



CONTRIBUTIONS OF ECONOMICS TO NIFA PRIORITIES

BIO-ENERGY, CLIMATE AND ENVIRONMENT¹

Public concerns about the environment, energy and climate change are as much economic as technological. While the state of technology can define the choices set, economic analysis provides the basis for deciding among the choices available. Economists view natural resources, including air and water, as national assets which can be enhanced, preserved or depleted to achieve multiple and diverse public purposes.

Economics is the science of choosing among competing demands for a given set of resources. Some of the demands now competing for America's natural resources include food and fiber production, bio-energy, other industrial uses, recreation, bio-diversity, open space, environmental enhancement and carbon sequestration.

Economics can help define an acceptable balance among the alternative uses of resources. It is important to note that economists examine both aggregate and distributive effects of alternative policies and actions.

What Economists Can Contribute

- **Agricultural and resource economists examine physical and economic tradeoffs among alternative uses of resources, such as food, fuel, carbon market offsets and environmental quality.** These tradeoffs are critically important to informed decision-making by producers, consumers and policy makers. For example, agricultural economists have examined how policies and activities to increase bio-fuels and carbon offsets will affect the prices of various foods and fuels, exports and imports, demands on the natural resource base, agricultural runoff, and income and well-being of various elements of society as manifest in Rajagopal et-al (2007) or the recent analysis of rules for implementation of the Energy independence and security act (EPA 2009)
- **Economists examine and measure private and public (societal) costs of alternative policies and courses of action in terms of food and energy security, environmental quality and economic welfare of various groups of citizens.** Their research is essential to designing policies that provide incentives for individuals and institutions to make decisions consistent with the public good. (Chang et al., 1994; Walker et al., 2009).
- **Economists bring an analytical perspective that integrates biophysical and environmental knowledge with an understanding of how domestic and global markets work and of the importance of balancing efficiency, equity and sustainability objectives** (Adams et al., 1990; Reilly et al., 2001).

¹ Prepared by Bruce McCarl (Texas A&M University), Jason Shogren (University of Wyoming), David Zilberman (University of California Berkeley), February 2010.

- **Economists can be very helpful in the identification of applied research priorities and opportunities in the bio-physical and environmental sciences.** Economists can identify the increments of new knowledge likely to have the highest economic payoff or contribution to other societal goals. Economists tend to bring a “big picture” perspective to the larger agricultural science community (see Porter et al., 2008; Coble et al., 1992).

Needs and Opportunities

Agricultural and resource economists have been conducting research and accumulating knowledge in the combined areas of bio-energy, climate change and environment for many years. New and expanded research in the following areas, as examples, could improve the effectiveness of public policies and private decisions:

- Economic analysis of, and incentive designs for, environmental protection programs;
- Economic valuation of the implications of climate change, loss of bio-diversity and environmental degradation (or enhancement);
- Integration of bio-physical and economic information to assess the consequences of new policy and technical developments related to bio-energy, climate and the environment;
- Improved assessments of how current and alternative public policies for bio-fuels, climate change, carbon sequestration and environmental improvement do and could affect outcomes such as food and energy prices, domestic and global land use patterns and the identification of winners and losers;
- Improved assessments of how various public policy decisions could be affected by, and contribute to, climate change risks; and
- Further research on how agricultural, energy and environmental policies can be designed and integrated to improve the likelihood of affordable food and energy, a clean environment and a competitive and efficient market structure.

900 Second Street, NE
Suite 205
Washington, DC 20002
Phone: 202-408-8522
www.cfare.org



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