

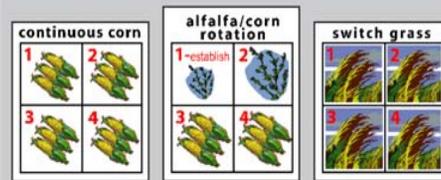
Economics and environment

A. What is this research project?

- We conducted an analysis to compare annual, farm-scale production costs, potential ethanol production, net energy balances, and environmental impacts of possible cropping systems for ethanol production in the Upper Midwest.
- We assessed the effect of rotating alfalfa with corn, and compared the rotation with other crop systems likely to be used to produce ethanol.
- To do this, we compared cropping systems of continuous corn, an alfalfa-corn rotation, and continuous switchgrass in Wisconsin.

B. What problem does it address?

The project addresses sustainability issues related to growing crops for ethanol production. More specifically, this analysis identifies the economic, environmental, and energy costs and benefits of crop rotations that use corn grain, corn stover, alfalfa, and switchgrass as feedstocks for ethanol production.



Three 4-year cropping rotations used in the study.

C. How is the project different from or how does it enhance other projects?

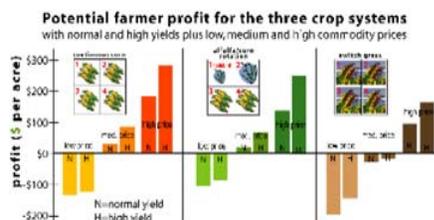
- While many research projects look at a specific aspect of feedstock production or conversion, this project looks at the bigger picture of sustainability.
- It complements other ARS research on switchgrass and alfalfa breeding, management, and production by adding information on the costs, profits, net energy balances, and environmental impacts of using these crops as feedstocks for ethanol production.

D. What are the potential benefits of partnering with ARS on this research?

The ARS provides scientific expertise on switchgrass and alfalfa breeding, production, and management, and on the economics, energy, and environmental impacts of these crops.

E. Who are the potential customers?

- Individual producers deciding which bioenergy cropping systems can fit into their production plans.
- Farm consultants and Extension educators trying to advise farmers on cropping decisions.
- Other researchers considering the potential viability of a particular crop as a biofuel feedstock.
- Policy makers considering how to balance the varying wants and needs of the tax-paying public.
- Biofuel production plant owners/managers looking to build a sustainable supply of feedstock.



Using two potential crop yields (normal and high) and three potential pricing scenarios, we found the alfalfa-corn rotation to be nearly as profitable as continuous corn – with the added benefits of having less soil erosion and less nitrate leaching.

Goal	Maximize Farm Profit	Minimize Energy Used	Maximize Ethanol Production	Maximize Energy Efficiency	Soil & Water Conservation & Quality
Crop Rotation	Farm production costs	Potential farm profit	On-farm energy use	Energy input/output	Net energy produced
Continuous corn	most desirable	most desirable	most desirable	medium	most desirable
Alfalfa/corn rotation	medium	medium	medium	most desirable	medium
Switch grass	most desirable	most desirable	most desirable	most desirable	medium

There is no one best cropping system for biofuel feedstock production. Different crops are more or less desirable depending on the final goal of the producer and/or the general public.



Stage of Development

This analysis has been completed and is published as a U.S. Dairy Forage Research Center Fact Sheet and as a technical article in the scientific journal, Bioenergy Research (2008, volume 1, p. 44-55).

Moving Forward

This research will be continued by gathering economic and production data from existing farms in Wisconsin to further develop and apply economic and environmental impact models and decision-making tools.

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