

Human activities play important roles in influencing natural systems, serving as forces for environmental change at local, regional, national, and even global scales. The evolution of social, economic, and cultural systems in a world that is more populated, urban, and interconnected than ever before creates additional vulnerabilities brought on by environmental change. Efforts to mitigate climate change are dependent upon improved understanding of the human drivers of global change, such as changes in demand for natural resources and global energy use. At the same time, humans have the ability to adapt to global environmental changes, which, when effective, enhances resilience. A more integrated understanding of the complex interactions between human and natural systems is essential if we are to identify mitigation options, estimate impacts and vulnerabilities, and enhance resilience to climate change through adaptation efforts.

### Goals

The overarching goal of the Human Contributions and Responses research element of USGCRP is to understand human influences on natural systems, the consequences of climate change on human systems and the resources they use, and societal responses to a changing climate. In order to achieve this goal, it will be necessary to integrate physical, biological, chemical, health, engineering, and social sciences, with an emphasis on improving the design of policy, planning and risk management. In a conceptual framework, the research that could be considered by this program element is vast. As a result, the IWG has elected to focus on five topics of broad national significance for future research efforts related to human contributions and responses to climate change.

### Significant Research Topics

- Urban systems
- Energy systems
- Land use change
- Human health
- Water resources

Due to the cross-disciplinary nature of human dimensions research, collaboration across relevant sectors will be necessary if the program is to be successful in providing useful information to support informed decision making. Such collaboration may continue to occur within the program, as it has with the various federal Agencies involved with the Human Contributions and Responses IWG. Additional programmatic collaboration may also occur across relevant areas, such as Modeling, Land Use/Land Cover, Water Cycle, Carbon Cycle,

Science to Inform Mitigation, Science to Inform Adaptation, and Decision Support. However, in addition to working with the traditional programmatic partners, many other federal Agencies, non-governmental organizations, and other entities may have existing research and data sources that can be used to advance our understanding of the complex interactions between human and natural systems. For example, key collaborations may be made with non-traditional partners that are conducting research in demography, risk communication and methods, economic valuation, national and international development, as well as emergency management and national security.