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Proceedings of the TAMUS/Future Earth Water-Energy-Food Nexus Workshop

Research gaps in the integrated observations and improved governance for the W-E-F Nexus

Executive Summary

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Executive Summary

Background

The Future Earth Water-Energy-Food (W-E-F) cluster project and the Texas A&M University System (TAMUS) collaborated to hold a workshop in Washington, DC on June 1-3, 2015. The workshop, entitled "Research gaps in the integrated observations and improved governance for the W-E-F Nexus," constituted the first of four regional workshops planned as part of the Future Earth W-E-F cluster.

The workshop included more than 75 experts representing a broad spectrum of education, government, international, and industrial groups that work in the water, energy, and food sectors, and their connections to science, policy, and society. Attendees included experts from the National Aeronautics and Space Agency (NASA), the United States Department of Agriculture (USDA), the US Department of Energy (DOE), the Environmental Protection Agency (EPA), the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the United States Agency for International Development (USAID); participants affiliated with US universities in Texas, Maryland, Colorado, Indiana, Michigan, and Pennsylvania; international experts from Germany, Japan, Switzerland, and Canada; and private sector representation from Abengoa, RAND, and the Battelle Memorial Institute. Among these participants were representatives from Future Earth programs such as the Global Energy and Water Exchanges, the Sustainable Water Future, and the Global Land Projects. Through these connections, the workshop facilitated outreach by the W-E-F Research Group at TAMUS to government departments, universities, and stakeholders in the United States and abroad. It also provided Future Earth with a North American perspective on W-E-F Nexus issues and activities.

Conclusions and Outcomes

The Nexus approach is an effective method to achieve sustainability through interdisciplinary cooperation at local, national, and global scales. It offers inclusive, transparent, and intergovernmental approaches to all stakeholders, supports compatibility with Sustainable Development Goals (SDG) as defined by the United Nations (UN), and presents scientifically enabled policy, monitoring, and assessments. This report summarizes the workshop's major conclusions and outcomes.

The use of the W-E-F framework for planning can empower local communities and encourage holistic approaches to problem-solving. While tangible outcomes must be local and site-specific, the approach is also embedded in a global context: lessons learned can be transferred, adapted, and applied to multiple contexts and options.

Earth observation programs must be used to monitor and understand environmental conditions and needs. In the particular case of satellite observations, data can be used for landscape monitoring and understanding and modeling land surface processes. The Nexus approach needs also to support more integrated governance arrangements to overcome the lack of coordination of sectoral policies. Such integration is needed to provide the enabling conditions for an effective implementation of the Nexus approach at all governance levels.

A global Nexus Community of Practice coordinated by Future Earth and a well-defined Road Map are needed to address the significant knowledge gaps that exist in science, education, and governance. This community would enable integrated research efforts, capacity building, outreach, and education. Additionally, it would enable local work related to global problems. This group should develop a road map

for using the Nexus approach to achieve sustainability, risk identification, management, and identifying the costs of addressing (or failing to address) these risks. Similarly, this Community of Practice and Road Map will produce and develop indicators for sustainable W-E-F governance and management of various spatial and temporal scales.

Recommendations

A number of initiatives are being recommended as a result of workshop discussions. They are listed here in a brief summary:

- Undertake case studies to define the interconnectivity of W-E-F systems. In this regard, a suite of comparative case studies should be carried out with an emphasis on governance issues;
- Develop a shared platform with both national and international components for data to serve the three communities simultaneously;
- Document data needs in order to support multi-scale, transdisciplinary research;
- Develop governance indicators to monitor the role and effectiveness of governance in management practices in both developed and developing countries;
- Develop 50-year scenarios for water, energy, and food outlooks to support planning in the W-E-F Nexus that consider the effects of climate change, trade-offs, externalities, ecosystem services, and food waste;
- Co-design local- or regional-scale pilot projects to test and implement solutions; and
- Develop a common accounting framework for ecosystem services to support more holistic regional resource management approaches.

Next Steps

The first follow-up action from the W-E-F Nexus Workshop is to document workshop discussions so that they can form the basis of a proposal to relevant federal and state agencies. A proposal for a US-based W-E-F Nexus project is being developed. A W-E-F Nexus proposal for Future Earth will be fully developed by December 2016 through this workshop and three additional regional workshops. This global program will integrate natural sciences with social sciences to explore the possibilities and issues associated with more systematically linking the W-E-F sectors. Both a national and a Future Earth Community of Practice are being established as a result of this workshop. Information on how to join these communities will be available on www.wefnexus.tamu.edu and www.nexus-cluster.org. Both sites will also carry the full report and presentations from the workshop.

Call for Action

A strong commitment of US agencies and academics to the W-E-F Nexus is essential for national, regional, and global advances in the development and implementation of a framework that will ensure the sustainability of the water, energy, and food sectors. The framework will be built on joint management across the Nexus and will be supported by technologies, observations, science, and good governance. The US could forge a strong partnership with the Future Earth program by developing a substantial initiative along the lines discussed at the workshop.