CHOICES
The magazine of food, farm, and resource issues

Theme Overview: Climate Change Economics

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This thematic package in *Choices* celebrates the International Panel on Climate Change (IPCC) work, its Nobel prize and the significant contributions of agricultural and resources economists to the IPCC process and reports. These nine papers present work which overviews the major aspects of climate change and its implications for agriculture and natural resources written by people who have been intimately involved with the IPCC.

The researchers examine five major topics as they address climate change economics:

- Gerald North, a meteorologist, discusses the nature of projected climate change. North led a recent National Academy panel on climate change and has been an IPCC reviewer and provider of information.
- John Antle considers the relationship between climate change and agriculture; Rich Adams and Dannele Peck explore the implications of climate change and water. Antle and Adams were both IPCC lead authors.
- Steve Rose and Bruce McCarl consider the implications of emissions prospects for climate change and agricultural adaptation needs; both researchers were lead authors.
- Uwe Schneider and Pushpan Kumar examine the significance of emissions mitigation possibilities broadly; Cees Van Kooten addresses sequestration; Brent Sohngen focuses on deforestation; and Bruce McCarl on biofuels. Schneider was an IPCC contributing author and the rest lead authors.
- Gilbert Metcalf and John Reilly evaluate alternative policy approaches to climate protection; Reilly was an IPCC lead author.

After North sets the stage, the rest of the papers present the case that economics can make good climate change policy better, and can prevent bad policy from getting worse. Each paper addresses in its own way the three key ways economics can improve climate change policy. First, economics asks climate policymakers to distinguish a stock from a flow pollutant, and its relationship to damaged ecosystem services. Stock pollution is concentration -- the accumulated carbon in the atmosphere, like water in a bathtub. Flow pollution is emissions -- the annual rate of emission, like water flowing into the tub. Because risk comes from the total stock of carbon, policies should focus on projected concentration levels. Greenhouse gases remain in the atmosphere decades before they dissipate, so different rates of emission could generate the same concentrations by a given year. Policymakers have options about the concentration target to select and how fast they hit a given target.

Second, economists stress that alternative policy options should account for the carbon stock and flow relationship, the global public good, and flexibility to find low cost risk reduction mechanisms. The stock-flow recognition is important because a least-cost path starts slowly with a more rapid rate of emission reductions after several decades. This would allow for a natural rate of capital depreciation and the replacement of high-carbon energy sources (e.g., coal) for low carbon sources like wind and solar. The public good nature of climate change implies it is total global carbon that matters. This means that international cooperation is the key for effective abatement. Flexible economic incentive systems are needed for cost-effective strategies, usually advocated in the form of carbon taxes or carbon emission trading. Carbon taxes fix the cost of carbon, and allow the quantity of emissions to be determined by the private sector. Emission trading fixes the quantity of emissions and allows people to trade emission permits at a price set by the market.

Third, economics is needed to calculate the benefits and costs of action or inaction in climate policy. The research advocates efficiency in climate policy—society should assess both the benefits and costs of alternative climate policy options because all resources are scarce, whether they are human, physical, or natural. The benefit side should measure the gains from fewer emissions or by enhancing the

capacity for adaptation or both; the cost side should estimate what society forgoes to pursue climate protection. The benefits and costs of international cooperation depend on the subjective/objective risk of a catastrophe, the degree of flexibility, and the origins of technological advance. If one believes catastrophe is not imminent, emission reductions can take a slower path toward stabilization. Regardless of the path, the degree of flexibility to follow this path affects costs. Flexibility is determined by the emission trading system, number of nations participating, and whether carbon sinks are included. Finally, the costs also depend on assumptions about the creation, adoption, and diffusion of new low-carbon technologies.

So take a few minutes to read this issue and help celebrate the role that AAEA agricultural and resource economists have and will continue to play in the IPCC's Nobel Peace Prize winning mission to better understand the risks created by climate change. And perhaps even more importantly think about how you can get involved in the IPCC's next Assessment Report process. The IPCC needs all the expertise we can provide.

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