

Review and Analysis of Food-Energy-Water Nexus Studies: Conceptual models

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Abstract

This talk presents a review and analysis of the current state of research and practice in the Food- Energy-Water (FEW) nexus. It is intended to provide scientists and practitioners in the FEW domains the tools, data, knowledge, and successful applications in this research and practice area. The talk also describes knowledge gaps in the FEW nexus domains. The objectives of this talk are (a) to synthesize existing knowledge in defining and conceptualizing FEW nexus for the stakeholders and help guide them in defining and conceptualizing their own FEW nexus, (b) to identify limitations and knowledge gaps. The following questions assisted in addressing the objectives: Which systems are involved? Where is the nexus applied or intended to be applied and at what scale? How are the nexus elements assessed? and Who should be considered? The study provides narrow and broad definitions as well as simple and complex conceptualization frameworks of FEW nexus that stakeholders can use while being aware of the limitations and knowledge gaps.

About the Speaker

Aavudai Anandhi, Ph.D., is an Assistant Professor, Biological Systems Engineering, College of Agriculture and Food Science, Florida A&M University. She obtained her Ph.D from IISc, civil engineering department in 2008. In Dr. Anandhi's group, during research, teaching, and outreach, they often use this concept: "There are known knowns, known unknowns, and unknown unknowns". This aids in the application of computational intelligence for modeling ecosystem processes and their interactions at the food-water-energy (FEW) nexus while improving these predictions to environmental changes (climate, water-use and land-use) using complex systems engineering. They continue to develop novel solutions to engineering design and decision methodology for synergizing FEW systems for efficient, productive, and sustainable ecosystem management. For this they use a mixture of systems thinking approaches, conceptual and structural models, artificial intelligence, spatial statistics, and machine learning for analysis of the ecosystem services by exploiting new data streams to advance the system adaptation, resilience, and stress mitigation. Dr. Anandhi has authored 55+ research and teaching articles and obtained ~\$12 Million funding. Her awards and recognitions include: "Emerging Researcher Award" at Florida A&M University; "Teacher of the year" award from Florida section of ASABE, ASCE's ExCEED fellow and "Blue Ribbon award" for innovative educational materials from ASABE. Dr. Anandhi's work experiences and collaborations with software industry, state, federal and non-governmental agencies, as well in academic institutions in India, NY, KS and FL has provided the skills, experiences and knowledge to develop a successful program.