



FACT SHEET ————— OCTOBER 2007

## BIOFUELS: FOOD VS FUEL

A number of important questions are being raised related to the relationship between renewable fuels from biomass, such as ethanol from corn and biodiesel from oilseed crops. The issues they uncover are often complex and the answers surprising. Food production, family farming, clean and renewable energy, fair trade, and stewardship of soil, air and water are core values at the heart of WORC.

Sustainability is central to WORC's public policy goals in promoting clean, renewable fuels from farms and other sources of biomass. This value incorporates the long-term viability of the soils, the preservation of water, and the commitment to substantially reduce the pollution of the earth's atmosphere with climate changing greenhouse gases. A good definition of sustainability comes from the UN Commission on Sustainable Development. It is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

WORC supports development of biofuels on a scale that strengthens rural communities through local ownership and small to moderate scale plants that minimize the transportation of feed stocks and can readily distribute the high protein animal feed co-products without necessitating large concentrations of livestock in factory farms.

Not all biofuels are created equal, and some feedstock production practices and life cycle environmental costs simply cannot justify a cleaner fuel product at the end. However, there are many instances where biofuels can be sustainably produced, consistent with core values of stewardship, rural well-being and substantial greenhouse gas reduction; and in ways that complement food production and local sustainable agriculture.

Compounding the questions and answers around food vs. fuels are a host of competing and conflicting interests and a heated debate. WORC has adopted **Sustainability Criteria**<sup>1</sup> to guide its policy advocacy on biofuels. WORC has also prepared a fact sheet, *Not All Biofuels Are Created Equal*<sup>2</sup> addressing concerns around the net energy balance of a variety of biofuels, including biodiesel, cellulosic ethanol, and ethanol from corn. This briefing examines issues related to producing fuel from crops and other biomass.

### Liquid sun: Renewable and sustainable v. carbon-bearing fossil fuels

One way to think about liquid fuels from biomass is as a unique means of storing solar energy in liquid form. Fossil fuels represent a geologic, ancient reservoir of solar energy that can be converted into electricity, thermal energy, or liquid fuel; wind mills can convert solar energy into electricity; and photovoltaic cells also transform solar energy into electricity. A major challenge inherent with wind and photovoltaics is storage capacity. While it can be fed into an electric energy grid, it is not so readily stored up for use when it might be needed. Biofuels have the advantage of being a portable, low carbon alternative fuel that can be integrated without too much fuss into existing infrastructure.

In olden times, hay fields sustained draft animals that did much of the labor on farms and in transportation. Early engines, diesel and internal combustion, were designed and operated on biofuels like ethanol and vegetable oils, until petroleum supplanted these with its plenitude, high energy value, and low cost. The days of plentiful supplies of cheap oil are rapidly coming to a close. In addition, fossil fuels like oil and coal carry with them a hefty by-product of carbon dioxide and other gases that are transforming earth's atmosphere in dramatic and troubling ways, and are located in increasingly

hard-to-reach deposits requiring massive environmental costs during extraction, processing, and distribution.

Biomass has a long history of sustaining human economic activity. Technology can make liquid (and gas) fuels from biomass once again viable alternatives to fossil fuels.

### Cheap commodities v. rural development and empowerment

For much of the last 40 years, U.S. farm policy has been tailored to share the abundance and productivity of our breadbasket regions in world markets at ever decreasing prices. As the structure of agriculture has grown ever more concentrated and vertically integrated, the value of the products at the farm-gate has declined dramatically, while profitability in the food sector has soared. These developments were hailed by many as the advent of greater efficiency in the market place and the natural evolution of agriculture into an industrial model.

Cheap commodities made it possible to establish large export markets for U.S. food commodities, especially corn and wheat, which had the unfortunate effect of undermining the competitive position of indigenous farmers around the globe. Many of the same multinational food giants that were

squeezing producers in rural America, were benefiting from establishing corporate controlled monocultures in agricultural regions of Latin America, Africa, and Asia.

It is in this framework that the issue of food vs. fuel has explosive ramifications. Important rainforest ecosystems in Indonesia and Brazil are being converted, at great loss of species diversity and carbon sequestering capacity, to energy crop monocultures that produce palm oil for biodiesel or sugar cane for ethanol to export into international markets. Indigenous peoples and peasant farmers are also displaced in the process.

A 2007 report from UN-Energy, an arm of the UN Food and Agriculture Organization, acknowledged the threat to food security and world hunger posed by rapidly rising commodity values controlled by multinational mercantile forces, but also hailed biomass technologies as an accessible, affordable source of distributed energy that could provide autonomy and empower meaningful rural development. Two keys to their advantageous use are sustainability and local ownership, according to the report.

*“The development of new bioenergy industries could provide clean energy services to millions of people who currently lack them, while generating income and creating jobs in poorer areas of the world. But rapid growth in first-generation liquid biofuels production will raise agricultural commodity prices and could have negative economic and social effects, particularly on the poor who spend a large share of their income on food. In many countries the current structure of agricultural markets means that the bulk of the profits go to a small portion of the population. Unless ownership is shared more equitably, this divide could become as true for energy commodities as it is for food commodities today.” Sustainable Bioenergy: A Framework for Decision Makers,” UN-Energy, April 2007.*

## Key Points from UN Energy Report

- The report goes on to note that bioenergy “could make energy services more widely and cheaply available in remote rural areas, supporting productivity growth in agriculture or other sectors with positive implications for food availability and access.”
- It also states “the current ‘food, feed, or fuel’ debate tends to be overly simplistic and fails to reflect the full complexity of factors that determine food security at any given place and time.”
- It also notes: “Currently on a global scale and under the current state of liquid biofuel production, food production and biofuel production are substitutes. But well-designed modern bioenergy systems may in fact augment local food production. For example, if leguminous nitrogen fixing crops

for biofuel production are rotated with cereals, the overall productivity of the system may be enhanced.”

- The relationship between oversupply of commodities and poverty in rural areas is also described: “Overproduction of food in industrialized countries where supply has long exceeded demand in part due to domestic subsidies, has depressed agricultural commodity prices. For decades, these low prices have been a major cause of economic stagnation in rural areas. As biofuels absorb crop surpluses in industrialized countries, commodity prices will rise, increasing income for farmers in poor countries and perhaps reducing the political pressure for other forms of agricultural subsidies in industrialized nations...”
- “The linking of agricultural commodity prices to the vicissitudes of the world oil market clearly presents risks, but it is an essential transition to the development of a biofuels industry that does not rely on major food commodity crops. Rising prices for maize and sugar are a major new incentive to develop second-generation cellulosic technologies that convert grasses, trees, and waste products into ethanol, as well as other technologies that allow the conversion of biomass into a variety of synthetic fuels.”

## The Tortilla Flap

Riots broke out in Mexico in the Spring of 2007 when the price of tortilla’s doubled in a short time and were widely attributed to the impact of increased ethanol production on the corn markets. While ethanol has had an impact on the value of corn (or maize) in world commodities markets, the Mexican tortilla riots were largely unrelated to ethanol.

Alexandra Spieldoch, Director of the Trade and Global Governance Program of the Institute for Agriculture and Trade Policy, offered a much more comprehensive analysis during a congressional briefing in March 2007. “While it may be true that tortilla prices have gone up partly due to the rise in ethanol plants and higher corn prices, the highest in a decade, it also appears that Mexican corn prices have risen too quickly to be experiencing a ripple effect from the U.S. corn ethanol boom.”

She went on to point out that U.S. ethanol and Mexican tortillas come from different varieties of corn – yellow feed corn in the former and white corn in the latter. According to Spieldoch, multinational food conglomerates, including Archer-Daniels-Midland and Cargill are both implicated in market manipulations that would advance a transition from corn to wheat as staples in Mexican diets.

Trade is also a factor in the Mexican corn markets, as post-NAFTA policies in Mexico have dismantled supply management, price controls, farmer set-asides and key tariffs

on corn and beans, and exposed farmers and consumers to the harsh realities of global markets. Since NAFTA, Mexico has lost over 1.5 million jobs in its rural sector. Between 1994 and 2000, the national production of corn in Mexico was reduced by almost 4% while corn imports grew by 136%. Prices to farmers were reduced by 43% over the period, while tortilla prices went up by as much as 571%.

It is a complex issue to disentangle, but it appears that the tortilla crisis in Mexico in the Spring of 2007 has much more to do with international trade and market manipulations by food conglomerates than with the rising price of yellow corn due to ethanol.<sup>3</sup>

## Rising food and feed prices

Many attribute the rise in food prices, especially in dairy and meats, to the high price of grains, especially corn. While this is a factor, the impact of corn prices on most food prices is considerably less than that of rising petroleum prices, which are significant in our highly mechanized, global food system. Economist John M. Urbanchuk, in a June, 2007 report, found that a 33% increase in crude oil prices translates into a 0.6% to 0.9% increase in the Consumer Price Index (CPI) for food while an equivalent increase in corn prices (\$1.00 per bushel) would cause the CPI for food to increase by only 0.3%. That is, petroleum prices are 2 to 3 times as large a factor as corn in the impact on retail food prices.

A 14 oz. box of corn flakes costs about \$2.97 to \$3.50, according to the Illinois corn marketing board. When corn is \$2 per bushel, a box of corn flakes includes about 2.2¢ worth of corn. At \$4 per bushel, the amount of corn in that cereal costs 4.4¢. In 2006, the amount of corn used for ethanol was roughly equivalent to the amount of corn exported (19.3% exported and 18.5% for ethanol.)

Another interesting dynamic in this complex equation is the effect of corn prices on large animal factory farms, a business model which is premised on below-cost-of production feed inputs<sup>4</sup>. Two important side effects of higher priced feed for livestock are (1) smaller family owned, integrated livestock feeding operators that can grow their own feed become more competitive with factory farms; and (2) the value of grass as a commodity processed by livestock on the range is enhanced. Many a rancher characterizes his or her business as raising grass. While there is a lag time between the higher corn prices and the rise in calf and steer prices, the relationship is well-documented by agricultural economists.

The National Cattlemen's Beef Association and other meat commodity organizations dominated by the vertically integrated multinational food conglomerates (Cargill, ADM, Tyson, et al.) have been vocal in their expressions of concern about the impact of ethanol on the meat supply chain. While this concern is shared by smaller, independent producers, the production of small scale, locally owned biofuels, especially

biodiesel from oilseeds, can be a highly complementary development for cattle and sheep ranchers in the Northern Great Plains and Rocky Mountain states. Ranchers can add value to grass-fed beef with supplementary oil seed meals and other biofuels co-products. [See upcoming WORC White Paper on Biodiesel and Livestock]

## Big Oil vs. Ethanol

A quiet, but effective and powerful lobbying interest in opposition to biofuels is coming from the petroleum sector. Recently the Consumer Federation of America published an important analysis of how the increasing availability of ethanol threatens to undermine the windfall profits being reaped in by the seven major oil refining companies in the U.S.<sup>5</sup>

Researcher Mark Cooper writes: "Having systematically failed to increase their refining capacity to meet growing and expected demand, the major oil companies have now declared war on a key policy that can help alleviate the shortage – the expanded production of alternative transportation fuels, particularly biofuels, like ethanol."

He asserts that "by tightening the refining market through mergers and shuttering of facilities, the industry changed the structure, conduct, and performance of the sector. The most critical element in the market structure is the lack of spare refining capacity. As long as capacity is tight, each of the members of the oligopoly (shared monopoly) knows that their product will be demanded in spite of rising prices."

"For consumers, the stakes in creating more competition are clearly huge," Cooper states. The profits garnered by U.S. refiners have signaled OPEC, a rent seeking cartel, that there is more to be extracted from the U.S. consumer, and OPEC is indeed finding ways to increase the price of its crude oil.

In May, 2007, the Wall Street Journal confirmed this effect by reporting that "OPEC officials say that if they pump more oil and depress world oil prices, U.S. gasoline prices might remain high, and the result would be even wider refining margins. In essence, OPEC would be putting more money into the pockets of refiners while its own revenue would be hurt by declining crude prices."<sup>6</sup>

"Ethanol production certainly appears to pose a competitive threat to Big Oil's long term strategy of keeping the refining sector tight to maximize profits," Cooper states.

Cooper notes the historic relationship between the price of crude and the price of corn, which has been that high energy prices cause higher food prices, not the other way around.

"Many factors will affect the relationship between food prices and ethanol production, above all the extent to which cellulosic feed stocks replace food feed stocks as

the source of raw material for ethanol production. To the extent that ethanol production mitigates domestic refining market power, the historic corn-crude price relationship will cushion the impact that ethanol production has on food prices.

“While there are many other aspects of the expansion of ethanol that deserve close attention – such as non-food feed stocks and land management issues – on the market structural potential for ethanol to be a game changer, consumers have a large stake in the outcome of the war being waged by Big Oil against ethanol. Supporting increased competition in the automobile fuels market will help discipline a market dominated by a handful of multinational oil companies that are extracting monopoly profits from US gasoline consumers,” he concludes.

## Corn Ethanol Should Be a Bridge to More Sustainable Biofuels

Even Sen. Ben Nelson, from the “cornhusker” state of Nebraska, asserts that corn ethanol is a bridge to other ethanol feedstock sources. Some of the most promising feedstocks are diverse stands of perennial prairie grasses. According to researchers featured in Science Magazine in December 2006, such prairie grass ecosystems restored nutrients to the soils.<sup>7</sup>

## Policies to Ensure that Biofuels Will Not Jeopardize Food Supplies

- Support local ownership and smaller plants – globally as well as in the U.S.
- Farm policy needs to return to the successful grain reserve policies of the period 1936-1996.
- Development of regionally appropriate strategies, reflecting appropriate sustainable biomass production – e.g. prairie grasses in the Great Plains, forestry slash and waste in the Pacific Northwest.
- Establish strict greenhouse gas standards for new biofuels technologies, and cap the amount of conventional corn ethanol that can be incorporated into the U.S. renewable fuel standards.

## Footnotes

<sup>1</sup> <http://www.worc.org/pdfs/Biofuels%20Sustainability%20Criteria.pdf>

<sup>2</sup> <http://www.worc.org/issues/biofuels/Not%20All%20Biofuels%20Are%20Created%20Equal%207-07.pdf>

<sup>3</sup> “Biofuels and Tortillas: A US-Mexican Tale of Chances and Challenges” March 16, 2007, Alexandra Spielloch, Director of the Trade and Global Governance Program, Institute for Agriculture and Trade Policy.

<sup>4</sup> “Below-Cost Feed Crops: An Indirect Subsidy for Industrial Animal Factories”, R. Dennis Olson, Institute for Agriculture and Trade Policy, June, 2006.

<sup>5</sup> “Big Oil v. Ethanol: The Consumer Stake in Expanding the Production of Liquid Fuels”, Consumer Federation of America, Mark Cooper, Director of Research, July 2007.

<sup>6</sup> Bhusahn Behree and Ana Campoy, “Why OPEC Idles as Gas Prices Reach New Highs: Cartel Blames Refiners, Cites Flush Oil Supplies, Tug of War Over Profits,” WSJ, May 25, 2007.

<sup>7</sup> David Tilman; Hill, Jason and Lehman, Clarence, “Carbon-Negative Biofuels from Low Input High Diversity Grassland Biomass,” Science, December 8, 2006.



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