NSF-FEW Nexus Workshop on Integrated Science, Engineering,

And Policy: A Multi Stakeholder Dialogue

The NSF-FEW Nexus Workshop took place in College Station on January 26 and 27. The event was meant to build partnerships and create a road map for establishing a national Food-Energy-Water (FEW) Nexus Community of Science together with a platform to address the key research challenges.

The symposium identified multiple, interdisciplinary research agendas for engineering, agriculture, geoscience, social, behavioral and economic sciences. New approaches to innovative research and approaches to data collection that will enhance longitudinal research capable of modeling and monitoring the processes associated with changes in climate, resiliency, vulnerability, risk perception, and overall enhancement of sustainable management practices for primary resources were discussed.

The kick-off included a live web session offered by the National Science Foundation. The critical directions of NSF thinking in the FEW Nexus arena were outlined and remarks were followed with an interactive session with broad audience participation.

BIG 10 BURSTS formed the basis of the next session. The following speakers briefly addressed their research areas in the context of the FEW Nexus, their interrelations, and the need for transdisciplinary collaboration to address many of the challenges that would be identified during the following sessions for the meeting. The topics of the 'Big 10 Bursts' were:

1. ***Data and Modeling***
2. ***Governance, Policy, and Financing***
3. ***Governing Resources in Future Cities***
4. ***Tradeoffs and Decision Support Tools***
5. ***Energy for Water***
6. ***Water For Food***
7. ***Water for Energy Production***
8. ***Food Processing and Waste***
9. ***Soil–Food –Climate Nexus***
10. ***Engagement and Outreach: Community Building***

Following the presentation of the ***BIG 10 BURSTS***, participants joined one of four breakouts addressing a) Research, b) Education, c) Practice, and d) Capacity Building: each in the context of the FEW systems. The goal of these sessions was to begin the identification of synergistic research teams to work together in developing FEW research proposals and other projects to be submitted to NSF, NIFA, DoE, and similar national and international funding agencies. Specifically, each group addressed five questions: 1) defining the target FEW system, 2) identifying the key challenges, 3) determining solutions to the challenges, 4) identifying the key potential impacts (social, environmental, economic), and 5) determining what resources are needed for implementation.

Day two of the symposium 'Action Day' began with a plenary session of two panel discussions; these sessions were live broadcast through workshop co-partner Circle of Blue, to a global audience of more than 100 participants, in addition to the 125 persons physically present. The *Science and Policy panel* members were asked to address questions of the characterization of the current state of FEW science and policy interactions nationally; the steps needed to improve science base decisions related to FEW resources, potential policy changes that might improve the science–policy coherence in FEW resources.

The *Industry and Technology panel* discussion questions included the correct incentives to innovation in FEW systems, its unique technological challenges and opportunities, infrastructure and human capacity needs to foster those innovations in the FEW system.

Afternoon breakout sessions addressed the pathways forward through building on the white papers that will be produced from the Big 10 Bursts session; establishing a Community of Science and Practice; and the upcoming calls for NSF-INFEWS and Belmont Forum. The targets and priorities identified, the action & activities plan, timeline, teams and roles needed to accomplish the targets, and potential resources for implementation will become part of the proceedings shared with sponsors and participants to help identify the next steps for expanding the Nexus program. Moving forward, organizers will work with NSF, NIFA, and other agencies toward implementing the suggestions and establishing the FEW Nexus community of science and practice.

Scientific Committee

Anik Bhaduri, Executive Officer, Global Water System Project and Future Earth

Manocher Dorraj, Professor, Political Science, Texas Christian University

Amr Elnashai, Dean, College of Engineering, Pennsylvania State University

Karin Krchnak, Director, Freshwater Program, World Wildlife Federation

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Claudia Ringler, Deputy Division Director, Environment and Production Technology, International Food Policy Research Institute (IFPRI)

Kurt Schwabe, Professor, Environmental Economics and Policy, University of California, Riverside

Shashi Shekhar, Professor, Computer Science, University of Minnesota

Organizing Committee

Phil Berke, Professor, and Director, Institute of Sustainable Coastal Communities, College of Architecture, TAMU

David Burnett, Director of Technology, Global Petroleum Research Institute, TAMU

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