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ENVIRONMENT

Food vs. Fuel

As energy demands devour crops once meant for sustenance, the economics of agriculture are being rewritten



Greg Boerboom raises 37,000 pigs a year on his farm in Marshall, Minn. Those hogs eat a lot of corn—10 bushels each from weaning to sale. In past years he has bought feed for about \$2 a bushel. But since late summer, average corn prices have leapt to nearly \$4 a bushel. To reduce feed costs, he sells his pigs before they reach the normal 275 pounds, and keeps them warmer so they don't devour more food fighting off the cold. Still, Boerboom hopes just to break even. "It's been a pretty tight squeeze on pork producers," he says. "The next eight months will be really tough."

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The spike in the price of corn that's hurting Boerboom and other pork producers isn't caused by any big dip in the overall supply. In the U.S., last year's harvest was 10.5 billion bushels, the third-largest crop ever. But instead of going into the maws of pigs or cattle or people, an increasing slice of that supply is being transformed into fuel for cars. The roughly 5 billion gallons of ethanol made in 2006 by 112 U.S. plants consumed nearly one-fifth of the corn crop. If all the scores of factories under construction or planned go into operation, fuel will gobble up no less than half of the entire corn harvest by 2008.

Corn is caught in a tug-of-war between ethanol plants and food, one of the first signs of a coming agricultural transformation and a global economic shift. Ever since our ancestors in the Fertile Crescent first figured out how to grow grains, crops have been used mainly to feed people and livestock. But now that's changing in response to the high price of oil, the cost in lives and dollars of ensuring a supply of petroleum imports, and limits on climate-warming emissions of fossil fuels. Farms are energy's great green hope. "Economics, national security, and greenhouse gases have created a perfect storm of interest," says John Pierce, vice-president for bio-based technology at DuPont, ([DD](#)) which is making fuel and chemicals from plants.

Indeed, a massive expansion of biofuels is the one policy that has support from Democrats and Republicans and from both ends of Pennsylvania Avenue. In his Jan. 23 State of the Union address, President George W. Bush called for 35 billion gallons of renewable fuels per year within 10 years, enough to replace 15% of gasoline burned in American cars and trucks. Congress is considering measures that would require 60 billion gallons by 2030. And the fervor for greener fuels isn't just a U.S. phenomenon. Europe is requiring that 5.75% of diesel fuel come from plants by 2010, while Japan and others line up contracts to buy biofuels to reduce their greenhouse gas emissions.

NEW LANDSCAPE

The consequences, while still uncertain, are impossible to ignore. According to the most optimistic estimates, which involve a switch to still-unproven energy crops, replacing U.S. consumption of gasoline with biofuels would take at least 50 million more acres of American cropland. Some put the figure far higher. Meeting Bush's mandate with corn ethanol alone isn't even feasible, because it would mean an additional 80 million acres of corn. Eliminating gasoline entirely could require more than double today's 430 million acres of cropland, by some calculations. Bioenergy threatens to eclipse food, livestock feed, and all other uses "as the major driver of American agriculture," testified Iowa farmer John Sellers at a recent Senate Agriculture Committee hearing.

Already, the growing demand for biofuels is bringing major expansions. Last fall, Singapore was enveloped in choking haze from forest fires set to clear land to plant oil palms. The palms will supply 90 biodiesel plants under construction in Malaysia and Indonesia. Biofuels are "a key engine of growth," says Indonesian President Susilo Bambang Yudhoyono. If the bioenergy boom continues, Agriculture Dept. chief economist Keith Collins foresees boosts in sugar cane and other crops everywhere from Thailand and Australia to Brazil and Central America. "It starts to change the landscape of agriculture," he says.

Whether this is good or bad is a matter of intense debate. At one extreme is Lester Brown, president of the Earth Policy Institute. He warns of a coming "epic competition between 800 million people with automobiles and the 2 billion poorest people," and predicts that shortages and higher food prices will lead to starvation and urban riots. "I don't think the world is ready for this," he says. Dow Chemical Co. ([DOW](#)), which is turning soybeans into foam for furniture and car seats, worries about rising demand. "There's only so much biologically based stuff around," says William F. Banholzer, corporate vice-president and chief technology officer. With chemical companies competing with fuel and food over the supply of certain crops, "it's not a very rosy picture," he says. Nor is the conversion of ecologically valuable forests to oil palm in Malaysia or sugar cane in Brazil. "Why are we burning our forests to plant something that we have been told will be clean, environmentally friendly fuel?" asks S.M. Idris, chairman of environmental group Sahabat Alam Malaysia (Friends of the Earth). "This is technology gone mad."

In addition, biofuels are expected to bring a rare permanent change in farm economics. "People had grown accustomed to \$2-per-bushel corn. That's not going to happen anymore," says Bob Dinneen, president of the Renewable Fuels Assn. Higher corn prices are already rippling through the economy, lifting prices for soybeans and other crops, and products like tortillas. Next could be meat, poultry, and even soft drinks. Chicken producers estimate that the industry's feed costs are already up \$1.5 billion per year. "Ultimately, these increases will be passed on to consumers, and we could have a fairly dramatic inflation scenario for food costs," says William Lapp, president of consultant Advanced Economic Solutions.

Is all this really so bad? Pessimists, in fact, are a minority in debates about food vs. fuel. Lapp notes that food is now at its cheapest level, historically. "It'll be easier to pass on the food increases because we're spending a smaller portion of our disposable income on food than in the 1970s," he says. And some experts even argue that a boost in food prices could be beneficial to Americans' health. A doubling of corn prices makes corn syrup more expensive, lifting the price of a bottle of soda by 6 cents, calculates David Morris, vice-president of the Institute for Local Self-Reliance in Minneapolis. That might lead people to consume less. "If Americans reduce our input of sugar, we could make 2 billion more gal. of ethanol and help overcome our obesity problem," he says.

And while grocery bills could rise modestly, higher agricultural commodity prices are a boon in many ways. Corn farmers are having a rare period of prosperity, and the federal government is getting a break. In 2006, Uncle Sam gave corn farmers \$8.8 billion in subsidies. Thanks to high corn prices, subsidies are expected to drop to \$2.1 billion in 2007. "All the price-dependent spending is getting wiped out," explains the USDA's Collins.

Higher incomes for farmers also mean healthier rural economies and more jobs in the U.S. and around the world. Contrary to Lester Brown's grim scenarios, "[biofuel] could be a lifesaver for Third World countries," argues Morris. "It can help keep farmers on the land without providing huge public subsidies." Plus, crop-based fuels could shift the global balance of power, as countries grow enough of their own fuel to cut back on imports from OPEC and other oil producers.

In the most optimistic scenarios, the world will move smoothly to biofuels through increased farm acreage, higher yields, and new crops and technologies. "Don't underestimate the ability of U.S. and global agriculture to respond to higher prices," says Collins. Farmers already plan to seed 10 million more acres of corn this spring. Some even worry about overshooting demand. "There's an old saying that goes, Farmers will see a hole in supply and put a pile on top of it," jokes Illinois farmer Steve Pitstick, who's shifting most of his soybean field to corn.

Corn is just the first step. It's a lousy raw material for fuel because producing 10 gallons of ethanol consumes the energy equivalent of about 7 gallons of gasoline, and greenhouse gas reductions are minuscule. That's why the key will be changing to more environmentally friendly sources, such as agricultural waste, trees, or new crops. Pine groves in the South could supply 4 billion gal. of ethanol a year and revitalize declining rural communities, says Georgia Tech's Roger P. Webb. Stanford University biologist Chris Somerville calculates that, with the right plants, 3.5% of the earth's surface could supply all of humanity's energy needs, compared with 13% now used for agriculture. One of the best candidates: perennial prairie grasses. Their deep roots store carbon captured from the air, improve soils, and require little water. Companies are now trying to breed the most productive varieties. Only 49 million acres could supply 139 billion gallons of ethanol a year by 2030, figures venture capitalist Vinod Khosla. "Farmers will be better off, the world will be less dangerously dependent on the Mideast, and we will take a giant step in greenhouse gas reductions," he argues. "There is little downside."

Of course, a lot could go wrong along the way. Methods to turn the cellulose from prairie grass into fuel may be hard to scale up. A host of unintended consequences could appear. And if the price of oil drops significantly, the whole biofuels bandwagon could come to a shuddering halt.

But a new world seems inevitable. "We have to be prepared for dramatic change in agriculture," says Nebraska pork farmer Joy Philippi. "There will be a tremendous shift."

By John Carey and Adrienne Carter, with Assif Shameen in Singapore

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