

Fuel ethanol cannot alleviate US dependence on petroleum

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A new study of the carbon dioxide emissions, cropland area requirements, and other environmental consequences of growing corn and sugarcane to produce fuel ethanol indicates that the "direct and indirect environmental impacts of growing, harvesting, and converting biomass to ethanol far exceed any value in developing this energy resource on a large scale." The study, published in the July 2005 issue of *BioScience*, the journal of the American Institute of Biological Sciences (AIBS), uses the "ecological footprint" concept to assess needs for ethanol production from sugarcane, now widespread in Brazil, and from corn, which is increasing in the United States.

In Brazil, ethanol from fermentation of sugarcane is used pure or blended with gasoline to yield gasohol, which contains 24 percent ethanol. In the United States, ethanol made from corn, production of which is heavily subsidized, is used in an 85 percent ethanol mixture called E85. In 2003, ethanol-blended gasoline accounted for more than 10 per cent of gasoline sales in the United States.

The authors of the study assessed the energy required to produce the crops and to manufacture and distribute the resulting fuels. In the United States, ethanol yielded only about 10 percent more energy than was required to produce it; in Brazil, where a different process is used, ethanol yielded 3.7 times more energy than was used to produce it. The researchers, Marcelo E. Dias de Oliveira, Burton E. Vaughan, and Edward J. Rykiel, Jr., also weighed effects of fuel ethanol use on carbon dioxide emissions, soil erosion, loss of biodiversity, and water and air pollution, assuming vehicles representative of each country. Specialized software was used to analyze the sensitivity of the conclusions to diverse assumptions in the analysis.

Dias de Oliveira and colleagues then looked at some consequences of moving to greater fuel

ethanol use. The results were unfavorable to fuel ethanol in either country. In Brazil, reducing the rate of deforestation seemed likely to be more effective for taking carbon dioxide out of the atmosphere. In the United States, reliance on ethanol to fuel the automobile fleet would require enormous, unachievable areas of corn agriculture, and the environmental impacts would outweigh its benefits.

"Ethanol cannot alleviate the United States' dependence on petroleum," Dias de Oliveira and colleagues conclude. They argue for the development of multiple alternatives to fossil fuels. Ethanol may, however, still be useful in regions or cities with critical pollution problems, they write, and to make use of agricultural wastes.

Source: American Institute of Biological Sciences

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