Ethanol Production in The United States: how the US public are being misled

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Impact of Ethanol Production on U.S. and World Agriculture
U.S. Ethanol Production

• 2003: 2.81 billion gallons
• 2004: 3.4 billion gallons
• 2005: 4 billion gallons
• 2006: 5.5 billion gallons
U.S. Ethanol Production

- Currently, there are 118 ethanol production facilities in the U.S.
- 76 more under construction

[map]
Who is supporting ethanol production?

• Today, about 40% of the nation’s ethanol facilities are owned by farmers and other local investors.
  – They have driven the growth of the industry over the past decade

• Most of the facilities under construction are made up of farmer cooperatives, though a number of new companies and investors have joined the industry in the last few years.

• The largest producer of ethanol in the U.S. is Archer Daniels Midland Corporation
  – Agricultural giant
  – Made profits of 10.98 billion in 2006
Types of Ethanol

- **E10** - blend of 10% ethanol and 90% unleaded gasoline
  - Safe to use in all vehicles without modification
- **E85** - blend of 85% ethanol and 15% unleaded gasoline
  - Can only be used in flexible fuel vehicles (FFVs)
- The American Coalition for Ethanol (ACE) is trying to overcome technical and regulatory obstacles to use blends above 10% such as E20, E30, and E40
Corn Production for Ethanol

- Corn is the primary feedstock for U.S. ethanol production
U.S. Corn Production for Ethanol

• Less than 5% a decade ago
• 2000: 6%
• 2005: 14%
• 2006: 20% (over 2 billion bushels- nearly equal to the amount of corn exported)
Corn

• With a corn-to-ethanol conversion rate of 2.7 gallons per bushel, the U.S. ethanol sector will need 2.6 billion bushels per year by 2010 in order to increase their output

  - 1.2 billion bushels more than it consumed in 2005.
Where will the corn come from?

- Divert corn from exports
- Ethanol producers will compete with other buyers in the marketplace and raise the price of corn
- Farmers will increase corn supply
  - Over the past decade, U.S. corn yields averaged 138 bushels per acre, compared with 115 bushels during the previous decade
- U.S. could devote more land to corn
Where will the corn come from?

• U.S. could grow corn more intensively
  – Producers currently pursuing a corn-soybean rotation, might shift to a corn-corn-soybean rotation, or might produce corn continuously every year
Brazil

- World’s leader in ethanol production
- By law, all gasoline contains a minimum of 25% alcohol
- Ethanol accounts for 40% of all vehicle fuel
- By 2007, 100% of all new Brazilian cars may be able to run on 100% ethanol
- Ethanol is now being used for aviation
Future of Ethanol in U.S.

• The share of ethanol in total corn use will rise from 12% in 2004/05 to 23% in 2014/15

• In Feb. 2006, annual capacity of U.S. ethanol sector stood at 4.4 billion gallons. U.S. ethanol production could reach 7 billion gallons in 2010, 3.3 billion more than the amount produced in 2005.
Deforestation Diesel
What will happen to the Environment?

• Increased use of chemicals
  – Soils from lands already in production contain less soil nutrients over time

• Environmental degradation
  – Deforestation
    • Previously uncropped land will be brought into production
  – Increased soil erosion on existing farm land
  – Increased amounts of smog
    • Ethanol increases evaporation rate of gasoline which increase smog amounts
      – EPA confirmed with 14 out of 18 realistic models in California
How will the United States get enough ethanol to support energy needs?

• The United States will need an additional 135 billion liters of ethanol per year to reach Bush's target of lower gasoline by 20%  
  – The world leader in ethanol production, (Brazil) currently produces 16.5 billion gallons per year

• The United States is currently the largest importer of Brazilian ethanol (58% of total Brazilian export)

• In 2006 Brazil exported almost 70% of the ethanol supply  
  – That number will soon increase and is hoped to replace 10% of global gasoline use by 2025  
    • Sugarcane planted land will increase from 6 to 30 million hectares
What is happening in Brazil?

- Brazil attempted to use corn as a source of ethanol
- Brazil now is using sugar cane as their source of ethanol
  - More land is being planted with mono-cropping sugarcane
- Severe labor exploitation is occurring to sugarcane farmers
  - Brazil is the largest producer of sugarcane, but has some of the highest levels of poverty in the world
Destruction In Brazil

• Only 2.5% of the original forest in the sugarcane region remains today
• In order to keep up with global demand, Brazil will need to clear an additional 148 million acres of forest
• Sugarcane is generating an increased return
  – Land is converted that was previously used to grow grains and graze cattle
    • Cattle ranchers are forced to deforest the Amazon in order to have ample grazing land for cattle
      » This could mislead deforestation causes
Deforestation

• In the United States monoculture farming strips land of natural nutrients.
  – Land use for farming also increases
  – Natural habitats decrease

• Rainforest accounts for less than 2% of land globally, but it is home to more than 50% of species diversity.
Deforestation Diesel

- World Hunger outweighs the fuel needs of one American

- Ethanol demand from places like Europe promote the destruction of vital habitat in places such as South America and Southeast Asia
Relevancy

Alternatives

Electricity - Wind, Hydropower, Solar

Transportation - Biodiesel, Ethanol, Hydrogen, Electric
Energy Gain vs. Energy Loss

- Energy In - Energy Out
  - Corn Production
  - Transportation
  - Ethanol Production

- Kyoto
Corn Prices

• High oil prices & low corn prices = happy ethanol producer
  – Break Even Price = $4.05/bushel (when oil is $60/barrel) (Elobeid 2006)

• Distance from Plant
  – Farmer owned
  – Conventional business

• Pork and Poultry Farmers suffer
QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.
Land Prices

• Long-term effects
  – Farmer & Landowner benefit short-term
  – Both lose out in long-term

• Corn prices entice established farmers

• Difficult for new farmers to establish
Alternatives to Corn Pose Threat

• Imported crops displace corn
  – Farmers lose out

• Volatile market as technology changes
  – Investments fail

• Cheaper to import?
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<table>
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<tr>
<th>Feedstock and country</th>
<th>Energy yield ratio</th>
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<td>Sugarbeet, Great Britain</td>
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Blöttnitz 2006