions in government and the private sector by providing long range, anticipatory, and integrated thinking over a wide range of policy issues.

CSIS is led by Dr. John J. Hamre, former Deputy Secretary of Defense, who has been President and CEO since April 2000. It is guided by a Board of Trustees chaired by former Senator Sam Nunn and consisting of prominent individuals from both the private and public sectors. Trustees such as Brent Scowcroft, Henry Kissinger, Jim Schlesinger, and Zbigniew Brzezinski are engaged directly in leading CSIS policy projects and initiatives.

About Sandia National Laboratories (SNL)

Since 1949, Sandia National Laboratories has developed science-based technologies that support our national security. Today, the nearly 300 million Americans depend on Sandia's technology solutions to solve national and global threats to peace and freedom.

Through science and technology, people, infrastructure, and partnerships, Sandia's mission is to meet national needs in five key areas:

- Nuclear Weapons: ensuring the stockpile is safe, secure, reliable, and can support the United States' deterrence policy
- Energy and Infrastructure Assurance: enhancing the surety of energy and other critical infrastructures
- Nonproliferation: reducing the proliferation of weapons of mass destruction, the threat of nuclear accidents, and the potential for damage to the environment
- Defense Systems and Assessments: addressing new threats to national security
- Homeland Security: helping to protect our nation against terrorism

Sandia is a government-owned/contractor operated (GOCO) facility. Sandia Corporation, a Lockheed Martin company, manages Sandia for the U.S. Department of Energy's National Nuclear Security Administration. We seek collaborative partnerships on emerging technologies that support our mission.

Head of Delegation

Erik R. Peterson
Senior Vice President; William A. Schreyer Chair in Global Analysis; Director, Global Strategy Institute
Center for Strategic and International Studies

Erik Peterson is Senior Vice President at the Center for Strategic and International Studies (CSIS) and holds the William A. Schreyer Chair in Global Analysis, an endowed position named in honor of the Merrill Lynch chairman emeritus and CSIS Executive Committee member. He is also Director of the CSIS Global Strategy Institute, a program dedicated to research on long-range strategic issues and to developing innovative educational programs geared to leaders in government, business, and other fields. As part of the Institute's research, Peterson heads the "Seven Revolutions Initiative," an internationally recognized effort to identify and project global trends out to the year 2025.

Peterson came to the Center from Kissinger Associates, where he was director of research. He holds an M.B.A. in international finance from the Wharton School at the University of Pennsylvania, an M.A. in international law and economics from the School of Advanced International Studies at the Johns Hopkins University, and a B.A. from Colby College. He holds the Certificate of Eastern European Studies from the University of Fribourg in Switzerland and the Certificate in International Legal Studies from The Hague Academy of International Law in the Netherlands. Peterson has taught on emerging markets at the American University School of International Service and lectured on international economics and finance and geopolitical risk at other colleges and universities, including Chapman and George Mason Universities, Georgia Tech, and the Wharton School. He is a board member of the Center for Global Business Studies at the Pennsylvania State University, and a member of the Advisory Board of the Center for the Study of the Presidency.

Members of the Delegation

Jeffrey J. Danneels
Department Manager, Geosciences and Environment Center
Sandia National Laboratories

Jeffrey J. Danneels is the Department Manager of the Materials Transportation Security/Risk Assessment Department within the Geosciences Center. For several years he worked in the Security Systems and Technology Center at Sandia National Laboratories on critical infrastructure security programs. He led development of the Risk Assessment Methodology for Water Utilities, RAM-W^{TM}, used by thousands of water utilities across the United States to assess their security risks. Shortly after the events of 9/11, he testified to Congress on two occasions. His first testimony concerned the security of the water infrastructure and in the second he outlined security research needs to better protect the water infrastructure. Mr. Danneels was the Program Director for the international *Innovative Technologies for Disaster Mitigation* conference (Oct '99) in Washington, DC. This three-day Architectural Surety® conference provided a forum for experts from around the world to exchange information on mitigating the consequences of natural and man-made disasters. He holds a BSCE from Michigan State University, a MSCE from Louisiana State University, and a Masters in Management from the University of New Mexico. Jeff has been with Sandia since 1985.

Peter B. Davies
Center Director, Geoscience and the Environment Center
Sandia National Laboratories

Peter Davies is currently Director of the Geoscience and Environment Center at Sandia National Laboratories. He is engaged in strategy development for Sandia Laboratory Global Engagement and for Global Water Futures (partnership with Center for Strategic and International Studies, Washington DC).

Program responsibilities of Peter's Center include geoscience research on expansion of the U.S. Strategic Petroleum Reserve; fossil energy exploration/production; and fundamental geoscience research. The Center also has responsibility for hazardous materials transportation package design, risk assessment and terrorist attack vulnerability.

Peter also serves as the coordinating Director for Sandia's Water Initiative, managing a cross-laboratory program focused on water safety, security and sustainability. Current international engagement is focused on developing collaborative R&D in the Middle East, including: Jordan, Iraq, Libya and Israel. R&D collaborations leverage a domestic R&D program that focus on water-infrastructure security, real-time water monitoring, water treatment and desalination technology, and cooperative decision modeling.

In previous capacities at Sandia, Peter worked on issues such as global nuclear materials management, the science/engineering of geologic repositories, nonproliferation-oriented repository activities, flow and transport of multiphase fluids and contaminants in fractured and highly heterogeneous porous media, and led a geoscience analyses for the Yucca Mountain Project geologic repository for high level radioactive waste.

From 1992 to 1999, Peter was actively engaged in multiple international radioactive waste activities, including: Sweden, Switzerland, Germany, Hungary, Japan, Taiwan, China, and Russia. He led negotiation and coordination of technical agreements for US Waste Isolation Pilot Plant (WIPP) with Sweden and Switzerland, serving as WIPP Technical Project Director for International Joint Committee (Aspo/Sweden) and International Joint Steering Committee (Grimsel/Switzerland) from 1997 to 1999

Prior to Sandia, Peter worked as a Research Hydrologist with the U.S. Geological Survey, Water Resources Division. He earned his Ph.D. from the Department of Applied Earth Sciences at Stanford University.

Ray E. Finley
Department Manager, Geosciences and Environment Center
Sandia National Laboratories

Ray Finley is the manager for the Geohydrology Department at the Sandia National Laboratories Geosciences and Environment Center. He leads a diverse group of engineers and geologists evaluating critical infrastructure risk (water systems & dams), water resource management and development of decision tools, investigating the linkages between technology and policy for water resources, international water resources interactions, application of spatial statistics for data interpretation in water quality variability, groundwater hydrology, and remote characterization, the storage of gas, liquids, and waste in underground caverns in evaporites and hard rock, landfill cover design and evaluation, groundwater flow and transport modeling and testing, development of instrumentation for real-time monitoring, decision support modeling of water resources, and development of probabilistic models for evaluating risk to water distribution systems, optimization of sensor placement and source inversion algorithms for identifying contaminant introduction. In this capacity he also contributed to the development and implementation of the Risk Assessment Methodology for Water (RAM-W) and the refinement of the Risk Assessment Methodology for Dams (RAM-D).

Prior to these responsibilities, Ray was a geological test and design engineer at Sandia. He was the principal investigator for evaluation of engineered barrier systems for the Yucca Mountain Project, contributed to the development of a methodology to evaluate the surety of Federal dams, led the development and installation of the first in situ thermal experiment at the Exploratory Studies Facility for the US high-level waste repository, and served as the project leader for the design and testing of sealing systems for underground waste repositories in salt and tuff, among many other projects.

Ray received his B.S. and M.S. in Geological Engineering from the University of Arizona.

Laura A. Keating
Research Associate, Global Strategy Institute
Center for Strategic and International Studies

As a research associate for the Global Strategy Institute, Laura Keating supports many of the institute's research initiatives. She directs the Global Water Futures project, an effort to identify policy and technology solutions to the world's growing water scarcity and quality challenges, and she coauthored the report, Addressing Our Global Water Future. Ms. Keating has also been engaged in the Seven Revolutions project.

Ms. Keating came to CSIS in 2003. She earned a B.A. in East Asian studies from the Pennsylvania State University, where she was also a student of the Schreyer Honors College. As part of her Honors College experience, she studied abroad in Beijing and earned a certificate of Chinese language from Peking University's Chinese Language Center.

Howard Passel
Sandia National Laboratories

Howard D. Passell works in the Energy, Resources and Systems Analysis Center at Sandia National Laboratories. His work is focused on water resources management, conservation and sustainability projects, with emphasis on the links between water and other systems, including demographics, economics, energy, food, public health, and governance. He is currently involved in water resource monitoring, modeling, management and policy projects at various scales in the U.S., Central Asia, the Middle East, the US/Mexico border region, and New Mexico. He earned M.S. and Ph.D. degrees in conservation biology and hydrogeoecology, respectively, from the University of New Mexico.