IMPACTS OF BIO-FUELS EXPANSION ON LAND USE AND CONSERVATION

Josh Roe
Research Associate
Department of Agricultural Economics
Kansas State University

Josh Roe,
Kansas State University
Bob Jolly and Robert Wisner,
Iowa State University
Introduction

- Substantial production expansion in all forms of bio-fuels since 1998.
- However, ethanol produced from corn is king!
- Corn demand for processing has surpassed exports.
- Ethanol production capacity predicted to increase 75% by 2008.
Objectives of the Presentation

- A look at current and predicted ethanol production:
  - Nationally
  - Regionally
- Will the increased ethanol production require more corn acreage?
- Agronomic and environmental implications.
- Is there economic incentive for corn producers?
Current Ethanol Production

- 2005 ethanol production capacity approximately 3.99 billion gallons
- Ethanol plants are located in 20 states

2005 Ethanol Production Distribution by Top States

Source: ACE and Various News Sources
Future Production Potential through 2008:

Potential ethanol demand.
- 2.6 billion bushels of corn (24.2%)
- 18 million acres of land

<table>
<thead>
<tr>
<th>State</th>
<th>Current</th>
<th>Planned</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iowa</td>
<td>1,053</td>
<td>1,490</td>
<td>2,543</td>
</tr>
<tr>
<td>Illinois</td>
<td>554</td>
<td>50</td>
<td>604</td>
</tr>
<tr>
<td>Minnesota</td>
<td>546</td>
<td>99</td>
<td>645</td>
</tr>
<tr>
<td>Nebraska</td>
<td>580</td>
<td>302</td>
<td>882</td>
</tr>
<tr>
<td>Nationwide</td>
<td>3,990</td>
<td>3,003</td>
<td>6,993</td>
</tr>
</tbody>
</table>

Source: ACE and Various News Sources
**Predicted Future Corn Demand**

<table>
<thead>
<tr>
<th>Predicted Future Corn Demand (Bill./Bu)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed*</td>
</tr>
<tr>
<td>Ethanol Processing</td>
</tr>
<tr>
<td>Other Processing</td>
</tr>
<tr>
<td>Export</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

*Adjusted for DDGS usage

- Given 2005 US corn production and yield, an additional 3.38 million acres (4.5%) of corn would be required.
- US corn production reached this level in 2004.
Given the trended increase in US corn yields, it is doubtful that agronomic technology can meet this demand.

Due to current oil prices, shipping corn a considerable distance is not feasible.

Feasible solution?
- Shifting additional acres to corn where the plants are located?
Minnesota, Distribution of Top 5 Crops and CRP, 2005

Source: USDA

Iowa, Distribution of Top 5 Crops and CRP, 2005

Source: USDA

Nebraska, Distribution of Top 5 Crops and CRP, 2005

Source: USDA

Illinois, Distribution of Top 5 Crops and CRP, 2005

Source: USDA
Agronomic and Environmental Impacts

- Increased nitrogen introduction
  - Environmental policy changes?
- Increased diseases
- Minimum tillage adoption?
  - Environmental implications
- Decreased continuous corn yields.
Farm-level Impacts

- Due to current energy, corn, and soybean prices: soybean production is currently more profitable.

- Holding soybean and energy prices constant and adjusting for extra inputs for corn, an equating corn price can be calculated.

- Corn Price Needed: $2.91
Wildcards that affect future ethanol production.

- Changes in:
  - government programs
  - US trade policy
  - biomass conversion technology
  - corn degerming and/or oil extraction technology
- Fuel cell research breakthroughs
- Future US energy policy
Conclusions

- **2008 predicted ethanol production:** 6.99 billion gallons.
- **Predicted US future corn demand will require additional corn acres.**
- **Main source of additional corn acres:** current soybean acres.
- **Additional corn production may cause changes in US Environmental Policy.**
- **Current corn prices too low to entice additional corn production at the farm level.**