



**Reflections Texas A&M Water Energy Food Nexus Initiative (WEFNI) August 2015-17**

The WEFNI Leadership team appreciates the *collective effort* of the *WEFNI community*. This past quarter has concluded a successful WEFNI's 'pilot' period and launches its future direction, including the San Antonio Case Studies. Substantial progress was accomplished toward the goals set for WEFNI: namely, 1) a vibrant WEFNI community of TAMU scholars leads national and international efforts toward establishing the *Nexus Community of Science and Practice*; 2) through its *San Antonio case studies*, WEFNI promises to contribute to the nexus discovery in the domains of modeling, technology, policy, and governance; and 3) the *TAMU Nexus Community accomplished this* through active engagement with federal agencies, submitting 18 proposals to *NSF-INFEWS* and *NSF-NRT*, 2 *USDA-NIFA* grants, 3 pre-proposals to the *Belmont Forum*, and hosting 4 *symposia* in Texas.

**Activities**

**Global**

- **XVI World Water Congress, 2017 Cancun**  
*High Level Panel (HLP) Water-Energy-Food Nexus: A Platform for Implementing the Sustainable Development Goals.* [Partners include: Global Environmental Facility, Circle of Blue, Stockholm Environment Institute, National Scientific and Technical Research Council, Texas A&M University, OCP Policy Center, International commission on Irrigation and Drainage, The World Bank, The Water Foundry, and the University of Zaragoza]
- **World Water Week Stockholm**  
2017 *Special Session. Dialogue on Water-Energy-Food Nexus and SDGs Implementation*  
2016 *Event. Water-Energy-Food Nexus Platform: Achieving the Water, Energy, & Food SDGs.*
- **Dresden Nexus Conference (DNC) (2016, 2017)**  
*Special Session. Tools, data, and instruments for managing environmental resources.*
- **World Water Day Watershed Conference, Vatican (2017)**  
*Making the Leap: Challenges of interconnected primary resources, trade-offs, analytics, synergies, sustainable development*
- **World Economic Forum** active participation (2015, 2016, 2017)
- **UN Habitat General Assembly, New York, Implementing SDGs, (2016, 2017)**

**National**

- **American Geophysical Union (AGU) Special session: Global Environmental Change: Achieving Water-Energy-Food Nexus Sustainability: a Science and Data Need or a Need for Integrated Public Policy? (New Orleans, 2017)**
- **International Conference on Sustainable Development (ICSD). Best Paper: The Role of WEF Nexus in Implementing the Sustainable Development Goals in Morocco.** Daher and Mohtar ( 2017)
- **American Society of Agricultural and Biological Engineers (ASABE), Panel: WEF Nexus at ASABE Annual Meeting Spokane, (July 2017)**
- **NSF Workshop** on Multidisciplinary Complex Systems Research (2017)
- **USDA-NIFA Data Science in Agriculture Summit, Chicago, Needs and Goals.** (2016)
- **Global Environment Facility, International Dialogue on the Global Commons, National Academies, Washington DC, (2016)**

**Texas**

- **TAMU Membership and participation in World Water Forum** (Marseille, Edinburgh, Cancun,



Brasilia 2015-2020)

- **NSF-FEW Nexus Workshop on Integrated Science, Engineering, and Policy: A Multi Stakeholder Dialogue**, College Station (2017)
- **Earth Day, Texas**, Dallas (April 2017)
- **International Livestock Congress**, Houston, *The WEF Nexus as a platform toward Water Sustainability and Economic Prosperity*. (March 2017)

**NSF-FFEW Workshop** (January 2017). Proceedings and Report of the meeting are available on request from [wefnexus@tamu.edu](mailto:wefnexus@tamu.edu). The special issue [Current Sustainable/Renewable Energy Reports](#): Volume 4, Issue 3, September 2017, ISSN: 2196-3010 (Online) Nexus of Food, Water, Energy (Mohtar, Section Editor) published through Springer reflects the workshop's primary outcomes and includes the following whitepapers:

1. INVITED COMMENTARY: [Preface to the Issue](#); Rabi H. Mohtar. Pages 87-89.
2. [Water for Energy: Systems Integration and Analysis to Address Resource Challenges](#); Ashlynn S. Stillwell, Ahmed M. Mroue...Pages 90-98.
3. [Food Processing and Waste Within the Nexus Framework](#), Elena Castell-Perez, Carmen Gomes...Pages 99-108.
4. [Energy for Water and Desalination](#); E. J. Sullivan Graham, Noel Baktian...Pages 109-116.
5. [Soil as a Basic Nexus Tool: Soils at the Center of the Food-Energy-Water Nexus](#), Rattan Lal, Rabi H. Mohtar, Amjad T. Assi...Pages 117-129.
6. [State of the Art of Water for Food Within the Nexus Framework](#), Sonja Loy, Jeffrey Tahtouh, Clyde Munster...Pages 130-136.
7. [Data for WEF Nexus Analysis: a Review of Issues](#), Bruce A. McCarl, Yingqian Yang...Pages 137-143.
8. [Model Use in WEF Nexus Analysis: a Review of Issues](#), Bruce A. McCarl, Yingqian Yang, Kurt Schwabe...Pages 144-152.
9. [Trade-offs and Decision Support Tools for FEW Nexus-Oriented Management](#). Bassel Daher, Walid Saad, Suzanne A. Pierce...Pages 153-159.
10. [Governance of the Water-Energy-Food Nexus: the Conceptual and Methodological Foundations for the San Antonio Region Case Study](#), Kent E. Portney, Arnie Vedlitz...Pages 160-167.
11. [Building a WEF Nexus Community of Practice \(NCoP\)](#), David W. Smith, Matthew Welch...Pages 168-172.
12. [Urban Nexus Science for Future Cities: Focus on the Energy-Water-Food-X Nexus](#). Joshua B. Sperling, Philip R. Berke. Pages 173-17

**San Antonio Case Studies** (SACS) in support of WEF resource planning in the San Antonio Region  
*Coordinators*: Mohtar, McCarl, Pistikopoulos, Portney, Rosen, Schweitzer (admin), Daher (student teams).

WEFNI launched (Aug 2016) the *San Antonio Case Studies* (SACS) with a team of 6 groups led by faculty across Texas A&M System. In the context of SACS, WEFNI support 6 PhD and 8 MSc students from Geosciences, Geography, WMHS, BAEN, Mechanical, and Chemical Engineering. The San Antonio Region represents a complex resource hotspot in Texas: it hosts a rapidly growing, urbanizing population; encompasses the Eagle Ford shale play with its economic potential for increased oil and gas production; has major agricultural activity. WEFNI's SACS project attempts to address those needs through six distinct, yet interrelated, case studies. A special issue, accepted at (*Science of the Total Environment* (STOTEN)) Elsevier, is expected to be published in Spring 2018. ***Opportunities in the Water-Energy-Food Nexus Approach: Innovatively driving economic development, social wellbeing, and environmental sustainability*** will include 15 peer reviewed papers reflecting the work of the SACS teams.

**San Antonio Stakeholders' Forum: November 14, 2017, San Antonio**

This mutually beneficial opportunity to bring the research community and the San Antonio resource stakeholders will offer a facilitated dialogue to improve economic development, enhance social well-being, and drive innovation and integration in WEF sectors. This collaboration between stakeholders and the



scientific community is expected to help *ensure WEF-Nexus Sustainability in San Antonio and nearby areas* and to lay the foundation for *extrapolation of lessons learned to hotspots in Texas and beyond*.

***NSF-INFEWS Project Funded: Decision Support for Water Stressed FEW Nexus Decisions (DS-WSND.*** Texas A&M University System-Agrilife Research and Extension (McCarl, Pistikopolous, Mohtar, Srinivasan), the University of California, Riverside (Schwabe), and Texas A&M University San Antonio (Rosen). The project will analyze *potential improvements arising from FEW Nexus-aware decision utilizing case studies encompassing the San Antonio and Los Angeles/San Diego regions*. Additionally, the project will develop analytical systems for Nexus decision evaluation within and outside these case study settings.

***NSF-RCN proposal: The Water Energy Food Nexus Community of Science*** to establish the formal community of science and practice for which WEFNI has contributed the foundation with a community of interest that exceeds 500 registrants globally. The NSF-RCN offers support to advance a field or create new directions in research or education by supporting groups of investigators in communicate and coordinating their research, training and educational activities across disciplinary, organizational, geographic and international boundaries. Discussions also ongoing to submit WEF Nexus Science and Technology Center proposal (contact [mohtar@tamu.edu](mailto:mohtar@tamu.edu)).

#### ***Upcoming Events***

- **American Geophysical Union (AGU), December 11-15, New Orleans, LA**  
*Special Session on the Water-Energy-Food Nexus*, co-organizers Lawford and Mohtar. Selected papers to be published as a special issue in a *Frontiers in Environmental Sciences*
- **American Chemical Society (ACS) March 18 - 22, New Orleans, LA**  
**Water Use Optimization: Water Quality, Treatment, and Reuse Symposium** (Environmental Chemistry Division), original research topics that integrate waste heat or renewable energy, treatment, use, and reuse of degraded water, water quality issues, fate and transport of pollutants, co-optimization of water and energy efficiency, water quality generated from managed aquifer recharge, storm water reuse management. ACS membership is not required. Abstract submission closes on October 9, 2017, [<http://abstracts.acs.org>]
- **American Association for the Advancement of Science (AAAS) February 15-19, Austin, TX**  
**Session 17905: How Communities Can Change Behavior to Address Complex Challenges.** [Advance registration and housing opens early September].
- **World Water Forum (WWF), March 18-23, Brasilia 2018**  
Continuing work begun with the Cancun *HLP, Dialogue on Water-Energy-Food Nexus and SDGs Implementation*, WEFNI and its global partners [Global Environmental Facility, Circle of Blue, Stockholm Environment Institute, National Scientific and Technical Research Council, Texas A&M University, OCP Policy Center, International commission on Irrigation and Drainage, The World Bank, The Water Foundry, and the University of Zaragoza] are preparing a special session for the World Water Forum ***Water-Energy-Food Nexus: A Platform for Implementing the Sustainable Development Goals***. The session will address lessons learned across thematic, national, regional, and global case studies, including *simplicity vs complexity in modeling tradeoffs, the effects of scaling, transboundary considerations, governance, funding and implementation*.