Water-Energy-Food Nexus Initiative

Launch

Information E-Booklet

October 8, 2015
The WEF Nexus Initiative is supported by:

- Texas A&M University System, Office of the Vice Chancellor for Research
- Texas A&M University, Office of the Vice President for Research
- College of Engineering & Engineering and Experiment Stations (TEES)
- College of Agriculture & Life Sciences, AgriLife Research
- Bush School of Government and Public Service
- College of Geosciences

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I. Background

The WEF Nexus Initiative received seed support from the Texas A&M University System Office of the Vice Chancellor for Research, the Texas A&M University Office of the Vice President for Research, and the Offices of the Deans of the Colleges of Agriculture, Engineering, Geosciences and the Bush School of Government and Public Service. In this launch event, we seek to engage the water for energy, water for food, food for energy, big data, and systems and modeling communities. Each of these interface with the water-food-energy nexus and become part of the nexus community of practice within the Texas A&M System.

The WEF Nexus Initiative will leverage past efforts, existing capabilities, university knowledge, and future potential to identify and assess feasible implementation mechanisms to achieve water-energy-food (WEF) security through complex, integrated resource management. It will seek to create an improved evaluation basis that supports sound decision making, policy formation and planning through an integrated systems platform that facilitates and links the WEF complex. It is intended to raise awareness in academia, society, government, and industry of the need for simultaneous consideration of decisions on water, energy and food in a changing world. This initiative will identify and respond to local, regional, national and global WEF challenges, providing the data, analytical tools, and scientific knowledge that will lead to a better understanding of the WEF Resource interfaces. This in turn will help policy makers plan effectively to address the anticipated shortfalls in these primary resources in a non-stationary world. This effort also will contribute to a better understanding of the full life-cycle footprint of food, water and energy resources, their products and services.

This initiative will build on ongoing, successful partnerships, regionally and nationally, in an effort to develop and implement new projects whose long term goal is enhancing these primary resources’ security and sustainability. These outcomes are intended to develop a plan to upscale local outcomes for enhanced national and global security.

This workshop will include breakout sessions during which we expect to expand the intellectual capacity and scope of the TAMUS WEF nexus effort. We will also advance the analytics effort by identifying capabilities, gaps in needed areas and creating a broad nexus community of practice across TAMUS. It is intended that the outcomes of the one day workshop will generate specific projects and scientific groups that will produce concepts, with seed funding potential, that will help make Texas A&M more competitive in the nexus field and better prepared for the upcoming NSF, DoE, USDA and other agencies’ nexus RFPs by identifying nexus research topics and effective working groups. Each topic will include champions who will coordinate larger efforts to identify potential sources for seed funding.
II. Program

The workshop will take place on **October 8, 2015** workshop, in the **Memorial Student Center #2406 MSC** from **8:00-1:30**. This is the first step in engaging the wide range of TAMUS expertise on which to synergize. The agenda includes:

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00-8:30</td>
<td>Coffee &amp; Sign in</td>
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<tr>
<td>8:30-8:35</td>
<td>Welcome</td>
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<tr>
<td>8:35-9:00</td>
<td>TAMU Leadership Panel, Moderated by Ben Zoghi</td>
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<tr>
<td>9:00 - 9:30</td>
<td>Nexus Initiative Overview and workshop outcomes</td>
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<tr>
<td>9:30-11:30</td>
<td>Breakout sessions &amp; Moderators</td>
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<tr>
<td>1) Energy - Water: Christodoulos Floudas</td>
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<tr>
<td>2) Water - Food: Arnold Vedlitz &amp; Ron Lacewell</td>
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<tr>
<td>3) Food - Energy: Elsa Murano</td>
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<td>4) Data and Analytics: Jack Baldauf</td>
<td></td>
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<tr>
<td>5) Resource allocation / management / trade-offs: Bruce McCarl</td>
<td></td>
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<tr>
<td>11:30-12:30</td>
<td>Summary and conclusions</td>
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<td>12:30-1:30</td>
<td>Lunch</td>
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III. Breakout Sessions

**Session 1: Energy-Water**
- technologies and practices leading to low carbon water generation and low water footprint energy systems

**Session 2: Water-Food**
- technologies and practices to increase water productivity in food systems, cropping systems management. Eco-system implications of food and water management

**Session 3: Food-Energy**
- bio-fuel systems: processing, human & eco-system impact; energy for rural agriculture

**Session 4: Data and Analytics**
- nexus tools, big data, multi-scale systems, systems analysis, processes and systems modeling

**Session 5: Resource allocation/Management/Trade-offs**
- resource allocation among multiple stakeholders with increasing demands
IV. Suggested Reading Material

Session 1: Energy–Water


Session 2: Water–Food


Session 3: Food-Energy


Session 4: Data and Analytics

- The Global Calculator http://uncached-site.globalcalculator.org/

Session 5: Resource allocation/Management/Trade-offs

V. WEF Nexus Funding Opportunities

Overview

Table 1. Agriculture and Natural Resources Sciences in the FY 2016 Budget
(budget authority in millions of dollars)

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<tbody>
<tr>
<td><strong>US Dept of Agriculture Budgets</strong></td>
<td></td>
<td></td>
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<tr>
<td>Natl Institute of Food and Agr (NIFA)</td>
<td>1282</td>
<td>1295</td>
<td>1508</td>
<td>213</td>
<td>16.4%</td>
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<tr>
<td>Agriculture and Food Research Init (AFRI)</td>
<td>316</td>
<td>325</td>
<td>450</td>
<td>125</td>
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<tr>
<td>Agricultural Research Service (ARS)</td>
<td>1122</td>
<td>1178</td>
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<td>219</td>
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<tr>
<td>Economic Research Service (ERS)</td>
<td>78</td>
<td>85</td>
<td>86</td>
<td>1</td>
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<tr>
<td>Forest Service R&amp;D</td>
<td>300</td>
<td>301</td>
<td>257</td>
<td>-4</td>
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<td><strong>NSF</strong></td>
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<td>Innovations at the Nexus of Food, Energy, and Water Systems (INFEWS)</td>
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<td>- -</td>
<td>75</td>
<td>75</td>
<td>- -</td>
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<tr>
<td>Integrative Organismal Systems (IOS)</td>
<td>215</td>
<td>214</td>
<td>215</td>
<td>1</td>
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<td><strong>Dept of Energy, Office of Science</strong></td>
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<tr>
<td>Biological &amp; Environmental Research (BER)</td>
<td>594</td>
<td>592</td>
<td>612</td>
<td>20</td>
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<td>Energy-Water</td>
<td>- -</td>
<td>- -</td>
<td>12</td>
<td>12</td>
<td>- -</td>
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<tr>
<td><strong>U.S. Geological Survey (USGS)</strong></td>
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<tr>
<td>Water Resources</td>
<td>118</td>
<td>122</td>
<td>128</td>
<td>7</td>
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<td><strong>U.S. Agency for International Development (USAID)</strong></td>
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<tr>
<td>Feed the Future</td>
<td>- -</td>
<td>1000</td>
<td>978</td>
<td>-22</td>
<td>2.2%</td>
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Source: Agency budget justifications and other budget documents.
All figures rounded to the nearest million. Changes calculated from unrounded figures.

Dear Colleague Letter: SEES: Interactions of Food Systems with Water and Energy Systems


Innovations at the nexus of food, energy, and water systems (INFEWS) ($74,960,000)

Science & Technology Centers (STC)

Engineering Research Centers (ERC)

Funded 17 WEF Nexus Workshops in 2015

1. Food, Energy and Water Nexus in Sustainable Cities
4. Workshop to explore the nexus between food, energy and water in a large international river system
5. Workshop on Migration, Climate Change and the Resilience of Regional Food, Water, and Energy Systems
7. Workshop to Identify Opportunities and Challenges for Nanotechnology to Optimize and Unify Food, Energy and Water Systems
8. Planned Migration as a Strategy to Sustain Agricultural Production
11. Closing the Human Phosphorus Cycle
13. Water- and Energy-efficient Food Production: Solutions for America’s Bread Basket
14. Food-Energy-Water infrastructure systems, engineering solutions and institutions
15. Food-Energy-Water Nexus Workshop to Develop System Approaches and Sustainability Metrics for Evaluation
16. A Workshop to identify interdisciplinary Data Science approaches and challenges to enhance understanding of Interactions of Food Systems and Water Systems
17. A sustainable rural framework workshop for the upper Great Plains
Department of Energy

- Meetings with Sec Moniz
- New $38 million Energy-Water crosscutting initiative
- Energy-Water Track:
  - RECENTLY FUNDED PROJECTS RELATED TO WATER-ENERGY
- Current opportunities related to Energy-Water
  - RENEWABLE ENERGY AND EFFICIENT ENERGY PROJECTS LOAN GUARANTEE SOLICITATION - DECEMBER 30, 2015 DEADLINE
  - ADVANCED FOSSIL ENERGY PROJECTS LOAN GUARANTEE SOLICITATION - DECEMBER 30, 2015 DEADLINE
- WATER POWER PROGRAM $67M FOR 2016
- U.S.-China Clean Energy Research Center Issues Solicitation to Address the Energy-Water Nexus (2015) $12.5 million

USDA

- Centers of excellence
- AFRI
  Requests $450 million for competitive grants through AFRI, which supports all strategic goals. A portion of this funding will support research focused on developing solutions for water management that could potentially affect health, food, climate, energy, and the environment.
- NIFA
  The President’s FY 2016 budget request for NIFA includes $57 million to support research on food security, a $17 million increase over FY 2015.
- ARS
  The President has proposed an increase of $5 million, to $206 million total, for USDA ARS environmental stewardship research. USDA Regional Climate Hubs will support study of the impact of global climate change on critical natural resources including water availability, soil health, soil conservation, and water quality.
- ERS
  Economic Research Service (ERS) will use $1 million to analyze linkages between shifting water supplies, farming practices, and food production. This will improve our understanding of the range of risk management and adaptive decisions in drought-prone areas, and analyze how farmers might respond to extreme weather events.