July 2015

Feeding the Ethanol Boom: Where Will the Corn Come From?

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Recommended Citation
Hart, Chad E. (2015) "Feeding the Ethanol Boom: Where Will the Corn Come From?," Iowa Ag Review: Vol. 12 : Iss. 4 , Article 2. Available at: http://lib.dr.iastate.edu/iowaagreview/vol12/iss4/2

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By the end of September 2006, there were 105 ethanol plants in the United States, with a combined production capacity of 5 billion gallons of ethanol. According to the Renewable Fuels Association, there are currently 42 new ethanol plants under construction and 7 plant expansions underway. These will add 3 billion gallons of ethanol production capacity to the United States. Beyond this, there are currently more than 300 business proposals for additional ethanol plants, which if built would create over 20 billion gallons of ethanol. So to say that the ethanol industry is booming may be an understatement. And the ethanol industry expansion is heating up corn futures prices and making corn a more lucrative crop to plant.

In testimony before the Senate Committee on the Environment and Public Works, USDA Chief Economist Keith Collins outlined a scenario for the year 2010 in which 90 million acres of corn are needed to fulfill ethanol, livestock, and export demands. Dr. Collins indicated that corn prices would need to be in the $3.10–$3.20 range to attract that many acres to corn. As of October 12, December 2007 corn futures were at $3.15 per bushel, with December 2008 and 2009 at $3.05 and $3.13, respectively. So the price signals are already there to induce a substantial increase in corn acreage. But where will that acreage come from?

### Shifting Location of Acreage

The last time this country planted over 90 million acres of corn was in 1944. In 1932, over 113 million corn acres were planted. In that year, Texas was the sixth largest and Georgia was the tenth largest corn producing state, with nearly 10 million corn acres between them. So a historical analysis would indicate the possible return of corn acreage in the Southeast and Great Plains. But corn acreage in the Southeast and in the western Great Plains is much lower today than it was in the 1930s and 1940s. A sizable amount of the land planted to corn during those earlier decades is no longer in agricultural production. In 2006, Georgia corn producers planted 280,000 acres and Texas had 1.75 million acres. Total cropland in Georgia is now less than 5 million acres. Meanwhile, the upper Midwest is devoting the same amount or more acreage to corn than was the case in the 1930s and 1940s. Iowa, Illinois, Indiana, Michigan, Wisconsin, and Minnesota have more corn acreage today than they did during the 1930s. Given the decline in the agricultural land base in the Southeast, additional corn acreage will likely have to come from where corn is already plentiful, the upper Midwest and the eastern Great Plains.

### Conservation Reserve Program Tightens Up

One potential pool of acreage is in the Conservation Reserve Program (CRP). In an earlier *Iowa Ag Review* ("CRP Acreage on the Horizon," Table 1. Corn versus soybean acreage

<table>
<thead>
<tr>
<th>State</th>
<th>2000-2006 Average Corn (acres)</th>
<th>Percentage of Acreage in Corn (%)</th>
<th>If the States Followed a 2/1 Rotation (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>11,421</td>
<td>53</td>
<td>14,438</td>
</tr>
<tr>
<td>Indiana</td>
<td>5,657</td>
<td>50</td>
<td>7,486</td>
</tr>
<tr>
<td>Iowa</td>
<td>12,386</td>
<td>54</td>
<td>15,224</td>
</tr>
<tr>
<td>Kansas</td>
<td>3,314</td>
<td>54</td>
<td>4,110</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,217</td>
<td>49</td>
<td>1,664</td>
</tr>
<tr>
<td>Michigan</td>
<td>2,221</td>
<td>52</td>
<td>2,838</td>
</tr>
<tr>
<td>Minnesota</td>
<td>7,214</td>
<td>50</td>
<td>9,648</td>
</tr>
<tr>
<td>Missouri</td>
<td>2,864</td>
<td>36</td>
<td>5,276</td>
</tr>
<tr>
<td>Nebraska</td>
<td>8,307</td>
<td>64</td>
<td>8,700</td>
</tr>
<tr>
<td>Ohio</td>
<td>3,371</td>
<td>43</td>
<td>5,243</td>
</tr>
<tr>
<td>South Dakota</td>
<td>4,350</td>
<td>51</td>
<td>5,686</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>3,636</td>
<td>69</td>
<td>3,497</td>
</tr>
</tbody>
</table>

*Table 1. Corn versus soybean acreage*
Spring 2006), we outlined the potential release of substantial CRP acreage in 2007 and 2008 and noted that USDA was working on re-enrolling much of that acreage. Originally, 26.4 million acres of CRP land could have re-entered crop production between 2007 and 2009. However, following USDA’s aggressive re-enrollment and extension program for CRP, now only 7.7 million acres are scheduled to be released from CRP during that period. Most of this acreage is in the western Great Plains and is more likely suited for wheat than for corn. So while some CRP land can be brought into corn production in the short term, CRP acreage will only be part of the shift.

In 2006, U.S. producers planted nearly 80 million acres of corn, 10 million acres shy of the projected demand for 2010. Both the Food and Agricultural Polity Research Institute (FAPRI) and Informa have recently projected 2007 corn acreage at roughly 83 million acres. In both cases, the corn acreage mostly comes at the expense of soybeans. FAPRI projects 71.3 million acres of soybeans in 2007; Informa gives 71.8 million acres; and both of these projections are down from the 2006 crop year total of 74.9 million acres. These results also suggest that the upper Midwest and the eastern Great Plains will be where additional corn acreage is found.

**Potential from Shifts in Crop Rotations**

The most likely source of new corn acreage will come from shifts in crop rotation from soybeans to corn. In most of the Corn Belt, corn and soybeans are planted in a two-year rotation. Planting corn two years in a row usually results in a 10 to 20 percent yield decline in the second year. This well-known yield effect drives many producers to a “standard” corn-soybean rotation. Over the 2000–2006 crop years, many states exhibited this rotational pattern, including Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, and South Dakota. However, if ethanol’s demand for corn shifts the corn-soybean price ratio even more in favor of corn, then planting corn after corn will look more economically attractive. One possible option is for producers to move to a three-year rotation—two years of corn followed by one year of soybeans. Producers could capture the relatively higher corn prices more often while still capturing some of the agronomic benefits of rotating soybeans into the crop mix.

Table 1 shows the potential shifts in acreage if some of the major corn-producing states move to a 2/1 rotation between corn and soybeans. Iowa and Illinois would add nearly 3 million acres of corn each. Those 6 million acres would move the United States much closer to a national total of 90 million corn acres. If all of the states listed in Table 1 shifted rotations and all other states held to their historical average corn acreage, this would push the U.S. total to over 97 million corn acres.

These numbers show that the potential is there for the United States to reach a 90-million-acre corn crop in the near future and that most of the “new” corn acres most likely are in corn production now. Given the crude oil price outlook for the next several years, ethanol’s expansion is apt to continue for some time. Even under higher corn prices, ethanol returns still look promising. And as Dr. Collins pointed out in his testimony, given fuel prices and the demand outlook, ethanol plants will likely compete for corn even at record high corn prices. The full need for additional corn acreage will depend on many factors, including fuel prices, fuel demand, and the demand for corn for livestock feeding.

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