Bio-Renewable Energy’s Impact on Agriculture and the Economy

Chad Hart
Center for Agricultural and Rural Development
Iowa State University
E-mail: chart@iastate.edu

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University of Arkansas
Fayetteville, Arkansas
Ethanol Explosion

Source: Renewable Fuels Association
Biodiesel Growth

Source: National Biodiesel Board
Renewable Fuels Standard

Source: Renewable Fuels Association
Current ethanol capacity: 147 plants, 8.5 billion gallons/year

Total capacity under construction and expansion: 5.1 billion gallons/year

55 new ethanol plants and 6 expansion projects underway

Source: Renewable Fuels Association

- 2.2 billion bushels of corn were used in producing fuel ethanol in 2006/2007 marketing year.

- 3.1 billion bushels of corn are expected to be used in producing fuel ethanol for 2007/2008 marketing year.
Current biodiesel capacity: 171 plants, 2.24 billion gallons/year

Total capacity under construction and expansion: 1.23 billion gallons/year

60 new plants underway

Source: National Biodiesel Board

- 2.8 billion pounds of soybean oil was used in producing biodiesel in 2006/2007 marketing year.

- 3.8 billion pounds of soybean oil are expected to be used in producing biodiesel for 2007/2008 marketing year.
Historical Corn Utilization
Two Views of the World

Using data derived from:
  FAPRI 2008 Baseline
  CARD 2008 Preliminary Baseline

Same modeling structure, different underlying assumptions
The Modelers Behind the Numbers

FAPRI – Food and Agricultural Policy Research Institute

Iowa State University: Miguel Carriquiry, Fengxia Dong, Amani Elobeid, Jacinto Fabiosa, Chad Hart, Dermot J. Hayes, Karen Kovarik, Jun Ruan, Simla Tokgoz, Tun-Hsiang (Edward) Yu


University of Arkansas: Eric Wailes, Ed Chavez

CARD – Center for Agricultural and Rural Development

Iowa State University: Miguel Carriquiry, Fengxia Dong, Amani Elobeid, Jacinto Fabiosa, Chad Hart, Dermot J. Hayes, Karen Kovarik, Jun Ruan, Simla Tokgoz, Tun-Hsiang (Edward) Yu

University of Arkansas: Ed Chavez

Texas Tech University: Suwen Pan
Model Interactions

Macroeconomic Variables

Policy Parameters

International Dairy

International Livestock

International Grains

Ethanol

International Oilseeds

International Sugar

U.S. Dairy

U.S. Livestock

U.S. Crops

International Rice
Crude Oil Price

$ per barrel

97/98 99/00 01/02 03/04 05/06 07/08 09/10 11/12 13/14 15/16 17/18

FAPRI  CARD
Ethanol Production

![Graph showing Ethanol Production from 1997/98 to 2017/18. The graph compares FAPRI and CARD projections. The y-axis represents Million gallons, and the x-axis represents years from 1997/98 to 2017/18. The graph shows a significant increase in ethanol production over the years, with a sharper incline after 2010/11.](image-url)
Renewable Fuels Standard

Source: Renewable Fuels Association
Corn-based Ethanol Production
Cellulose-based Ethanol Production
Biodiesel Production

Million gallons

97/98 99/00 01/02 03/04 05/06 07/08 09/10 11/12 13/14 15/16 17/18

FAPRI  CARD
Historical Ethanol Margins

- Ethanol Gross Margin
- Net Cost of Corn
- Cost of Nat. Gas
Projected Ethanol Margins

- Ethanol Gross Margin
- Net Cost of Corn
- Cost of Nat. Gas
Dry Mill Ethanol Margins
Rack Fuel Prices

The chart shows the trend of rack fuel prices over the years from 1997/98 to 2017/18. The x-axis represents the years, while the y-axis shows the price per gallon in dollars. The chart includes lines for Gas - FAPRI, Gas - CARD, Ethanol - FAPRI, and Ethanol - CARD, each represented by different colors and styles.

Key observations:
- Gas prices generally started lower in 1997/98 and have increased significantly by 2006.
- Ethanol prices were higher than gas prices from 2008 onwards, particularly after a sharp increase in 2011/12.
- The CARD lines generally follow the FAPRI lines but with slight variations.

The chart highlights the fluctuation and increase in fuel prices, particularly for Ethanol, over the observed period.
Soybean Acreage

![Soybean Acreage Graph](image-url)
Soybean Farm Price
Rice Acreage
Rice Farm Price
Cotton Farm Price

The graph shows the cotton farm price over the years from 1997/98 to 2017/18. The $ per pound is on the y-axis, and the years are on the x-axis. There are two lines on the graph: one in dark brown labeled 'FAPRI' and one in light blue labeled 'CARD.' The price fluctuations are indicated by the line changes.
Meat Production

Source: FAPRI 2008 Baseline
Meat Prices

Source: FAPRI 2008 Baseline
## Farm to Retail Food Price Spread

<table>
<thead>
<tr>
<th>Food</th>
<th>Farm Value Share of Retail Food Price</th>
<th>Food</th>
<th>Farm Value Share of Retail Food Price</th>
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<tr>
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<tr>
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<td>Orange Juice</td>
<td>33</td>
<td>Corn Syrup</td>
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</tbody>
</table>

10 Observations about Ethanol

1. Ethanol production growth has exceeded expectations
   - But the industry is approaching a barrier point (10% of gasoline usage)

2. Gasoline prices are likely to remain high enough to support ethanol

Observations from Keith Collins, former Chief Economist for USDA
10 Observations about Ethanol

3. Ethanol margins can remain positive over a wide corn price range

4. Corn prices are likely to remain higher than usual

5. Given positive margins, ethanol plants will be competitive for corn at higher prices
10 Observations about Ethanol

6. To maintain all corn usage demands, the U.S. will need to dramatically expand corn acreage

7. Other countries will respond to higher corn prices as well

8. With heightened demand and thin stocks, the corn market will be more volatile
10 Observations about Ethanol

9. Cellulosic ethanol has tremendous promise, but it will be several years before cellulosic ethanol truly impacts the energy markets.

10. The merging of the energy and agricultural sectors will force substantial changes in both sectors.
Thank you for your time.

Any questions?