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Will Tennessee Soybean Producers Support a Biodiesel Cooperative?

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Will Tennessee Soybean Producers Support a Biodiesel Cooperative?

Abstract

Adding value to agriculture products to create jobs is one means to achieve rural development. Tennessee soybean growers' views on both biodiesel and the formation of a biodiesel cooperative are evaluated. Results from a mail survey suggest considerable interest from farmers in selling their soybeans to a biodiesel production plant. Some producers are willing to provide funding and purchase shares in a cooperative. This study provides Tennessee Extension agents a means to evaluate farmers' perceptions of the development of a "new generation" cooperative and to help provide advice on cooperatives and how this might affect the farmer's bottom line.

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Introduction

Tennessee produces about 35.7 million bushels of soybeans each year. A growing market for soybeans is as a feedstock for biodiesel. Biodiesel can be made from soybeans, as well as other feedstocks, and can be blended with conventional diesel (B20 is 20% biodiesel) and used in engines with no modifications. Substituting petroleum diesel with biodiesel could decrease air emissions, reduce reliance on foreign oil, and help expand markets for U.S. farmers.

A recent study, funded in part by the Tennessee Soybean Promotion Board, Tennessee Department of Agriculture, USDA Rural Development, Tennessee Farm Bureau, and Tennessee Valley Authority, evaluated the economic feasibility of biodiesel production in Tennessee (English, Jensen, & Menard, 2002). As part of this study, it was determined that at the current time the most economically efficient sized plant is a 13-million-gallon biodiesel plant that would use 9 million bushels of soybeans.

While the results from this study were suggestive that a biodiesel facility would be economically feasible in Tennessee given sufficient soybean production, the question of producer interest in selling soybeans to a biodiesel facility was not addressed. The study reported here examines Tennessee soybean growers' views on biodiesel, their interest and capability to supply sufficient production to a biodiesel plant, and their interest in formation of a cooperative to produce biodiesel.

Survey and Analysis Methods

In February of 2003, a mail survey was sent to 2,452 producers in Tennessee. A listing of soybean producers was provided by the Tennessee Agricultural Statistics Service (TASS). All soybean producers farming soybeans on at least 100 acres were surveyed. Among those producing on less than 100 acres, 20% were randomly selected and surveyed. About 2 weeks after the initial mailing, a follow-up mailing was conducted. In this mailing, a second copy of the survey was sent to all producers who did not respond to the first mailing. Of the 2,452 producer addresses, 40 were undeliverable. A total of 561 usable responses were provided, giving a response rate of 23.3%. The results are summarized with means (for continuous responses, such as age) and with frequency counts (for categorical responses, such as "yes" or "no").

The survey was comprised of three sections. The first section contained questions regarding soybean producers' views on biodiesel markets, including their views on growth potential for biodiesel markets and whether they would be willing to sell soybeans to a biodiesel processing facility. The second section focused on cooperative processing of soybeans into biodiesel. This section included questions about purchasing delivery shares in a cooperative and desired rates of return on investment in a cooperative to produce biodiesel. The third section of the survey included questions regarding characteristics of the soybean farm and the soybean producers' characteristics, including size of farm and experience of the farm operator.

Summary measures include means for continuous variables (for example, age in years) and frequency tables for discrete variables (such as "Yes/No"). Throughout this document "N" represents the number of responses to the question. The frequency of responses versus non-responses was compared by county. No significant association between county and response was found. Age and farm size were also examined to determine if non-response bias existed. The statewide average age of the operator was 55.4, while the survey respondents averaged 52.4. When small (<100 acres) versus larger farms (100+ acres) were compared, the larger farms had a response rate of 23.8%, while the smaller farms had a response rate of 11.2%.

A breakdown of the responses, sample, and population is shown in Table 1. Due to the lower response rate on the part of smaller firms, care should be taken in extending the results to the full sample or the population.

Table 1.
Response Rates Across Farm Size

	Respondents	Sample	Population	Response Rate	Percent of Population
Large (100+ acres)	471	1,977	1,977	23.82%	23.82%
Small (<100 acres)	53	475	2,375	11.16%	2.23%
Total	524	2,452	4,352		

Survey Results

Section I. Biodiesel Markets

On average, producers felt optimistic about the growth prospects for biodiesel markets in the next decade (Table 2), strongly agreed or agreed that biodiesel production will provide an important national market for soybeans in the next 10 years, and were interested in using biodiesel from soybeans in a 20% blend on their farming operation if it were competitively priced with conventional diesel.

Table 2.
Producers' Opinions About Biodiesel Markets

	Average Rating*	N
The U.S. markets for biodiesel will grow rapidly in the next 10 years.	1.88	548
Biodiesel production will provide an	1.86	539

important national market for soybeans in the next 10 years.		
If priced competitively with conventional diesel, I would be interested in using biodiesel from soybeans in a 20% blend on my farming operation.	1.46	542
* 1= Strongly Agree, 2=Agree, 3= No Opinion, 4=Disagree, 5=Strongly Disagree		

As shown in Table 3, nearly 96% of producers believed that biodiesel could be profitability produced in West Tennessee. About 97% indicated they would be willing to sell some or their entire crop to a biodiesel processing plant.

Table 3.
Views on Tennessee Biodiesel Markets

	Percent Indicating Yes	N
Do you believe that biodiesel from soybeans could be profitably produced in West Tennessee?	95.7	535
Would you be willing to sell some or all of your soybeans directly to a biodiesel processing plant?	97.0	532

When asked about the type of buyer producers would like to sell to, 6.21% indicated they would prefer to sell to a privately owned buyer, 35.73% to a cooperatively owned buyer, and 58.06% had no preference for type of buyer (Table 4).

Table 4.
Preferred Business Structure for Processing Plant

I would prefer to sell my soybeans to a processing plant that is:	Percent (N=515)
Privately owned	6.21
Cooperatively owned	35.73
No preference	58.06

The respondents were also asked about whether they would rather sell on a contract or spot basis. As shown in Table 5, of those wishing to sell to a privately owned buyer, the respondents would sell 278,000 bushels through marketing contracts and 90,500 bushels on a spot basis. Among those wishing to sell to a cooperative or with no preference, 4,05,0349 bushels would be sold through contracts and 2,256,889 bushels on a spot basis.

From the respondents, a total of 6,675,738 bushels would be available for use in some type of plant. Accounting for farm size differences, a projection of the bushels available across the sample is 28,087,804 and across the population is 30,031,547 bushels. The adjustment was made by multiplying the average bushels for sale by small farmers (<100 acres) and the average bushels for sale by large farmers (100+acres) by the number of farms in the sample in the two categories. These two values were then summed to get a total across small and large farms. The adjustment for the population estimate was calculated in the same way using the number of farms in the population in each size category. Because the total number of bushels is 35.7 million, this represents about 84% of the state's production.

Table 5.

No. of Bushels Would Sell	To Privately Owned Plant	To Cooperative Plant or No Preference	Total
Through marketing contracts	278,000 (N=18)	4,050,349 (N=322)	4,328,349
On a spot basis	90,500 (N=12)	2,256,889 (N=262)	2,347,389
Total	368,500	6,307,238	6,675,738

Section II. Cooperative Production of Biodiesel

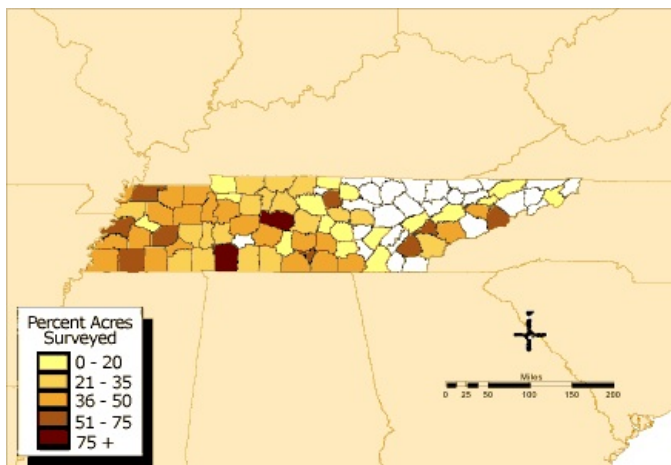
The percent indicating they would be interested in participating in a new generation cooperative to produce biodiesel was 75.66%, or 314 producers (N=415). The desired average minimum percent per year on any investment made in a biodiesel facility was 9.58% (N=269). Among those interested in investing in a new generation cooperative, at this rate of return, 88.51% indicated they would be willing to make a minimum purchase of 2,500 shares (\$5,625 at \$2.25 per bushel) (N=261). This represents about 577,500 bushels or \$1,299,375 total investment. In addition, another 13 producers indicated they would buy the minimum amount for a total of 32,500 bushels or \$73,125 investment, but did not indicate a desired rate of return. This gives a total of 610,000 bushels or 1,372,500 in investment.

If adjustments are made for the farm size differences, then the projections for the sample are 2,622,674 bushels and for the population are 4,688,627. This is an investment of \$5,901,016 for the sample and \$10,549,412 for the population. Recalling that the shares and investment needed are 9 million bushels and \$18.5 million in producer investment, the population estimates represent about 52.1% of the bushels needed and 58.6% of the producer investment required would be available for operating the cooperative. However, these are state estimates, and members of a cooperative will likely be more regionally oriented.

Section III. Farming Operation and Producer Characteristics

Of the respondents, 70.52% indicated they were members of agricultural cooperatives (N=536). The respondents who produced soybeans in 2001 harvested an average of about 665.14 (N=524), or 348,533.4 acres in total. Distributed across the state, a total of 33% or more of the acres planted as reported by the National Agricultural Statistics Service (NASS) are represented by the survey (Figure 1).

Figure 1.
Proportion of Acres Represented by Survey Responders



Using an average of 30 bushels per acre, this would represent about 10,456,002 bushels of soybeans. About 31.54% (N=539) had no on-farm storage. Among those with on-farm storage, average storage capacity was about 23,819 bushels of soybeans on-farm (N=369). The total amount of storage indicated was 8,789,211 bushels. On average, the respondents stated they typically sold about 33.65% through contracts (N=525).

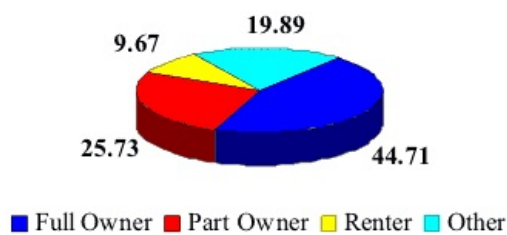
On average the respondents were 52.39 years old and had been farming for 33.99 years (Table 6).

Table 6.
Producer's Age and Farming Experience

	Average Number of Years	N
Producer's Age in Years	52.39	546
Years in Experience in Farming	33.99	529

Shown in Figure 2, about 44.71% of the farmers were full owners of their farms, while 25.73% were partners in the farm. About 9.67% were renters. The majority of the rest, 19.89%, were owner/renters.

Figure 2.
Farm Ownership



The net farm income from farming most commonly cited was \$35,000-\$49,999, at 15.45% (Table 7). The majority (54.27%) of producers had net incomes from farming between \$15,000 and \$75,000 per year.

Table 7.
Net Income From Farming in 2001 (After Taxes)

	Net Farm Income Level	Percent (N=492)
a.	negative (less than \$0)	5.69
b.	\$0-\$9,999	15.65
c.	\$10,000-\$14,999	8.74
d.	\$15,000-\$24,999	15.24
e.	\$25,000-\$34,999	13.21
f.	\$35,000-\$49,999	15.45
g.	\$50,000-\$74,999	10.37
h.	\$75,000-\$99,999	4.07
i.	\$100,000-\$149,999	4.67
j.	Greater than or equal to \$150,000	6.71

As displayed in Table 8, nearly 35% had no farm debt. The majority, 53.71%, had less than \$5 financed with debt per \$100 of assets.

Table 8.
Farm Debt

	Dollars Financed with Debt per \$100 of Assets	Percent (N=484)
a.	\$0	35.74
b.	\$1-\$2.99	13.22
c.	\$3-\$4.99	4.75
d.	\$5-\$9.99	7.85
e.	\$10-\$14.99	4.75
f.	\$15-\$19.99	7.85
g.	\$20-\$39.99	14.67
h.	\$40-\$69.99	8.47
i.	\$70 or Greater	2.69

On average, about 35.95% of the respondents' household income came from off farm sources in 2001 (N=507). Shown in Table 9, most of the producers were either high school graduates, had attended some college, or held a college degree.

Table 9.
Education Level

	Education Level	Percent (N=544)
a.	Some high school or less	7.90
b.	High school graduate	39.15
c.	Some college	22.61
d.	College graduate	23.71
e.	Post graduate	6.62

Soybean Draw Area

A biodiesel facility located in Northwest Tennessee could be served by local soybeans trucked from the surrounding area or by soybeans delivered by barge from upriver. Counties in Tennessee lying within a 50-mile radius of Cates Landing, Tennessee include Dyer, Obion, Gibson, Weakley, and Lake. Responses from these counties indicate that a total of 2,634,155 bushels would be available

for sale from the responding farmers. Projecting this amount to the five-county area, the total bushels available would be about 10,631,831 bushels. This suggests that area farmers could adequately supply a facility in Northwest Tennessee.

Implications for Extension

Rural development is critical for agriculture to survive. Striving for ways to not only create jobs but also add value to what is produced in agriculture is one means to achieve development. The biodiesel enterprise featured in this article has the potential of increasing the number of local jobs, increasing the value of commodity soybeans, and increasing income in rural areas through vertical integration--the producer owning processing facilities and thus capturing more of the profits available from selling the biodiesel. Extension needs to be in a position to provide advice on the formation of cooperatives and how this might affect the farmer's bottom line. Extension agents will need to work with producers as they struggle in analyzing the financial impacts to their respective operation.

This study provides Tennessee Extension agents a means to evaluate farmers' perceptions of the development of a "new generation" cooperative. In Tennessee, there have been few success stories involving value-added cooperatives, especially those requiring large capital investment. However, the analysis indicates that while some producers are willing to provide some funding and are willing to purchase shares in a cooperative, many more are looking for new innovative ways to market their product.

Summary and Conclusions

The results from the survey reported here suggest considerable interest on the part of soybean farmers in selling their soybeans to a biodiesel production facility. Producers were less certain about formation of a new generation cooperative to produce biodiesel. If 9 million bushels are required to provide sufficient feedstock for a biodiesel production plant, there does appear to be sufficient interest and ability to supply soybeans on the part of producers.

As part of the economic feasibility study conducted during 2002, financial viability of a 13 million gallon (9 million bushel) facility at an investment of \$18.5 million from producers and \$18.5 million from outside investors was examined. From the survey responses, it appears that producers would be willing to purchase shares in a new generation cooperative in the amount to supply and finance about half the needs of a biodiesel plant. For the other half, additional sources of funding would be required.

References

English, B., K. Jensen, and J. Menard. (2002). *Economic feasibility of producing biodiesel in Tennessee*. Department of Agricultural Economics at the University of Tennessee. Available at: <http://web.utk.edu/~aimag/pubmkt.html>

Tennessee Agricultural Statistics Service. (2002). *Tennessee Agriculture, 2002*. Bulletin No. 37. Available at: <http://www.nass.usda.gov/tn/tnbull00.htm>

United States Department of Agriculture. (1997). National Agricultural Statistics Service. Census of Agriculture. Tennessee State and County Data. Vol. 1, Geographic Area Series, Part 42. Available at: <http://www.nass.usda.gov/census/census97/volume1/vol1pubs.htm>

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