**附件1 资助领域说明（英文）**

The initiative goals for "Innovations at the Nexus of Food, Energy, and Water Systems for US and China (INFEWS:US-China)" are to:

1. significantly advance our understanding of the food-energy-water system through quantitative and computational modeling and
2. enable research that will lead to innovative human and technological solutions to critical FEW systems problems.

These two goals require systems approaches, which may be defined at a wide range of temporal and spatial scales, locally to globally. Each proposal must define the FEW systems intended for study, identifying the systems boundaries and the primary food and energy and water components in these systems. Although many disciplinary challenges remain in FEW systems research, this initiative intends to foster new lines of research that emerge only in an interdisciplinary context.

Theme 1: The first theme is to significantly advance understanding of FEW systems with advanced modeling that investigates the coupled biotic, abiotic, engineered and social systems and the couplings and feedback mechanisms among FEW system components. Projects may use a wide variety of different systems analyses and modeling approaches to explore the functional dynamics of FEW systems. Some projects might integrate across models from multiple disciplinary domains, including, but not limited to agricultural, behavioral, computational, cultural, ecological, economic, energy, engineering, geospatial, hydrological, mathematical, and social. Systems chosen for study must be examined to define/quantify spatially heterogeneous FEW systems responses to various internal and external driving factors that occur on both short and long timescales. FEW systems operation must be investigated under the influence of single and multiple driving factors. FEW models should allow for investigation of system resiliency, attempt to identify thresholds, and explore system response to variability among critical parameters singly, in combination, or at extreme values.

Theme 2: The second theme is to develop and examine innovative solutions that address specific FEW system challenges and enhance FEW system’s resilience and sustainability. This research may explore sustainable management solutions, examine drivers of resource consumption, and study ways to extend resources via methods such as reducing, recycling, recovery, and reuse. Projects should demonstrate how the envisioned solution will contribute to a healthy balance across sectors and places, and how sectors and places might vary over temporal and spatial scales. Specific areas of interest include, but are not limited to:

* Efficient Use of Resources: Scientific and engineering solutions to improve FEW systems efficiencies should be coupled with new knowledge of how ecological, economic, social, and physical systems interact. Projects can address production, consumption and waste and how FEW systems interact with each other in technical and non-technical domains.
* Conversion and/or Reuse of Waste Materials: New devices, sensors, catalysts, nanomaterials, smart filters, and processes may be required to detect, remove, destroy or convert compounds of concern from waste streams, or to turn waste constituents into valuable primary or secondary products. Both technical aspects and human factors will be important in the decision-making process.
* System Sustainability: INFEWS: US-CHINA aims to encourage research on innovative strategies for appropriate management of natural and physical systems, including consideration of use, access, and governance. Sustainability solutions might incorporate physical sciences, biological sciences, computer sciences, institutional, economic, behavioral, and technical components.