Zellner  
NSF FEW workshop

Big ideas in science (e.g., modeling system of FEW systems) and applications (e.g., precision agriculture) for understanding and innovating for FEW nexus. In addition, it should list data needs (e.g., global water census) or data-science needs of the FEW nexus science and application innovations.

Research purposes:
1. To understand how FEW systems function, in terms of:
   a. Processes: production, processing, transportation, retail and consumption
   b. Interconnected systems and networks: markets, resources, waste, infrastructure
   c. Drivers of the systems in different contexts
   d. Outcomes: sustainability metrics (e.g., resource efficiency; air, soil, and water quality; social equity; economic development) and resilience to disturbance (e.g., to climate change, market shocks, scarcity, disease).

2. To design and assess alternative designs and models for FEW systems, in conjunction with stakeholders, and for a range of socio-economic and biophysical contexts. Identify opportunities and barriers of behavior and policy to implement these changes, and ways to address them.

Priority areas of focus: Nutrient reduction, market stability, public health and appropriate nutrition, water sustainability (quality and quantity), energy efficiency (while dis-incentivizing the rebound effect).

Applications:
Urban, suburban, peri-urban, and more traditional large-scale food systems.
Water supply and stormwater management in light of land-use, climate and energy changes.
FEW consumption choices and behavior.
Market and regulatory institutions for ecosystem services.

Methods:
There are plenty of existing data and model driven methods that can be applied:
1. Life Cycle Analysis
2. Benefit Cost Analysis
3. Agent-based Modeling
4. Economic Modeling (econometric, hedonic)
5. Spatial statistics
6. Network analysis
7. Participatory modeling

To address the questions above, we will likely need a variety of methods, and we can further use the above methods to make use of new sources of data, as well as design data collection efforts (e.g., by identifying drivers through modeling, for which data may be sparse). In addition, there are a number of data driven approaches that are currently being developed. However, I believe that the methods are not as important as the questions we seek to explore.