

# The Knowledge Systems for Sustainability Collaborative

Oak Ridge National Laboratory (ORNL) is a principal partner participating with the Knowledge Systems for Sustainability (KSS) Collaborative. The collaborative links research communities with a wide variety of private-sector players and public agencies to produce more far-sighted practices for using land, water, and energy in ways that guard the future of those resources and of future generations.

A knowledge system brings together data and information from various arenas to help decision makers gain a better understanding of the sustainability implications of their decisions more holistically. In the 21st century, we are in need of new perspectives, tools, and approaches to using resources strategically so we will continue to obtain what we need from the Earth and at the same time minimize damage to the environment.

The KSS Collaborative is a global network of partners working across disciplinary boundaries to adapt, adopt, and invent ways to make the transition from economies focused on maximum production and consumption, at whatever cost, to ones that deliver sustainable livelihoods for all. It seeks to build new knowledge systems to guide decision makers at all levels in devising workable long-term, large-scale strategies for meeting needs for food, materials, energy, water, and security.

The collaborative brings together a community of researchers and practitioners with expertise in climate, energy, security, education, and social and natural sciences who are engaged in dialogues that often cross disciplinary boundaries. Together the KSS Collaborative is working to identify and leverage computational resources; climate, energy, and environmental research data; and analytical tools to aid decision makers in improving the sustainability outcomes of their decisions.

## The Challenge

The grand challenges of the early 21st century affect every aspect of our existing social and physical fabric. Food insecurity, diet- and climate-related health threats, large-scale extinctions of species, and threats to essential natural resources threaten billions of people. Sustainable outcomes will result from influencing day-to-day decisions at small scales, i.e., individual fields or patches of forest or factories or villages. In the absence of objective, useful, widely accessible information, decision-making tends to default to drivers like money, power, and prejudices and is likely to deliver outcomes that do not balance competing needs now or in the future. There is a critical need for ways of learning from consistent, repeatable successes and failures related to the interlinked consequences of extracting and using land, water, and energy resources.

Humans are mining the Earth in ways that are driving it toward environmental tipping points. We know there could be extreme penalties, and yet we are challenged to connect what we know about the consequences of our choices to the choices themselves.

Environmental degradation and food and water insecurity also have direct impacts on global and national security. Spikes in food prices, for example, played a large part in the unrest in the Mideast that led to the “Arab spring” regime shifts that have profound security implications far beyond that region.

## The KSS Collaborative Concept

All of the diverse stakeholders in the development of sustainable economies—property owners, farmers, workers, public officials, scientists—possess important knowledge that must be made accessible and integrated to enable wise, workable decisions. The KSS Collaborative’s mission is to gather and link these distinct collections of specific information related to human and ecological needs with new and existing tools to guide decisions about resource use, management, and protection.

The KSS Collaborative has three intersecting dimensions: Data, information, and knowledge assets relevant to sustainable use of resources; modeling and scenario building; and delivering high-quality and relevant information to support decisions about landscape management. Together, these dimensions can shed light on the impacts of individual and collective choices on landscapes and ecosystems and communicate this knowledge to the people actually making the decisions, from the farmer to the supply-chain manager to the policy maker.

*ORNL's KSS Collaborative activities are managed from the Energy & Environmental Sciences Directorate, Environmental Sciences Division.*

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