



More thoughts on ethanol after the State of the Union...what will farmers do, and have they read the research?

Posted by [Heading Out](#) on January 29, 2007 - 11:45am

Topic: [Alternative energy](#)

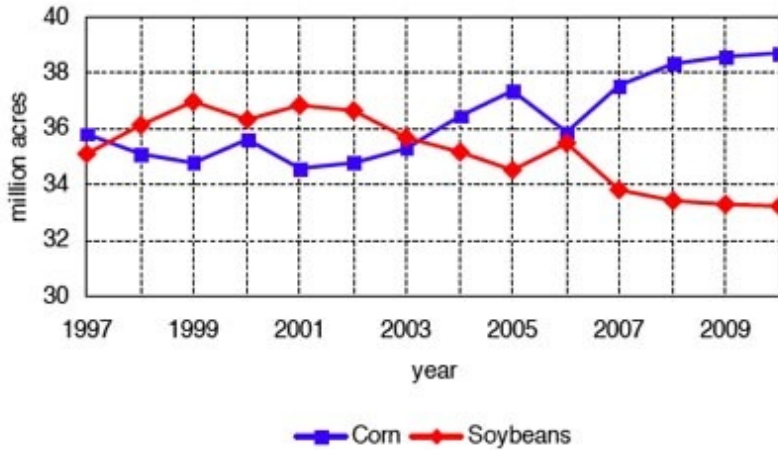
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In the State of the Union message this past week, the President gave, as part of his solution to the increasing problems of gasoline supply, an increasing emphasis on ethanol. There has been some considerable debate about whether this will work, but I thought I would follow a couple of different thoughts today. The first relates to what the farmers might be doing in order to benefit from this coming bonanza, and the second is to see how much research is actually being done.

Looking around for some information (thanks to Google) I came across the [Food and Policy Research Institute](#) which is a joint program between the Universities of Iowa and Missouri. It makes projections each year on the future development of the markets, and since it is located in the Midwest, it seemed a good starting place to look at what might be going to happen in the corn business. Interestingly in their [latest report on ethanol](#) the number that they project for ethanol production is not that different from the President's (35 billion gallons).

Estimates of the long-run potential for ethanol production can be made by calculating the corn price at which the incentive to expand ethanol production disappears. Under current ethanol tax policy, if the prices of crude oil, natural gas, and distillers grains stay at current levels, then the break-even corn price is \$4.05 per bushel. A multi-commodity, multi-country system of integrated commodity models is used to estimate the impacts if we ever get to \$4.05 corn. At this price, corn-based ethanol production would reach 31.5 billion gallons per year, or about 20% of projected U.S. fuel consumption in 2015. Supporting this level of production would require 95.6 million acres of corn to be planted. Total corn production would be approximately 15.6 billion bushels, compared to 11.0 billion bushels today. Most of the additional corn acres come from reduced soybean acreage. Wheat markets would adjust to fulfill increased demand for feed wheat. What I found interesting about that statement (the full report is available as a pdf) was the remark about where the corn would come from. And on the basis that a picture is worth a thousand words, I found this within another [pdf presentation](#), that had some interesting numbers.

Corn Belt* acreage planted



*Iowa, Illinois, Indiana, Ohio, and Missouri
 Source: FAPRI July 2006 baseline update

What it shows is that the Institute does not see a significant change in the amount of acreage that will be planted, as the following table also shows, through the next few years.

U.S. crop acreage planted

| | 2004 | 2005 | 2006 | 2010 | 2010 vs. 2006 |
|----------------|-------|-------|-------|-------|---------------|
| Corn | 80.9 | 81.8 | 79.4 | 87.0 | 7.6 (9.6%) |
| Soybeans | 75.2 | 72.1 | 74.9 | 71.6 | -3.3 (-4.5%) |
| Wheat | 59.7 | 57.2 | 57.9 | 57.1 | -0.7 (-1.3%) |
| Upland cotton | 13.4 | 14.0 | 14.9 | 14.1 | -0.8 (-5.3%) |
| 7 other crops* | 23.6 | 23.5 | 21.2 | 21.4 | 0.2 (1.1%) |
| Hay harvested | 62.0 | 61.6 | 62.7 | 62.8 | 0.1 (0.2%) |
| CRP | 34.9 | 35.6 | 36.0 | 35.0 | -1.0 (-2.9%) |
| Sum of above | 349.7 | 345.8 | 347.1 | 349.1 | 2.1 (0.6%) |

*Sorghum, barley, oats, rice, sunflowers, peanuts, and canola.
 Source: FAPRI July 2006 baseline update. Figures in million acres.

Now what this is going to do to our export market for grain does not likely bode well for those folks down in Mexico worried about the [rising price of tortillas](#), though it may encourage more local production.

The presentation also had a bioconversion chart, that may be useful, so I am including this also.

Biofuel conversion factors, 2012

| | Crop yield per acre | Vegetable oil yield | Biofuel yield per unit | Biofuel yield per acre |
|----------------------------|---------------------|---------------------|------------------------|------------------------|
| Ethanol from corn | 158.6 bu. | | 2.77 gallons per bu. | 439 gallons/a. |
| Ethanol from sugarbeets | 23 tons | | 24 gallons per ton | 552 gallons/a. |
| Biodiesel from soybean oil | 42.8 bu. | 11.3 lbs./bu. | 7.7 lbs. per gallon | 63 gallons/a. |
| Biodiesel from canola oil | 1557 lbs. | 0.383 lbs/lb. | 7.7 lbs. per gallon | 77 gallons/a. |

Crop yields and vegetable oil yields from FAPRI Jan. 2006 baseline for 2012. Biofuel yields are assumptions from various sources

Now if corn can thus increase the amount of ethanol to close to what the President needs, one presumes that the remaining 10% or so of new production will come from ethanol produced from a cellulosic source. The Government plan for cellulosic research came from a [workshop](#) held in 2005, following which DoE published a roadmap for research to meet the goals. DoE has a special [Biomass Program](#). It is interesting to see where the program is investing. There are two efforts at National Labs, one at [PNNL](#), which is the Pacific Northwest National Lab located at Hanford in Washington State. Interestingly one of their projects is with UOP, and I did hear a rumor the other day that UOP were one of the partners in the award from DARPA on the jet fuel from biomass program – we will see.

The other National Lab that gets significant funding is the [National Renewable Energy Laboratory](#), although that program does not look quite as large, it also houses the National BioEnergy Center. Under partnership with the Department of Agriculture there is also a [Biomass Research and Development Initiative](#). The projects they funded last year (for a total of \$17 million) were:

| | |
|------------|---|
| 1 | Energy Corn Consortium |
| 2 | Novel Enzyme Products for the Conversion of Defatted Soybean Meal to Ethanol |
| 3 | Value Prior to Pulping |
| 4 | Overcoming Barriers to Facilitate the Commercialization of Willow Biomass Crops as a Feedstock for Biofuels, Bioenergy and Bioproducts |
| 5 | Biotechnological Improvement of Switchgrass |
| 6 | Moisture Management In Polylactide and Polylactide Copolymers |
| 7 | High-Value Chemical Production from Biodiesel-Derived Glycerol |
| 8 | Lignin Conversion to Value-Added Materials - |
| 9 | Adding Value to Commercial Polymers through the Incorporation of Biomass Derived Chemistries |
| 10 | Thermoplastics composites Reinforced with Natural Fibers and Inorganic Nano-Particles |
| 11 | A Plant-based Production System for Methacrylate |
| 12 | Enhancing Animal Feed Values In Corn Dry Milts with Biobased Solvents |
| 13 | Strategic Development of Biomass In the Western State |
| 14 | Technical Area 4; Expansion of ethanol production; evaluation of costs and benefits to rural communities in the Upper Mississippi River Basin |
| 15 | Analysis for Strategic Guidance Demonstrating the Value of Waste Biomass Feedstocks for Fuel Ethanol Production from Energy Policy Perspectives |
| 16 | Life Cycle Assessment to Improve the Sustainability and Competitive Position of Biobased Chemicals |
| 17 | Strategic Positioning of Biofuels In the Economic Context of Agriculture, Crude Oil, and Auto-Manufacturing |
| FY08 Total | |

One thing struck me, going through to try and find this information, and it was that there are not a whole lot of different programs that are easy to find. Now I know that there is some private research going on ([Vinod Khosla](#) springs to mind), but if we are to put some \$1.8 billion into this program, one would have thought that there would have been a bit of a stronger research base on which to properly invest to get the needed results in the time available. I guess one will have to wait and see where the money actually gets spent.

Back in August the Government had announced that they will spend \$250 million on two BioEnergy Research Centers

U.S. Department of Energy (DOE) Secretary Samuel W. Bodman announced today that DOE will spend \$250 million to establish and operate two new Bioenergy Research Centers to accelerate basic research on the development of cellulosic ethanol and other biofuels. The Secretary made the announcement with Congressman Jerry Weller (IL-11th), local officials and biofuels stakeholders during a visit to Channahon, IL. Universities, national laboratories, nonprofit organizations and private firms are eligible to compete for an award to establish and operate a center. Awards, based on evaluation by scientific peer review, will be announced next summer. The centers are expected to begin work in 2008 and will be fully operational by 2009.

The centers' mission will be to conduct systems biology research on microbes and plants, with the goal of harnessing nature's own powerful mechanisms for producing energy from sunlight. A major focus will be on understanding how to reengineer biological processes for more efficient conversion of plant fiber, or cellulose, into ethanol, a substitute for gasoline.

The only problems I have with this effort is that it concentrates the funding rather than spreading it among a larger number of investigators, thereby limiting the number of fresh ideas that will be

The Oil Drum | More thoughts on ethanol after the State of the Union...what will <http://www.oildrum.com/node/224> developed (one occasionally gets the idea that the federal view on innovation is that it wasn't invented at MIT or some such place it has little promise), and secondly, given the length of time it is going to take to establish these centers, it is unlikely to have any impact at all on the current production plans.

ED by PG...Don't forget about Engineer Poet's interesting piece on this as well, [Sustainability, Energy Independence, and Agricultural Policy](#).



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