## *3. Cellulosic Biofuel Feedstock Production and Contracting: An Interactive Survey Building Session*

**Jason Bergtold <jasonbergtold@agecon.ksu.edu>**

*Jason Bergtold is an assistant professor with research focus in the areas of production economics, natural resource conservation and applied econometrics. His current research focus in on cellulosic biofuel feedstock production and markets; the adoption, intensification and retention of conservation practices and systems on-farm; the interface between on-farm biofuel feedstock production and conservation; and applied statistical theory concerning discrete choice modeling. Prior to coming to Kansas State University, Dr. Bergtold was in the employ of USDA-ARS National Soil Dynamics Laboratory in Auburn, AL as an Agricultural Economist working on the economics and adoption of conservation systems in the Southeast.*

**Jeff Williams <jwilliam@agecon.ksu.edu>**

*Jeff Williams is a Professor of Agricultural Economics at Kansas State University. He teaches courses in Natural Resource and Environmental Economics, Farm Management and Risk Management. His research involves evaluating the profitability and risk of biomass production, tillage and cropping systems, soil carbon sequestration and best management practices to improve water quality.*

### *Abstract/Summary*

*Under current agricultural policy, the production of alternative cellulosic biofuel feedstocks, such as switchgrass, sweet sorghum and corn stover, is a likely on-farm enterprise for farmers in the Midwest. The development of these enterprises will depend on the market for these feedstocks, which will likely involve the use of contracts with biorefineries or processors, as well as economic viability at the farm level. This is an interactive session, where farmers will be provided information about these issues, but then will be asked their willingness to participate and views about such a market discussion and a survey exercise. The information will be used to guide research into this area and inform industry about the direction the market needs to take.*

# Cellulosic Biofuel Feedstock Production and Contracting: An Interactive Survey Building Session

Jason Bergtold[1]
Jason Fewell[2]
Jeff Williams[3]

The authors are a [1]Assistant Professor, [2] Graduate Research Assistant, and [3] Professor in the Department of Agricultural Economics at Kansas State University

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## Introduction

- By the Energy Independence and Security Act of 2007, biofuel production must increase to 36 billion gallons by the year 2022 (U.S. EIA, 2010).
- 21billion gallons of this target must come from "advanced" biofuel sources—cellulosic feedstocks, municipal waste, algae, others.

## Introduction

- Kansas farmers are a likely source for supplying cellulosic biomass feedstocks.
- Three major types of cellulosic feedstock are considered here:
  - Corn stover
  - Sweet sorghum
  - Switchgrass

## Purpose

**To examine the harvesting, contracting and pricing arrangements that will impact farmers' willingness to produce alternative cellulosic biofuel feedstocks.**

## Who Cares?

- Production of biofuel feedstocks may provide an additional income stream for farmers.
- Bio-refineries may approach you about contracting possibilities for cellulosic feedstocks in the future.
- These crops may provide an opportunity to diversify crop rotations and offer better revenue generating opportunities on marginal lands (e.g. CRP), if the price is right.

## Who Cares?

- No markets currently exist for this biomass intended for biofuel production.
- Farmers are more likely to produce biomass with some type of contractual agreement due to market uncertainty.
- Bio-refineries need an ensured supply of biomass to operate their plants and obtain financing.
- The design of these contracts will be important!

## Harvesting Corn Stover

- Yields can reach as much as 3.5 tons/acre on irrigated corn land depending on the percentage of stover removal.
- Involves the need to cut, rake and bale stalks.
- Opportunity costs include lost nutrients and loss in soil productivity due to erosion, lower water use efficiency, and soil health.

## Sweet Sorghum Production

- Yields can reach as much as 15 dry tons/acre depending on the percentage of biomass removal, rainfall, soil type, etc.

- An annual crop that can fit into conventional crop rotations.
- Chop plants into billets for sugar extraction rather than conventional baling as with corn or wheat straw.

- Opportunity costs may include a reduction in soil productivity with biomass removal.

# Switchgrass Production

- Yields range from 1 to 8 dry tons/acre depending on the percentage biomass removal, rainfall, soil type, etc.
- Perennial crop with 3-yr establishment phase and 10-year life.
- Need to cut, rake, and bale.
- Benefits include reduced erosion and long-term soil nutrient replenishment.
- A good candidate for marginal lands, such as CRP land.

# Production Similarities

- Harvesting operations may be done by the farmer or by a custom operator.
- Some in-field storage will be required.
- Hauling may be done by the farmer or custom hauler hired by the biorefinery.

# Select Cost Budgets

| | Corn Stover | Sweet Sorghum | Switchgrass |
|---|---|---|---|
| Rent | $43.50 | $43.50 | $43.50 |
| Seed | --- | 27.00 | 14.40 |
| Fertilizer | --- | 24.85 | 39.71 |
| Herbicides | --- | 20.00 | 1.63 |
| Irrigation | 5.80 | --- | --- |
| Machinery | --- | 59.36 | 10.93 |
| Custom Harvest[a] | 41.79 | 40.00 | 54.27 |
| Hauling/Storage[a] | 4.09 | 13.15 | 6.85 |
| Operating Interest | 6.51 | 19.37 | 14.56 |
| **Total Costs** | **$83.04** | **$247.23** | **$185.85** |

[a] Custom harvest and hauling expenses may or may not be incurred if the bio-refinery assumes responsibility for this portion of the biomass production enterprise. With no custom harvest or hauling costs, total costs would be $37.16, $194.08, and 124.73 for corn stover, sweet sorghum and switchgrass, respectively.

# Estimated Returns per Acre

Net returns in dollars per acre for each bioenergy crop at specified biomass prices and yields.

| Biomass Price | Corn Stover (Irrigated) | Sweet Sorghum | Switchgrass |
|---|---|---|---|
| $80/ton | 52.42 | 435.54 | 51.11 |
| $60/ton | 18.42 | 255.54 | (8.89) |
| $40/ton | (15.58) | 75.54 | (68.89) |
| $20/ton | (49.58) | (104.46) | (128.89) |

*Notes:* Assumed Irrigated Corn Stover yield is 1.7 tons/acre
Assumed Sweet Sorghum yield is 9.0 tons/acre
Assumed Switchgrass yield is 3.0 tons/acre

# Cost Share Assistance

- Administered through the Farm Service Agency, "Biomass Crop Assistance Program (BCAP) provides financial assistance to producers or entities that deliver eligible biomass material to designated biomass conversion facilities for use as heat, power, biobased products or biofuels. Initial assistance will be for the Collection, Harvest, Storage and Transportation (CHST) costs associated with the delivery of eligible materials." (USDA, FSA)
- Bioenergy firms may offer seed cost-share assistance to help establish switchgrass stands.

# Contracts

- Contracts are the likely vehicle for transactions in emerging biomass markets.
- Sticking points:
  - Contract Length
  - Storage
  - Flexibility


# Insurance

- No insurance currently exists for bioenergy crop production.
- Risk Management Agency (RMA) is conducting research for a crop insurance policy on dedicated bioenergy crops.
  - Would not include wheat straw or corn stover.

# References


- U.S. Department of Agriculture. Farm Service Agency. 2010. "Biomass Crop Assistance Program for FSA." http://www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap.
- U.S. Energy Information Administration. 2010. *Annual Energy Outlook 2010*. Report #:DOE/EIA-0383(2010). "Oil and Natural Gas Projections." http://www.eia.doe.gov/oiaf/aeo/index.html