

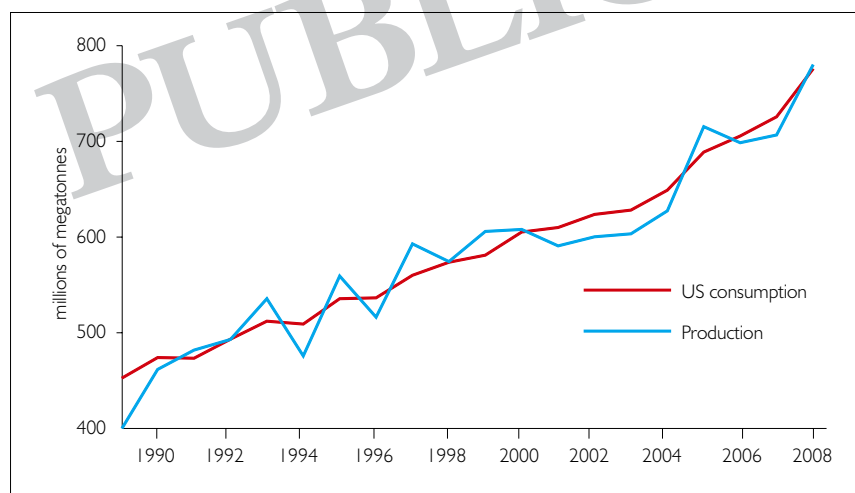
Biofuels are facing not only the food versus fuel controversy, but also criticism that the growing biofuels industry produces a bigger carbon footprint than the savings made when using them. *Eric Fishhaut* of GlobalView Software looks at the arguments

Backlash against biofuels

★ Before crude oil surpassed \$100 per barrel, before gasoline prices skyrocketed, before food riots broke out in various locations around the world – ethanol and biofuels were the darlings of alternative energy. Now, the controversy over whether biofuels are upsetting economic fundamentals around the world is heating up day by day. Experts have taken both sides of the argument about whether corn can serve as both a source of fuel and food and whether deforestation for increased farm acreage causes more carbon emissions than burning petroleum would.

Demand for biofuels is growing quickly due to both the green movement and continued increases in volatility in the crude oil and refined products markets that have been setting

record prices on a regular basis in the past few months. In spite of reports of falling demand mostly due to prices in the US, the upward march continues with oil prices recently topping \$127 per barrel. The International Energy Agency (IEA) cut its global oil demand growth forecast for this year to 1.2% from 1.5%. In the US, the IEA said demand for oil may contract by as much as 2.1% this year, while demand for gasoline will drop by about 1%. The American Petroleum Institute (API) reported a 1.4% drop in refined petroleum products below year-ago levels, the third straight quarter of year-on-year declines in the world's largest oil consuming nation, while the average price of gasoline had topped \$3.60 per gallon by the end of April.



F1. Worldwide corn production/consumption

Corn crop production worldwide has nearly doubled in the past 20 years with almost 30% growth in the last five years. The US produced nearly 40% of the world harvest. This past season witnessed a 16% drop in the production of soybeans

Source: US Department of Agriculture (DA)

The US picture

Under declining economic conditions, prices are rising quickly for day-to-day consumer necessities. With major implications for transportation costs for food and goods, diesel fuel has reached a US national average of \$4.39 a gallon. The Energy Information Administration (EIA) reports that world distillate markets, which have been unusually tight this year, are placing extra pressure on US diesel and heating oil prices over and above the high price of crude oil. Holding above a \$20 per barrel crack spread¹ for much of the last 45 days, distillate fuel has maintained a high price margin

1. The crack spread is the differential between the price of crude oil and petroleum products extracted from it; in other words, it is the profit margin that an oil refinery can expect to make by extracting other products from oil.

relative to crude oil so far this year. US stockpiles of distillate fuels are now near the bottom of the five-year average range after being near the top of the range at the beginning of February. High exports of distillate in January and February to help meet unusual needs in Latin American and Europe contributed to the drawdown, according to the EIA's weekly *Petroleum Status Report*.

In the US Senate, 24 Republicans, including presidential candidate John McCain, sent a letter to the US Environmental Protection Agency (EPA) asking it to waive rules that require a fivefold increase in ethanol production over the next 15 years. The *Energy Policy Act* of 2005 directs the US EPA to run a program that requires the blending of renewable fuels into motor vehicle fuels. The updated law passed just last year mandates a ramp-up of corn ethanol to 15 billion gallons by 2015 and 36 billion by 2022. But these legislators feel the rules should be suspended to put more corn back in the food supply and to encourage farmers to plant other crops. McCain stated the subsidised ethanol program has contributed to high food prices and "a devastating food crisis throughout the world". At the same time, individual states are making similar requests. In Texas, governor Rick Perry asked the US government to cut "skyrocketing" food prices by waiving half of the renewable fuel standard for ethanol made from grain.

US farmers have planted the largest corn crop in 60 years, leaving fewer acres for soybeans, oats and other grains. Tight crop supplies are blamed for flour prices having risen 50% since January and impacting the prices of bread, cereal and numerous groceries. Ethanol currently accounts for roughly 5% of the US vehicle fuel mix with a mandate goal of 22% by 2022.

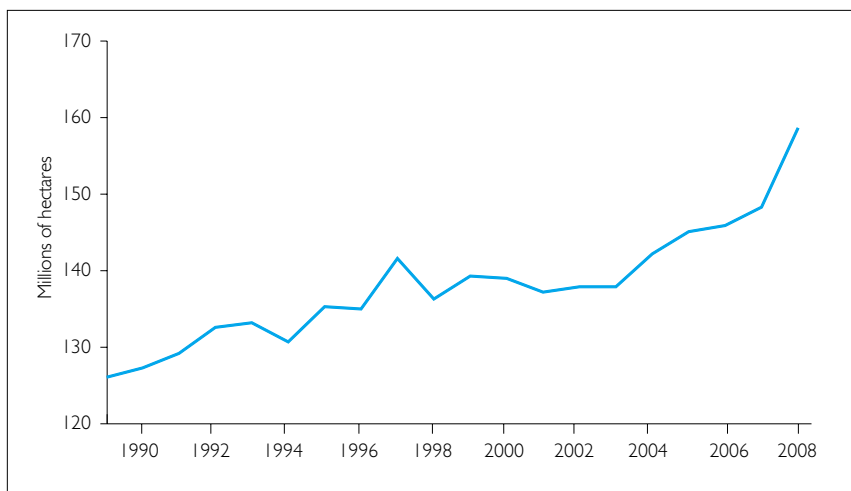
The incentives, including ethanol subsidies, are strong motivation for farmers to move to corn crops. This is clear in Iowa which, with 53,000 jobs and \$1.8 billion in income from ethanol, has become the American biofuel centre. The state produced nearly 2 billion gallons of ethanol last year, 30% of the US total. Corn is used for 98% of ethanol production in America and this past year 27% of the crop went to ethanol. A simple equivalence can shed some light – 25 gallons of ethanol (one SUV fill-up) uses enough corn to feed a person for an entire year.

However, farmers refute the claim that food prices are being adversely impacted upon by the growing of crops for biofuels. American agriculture officials at local levels tell us the amount of corn and soybeans being processed or stored at the feed mill has increased about 25% since 2005, but the effects of biofuels initia-

tives and increasing ethanol production are minimal. They explain that corn and soybeans processed into ethanol are not completely removed from the market. In the ethanol-production process, corn is ground up, and its starches are used to make alcohol. The grain's proteins remain a byproduct and are used in animal feeds. Similarly, soybeans used for biodiesel are not wholly removed from the market. After the oil is taken out of the soybean, the meal becomes feed – this is achieved via a process that has been in place for over 50 years. However, until recently, the oil was an unwanted byproduct.

Meanwhile, the biofuels industry is fighting back the negative publicity. At the recent fifth annual *World Congress on Industrial Biotechnology and Bioprocessing* trade conference, industry leaders claimed new technologies can boost production of environmentally friendly biofuels without threatening the world's food supplies. CEO's of major companies, including the likes of Archer Daniels Midland, ConAgra and Agrisoma Biosciences (a Canadian company that engineers oilseeds with oil content that is tailored for biodiesel manufacturers) point out that farm commodity costs are only one component of higher prices at the grocery store. Other factors, such as soaring crude oil and transportation prices, along with fertiliser costs, also contribute.

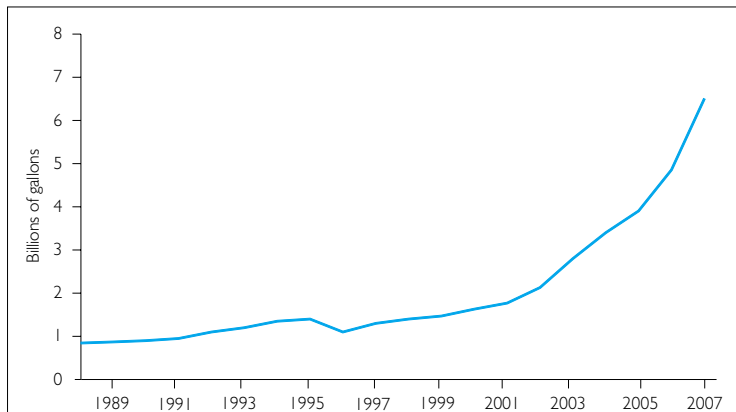
James Greenwood, president and chief executive of the Biotechnology Industry Organisation (BIO), defends the industry by pointing out that: "it is biotechnology that has expanded the productivity of farmers by 30%". The BIO opposes Texas governor Rick Perry's request and cites a recent study by Texas A&M University's Agricultural and Food Policy Center which concludes that: "relaxing the renewable fuel standard (RFS) does not result in significantly lower corn prices".



F2. World corn area harvested

While the area used to harvest corn worldwide has grown 26% over the past 20 years, a growth spurt of 15% has occurred in the last five years. The US now has the highest acreage used since 1939

Source: USDA



F3. US ethanol production

The growth rate for the production of ethanol in the US has clearly skyrocketed in the past few years due to incentives and the ramp-up of production facilities

Source: Renewable Fuels Association

A worldwide debate

By no means is the debate limited to the US. The international community has started to question whether the production of biofuels on land, which could otherwise be used for food crops, is in part to blame. The United Nations World Food Program says that rising food prices have pushed 100 million people into hunger worldwide, issuing a report calling biofuels a “crime against humanity”. It recommended an international moratorium on incentives for producing and marketing biofuels. The head of the International Monetary Fund, Dominique Strauss-Kahn, suggests a link between biofuel production and rising food prices. He warned of dire consequences, such as famine and even war, should nothing be done to curb the rising cost of food.

The European Union (EU) has targeted that by 2020, 20% of the fuel used on the continent will be biofuel. Within and among the EU member states, the argument is strong. British prime minister Gordon Brown became the latest official to say that the EU may have to back off from its goal. The Czech Republic’s president Václav Klaus, known for his anti-environmentalist stance, has strongly criticised the rapidly developing biofuels industry.

Brazil’s president Luiz Inácio Lula da Silva strongly defends biofuels, denying that their production contributes to food scarcity and rising global prices. While Brazil is the world’s leading exporter of ethanol, he criticises industrial countries for subsidising agricultural output, which he blames for undermining the competitiveness of developing nations and reducing world production.

1. Fargione et al: ‘Land clearing and the biofuel carbon debt’
Science 29 February 2008: Vol. 319, no. 5867, pp. 1235–1238

2. Searchinger et al: ‘Use of US croplands for biofuels increases greenhouse gases through emissions from land-use change’
Science 29 February 2008: Vol. 319, no. 5867, pp. 1238–1240

Scientific input

While the worldwide green movement has gained more credence through scientific evidence, the biofuel industry is also trying to use scientific evidence to prove its point. Possibly the strongest contention against biofuels being made is the greenhouse gas emissions factor. Two recent studies suggest that growing crops for biofuel production could actually lead to increased emissions. But the scientific answer seems to be uncertain when analysing the lifecycle emissions from biofuels.

One study¹ found that carbon released by converting rainforests, peatlands, savannas, or grasslands often far outweighs the carbon savings from biofuels. There is three times as much carbon in soil and existing plants as there is in the air and up to 40% of it is released when land is converted for crops. As an example, conversion of peatland rainforests in Indonesia and Malaysia for palm oil plantations incurs a “carbon debt” of 423 years.

Likewise, the carbon emission from clearing Amazon rainforest for soybeans takes 319 years of renewable soy biodiesel before the land can begin to lower greenhouse gas levels and mitigate global warming. Another study² says that clearing forests and other lands to create new cropland, in order to meet growing corn demand, releases carbon at levels twice that of burning petroleum fuel.

Watching the market forces in motion can be quite an interesting study. The effect of US ethanol policy can, in fact, contribute to deforestation and carbon emissions. As farmers switch crops to corn to cash-in on high prices, soybean supplies shrink, causing rising prices. Farmers in Brazil then expand into cattle-grazing land with soybean crops to take advantage and meet world demand, thus causing the clearing of land for pastures which releases more carbon in the atmosphere.

A new international panel of environmental, energy, economic and cultural experts – the Roundtable on Sustainable Biofuels – has been formed to develop standards by which nations and consumers can judge biofuels and their impact on the environment and society. Members of the panel tell us that biofuels could still prove useful in the fight against climate change, but using different approaches, such as focusing on crops for both food and fuel or using new technology for generating biofuels from food waste.

While it is clear that there are two sides to the argument over biofuels, the intensity is growing quickly. At this point, the line appears to be clearly drawn between the commercial interests and the environmental movement, which is a familiar scenario. With the science being manipulated to make each side’s point and the lack of a crystal ball, there is little likelihood of any conclusion in the foreseeable future. **ER**

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