

Saving the Poor and the Planet with Biofuels

By Cliff Bradley
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I see two compelling reasons to pursue biofuels with all speed.

- 1) Combining biofuels with really serious conservation is the only source of transportation fuel that can come on line in time to do anything about global warming. Biofuels are made from current, not fossil carbon; and the production of biofuels can be sustainable. Biofuels rely on existing or near term technology, can be delivered through the existing transportation infrastructure and used in the existing transportation fleet (with minor modification to older gasoline engines). Burning the last drop of petroleum while we wait for global energy companies to bring us the hydrogen economy is not an option.
- 2) It is possible, not inevitable, but possible to develop biofuels with enough diversity of ownership and feedstocks to strengthen rural economies in both rich and poor countries.
- 3) Biofuels can begin to break the stranglehold that giant energy and agribusiness companies have over the global economy.
- 4) Biofuels are the only source of transportation fuel with technology and capital costs that make it possible to think big with small and diverse.

-The technology is simple and feedstocks can be diverse in both type and geography.

-Farmer coops can produce ethanol as cost effectively as Exxon or Archer Daniels Midland Co (ADM). Much of the boom in ethanol and biodiesel is new smaller companies and farmer owned coops.

Ethanol is replacing MTBE (methyl tertiary-butyl ether), which causes cancer and pollutes groundwater, as the pollution control additive in gasoline. After decades of decline, the Midwest farm economy is booming. Increased commodity prices are increasing value and preserving farmland. Taking subsidized US grain out of global markets is helping farmers and economies in poor countries. Ethanol and biodiesel are the only new sources of transportation fuel with a positive net energy yield because the primary energy input is solar. Biofuels coupled with serious efficiency improvements could completely replace imported petroleum. [The Rocky Mountain Institute makes a compelling case in their analysis, The Oil End Game (www.rmi.org).]

So why all the bad press?

Farmers Just Can't Win!

I think \$4.00 per bushel corn is a good thing

Farmers just can't win. For the first time in decades the price of corn and other grains are above production cost for an extended time and farmers might, with good weather, finally make a decent living this year. And high corn prices will save taxpayers about \$9 billion

in government payments to corn farmers this year. Yet, from reading the papers and op-eds, you would think that farmers making a living will ruin the US economy and starve the world's poor.

For more than 30 years, politicians and agribusiness companies promised to raise the price of corn and increase farm income.

* In the 1970's we used food as a weapon in the cold war.

* In the 1980's ADM, Cargill and a couple of other companies went into the business of high fructose corn syrup, promising booming corn markets. This in turn, ruined the economies of sugar producing poor countries in the Caribbean and Central America, but didn't raise the price of corn.

* Then came the 1990's with the "freedom to farm" farm bill, the WTO and the promise of global free markets.

Through it all the price of corn stayed stuck at \$2.50 a bushel. Thousands of farmers went out of business, rural economies declined and towns died. To bring attention to their plight, Willie Nelson with Farm Aid concerts actually created a charity for US farmers.

It took a boom in ethanol creating domestic demand largely independent of ADM and Cargill to finally get the price of corn up to where farmers can make a living. Never mind that even at \$4.00 per bushel the corn in a box of corn flakes still costs less than the box. You would think that the world was coming to an end for US consumers!

Given such factors as the concentrated ownership of retail grocery stores and "outsourcing" of vegetable production, I would make an educated guess that that the increase in fuel costs has much more effect on food cost than the price of corn.

What might be coming to an end if corn prices stay high is the huge subsidy enjoyed by a handful of big grain companies, and meat packers. Government payments kept grain farmers hanging on by their fingernails, but gave the global grain companies and big meat packers and poultry companies an endless supply of corn (and wheat) at below production cost. Corn priced above production cost just might force diversity of ownership back into grain markets and meatpacking.

Thirty years of subsidized corn paralleled an immense concentration in ownership of the livestock industry. According to a recent USDA study, since 1997:

* The number of dairy farms in the US declined by 45% and 30 % of fluid milk sold in the US is now owned by one company,

* Four companies slaughter 64% of hogs. The recent merger of Smithfield with Premium Standard farms will create one company that accounts for 20% of hog production and 31% of hog slaughter.

* The top four poultry companies account for 53 % of chicken slaughter

* Four companies account for 70% of cattle slaughter.

(Martinez, The US Food Marketing System: Recent Developments 1997-2006 USDA Economic Research Service, May 2007).

With the acquisition of Iowa Beef Packers, Tyson Foods became the largest processor of chicken, beef and pork in the world. About 200 feedlots now account for 70% of all cattle feeding. Smithfield just purchased the feedlot operations of Con Agra, so in addition to hogs, Smithfield is now the world's largest cattle feeder with a capacity of 811,000 and

annual finishing of 1.6 million steers. Four companies provide 34% of all livestock feed sold in the US.

Information from (*BEEF Weekly*, the Agribusiness Accountability Initiative www.aai.org and company websites).

One of the unintended consequences of \$4.00/ bushel corn might be to make the 100,000 head feed lot uneconomical, doing for consumers what enforcement of antitrust laws should have done. Ethanol and unsubsidized corn might drive a return to diversity in feed production and livestock feeding. Recent reports at the 2007 Ethanol Producers and Consumers Conference described research to incorporate more distillers grain in animal feeds, co-location of ethanol plants and feed lots to cut costs for distillers grain, drying, transportation, and process energy by using manure digesters for biogas.

Who knows, we might even start to feed cattle with grass.

Starving the Poor

That more than 800 million people suffer chronic hunger in a world of plenty is I think humankind's greatest tragedy. (See *The State of Food Insecurity in the World*, published every year by the UNFAO). A global economy in which 800 million people slowly starve while farmers can't make a living is broken. Corporate globalization and free market economic theory converged to create a global agricultural economy in which the handful of companies that control the global commodities trade force low prices and overproduction relative to demand. Farmers are driven off the land. Corporate globalization created a global "market economy" for food in a world where a billion people have no money and no land. Ethanol is not the problem.

Thirty years of cheap, subsidized US corn did not end hunger. In several op-ed's, I have seen the statement that the corn to fill an SUV gas tank contains enough calories to feed a person for a year. No doubt this is true; but I think a more relevant comparison is that we now use the same amount of corn to make enough high fructose corn syrup to sweeten 250 gallons of soda pop. The US does not grow corn to feed the world; we grow corn to produce marbled beef, fat hogs, Chicken McNuggets and high fructose corn syrup to sweeten our junk food and soda pop. Why not ethanol? Ethanol competes with high fructose corn syrup for the starch in corn; the leftover protein still gets fed to cattle.

If anything, domestic demand that takes subsidized US grain out of global markets will help to reduce poverty and hunger. Grain and cotton dumped by the US and Europe on world markets, at below production cost, drives farmers off their land and ruins rural economies in poor countries where most hungry people live. It was the poor countries that stalled (if not killed) the WTO over the issue of subsidized crops exported by rich countries. Much of the poverty and hunger in rural Mexico (and immigration to the US) is because NAFTA and subsidized US corn displaced 2 million Mexican farmers.

A recent piece, *Mexico: The Tortilla War*, provides an excellent short history of NAFTA and corn. It describes how manipulation of Mexican corn markets by Cargill and ADM, not ethanol, drove up the price of tortillas.

"The major Mexican corn processors control storage of domestic supply and are the major importers. By controlling inventory, they can manipulate supply and demand to raise or lower prices at their convenience. They acquired a significant part of the 10 million tons

produced in the spring-summer (2006) harvest in Sinaloa, Mexico's largest corn producing state. They paid 1,350 pesos (US\$123) a ton and accumulated a stockpile of an estimated one million tons of corn or more.

Sitting on this stockpile, the transnational processing companies have begun to play the game of speculation, artificially raising the price by cutting off supply. That same ton of grain they bought in Sinaloa for \$123 is now being sold in Mexico City for \$320--\$197 more than what they paid for it.

While the price of corn in the world market has increased in recent months due to its use in ethanol production, the increase does not explain the price hike in Mexico. Corn trades on the Chicago Board of Trade for approximately \$144 per ton, in other words, less than half the price in Mexico City”

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The rich countries need to help consumers in poor countries hurt by high grain prices, but in the long run poor rural economies will be stronger with less poverty and hunger if farmers can make a living. For decades the US and Europe used food aid to poor countries as a sink for domestic overproduction. This saves lives during short term crisis, but has done nothing to help the real problem, the poverty that causes chronic life long hunger. To reduce poverty, and ease the shift to livable grain prices for farmers, global trade and foreign aid needs to help strengthen rural economies, not flood markets in poor countries with subsidized grain. Instead of grain some countries now provide money as foreign aid so countries that need food during a crisis can buy it from a nearby poor country at market prices. This helps farmers make a living and puts money into rural economies.

Poor countries could benefit from their own biofuels production. For example in Central America (where I worked in agriculture for many years) upwards of a million acres of their best farmland is owned by Dole, Del Monte, United Fruit and a couple other companies who receive huge subsidies in tax breaks and lack of labor laws to produce export crops such as bananas, pineapple, and melons. At the same time, these countries, which have no oil or refinery capacity, import gasoline and diesel at enormous cost to their economies. Instead of cheap bananas for US consumers produced on the backs of people making starvation wages they would be better off to produce biofuel crops to displace imported fuel.

Ethanol and Net Energy

The ultimate irony of the ethanol net energy debate is that because ethanol and biodiesel are ultimately solar energy, they are the only important incremental sources of liquid transportation fuel that do have a positive net energy yield. The debate is less about net energy and much more about the ability of corporate funded think tanks to frame issues. It is truly amazing that, after decades of the all-electric home, nuclear power, SUVs, oil shale and tar sands, it took ethanol for the oil company funded think tanks to discover thermodynamics.

For example by 2015, the US will get about one million barrels of oil a day or about 5% of current consumption from tar sands in Alberta (Petroleum Economist eenews.net) Getting the oil in tar sands out of the ground uses one of two processes; massive strip mines for

the tar sand then extracting the oil using hot water and solvents (with massive water use and pollution) or in situ recovery, pumping steam into the ground to make the tar hot enough to pump. And this does not include upgrading, refining, transport, cleaning up the mess, deforestation or greenhouse gasses. (For more on tar sands see Baghdad Burns, Calgary Booms, Naomi Klein, The Nation June 18, 2007).

Most analysis puts the net energy yield of current corn based ethanol production at about 1.5:1 (about 1.5 units of energy out for each unit of energy input). The Pimentel, Padzek study is the only one, of six studies I have read, which calculates a negative energy yield for corn ethanol. For example a study by Argonne National Labs for DOE (Wang, Michael, An Update of Energy and Greenhouse Emission Impacts of Fuel Ethanol, Center for Transportation Research, Argonne National Laboratory, Scottsdale, AZ, and February 8, 2005) puts the energy yield of ethanol at a positive 0.74 btu fossil energy input per btu of ethanol. This compares with gasoline with a negative net energy yield of 1.23 btu of fossil energy input per btu of gasoline.

These estimates are for the current generation of ethanol plants using primarily natural gas for process energy. New technology will improve this further-- improved enzymes for converting starch to sugars, biomass gasification for process energy, integration with manure digesters from feedlots and new feedstocks. The Rocky Mountain Institute estimates a 5:1 positive energy yield for cellulose derived ethanol.

Thermodynamics does say that high density liquid fuel will require energy to produce. With biofuels it comes mostly from the sun.

[Shapouri, Hosein, The 2001 Net Energy Balance of Corn-Ethanol, U.S. Department of Agriculture, 2004.

Pimentel, David, Ethanol Fuels: Energy Balance, Economics, and Environmental Impacts are Negative, Natural Resources Research, Vol. 12, No. 2, June 2003.

Wang, Michael., Saricks, Christopher, and Santini, D., Effects of Fuel Ethanol Use on Fuel-Cycle Energy and Greenhouse Gas Emissions, Center for Transportation Research, Energy Systems Division, Argonne National Laboratory, January, 1999.

Wang, Michael., Saricks, Christopher, and Wu, May, Fuel-Cycle Fossil Energy Use and Greenhouse Gas Emissions of Fuel Ethanol Produced from U.S. Midwest Corn, Center for Transportation Research, Argonne National Laboratory, December 19, 1997.]

Saving Farmland with Biofuels

With the boom in ethanol, farmland has value again. High commodity prices driven by biofuel production may stop the loss of farmland to urban sprawl.

Using corn for ethanol is not changing how farmers grow corn in the US and will not change the amount of land in agricultural production. In fact, farmland in the US has been shrinking. Since the peak in the 1980's the US has taken about 50 million acres, or about 1 in 7, out of production. (Harvested crop land in the US peaked in the 1980's at about 350 million acres and declined to 300 million acres by 2005). About 30 million acres of land taken out of production was CRP, primarily from dry land wheat, the rest was lost to mostly to urban sprawl, or simply taken out of production because farmers couldn't make a living. (USDA National Agriculture Statistics Service NASS)

This year (2007) the US will produce corn on about 90 million acres, up from the recent average of about 80 million acres over the past 10 years. But ethanol is not changing the amount of land in production because all of the available land is already in production. US farmers produced corn on 90 million acres in 1944. High corn prices brought a small amount of land out of CRP (Conservation Reserve Program) this year, about 1 million acres, or less than 1% of Midwest crop land. Changes in production come primarily from changing crop rotations as prices change. Corn is up while cotton is down, so much of the increased corn acreage this year has come from production in the southern corn belt on land that was in cotton last year.

Analyses by the USDA Economic Research Service forecast that ethanol production from corn will increase from about 6 billion gallons in 2007 to reach a peak of about 13 billion gallons by 2014. Total Midwest farm acreage will not change. Increases in corn ethanol production will come from yield increases and from diverting corn from current uses, primarily from livestock feed (which will be made up with distillers grains), and from high fructose corn syrup and reduced exports.

(Hoffman et al., Feed Grains Background, Outlook Report from the Economic Research Service, March 2007 www.ers.usda.gov. Baker and Zahniser, Ethanol Reshapes the Corn Marke., Amber Waves April 2006. www.ers.usda.gov/amberwaves)

I agree with critics that agronomic practices in US farming are not sustainable in the long run and must change. But this is true whether we produce crops for ethanol, soda pop or food. As technology for cellulose to ethanol conversion comes on line, dedicated biomass crops might actually reduce soil erosion and improve soil quality. Some of the most promising biofuel crops are perennial grasses, grown without annual soil tillage and with much less input of synthetic fertilizer and pesticides.

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