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## **Study: Ethanol may add to global warming**

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WASHINGTON --

The widespread use of ethanol from corn could result in nearly twice the greenhouse gas emissions as the gasoline it would replace because of expected land-use changes, researchers concluded Thursday. The study challenges the rush to biofuels as a response to global warming.

The researchers said that past studies showing the benefits of ethanol in combating climate change have not taken into account almost certain changes in land use worldwide if ethanol from corn - and in the future from other feedstocks such as switchgrass - become a prized commodity.

"Using good cropland to expand biofuels will probably exacerbate global warming," concludes the study published in Science magazine.

The researchers said that farmers under economic pressure to produce biofuels will increasingly "plow up more forest or grasslands," releasing much of the carbon formerly stored in plants and soils through decomposition or fires. Globally, more grasslands and forests will be converted to growing the crops to replace the loss of grains when U.S. farmers convert land to biofuels, the study said.

The Renewable Fuels Association, which represents ethanol producers, called the researchers' view of land-use changes "simplistic" and said the study "fails to put the issue in context."

"Assigning the blame for rainforest deforestation and grassland conversion to agriculture solely on the renewable fuels industry ignores key factors that play a greater role," said Bob Dinneen, the association's president.

There has been a rush to developing biofuels, especially ethanol from corn and cellulosic feedstock such as switchgrass and wood chips, as a substitute for gasoline. President Bush signed energy legislation in December that mandates a six-fold increase in ethanol use as a fuel to 36 billion gallons a year by 2022, calling the requirement key to weaning the nation from imported oil.

The new "green" fuel, whether made from corn or other feedstocks, has been widely promoted - both in Congress and by the White House - as a key to combating global warming. Burning it produces less carbon dioxide, the leading greenhouse gas, than the fossil fuels it will replace.

During the recent congressional debate over energy legislation, lawmakers frequently cited estimates that corn-based ethanol produces 20 percent less greenhouse gases in production, transportation and use than gasoline, and that cellulosic ethanol has an even greater benefit of 70 percent less emissions.

The study released Thursday by researchers affiliated with Princeton University and a number of other institutions maintains that these analyses "were one-sided" and counted the carbon benefits of using land for biofuels but not the carbon costs of diverting land from its existing uses.

"The other studies missed a key factor that everyone agrees should have been included, the land use changes that actually are going to increase greenhouse gas emissions," said Tim Searchinger, a research scholar at Princeton University's Woodrow Wilson School of Public and International Affairs and lead author of the study.

The study said that after taking into account expected worldwide land-use changes, corn-based ethanol, instead of reducing greenhouse gases by 20 percent, will increase it by 93 percent compared to using gasoline over a 30-year period. Biofuels from switchgrass, if they replace croplands and other carbon-absorbing lands, would result in 50 percent more greenhouse gas emissions, the researchers concluded.

Not all ethanol would be affected by the land-use changes, the study said.

"We should be focusing on our use of biofuels from waste products" such as garbage, which would not result in changes in agricultural land use, Searchinger said in an interview. "And you have to be careful how much you require. Use the right biofuels, but don't require too much too fast. Right now we're making almost exclusively the wrong biofuels."

The study included co-authors affiliated with Iowa State University, the Woods Hole Research Center and the Agricultural Conservation Economics. It was supported in part indirectly by a grants from NASA's Terrestrial Ecology Program, and by the William and Flora Hewlett Foundation. Searchinger, in addition to his affiliation with Princeton, is a fellow at the Washington-based German Marshall Fund of the United States.

The study prompted a letter Thursday to President Bush and Democratic and Republican leaders in Congress from nearly a dozen scientists who urged them to pursue a policy "that ensures biofuels are not produced on productive forests, grassland or cropland."

"Some opportunities remain to produce environmentally beneficial biofuels" while "unsound biofuel policies could sacrifice tens of hundreds of million of acres" of grasslands and forests while increasing global warming, said the scientists, including four members of the National Academy of Sciences.