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Energy Price Change Impacts on Selection of Conservation Systems

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Energy Price Change; Impact on Selection of Conservation Systems

November 30, 2005
Mike Duffy

Outline
• General comments/observations
• Iowa farm energy use and cost impacts
• Energy use by crop rotation
• Conclusions

General Calculations
• Approximately 139,000 British Thermal Units (BtU’s) in a gallon of diesel fuel
• A BtU is the amount of heat needed to increase the temperature of a pint of water one degree Fahrenheit

Common Units
• Gallons of diesel fuel equivalents
  – Pound of anhydrous .20
  – Pound of urea .25
  – Pound of P2O5 .05
  – Pound of K2O .04
  – Gallon of propane .65
  – Pesticides vary by formulation; approximation 1 pound a.i. 1.00

U.S. Energy Use
• U.S. energy use has been increasing
• U.S. energy use per person is flat
• U.S. energy use per dollar of gross domestic product has been decreasing
• Agriculture is approximately 1 percent of total U.S. energy use

Total U.S. Energy Use

Graph showing the trend of total U.S. energy use over time.
Fuel and Fertilizer as a Percent of Manufactured Input Expense, Iowa

Fuel as a Percent of Total Expenses

Rotation Impacts

Assumptions for Rotation Data

- Yields from research plots at the North Central Research farm, Kanawha, IA
- Four N levels tested; 0, 80, 160, 240
- All N is applied in the form of urea
- Operations and input use are consistent with practices in the area
- Base prices; $2.34 Corn, $5.50 Soybeans, $1.80 Oats, $80 alfalfa, $40 Straw

Highest N Use Return to Land Using Base Prices with $ .25 N

Highest N Use Return to Land Using Base Prices with $ .50 N
Highest N Use Return to Land Using Base Prices with $0.75 N

Energy Use by Rotation for N Use with Highest Return to Land

Gallons of Diesel Fuel Used per $1 of Gross Revenue

Gallons of Diesel Fuel Used per $1 Positive Return to Land with $0.25 N
What Can be Done?

Conservation of energy use was a very successful strategy in the 1970s
Think about energy use and where there are ways to save it or alter the use

What Can be Done?

Short Run

Consider all trips across the field
Be sure power units are properly tuned
Properly ballast tractor and inflate tires
Watch fertilizer levels
Follow sound farm management and marketing practices
Remember conservation of energy

Alternative Considerations

Proper insulation and check for damage
Timers and sensors for energy use control
Properly sized motors
Alternative energy sources such as solar panels, methane, and the like

Outlook for Inputs

Nitrogen costs will be higher; very unsettled times with respect to pricing options
Pesticides will be higher but will vary by product
Diesel will be higher than last year but how much higher isn't known right now
Winter weather will have an impact
Final Thoughts

- U.S. agriculture has become fossil fuel energy intensive, especially for fertilizer
- The price for fossil fuel energy will be subject to supply and demand shocks; it will remain volatile but show an upward trend
- Farmers' options are limited in the short run with conservation being the key, in the longer run different equipment and possibly rotations may be more attractive options.