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**Suzanne Savanick • Conservation Biology • May 2007**

## **The Conservation Reserve Program and Ethanol Fuel: Competition for Resources Between Environmental Strategies**

In the summer and fall it is unmistakable. For miles around Carleton and Northfield, the fields are covered with corn stalks and soy plants. Farms constitute a significant portion of Northfield's land use and economy. There are 1,296 farms listed in Rice County (USDA 2002). On those 1300 or so farms, corn and soybeans are extremely important. In 2002, there were 497 farms producing corn for grain, 118 produced corn for silage or greenchop, and 495 farms produced soybeans (USDA 2002). The importance of those two crops in Rice County is unavoidable.

So news of unusually high corn prices this year is not of small significance in Northfield. The high prices have driven farmers around the country to plant corn this year on an unprecedented amount of acres. Due to Rice County's reliance on corn as a staple crop, the high prices and increase in corn acreage has a considerable effect on the local economy and the local landscape.

Increasing exports have contributed somewhat to rising corn prices, but high corn prices are driven in a large part by an increasing demand for ethanol fuel. Ethanol produced from corn has been identified as an alternative, renewable fuel source that can help ease the country's reliance on foreign oil, and also to help ease environmental concerns about greenhouse gas emissions. Gas stations throughout the Midwest have for several years

carried a fuel that is a blend of 85% gasoline and 15% corn ethanol, known as E85, and other stations continue to add E85 to their fuel selection. The large auto manufacturers, especially GM and Ford have been increasingly producing cars that run on E85. Other countries, especially Brazil, have found significant success in producing fuel from plants, sugar in the case of Brazil.

The popularity of ethanol as a potential alternative fuel has increased demand for corn, and thus prices went up. Following the high prices, farmers planted 90.5 million acres of corn, a staggering number. In an effort to harvest even more corn, potentially turn larger profits, and to ease the strain on supply, farmers petitioned the U.S. government to allow plots that have been retired into the Conservation Reserve Program (CRP), to be removed from the program and farmed again. Aside from the political issues surrounding their petition, at the heart of the matter is a conflict between the relative importance of two environmental programs—corn ethanol and the CRP. The issue plays out on the national scale as well as locally. In addition, the viewpoint of a conservation biologist is certainly different than that of a local corn farmer. In addition to weighing the benefits of corn ethanol and the CRP as they compete for space on American farms, it is important to also look at the effectiveness of ethanol and the CRP in achieving their stated goals.

### **High Corn Prices Lead to Record Corn Farming**

Farmers this year planned to plant 90.5 million acres of corn. Those 90.5 million acres represent the most acreage planted in corn since World War II. All told, farmers planted 15 percent more corn than last year, a staggering number (Martin 2007). Why the

increase? It is especially due to increasing production of ethanol fuel, although there is also increasing demand for livestock feed. The high demand for corn has driven the price for a bushel of corn to around \$4 (CBT 2007). In 1999, a bushel of corn cost around \$2. This then is truly a significant price increase. Seeking higher profits, farmers have responded to the high prices by planting corn in record numbers.

While increased corn production has significant effects on the acreage and prices of other crops, one of the most significant effects of increased corn farming is the strain it puts on the Conservation Reserve Program. Most significantly, two programs that are driven by environmental concerns—the CRP and ethanol fuel—are in competition for land and resources.

The Conservation Reserve Program is a federally funded program that pays farmers to convert some farmland into native grasses. Importantly, the program allows for moderate restoration and the growth of native grasses on otherwise farmed land. In exchange for the payments that farmers receive from the government, enrolled plots retired for 10 to 15 years. Native grasses and wildflowers replace corn and soybeans. Significantly, farmers may only harvest biomass off of enrolled plots, not corn or other staple crops. Exact figures on the distribution of crops among fields in Northfield and the surrounding towns are difficult to find. However, I spoke with Jeff Erickson, who owns and runs a 3,500-acre farm in Cannon Falls, MN. Typically, he tries to farm on a rotation, maximizing the productivity of his soil, and his workforce. Corn is much more labor-intensive than soybeans, so it costs him more to produce the corn. However like many other farmers, he

is growing mostly corn this year, producing only limited acres of soybeans and other crops, simply because the price is good for corn (Erickson 2007).

Erickson is not enrolled in the CRP, but he participates in a similar program, maintaining buffer strips in areas where water tends to drain. Although he is not enrolled in the CRP program, he finds it has merits as strategy for land management, for environmental protection, and for economics. CRP plots are often placed where the dense native grasses help prevent land erosion and save runoff. Because of the grasses, the soil stays in place better. Environmentally, the buffer areas he maintains help protect water sources from contamination from fertilizers and excessive runoff. For farmers, he says, the CRP often offers a positive economic benefit: “land you put into the CRP is not the most productive land (Erickson 2007),” so it has the dual benefit of compensating the farmer and also maintaining the soil.

### **Weighing the Benefits of the CRP against Corn Ethanol**

From an environmental standpoint, the struggle between the preservation of CRP plots and ethanol production is a difficult tradeoff. On one hand, CRP permits the growth of native plants on otherwise farmed land. Perhaps it is clear, but it is worth noting that CRP plots are significantly more diverse than the plots of one plant species that they replace. As Erickson told me, CRP and buffer areas help prevent soil erosion and runoff, which are potentially severe problems both for farming and for water sources.

On the other hand, ethanol offers the potential to ease the effects of climate change, perhaps the most threatening and pervasive environmental issue of the time. The potential

drawbacks of higher temperatures in Minnesota—a drier climate, different growing conditions for farmers, and increasing numbers of invasive species of flora and fauna—are severe. The dangers of a globally changing climate are also becoming increasingly well known and real. Many political figures have championed corn ethanol’s potential, both to offset petroleum use and to support heartland farmers.

As discussed earlier, the increasing demand for ethanol has pressed the nation’s corn supply, and has caused a record crop of corn this year. As a result of producing enough corn to meet the perceived demand, the benefits of the CRP and corn ethanol have been brought into conflict. In February, 30 national and state agribusiness groups asked the U.S. government to grant flexibility in allowing corn to be planted on CRP retired cropland without penalty. The letter made clear the importance of corn in the American economy and to ethanol production. “Corn availability is not only key to traditional grain and oilseed customers, but also to the viability of a large number of existing ethanol plants, as well as those coming on line or planned (Brock 2007).” In choosing whether to release CRP land, the USDA must carefully consider how the benefits and drawbacks of ethanol compare with those of the CRP. The issue is much more complex than that simple comparison, especially when the fuel potential of CRP plants is more fully explored.

### **The Potential of Diverse Biomass Ethanol Production**

Corn ethanol has recently been much promoted as a desirable and viable alternative to petroleum. Ethanol shows promise, especially in reducing the country’s dependence on foreign sources of oil. Secondly, unlike oil, corn is renewable, and can be grown every

year. Furthermore, it would offset somewhat consumption of gasoline. Corn ethanol, however, has several drawbacks. First, corn is not efficiently converted into ethanol. Were we to convert every ear of corn grown in the US into ethanol, the resulting fuel would replace only 12% of our gasoline consumption. Other crops are much more efficient, and have a more significant impact on fuel consumption. Brazil, which uses sugar cane to produce ethanol, has replaced much of its gasoline with ethanol (Krugman 2007).

Second, the positive effects of corn ethanol are somewhat mitigated by the large amounts of fossil fuels required to grow corn and to produce the ethanol itself. According to David Tilman, Professor of Ecology at the University of Minnesota, "Sixty percent of the energy input in making ethanol is fossil fuel-driven distillation" A study by the Environmental Protection Agency indicates that corn ethanol would reduce greenhouse gas emissions by 20% over gasoline. Other studies indicate that corn ethanol is less effective, only reducing emissions by 15% (Morrison 2006). Sugar ethanol, on the other hand, would reduce emissions by 56% (Andrews 2007).

It is interesting and important to note that what is considered to be potentially the most effective source of renewable fuel could come from the type of environment and plants fostered by CRP plots. In the same EPA study, the fuel source that most reduced emissions was cellulosic ethanol, reducing greenhouse gas emissions by a staggering 91% (Andrews 2007). Furthermore, Tilman argues in a recent paper that, "biofuels derived from low-input high-diversity (LIHD) mixtures of native grassland perennials can provide more usable energy, greater greenhouse gas reductions, and less agrichemical pollution per hectare than can corn grain ethanol or soybean biodiesel." Surprisingly, the potential gains

in efficiency are not small. “LIHD biomass converted via IGCC-FT yields 51% more usable energy per hectare from degraded infertile land than does corn grain ethanol from fertile soils (Tilman, Hill & Lehman 2006).”

The high biodiversity of CRP plots is undeniably important from a conservation standpoint. If natural grasses are harvested as biomass for the production of fuel, biodiversity will be especially important in maximizing growth. Not only are diverse plots more effective as ingredients in fuel than corn, but also “diverse prairie grasslands are 240 percent more productive than grasslands with a single prairie species (NSF 2006).” “Greater numbers of plant species let to greater temporal stability of ecosystem annual aboveground plant production (Tilman, Reich, and Knops 2006).” The greater productivity and stability of biodiverse plots has the potential to ease some of the burden on farmers like Jeff Erickson, who finds corn to be especially labor-intensive. There is no question that American farmers will continue to grow it, but biodiverse plots have the potential to reduce the need for corn.

There are indications that, “the reliable, efficient and sustainable supply of some foods (for example, livestock fodder), biofuels and ecosystem services can be enhanced by the greater use of biodiversity (Tilman, Reich, and Knops 2007).” Such biodiverse plots, then, may be appealing to farmers, such as Erickson, wishing to reduce the time spent in the fields growing corn, to ranchers seeking a more effective food supply, and to those looking to develop more effective renewable energy sources. It is unclear, however, from scientific papers, what the economic impact of more biodiverse, grass-oriented plots would be, and also, the potential political impact of such strategies. What is clear, however, is that what is

now viewed as retiring land may ultimately prove to be more effective at both conserving biodiversity and producing renewable, clean, energy sources.

## **Conclusion**

As of April, most of the acres that might have been removed from the CRP in order to produce more corn had been re-enrolled in the program. Only 4.6 million out of 27.8 million acres, or roughly 83%, were removed from the program as their contracts expired (Lamp 2007). The USDA had not come to a decision about whether to release early CRP acres that were still under contract.

In the short term, with high corn prices and high demand for ethanol fuel, the CRP will continue to be viewed by as a standing in the way of important environmental measures, and by many as lowering profits for farmers. In the long run, however, it is clear that the types of plants and ecosystems in CRP plots are not only important in conserving native species and biodiversity, but will also be important in lowering American dependence on foreign oil and domestic corn.

## **Literature cited**

Andrews, E. 2007. Lawmakers Push for Big Subsidies for Coal Process (Graphic). The New York Times. May 28: C8.

Brock, R. 2007. Groups Seek Corn on CRP Land. The Corn and Soybean Digest. Feb. 21: Available from <http://cornandsoybeandigest.com/corn/corn-crp-land/> (Accessed April 2007).

Chicago Board of Trade (CBT). Corn Futures. CBT, Chicago, IL. Available from <http://www.cbot.com/cbot/pub/page/0,3181,1213,00.html> (Accessed May 2007).

Erickson, J. 2007 Personal Communication. May 22.

Krugman, P. 2007. The Sum of All Ears. The New York Times. Jan. 29: A19.

Lamp, G. 2007. Most CRP Acres Re-Enroll. The Corn and Soybean Digest. Apr. 1: Available from [http://cornandsoybeandigest.com/corn/crp\\_acres\\_re-enroll/index.html](http://cornandsoybeandigest.com/corn/crp_acres_re-enroll/index.html) (Accessed May 2007).

Martin, A. 2007. Farmers Head to Field to Plant Corn, Lots of It. The New York Times Mar. 31:C1.

Morrison, D. 2006. Back to the future: Prairie grasses emerge as rich energy source. UMN News. Dec. 8: Available at [http://www1.umn.edu/umnnews/Feature\\_Stories/Back\\_to\\_the\\_future\\_prairie\\_grasses.html](http://www1.umn.edu/umnnews/Feature_Stories/Back_to_the_future_prairie_grasses.html) (Accessed April 2007).

National Science Foundation (NSF). 2006. Ecosystems With Many Plant Species Produce More and Survive Threats Better. NSF, Arlington, VA. Available from [http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=107018](http://www.nsf.gov/news/news_summ.jsp?cntn_id=107018) (Accessed April 2007)

Tilman, D, J. Hill, and C. Lehman. 2006. Carbon-Negative Biofuels from Low-Input High-Diversity Grassland Biomass. *Science* 314: 1598.

Tilman, D, P. Reich, and J. M. H. Knops. 2006. Biodiversity and ecosystem stability in a decade-long grassland experiment. *Nature* 441: 629-632.

United States Department of Agriculture (USDA). 2002. 2002 Census of Agriculture. Available from [http://www.nass.usda.gov/Census/Create\\_Census\\_US\\_CNTY.jsp](http://www.nass.usda.gov/Census/Create_Census_US_CNTY.jsp) (Accessed May 2007).