U.S. Ethanol Outlook: Implications for DDGS

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Export Exchange

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Ethanol’s Success Story

• Blended coast-to-coast and border-to-border
• 10% of U.S. gasoline supply
• Decreases pump prices for U.S. consumers
• Reduces demand for oil imports
• Supports approximately 400,000 American jobs
• Adds $50 billion to U.S. GDP
• Second-largest market for U.S. corn
• Reduces harmful pollutants and GHG emissions
Historical Ethanol Production and RFS Requirements

Annual U.S. Ethanol Production and RFS Requirements

Source: RFA and EIA
Ethanol Industry Feed Production

U.S. Ethanol Industry Animal Feed Co-Product Output

THOUSAND METRIC TONS

- 0
- 5,000
- 10,000
- 15,000
- 20,000
- 25,000
- 30,000
- 35,000
- 40,000

90-91  91-92  92-93  93-94  94-95  95-96  96-97  97-98  98-99  99-00  00-01  01-02  02-03  03-04  04-05  05-06  06-07  07-08  08-09  09-10  10-11  11-12  12-13P

CORN GLUTEN MEAL
CORN GLUTEN FEED
DISTILLERS GRAINS

Source: RFA based on USDA
Exports have accounted for roughly 25% of U.S. distillers grains production in recent years.
Co-product Output In Context

<table>
<thead>
<tr>
<th>2011/12 U.S. Co-product Output</th>
<th>Million metric tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distiller grains (DG)</td>
<td>35.1</td>
</tr>
<tr>
<td>Corn gluten feed (CGF)</td>
<td>3.0</td>
</tr>
<tr>
<td>Corn gluten meal (CGM)</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>38.6</strong></td>
</tr>
</tbody>
</table>

- U.S. now produces more DG than soybean meal
- Ethanol co-product supply would rank as world’s fourth-largest corn crop
- Enough feed to produce 50 billion hamburger patties or 100 billion chicken breasts
- DG, CGF, and CGM displaced ~46 mmt of feed (35.6 mmt of corn and 10 mmt of soybean meal)
Current Ethanol Marketplace and Policy Issues

• Drought impacts on corn supply and price
• Renewable Fuel Standard (RFS) waiver requests
• E10 “blend wall”
• E15 commercialization
Drought Impacts

• In 2012, U.S. experienced “most severe and extensive drought in at least 25 years” according to USDA

• On June 17, only 9% of corn crop rated in “poor” or “very poor” condition; by Aug. 5, 50% of crop was rated “poor” or “very poor”

• Corn crop expected to be ~28% smaller than first estimates

• Corn prices up ~30% since early June

<table>
<thead>
<tr>
<th></th>
<th>June 2012 estimate</th>
<th>October 2012 estimate</th>
<th>Change</th>
</tr>
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<tbody>
<tr>
<td>Average corn yield (bu./acre)</td>
<td>166.0</td>
<td>122.0</td>
<td>-26.5%</td>
</tr>
<tr>
<td>Corn production (mil. bu.)</td>
<td>14,790</td>
<td>10,706</td>
<td>-27.6%</td>
</tr>
</tbody>
</table>

Source: USDA
Ethanol Industry Has Responded to Drought by Dramatically Reducing Production

Corn Use for Ethanol and Weekly Corn Price

- Corn use for ethanol = **5.1** billion bu. annualized
- Ethanol industry has reduced corn consumption by 600-700 million bushels (annualized) since June
- Corn use for ethanol = **4.3** billion bu. annualized

Source: Energy Information Administration and USDA
RFS Waiver Requests

• Drought conditions prompted the governors of Arkansas and North Carolina to request a waiver of RFS for 2012/13
  – They argue a waiver would reduce corn use for ethanol and reduce corn prices
• EPA currently considering waiver requests, as well as stakeholder comments
• Decision expected in mid or late November
A Waiver is **Unnecessary** and Would Not Noticeably Impact Corn Prices or Availability in 2012/13

- Markets are already adjusting; waiver would provide little or no additional relief
- RFS requirements can be met with “banked” credits ("RINs") from previous years
  - Up to 20% of 2013 requirement can be satisfied with excess RIN credits
  - Approximately 2.6 billion excess credits available (equivalent of 930 million bushels of corn)
- Near-term ethanol demand is strong irrespective of RFS
  - Ethanol is $0.60/gallon less than gasoline
  - $1-2/gallon less than other octane sources
A Waiver Would Not Meaningfully Reduce Corn Prices

**Effects of RFS Waiver on 2012/13 Corn Price; Results from Five Studies**

- **No Waiver of RFS**
- **Waiver of RFS**

<table>
<thead>
<tr>
<th>Study</th>
<th>No Waiver</th>
<th>Waiver of RFS</th>
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<tbody>
<tr>
<td>CARD (Aug. 2012)</td>
<td>$7.82</td>
<td>$7.24</td>
</tr>
<tr>
<td>Purdue (Aug. 2012)</td>
<td>$7.89</td>
<td>$7.45</td>
</tr>
<tr>
<td>UIUC/FAO (Sep. 2012)*</td>
<td>$7.90</td>
<td>$7.78</td>
</tr>
<tr>
<td>Cardno-Entrix [&quot;Low&quot; Case] (Sep. 2012)</td>
<td>$8.28</td>
<td>$7.83</td>
</tr>
<tr>
<td>FAPRI (Oct. 2012)</td>
<td>$7.87</td>
<td>$7.83</td>
</tr>
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*UIUC/FAO price reduction with waiver is implied based on USDA 2012/13 season-average price*

Most recent study found a waiver would only reduce 2012/13 corn prices by **$0.04/bushel**
If a Waiver **Did** Reduce Ethanol and Biodiesel Production, it Would Also Reduce Supplies of DDGS and Soybean Meal...and Prices Would Rise

If a waiver reduced 2012/13 ethanol and biodiesel production by 500 mg each...

![Graph showing 2012/13 prices for Corn, DDGS and SBM with & without a waiver of the RFS](chart)

**Source:** Urbanchuk, J.M. (Sep. 2012) *Impact of Waiving the Renewable Fuel Standard on Total Net Feed Costs*
E10 “Blend Wall” and the Introduction of E15

• U.S. ethanol use is currently equivalent to 10% of gasoline consumption
• Until recently, 10% ethanol (E10) was the maximum allowable concentration of ethanol in gasoline for conventional automobiles
• Thus, ethanol demand had encountered an E10 “blend wall”
• EPA approved the use of 15% ethanol blends (E15) in conventional autos built in 2001 or later
• First gallons of E15 sold commercially in summer of 2012
• However, E15 use will not be widespread in the near term due to:
  – Marketplace and regulatory hurdles
  – Effect of drought on corn market/feedstock availability
Grain and Feed Markets are Global!

### World Cereal Grains Production

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<tbody>
<tr>
<td>Asia</td>
<td>1,017.4</td>
<td>1,069.3</td>
<td>1,070.4</td>
<td>+0.1%</td>
</tr>
<tr>
<td>Africa</td>
<td>164.0</td>
<td>156.8</td>
<td>159.2</td>
<td>+1.5%</td>
</tr>
<tr>
<td>Cent. America</td>
<td>41.4</td>
<td>35.0</td>
<td>40.4</td>
<td>+15.4%</td>
</tr>
<tr>
<td>South America</td>
<td>145.2</td>
<td>147.9</td>
<td>159.7</td>
<td>+8.0%</td>
</tr>
<tr>
<td>North America</td>
<td>443.8</td>
<td>431.5</td>
<td>404.9</td>
<td>-6.2%</td>
</tr>
<tr>
<td>Europe</td>
<td>406.8</td>
<td>462.8</td>
<td>415.8</td>
<td>-10.2%</td>
</tr>
<tr>
<td>Oceania</td>
<td>39.8</td>
<td>43.9</td>
<td>35.5</td>
<td>-19.1%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>2,258.4</td>
<td>2,347.2</td>
<td>2,285.9</td>
<td>-2.6%</td>
</tr>
</tbody>
</table>

Source: FAO, Oct. 2012; includes coarse grains, wheat, and rice

U.S. grain production is estimated down 8.5% from last year, but global production is only off 2.6%.

The 2012 global grain crop is projected to be the second-largest on record, trailing only the 2011 crop.
Outlook for 2013

- U.S. corn stocks tighter than normal
- Corn prices higher than normal
- ALL grain users will participate in demand rationing
  - Corn use for ethanol and feed co-products likely to fall to lowest level in 3 years
  - DG production likely to fall 10%; possibly more if RFS is waived
- U.S. farmers likely to increase corn acres planted in 2013
  - However, a waiver of the RFS could discourage farmers from planting more corn
- Return to trend corn yield would likely result in record U.S. crop in 2013
2012/13 Demand Rationing

CORN DEMAND, 2012/13 VS. 2011/12
(USDA, Oct. 2012)

Feed & Residual + Distillers Grains
5.7% Reduction

Ethanol (- Distillers Grains)
10% Reduction

Food, Seed, Industrial
2.9% Reduction

Export + Distillers Grains Exports
21.2% Reduction

MILLION BUSHELS

2011/12 2012/13
Feed & Residual + Distillers Grains 4,400 4,150
5.7% Reduction

Ethanol (- Distillers Grains) 3,500 3,150
10% Reduction

Food, Seed, Industrial 1,390 1,350
2.9% Reduction

Export + Distillers Grains Exports 1,540 1,150
21.2% Reduction

2011/12 2012/13
2011/12 2012/13
2011/12 2012/13
Summary

• Ethanol growth has moderated
• U.S. drought has impacted all users of corn
• 2012 ethanol production will be lower than 2011
• 2012/13 feed co-product output likely down ~10% compared to 2011/12
• RFS waiver could exacerbate co-product supply issues
• RFS waiver unlikely to meaningfully reduce corn price
• Grain/feed markets are global; adjustments are occurring
• Increased corn acres and production expected in 2013