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## **Corn Can't Save Us**

by David Pimentel

Dwindling foreign oil, rising prices at the gas pump and hype from politically well-connected U.S. agribusiness have combined to create a frenzied rush to convert food grains into ethanol fuel. The move is badly conceived and ill advised. Corporate spin and pork barrel legislation aside, here, by the numbers, are the scientific reasons why corn won't provide our energy needs:

- First, using corn or any other biomass for ethanol requires huge regions of fertile land, plus massive amounts of water and sunlight to maximize crop production. All green plants in the United States - including all crops, forests and grasslands, combined - collect about 32 quads (32 x 10<sup>15</sup> BTU) of sunlight energy per year. The American population today burns more than three times that amount of energy annually as fossil fuels. There isn't even close to enough biomass in America to supply our biofuel needs.

- Second, biofuel enthusiasts - including agribusiness lobbyists and PR firms - suggest that ethanol produced from corn and cellulosic biomass such as grasses could replace much of the oil used in the United States.

But consider that 20 percent of the U.S. corn crop was converted into 5 billion gallons of ethanol in 2006, and that amount replaced only 1 percent of U.S. oil consumption. If the entire national corn crop were used to make ethanol, it would replace a mere 7 percent of U.S. oil consumption, far from making the United States independent of foreign oil.

- Third, ethanol production is energy intensive: Cornell University's up-to-date analysis of the 14 energy inputs that go into corn production, plus the nine energy inputs invested in ethanol fermentation and distillation, confirms that more than 40 percent of the energy contained in one gallon of corn ethanol is expended to produce it. The energy expended to make ethanol comes mostly from oil and natural gas.

Some investigators conveniently omit several of these energy inputs required in corn production and processing, such as energy for farm labor, farm machinery, energy production of hybrid corn-seed, irrigation and processing equipment. Omitting energy inputs wrongly suggests that a corn-ethanol production system offers a more positive energy return. In reality, corn is an inefficient choice from an energy-cost and transport standpoint.

Cellulosic ethanol also is touted loudly as a replacement for corn ethanol. Unfortunately, cellulose biomass production requires major energy inputs to release minimal amounts of tightly bound starches and sugars needed to make fuel. About 70 percent more energy - coming, again, from precious oil and gas - is required to produce ethanol from cellulosic biomass than the energy contained in the ethanol produced. That makes cellulosic ethanol an even poorer performer than corn ethanol.

Also, the production of corn ethanol is highly subsidized: State and federal governments pay out more than \$6 billion per year in subsidies, according to a 2006 report from the International Institute

for Sustainable Development in Geneva, Switzerland. Calculated on a per-gallon basis, these subsidies are more than 60 times those for gasoline.

Moreover, the environmental impacts of corn ethanol production are serious and diverse. These include severe soil erosion of valuable food cropland, plus the heavy use of nitrogen fertilizers and pesticides that pollute rivers. Fermenting corn to make one gallon of ethanol produces 12 gallons of noxious sewage effluent. Making ethanol requires the use of fossil fuels, releasing large quantities of carbon dioxide into the atmosphere, adding to global warming.

- Finally, using food crops such as corn to produce ethanol raises major nutritional and ethical concerns. Nearly 60 percent of the people on Earth are malnourished according to the World Health Organization. Growing crops for fuel squanders land, water and energy vital for human food production.

The use of corn for ethanol has increased the price of U.S. beef, chicken, pork, eggs, breads, cereals and milk - a boon to agribusiness but a bane to consumers. Jacques Diouf, the director general of the U.N. Food & Agriculture Organization, reports that using 22 pounds of corn to produce one gallon of ethanol already is causing food shortages for the world's poor.

One last set of statistics: The global population stands at 6.6 billion: A quarter-million mouths to feed are added daily. Energy experts report that the peak of oil production already has been reached. As cheap oil supplies decline, fuel prices will rise, causing food prices to climb, too, because maximum agricultural production requires the use of fossil fuels.

As global population soars to 8 billion or more toward mid-century and as we burn more grain as fuel, shortages and production costs could cause grain prices to skyrocket, taking food from the mouths of the world's poorest people.

The science is clear: The use of corn and other biofuels to solve our energy problem is an ethically, economically and environmentally unworkable sham.

*David Pimentel is a professor of entomology at the College of Agriculture and Life Sciences at Cornell University.*

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