Antecedents to Biomass Procurement: The Essentials for Producer Participation

Mohammad Mainul Hoque, Georgeanne M. Artz, Bobby J. Martens, and, Darren H. Jarboe.

Mohammad Mainul Hoque is a Graduate Student of Economics, Georgeanne M. Artz is a Visiting Assistant Professor of Economics, Bobby J. Martens is an Assistant Professor of Supply Chain Management, and Darren H. Jarboe is a Program Manager in Center for Crops Utilization Research at Iowa State University.

moinhoq@iastate.edu gartz@iastate.edu martens1@iastate.edu jarboe@iastate.edu

Poster prepared for presentation at the Agricultural & Applied Economics Association's 2012 AAEA Annual Meeting, Seattle, Washington, August 12-14, 2012

IOWA STATE UNIVERSITY

Agricultural and Applied Economics Association
August 12-14, 2012

Antecedents to Biomass Procurement: The Essentials for Producer Participation

Mohammad Mainul Hoque, Graduate Research Assistant and **Georgeanne M. Artz**, Visiting Assistant Professor, Department of Economics;
Bobby J. Martens, Assistant Professor, Supply Chain Management; and **Darren H. Jarboe**, Program Manager, Center for Crops Utilization Research

Background

- A continuous and consistent supply of biomass for sustainable production of cellulosic biofuels largely depends on farmers' willingness to grow biomass crops.
- A high degree of uncertainty remains in all stages of the agricultural biomass-based supply chain.
- Iowa's share of the nation's collectible corn stover is roughly 22%; Iowa alone could produce 1.53 billion gallons of cellulosic ethanol per year.
- Two large biofuel manufacturers - POET in Emmetsburg, IA and DuPont in Nevada, IA -- are expected to operate commercial production in 2013.

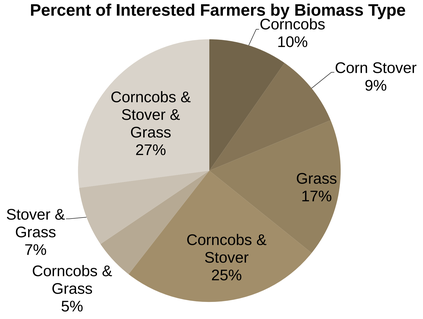
Research Objectives

- To determine Iowa farmers' interest in supplying agricultural residue biomass, and growing energy dedicated crops.
- To identify critical elements affecting farmers' interest in producing various types of biomass, including Corncobs, Corn stover, and Grass.
- To investigate any correlation in farmers' interest in growing various types of biomass.

Data

- Surveyed 2,250 Iowa producers with 50 acres or more land by mail.
- Evenly divided sample among five regions of the state to reflect variation in land type, producer knowledge of biomass production.
- Response rate of approximately 30%.

Percent of Interested Farmers by Biomass Type



- 37% of farmers were interested in supplying biomass
- 64% of the interested farmers expressed interest in supplying more than one type of biomass

Method

- Exploratory factor analysis used to group important variables.
  - Resulted in 10 multi-item factors on areas related to knowledge, information perceptions, and concerns regarding various stages of biofuel production and marketing.
- Estimate a multivariate probit model to identify which factors and farm/farmer characteristics significantly affect farmer interest in producing different types of biomass.
  - Test for correlation in adoption choices across biomass types.

Factors Grouped under Three Major Themes

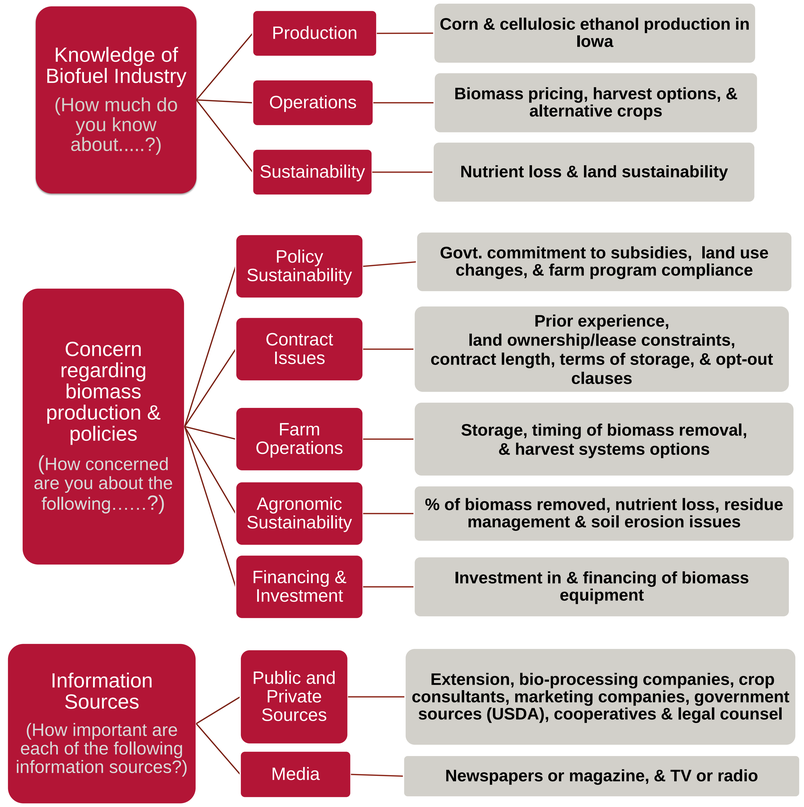


Table 1. Critical Elements Identified from Multivariate Probit Estimation

Critical Elements	Corncobs	Corn Stover	Grass
Factors			
Concern: Farm Operation Issues	+	+	+
Concern: Agronomic Sustainability	no	-	no
Information Source: Public & Private	+	+	no
Information Source: Media	+	+	+
Knowledge: Biofuel Production	No	no	-
Knowledge: Biofuel Operation	no	+	+
Controls			
College degree	+	no	no
Large Farm (> 2,500 acres)	+	+	no
% Of Land in CRP or Pasture	-	no	no
Number of Beef Cattle	no	no	-
Highly Erodible Land	no	no	+
% of Cropland Under No-Till	no	-	no

Note: Additional controls included but turn out to be insignificant are age, farming experience, farm income, percentage of land area under corn or soybean, and future farming plans

Farmer interest in growing corncobs/stover and grass are significantly correlated.

Table 2: Correlation Across Interest in Biomass Types

	Corncobs	Corn Stover	Grass
Corncob	1.00		
Corn Stover	0.87	1.00	
Grass	0.46	0.59	1.00

Key Findings

- Concerns about farm operations, contract issues, and knowledge regarding biofuel operation favor farmer biomass adoption.
- Consistently positive influence of media, and public and private information sources on farmer interest in growing biomass.
- Large farmers are interested in supplying agricultural residue biomass.
- Having a large number of beef cattle or more land under no-till production practice exerts a negative effect on biomass adoption.

Key Implications

- Seasonality, technical feasibility, and cost concerns induce processors to utilize multiple feedstock. A significant proportion of Iowan farmers expressed interest in growing differentiated biomass simultaneously.
- Since information sources are critical, investment in various information dissemination programs might improve farmer interest in supplying biomass.

Support from Iowa State University Bio-based Industry Center, Iowa Alliance for Cooperative Business Development, and USDA Rural Business-Cooperative Service are greatly acknowledged.