Mitigating the Fuel and Feed Effect of Increased Ethanol Production Utilizing Sugarcane

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Outline
- Background
- Objective
- Materials and Methods
- Results
- Summary and Conclusions

Background
- Ethanol production increased the last few years
- Corn is the primary feedstock
- Corn prices near doubling since late 2006
- 20% of US corn goes to ethanol
- Food vs. Fuel vs. Feed debate starting to gain attention

Background
- Brazil is the biggest producer of sugarcane based ethanol
- Energy output to input from cane ethanol 8:1 compared to 1.3:1 from grain based ethanol
- One disadvantage is that ethanol can only be produced during cane harvesting

Objective
- To evaluate the economic feasibility of using a non-feed crop such as sugarcane in ethanol production
Materials and Methods

• 100 mil gallon nameplate so 105 mil gallons sold
  – 1st dual feedstock plant we are aware of
  – Approx 6 mo of year grind cane and 6 mo of year use dry mill process with grain
  – Plant buys and owns all harvesting equipment
  – Plant loans growers initial start-up costs for 3 years to be paid back from Yrs 1-3
  – Feedstocks
    • Sugarcane
    • Grain sorghum (could use corn if wanted to)

Materials and Methods

• Goal of 50 mil gallons from sugarcane requires:
  – 85,000 acres of sugarcane
    • Initial establishment cost $650/acre
    • Annual production costs $350/acre
    • Average yield 28 tons (lower than valley but approx the same as Louisiana)
  – Producers receive $17/ton for cane and have $0 harvesting costs
  – If sugarcane production is short – will maintain 100 mil gallon production with grain
   • Depends on fiscal year

Materials and Methods

• Plant and equipment would be financed:
  – 50% equity – return 15%/year dividends
  – 50% debt at 9% over 10 years
• Total Investment Costs - $276 mil
  – $196 mil plant
  – $10 mil vinasse handling
  – $13.2 mil (20 harvestors, 50 tractors, 20 buggies, and 60 semi trucks w/ trailers, 15 pickups, 2 suburbans)
  – $1.7 mil (office and shop equipment)
  – $55.3 mil (cane establishment)

Results

<table>
<thead>
<tr>
<th>Feedstock</th>
<th>Sugarcane</th>
<th>Sorghum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing</td>
<td>0.72</td>
<td>0.54</td>
</tr>
<tr>
<td>Less DDG Credit</td>
<td>-0.22</td>
<td></td>
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<tr>
<td>Total Cash Cost</td>
<td>1.63</td>
<td>1.73</td>
</tr>
<tr>
<td>Depreciation</td>
<td>0.29</td>
<td>0.15</td>
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<tr>
<td>Total Cost</td>
<td>1.92</td>
<td>1.88</td>
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</tbody>
</table>

Results

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>StDev</th>
<th>Min</th>
<th>Max</th>
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</thead>
<tbody>
<tr>
<td>Statistical Summary of Net Present Value</td>
<td>78,691,279</td>
<td>38,441,453</td>
<td>-60,028,338</td>
<td>198,694,766</td>
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<tr>
<td>Probability of Success</td>
<td>0.9746</td>
<td></td>
<td></td>
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<tr>
<td>Deterministic NPV Values</td>
<td>D.NPV</td>
<td></td>
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<tr>
<td></td>
<td>70,029,520</td>
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<td></td>
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<tr>
<td>Probability NPV Exceeds Deterministic NPV</td>
<td>P(NPV&gt;D.NPV)</td>
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</tbody>
</table>
Summary and Conclusions

- Sugarcane seems to be a viable feedstock alternative for ethanol production in the U.S.
- For year-round production use cane and grain
- Energy output to input ratio for cane ethanol much better than grain ethanol