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How Green Are Biofuels?

Politicians and businesses have embraced biofuels to promote energy independence and reduce carbon dioxide emissions. But rising demand for biofuels has already caused some unexpected environmental and economic side effects.

Encarnación Torres harvests corn near the village of San Nicholas de los Ranchos, Mexico in January 2007. Mexican corn prices have doubled since Christmas fuelled by increasing demand for corn-based biofuel in the United States (Photo: Reuters)

Since last Christmas, Mexican corn prices have more than doubled forcing many people to replace their beloved tortillas with cheap white bread. In August, some 120,000 people took to the streets of Mexico City to protest against the rising price of corn and government policies. One reason for the “Tortilla Crisis,” however, is beyond the control of Mexico’s President Felipe Calderón.

The United States, the world’s biggest corn producer, has discovered corn-based ethanol fuel as a remedy for carbon dioxide emissions and the nation’s dependence on imported petroleum. And with one third of U.S. corn going into ethanol production, corn prices have gone up dramatically.

Soaring food prices

Similar problems have arisen with palm oil, a staple food in Africa and Southeast Asia, which is now widely used as a biofuel crop. These problems have experts talking about a “food versus biofuel” dilemma. The Organization for Economic Cooperation and Development (OECD) and the UN Food and Agriculture Organization (FAO) predict record food prices for the next ten years due to increased demand for biofuel.

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“Higher commodity prices are a particular concern for net food importing developing countries as well as the poor in urban populations,” experts from OECD and FAO write in the Agricultural Outlook 2007.

“If you have more and more biofuel, you are going to compete with food,” explains Brice Lalonde, chairman of the OECD’s Round Table on Sustainable Development. “The first reason is simple, you need land to grow food and biofuels and we don’t have much more land available. The second reason is that food and biofuel production use the same feedstocks right now. This can be sugar, this can be cereals, this can be vegetable oils. And the prices are going up, because we need more and more.”

Environmental destruction

Environmentalists point to yet another problem with a “misjudged push for green fuels.” In a joint statement Friends of the Earth, Greenpeace, the Royal Society for the Protection of Birds, and the World Wide Fund For Nature (WWF) said biofuel production could damage forests and even spur climate change instead of preventing it. The warning came in response to British government plans to ensure that 5.75 percent of transport fuel comes from biofuels by 2010.

Sugar Cane

A truck unloads newly-harvested sugar cane at a refinery in Sertaozinho. Brazil, the world's largest producer and exporter of sugar and ethanol, is a pioneer in the use of ethanol made from sugar cane to power cars (Photo: Reuters)

“The proposal could, in its present form, see businesses producing biofuels by destroying rainforests and wetlands, not only threatening endangered habitats and species, but also releasing far more carbon into the atmosphere than could ever hope to be saved by replacing fossi fuels,” the organizations, which urged tougher regulation of the biofuels industry.

Sugar cane – sweet efficiency?

Biofuel can be made from all sorts of crops, including soy, rapeseed, and sugar cane. Depending on the source, the fuel gives different savings in greenhouse gas emissions. Sugar cane, for example, is believed to be the most efficient source for biofuel. The distilling process is fairly simple, and the energy required to heat the cauldrons comes primarily from burning dried sugar cane waste. Turning starch-based crops like corn into biofuel is more complicated. Corn or rapeseed also produce less biomass to fuel the refining process.

So far, biofuel production without subsidies has only been possible in a tropical climate with sufficient water supplies. Brazil, the world’s leading producer and consumer of biofuel, has been capitalizing on its favorable climate for decades. The country now produces about 16.5 billion liters of ethanol from sugar cane annually. Its per capita greenhouse gas emissions are less than half the world’s average. On the downside, 75 percent of the country’s carbon emissions stem from deforestation, which is partly fuelled by demand for agricultural land.

A vicious circle

Diana Profir of the U.S.-based think tank World Resource Institute says the rush for more arable land can accelerate deforestation. It is one of these vicious circle," she explains. "Palm oil has become a feedstock for biofuel and there is an increasing demand for it. So there is an incentive for developing countries, including Indonesia, to increase their rate in which they cut down forests."

Vast areas of forest have already been cleared in Indonesia and Malaysia to make way for palm plantations. Orangutans are among the most prominent species losing their natural habitats as a result. Indonesia's 90 million hectares of tropical forest represent 10 percent of the world's remaining total, but it has already lost close to three quarters of its original forest cover.

Advocates say the long term success of biofuels will depend on next-generation products. Ethanol, for example, is currently made from starches and sugar, but scientists are developing technology to allow it to be made from cellulose and other fibrous plant materials. The hope is that technical developments will expand the range of materials that can be used to make biofuels, improve their efficiency, and help bring down their cost. For the time being, second-generation fuels are far too expansive to lighten the price pressure on food crops and the Tortillas market.

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