Public release date: 11-Mar-2010

Contact: Jennifer Williams
jwilliams@aibs.org
202-628-1500
American Institute of Biological Sciences

More maize ethanol may boost greenhouse gas emissions

New economic analysis confirms that maize-based biofuel is unlikely to reduce global production of carbon dioxide

In the March issue of *BioScience,* researchers present a sophisticated new analysis of the effects of boosting use of maize-derived ethanol on greenhouse gas emissions. The study, conducted by Thomas W. Hertel of Purdue University and five co-authors, focuses on how mandated increases in production of the biofuel in the United States will trigger land-use changes domestically and elsewhere. In response to the increased demand for maize, farmers convert additional land to crops, and this conversion can boost carbon dioxide emissions.

The analysis combines ecological data with a global economic commodity and trade model to project the effects of US maize ethanol production on carbon dioxide emissions resulting from land-use changes in 18 regions across the globe. The researchers' main conclusion is stark: these indirect, market-mediated effects on greenhouse gas emissions "are enough to cancel out the benefits the corn ethanol has on global warming."

The indirect effects of increasing production of maize ethanol were first addressed in 2008 by Timothy Searchinger and his coauthors, who presented a simpler calculation in Science. Searchinger concluded that burning maize ethanol led to greenhouse gas emissions twice as large as if gasoline had been burned instead. The question assumed global importance because the 2007 Energy Independence and Security Act mandates a steep increase in US production of biofuels over the next dozen years, and certifications about life-cycle greenhouse gas emissions are needed for some of this increase. In addition, the California Air Resources Board's Low Carbon Fuel Standard requires including estimates of the effects of indirect land-use change on greenhouse gas emissions. The board's approach is based on the work reported in BioScience.

Hertel and colleagues' analysis incorporates some effects that could lessen the impact of land-use conversion, but their bottom line, though only one-quarter as large as the earlier estimate of Searchinger and his coauthors, still indicates that the maize ethanol now being produced in the United States will not significantly reduce total greenhouse gas emissions, compared with burning gasoline. The authors acknowledge that some game-changing technical or economic development could render their estimates moot, but sensitivity analyses undertaken in their study suggest that the findings are quite robust.

###

After noon EST on 11 March and until early April, the full text of the article will be available for free download through the copy of this press release available at www.aibs.org/bioscience-press-releases/.

BioScience, published 11 times per year, is the journal of the American Institute of Biological Sciences (AIBS). *BioScience* publishes commentary and peer-reviewed articles covering a wide range of biological fields, with a focus on "Organisms from Molecules to the Environment." The journal has been published since 1964. AIBS is an umbrella organization for professional scientific societies and organizations that are involved with biology. It represents some 200 member societies and organizations with a combined membership of

about 250,000.

The complete list of peer-reviewed articles in the March 2010 issue of *BioScience* is as follows:

Unfurling Fern Biology in the Genomics Age
Michael S. Barker and Paul G. Wolf

Global Decline of and Threats to Aegagropila linnaei, with Special Reference to the Lake Ball Habit
Christian Boedeker, Anja Eggert, Anne Immers, and Erik Smets

Invasion, Competition, and Biodiversity Loss in Urban Ecosystems
Eyal Shochat, Susannah B. Lerman, John M. Anderies, Paige S. Warren, Stanley H. Faeth, and Charles H. Nilon

Process-based Principles for Restoring River Ecosystems
Timothy J. Beechie, David A. Sear, Julian D. Olden, George R. Pess, John M. Buffington, Hamish Moir, Philip Roni, and Michael M. Pollock

Effects of US Maize Ethanol on Global Land Use and Greenhouse Gas Emissions: Estimating Market-mediated Responses
Thomas W. Hertel, Alla A. Golub, Andrew D. Jones, Michael O'Hare, Richard J. Plevin, and Daniel M. Kammen

What Role Does Heritable Epigenetic Variation Play in Phenotypic Evolution?
Christina L. Richards, Oliver Bossdorf, and Massimo Pigliucci

---