Switching to an energy crop: Break even or make a profit?

October 31 2012

Along with the growing interest in biomass energy crops as renewable alternatives to fossil fuels comes a growing list of questions from corn and soybean farmers about what it will cost them to switch. University of Illinois agricultural economist Madhu Khanna developed a customizable online calculator to eliminate some of the guesswork and help farmers make the decision.

"We've been doing calculations on what it would cost to produce energy crops in Illinois and other states for quite some time, and we realized that it could be useful to people who want to be able to calculate what these costs would be on their own farm," Khanna said. "We wanted to create a calculator so farmers would be able to make their own assessment."

The feedstock cost and profitability calculator can be found at http://miscanthus.ebi.berkeley.edu/Biofuel/.

"It's an information dissemination tool," Khanna said. "The calculator allows farmers to put in their own parameters. They can customize the costs based on what their current farming operation looks like, what their current returns are on the land that they are thinking about converting, and learn what it would cost to grow an energy crop on it instead. They can decide at what price it might be feasible for them to produce an energy crop. What is the minimum price they would need in order to make it worthwhile?"

After selecting a baseline crop that they are currently farming, users provide specific information about their expenses, yields, and inputs.

"Unlike corn and soybeans where we've had years of experience and people have developed recommended, standardized application rates and planting techniques, these bioenergy crops are still very experimental," Khanna said. "We're still figuring out what the optimum rate of nitrogen application should be, the timing for harvest, and so on. This is based on a representative set of assumptions using our best knowledge to date."

Before using the calculator, Khanna recommends that farmers gather some key information about their current operating expenditures. For example, one line item on the calculator requires the discount rate.

"If farmers are thinking of growing energy crops purely as an investment decision, then they would be interested in getting the same return from their investment in an energy crop over time as they would get if they were to put this money in the bank. That's the discount rate they should use when discounting future returns to compare them to the upfront investment that would be needed to establish an energy crop," Khanna said. "If the bank is going to give them 4 percent, then they should at least get a 4 percent return on growing an energy crop instead."

Khanna said that although the calculator has been internally tested, it hasn't been tested by real users. She would welcome feedback from farmers about the calculator. Are there aspects of the calculator that need more explanation? What problems arise? Is the calculator easy to use?

Khanna hopes to use feedback to create a list of frequently asked questions. "There is a clickable link on the website to submit questions. We hope to get input from users so that we can update the information as it becomes available," she said.

Although Khanna has data for all rain-fed states in the United States, this first version of the online calculator includes data for only Illinois, Michigan, and Oklahoma. "We presented these three states as illustrative," Khanna said. "We looked at poplar, Miscanthus, switchgrass, prairie grass, and stover. They behave differently in different parts of the country, so this initial calculator shows the contrast between three very different climate and rainfall regions."

The calculator includes costs for converting both currently cropped land and marginal land.

"Land cost is a significant part of the cost of producing energy crops," Khanna said. "One reason for looking at marginal or less productive cropland is to show that the cost of producing these energy crops is expected to be significantly lower on land that is less productive for growing row crops but could be used productively to grow energy crops.

"If you have land that's currently not being put to any economic use, then you might be able to get high yields from energy crops.

Miscanthus doesn't seem to require very high-quality crop land to begin with, although that is still being studied through field experiments. It's not affected adversely by low soil quality and nutrient values. So, in southern Illinois, for example, corn yields may be low compared with central Illinois, but Miscanthus could be more productive," Khanna said.

More information: For more information, an in-depth explanation of how the categories and calculations were developed is available on the farmdoc website at www.farmdoc.illinois.edu/manag … o11_06/fefo11_06.pdf

The calculator was based on the article The breakeven costs of alternative feedstocks for cellulosic biofuels, which was published in

Aspects of Applied Biology.

Provided by University of Illinois at Urbana-Champaign