

## **Impact of Biodiesel on the Iowa Agriculture Economy**

Cardno ENTRIX

10 Corporate Circle  
Suite 300  
New Castle, DE 19720  
USA

Phone 302 395 1919  
Toll-free 800 368 7511  
Fax 302 395 1920  
www.cardno.com

[www.cardnoentrix.com](http://www.cardnoentrix.com)

**Prepared for  
The Iowa Renewable Fuels Association, the Iowa Soybean Association, the  
Iowa Corn Growers Association and the Iowa Biodiesel Board**

**John M. Urbanchuk  
Technical Director – Environmental Economics  
Cardno ENTRIX**

**January 21, 2013**

The renewable fuels industry has grown spectacularly over the past decade and Iowa has been both a major participant and beneficiary. Iowa is the nation's largest producer of ethanol and biodiesel. The biodiesel industry is both younger and smaller than the ethanol industry, but Iowa accounts for about 17 percent of national biodiesel output and produced an estimated 184 million gallons in 2012, 11 percent more than 2011 and 18 times as much as in 2002.

### **Objective**

Biodiesel producers are part of a manufacturing sector that adds substantial value to agricultural commodities produced in Iowa and makes a significant contribution to Iowa agriculture. The objective of this analysis is to identify and quantify the impact of the Iowa biodiesel industry on the Iowa agricultural economy by estimating what the impact on Iowa corn, soybean, and livestock producers would be in the absence of the Iowa biodiesel industry.

### **Impact of Biodiesel on Commodity Prices**

Iowa is the nation's leading biodiesel producer with the second largest biodiesel capacity (after Texas). According to the Iowa Renewable Fuels Association (IRFA), Iowa's 12 biodiesel plants have rated capacity of 314.5 million gallons and produced

184 million gallons of biodiesel in 2012<sup>1</sup> accounting for about 17 percent of total U.S. biodiesel output.

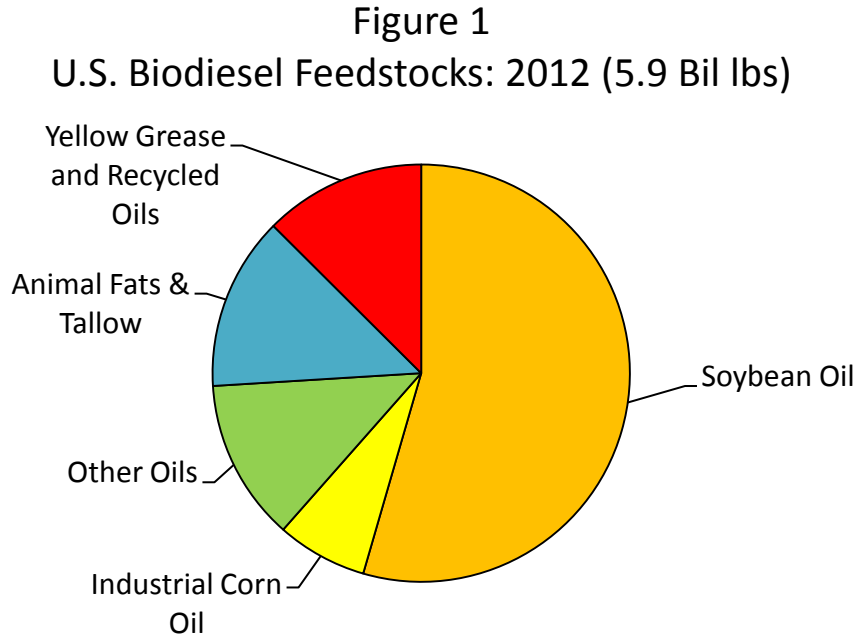
Virtually all of the biodiesel produced in Iowa is produced from soybean oil, industrial grade corn oil, canola oil, and other fats produced and refined in Iowa. The increased demand for industrial grade corn oil as a biodiesel feedstock has created a new value stream for Iowa's ethanol industry that is benefitting both biodiesel and ethanol producers. Since feedstocks account for the largest share of production costs and most other inputs -- from labor to electricity and natural gas -- are procured locally, Iowa farmers and the agriculture economy benefits more directly from renewable fuels production than most other states.

Biodiesel is produced from a wide range of potential feedstocks including soybean oil, canola oil, industrial grade corn oil, animal fats and tallow, and recycled cooking oils and grease. Energy Information Administration (EIA) statistics indicate that nearly 6 billion pounds of fats and oils were used to produce 781 million gallons of biodiesel during the first nine months of 2012.<sup>2</sup> As shown in Figure 1 soybean oil is the primary biodiesel feedstock in the U.S. accounting for nearly 55 percent of biodiesel output. Industrial grade corn oil accounted for 7 percent of biodiesel production while the remaining feedstocks were more or less equally split among animal fats and tallow, yellow grease and recycled oils, and other vegetable oils.

---

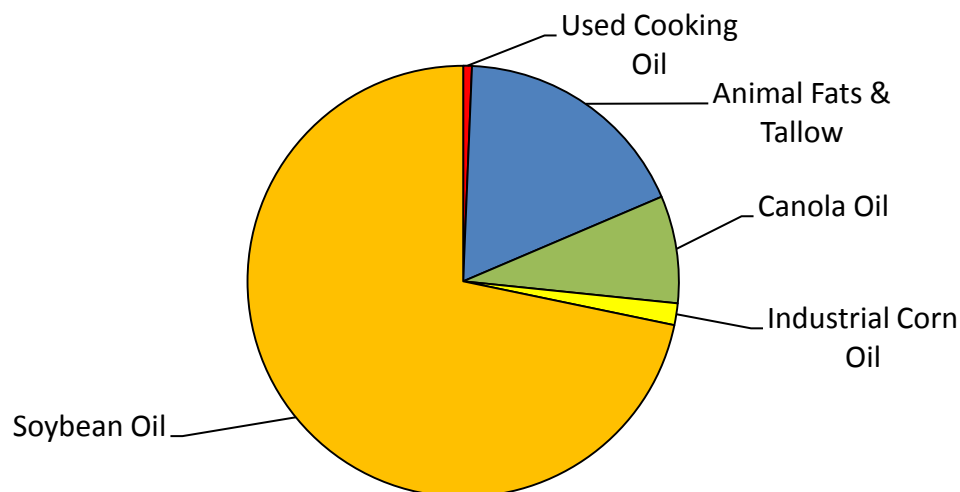
<sup>1</sup> [http://www.iowarfa.org/biodiesel\\_refineries.php](http://www.iowarfa.org/biodiesel_refineries.php)

<sup>2</sup> U.S. Energy Information Administration, Form EIA-22M "Monthly Biodiesel Production Survey"



Reflecting the large concentration of soybean processing facilities in Iowa, the state's biodiesel industry uses a larger share of soybean oil as a feedstock than other states. As reported by IRFA and shown in Figure 2, the Iowa biodiesel industry used nearly one billion pounds of soybean oil in 2012 to produce biodiesel, nearly 72 percent of total feedstock use. In addition Iowa biodiesel producers used approximately 250 million pounds of animal fats, 111 million pounds of canola oil, 23 million pounds of industrial grade corn oil, and 9 million pounds of used cooking oil as biodiesel feedstock in 2012. A vast majority of the raw material for biodiesel production in Iowa is procured locally.

Figure 2  
Iowa Biodiesel Feedstocks: 2012 (1.4 Bil lbs)



Soybean oil is one of the two principal co-products of soybean processing and Iowa is the nation's largest soybean producer. Increased use of soybean oil raises soybean oil prices and moderates soybean meal prices. Since soybeans compete with corn for land, higher soybean prices also have a positive impact on corn prices. Iowa is also the nation's largest corn producer. Consequently, increased biodiesel production raises both soybean and corn prices and boosts revenue for Iowa crop farmers. Since increased crush demand for soybeans also increases production of soybean meal, an increase in biodiesel use and soybean oil demand will reduce soybean meal prices to the benefit of Iowa's livestock producers.

A recent analysis of the impact of biodiesel demand on soybean meal prices indicated that over the five year period 2005 to 2009 a 10 percent increase in the demand for soybean oil resulted in a five cents per pound increase in the price of soybean oil, \$0.24 per bushel increase in soybean prices and \$12.90 per ton decrease in soybean meal prices (Bard and Schroeder 2012). Applying these changes to the average prices of these three commodities over the five-year period suggests a demand elasticity of 0.143 for soybean oil, 0.29 for soybeans and -0.047 for soybean meal.<sup>3</sup> In other words, all other things held

<sup>3</sup> These studies do not include the impact on Distillers dried grains or other fats and oils. In order to calculate the impact of changes in soybean oil demand (and soybean oil prices) on DDG, tallow and lard prices we estimated price elasticities for these products from OLS regressions on annual data of wholesale prices reported by USDA.

constant, a 10 percent increase in soybean oil demand would increase soybean oil prices by 14.3 percent; soybean prices 2.9 percent, and reduce soybean meal prices by 4.7 percent.

The impacts of changes in soybean and soybean oil prices on corn and the cross price effects on beef were estimated and reported in an analysis of the impact of biofuels on crop and food prices published by economists at the Federal Reserve Board. Using data from the USDA and FAPRI they estimate that a one percent increase in soybean prices will increase corn prices about 0.65 percent; one percent increase in corn prices will push up beef prices on 0.1 percent while a one percent increase in soybean prices will push up beef prices by 0.06 percent. (Baier et. al. 2009, p. 11).

We estimate that demand for soybean oil for biodiesel production in 2012 increased an estimated 29 percent over year-ago levels. As shown in Table 1, applying these demand elasticities to 2011 marketing year prices suggests that in the absence of the Iowa biodiesel industry in 2012, Iowa soybean prices would have been 8.3 percent lower; corn prices 5.4 percent lower; and beef cattle and hog prices one percent lower.<sup>4</sup> However, soybean meal and Distillers dried grains prices would have been 13.6 percent and five percent higher, respectively.

Table 1  
Impact of a 29% Increase in Soybean Oil Demand from Biodiesel

	Without Biodiesel Price	Change Due to Biodiesel	Actual 2011/12 Price
Soybeans (\$/bu)	\$11.56	8.3%	\$12.60
Soybean Meal (\$/ton)	\$429.20	-13.6%	\$377.67
DDG 65% (\$/ton)	\$235.30	-5.0%	\$224.13
DDG 10% (\$/ton)	\$78.54	-5.0%	\$74.81
Corn (\$/bu)	\$5.87	5.4%	\$6.20

It is important to note that these impacts are estimated to result solely from a 29 percent increase in soybean oil used for biodiesel in 2012. Impacts from other biodiesel factors such as increased demand for animal fats are discussed in subsequent sections.

---

This analysis indicates that the elasticity of DDG prices with respect to soybean meal and corn prices is 0.4665 and the elasticities of edible tallow and lard prices to soybean oil prices are 0.881 and 0.893, respectively.

<sup>4</sup> While the FRB study does not specifically reference an impact on hogs, we have assumed the same change for hog prices as was indicated for cattle.

### Biodiesel Impact on Industrial grade corn oil

Ethanol producers have begun to extract industrial grade corn oil from Distillers dried grains with solubles (DDGS) for use as a biodiesel feedstock. Typically this oil is of lower quality than that produced by corn wet mills for the food market but is an excellent biodiesel feedstock. The use of industrial grade corn oil provides several benefits to ethanol and biodiesel producers and livestock feeders. First industrial grade corn oil provides an additional revenue stream for ethanol producers which can help offset high corn prices. Since industrial grade corn oil is a co-product and is typically priced at a discount to crude soybean oil, it provides biodiesel producers with competitive alternative feedstock, thereby enhancing biodiesel returns. Finally, separating industrial grade corn oil from DDGS changes the nutritional value of Distillers grains by increasing the protein content and reducing the amount of fat.

According to IRFA 33 of Iowa's 35 dry mill ethanol plants extract industrial grade corn oil. These plants represent more than 3 billion gallons of ethanol production utilizing nearly 1.1 billion bushels of corn. Using an average industrial grade corn oil yield of 0.6 pounds per bushel, this equates to approximately 656 million pounds of industrial grade corn oil.

Information provided by major industrial grade corn oil marketers suggests that approximately 70 percent of Iowa industrial (non-food) corn oil was sold as a biodiesel feedstock in 2012. Industrial grade corn oil extracted by dry mill ethanol plants typically has a high free-fatty-acid composition and a high content of waxes and other chemicals that make it unsuitable for human consumption. Consequently this industrial grade corn oil trades at a discount to food-grade oil that makes it competitive with animal fats and yellow grease. Discussions with biodiesel producers indicate that industrial or non-food grade corn oil is priced in correlation with crude (or unrefined) soybean oil. To reflect this relationship we have assumed that industrial grade corn oil is priced at 80 percent of crude soybean oil as a biodiesel feedstock. At an average price of \$0.51 per pound for crude soybean oil<sup>5</sup> in 2012, this equates to \$0.41 per pound for industrial grade corn oil and amounts to \$55 million of additional revenue for Iowa's ethanol industry.

A 100 MGY dry mill ethanol plant that extracts 0.6 pounds of industrial grade corn oil for every bushel of corn would produce 24 million pounds of industrial grade corn oil and add \$0.087 cents of revenue to each gallon of ethanol marketed. Based on industry reports that 70 percent of Iowa industrial grade corn oil is sold as a biodiesel feedstock, the biodiesel share accounts for as much as 6.6 cents per gallon of

---

<sup>5</sup> Cash market prices, Wall Street Journal.

net revenue for a dry mill ethanol plant, increasing profitability by 55 percent.<sup>6</sup> The impact of industrial grade corn oil used for biodiesel on net revenue for a typical 100 million gallon Iowa dry mill ethanol plant producing at 110 percent of capacity that extracts industrial grade corn oil is illustrated in Table 2.

Table 2  
Impact of Industrial Grade Corn Oil  
100 MGY Iowa Dry Mill Ethanol Plant: 2012

	<b>Corn Oil Extraction “No Biodiesel”</b>	<b>Corn Oil Extraction “With Biodiesel”</b>
<b>OPERATING COSTS</b>	<b>\$/gal</b>	<b>\$/gal</b>
Corn	\$2.475	\$2.475
Enzymes, Yeast, Chemicals, Denaturant	\$0.159	\$0.159
Natural Gas (\$/MCF)	\$0.131	\$0.131
Labor	\$0.059	\$0.059
Other Operating Costs	\$0.130	\$0.130
<b>Net Operating Costs</b>	<b>\$2.947</b>	<b>\$2.947</b>
<b>REVENUE</b>	<b>\$/gal</b>	<b>\$/gal</b>
Ethanol (FOB, IA \$/gal)	\$2.231	\$2.231
DDG (10% Iowa \$239/ton)	\$0.749	\$0.749
Industrial grade corn oil (\$0.41/lb)	\$0.0210	\$0.087
Total Revenue	\$3.002	\$3.067
<b>EBIDTA</b>	<b>\$0.0590</b>	<b>\$0.119</b>
<b>Biodiesel Impact</b>		<b>\$0.066</b>

#### Impact of biodiesel demand for beef tallow and white grease on the value of beef cattle and hogs

In addition to soybean and industrial grade corn oil, Iowa biodiesel producers also have available a range of other feedstocks including beef tallow and white grease. These feedstocks are byproducts of the

<sup>6</sup> We have assumed that in the absence of the biodiesel industry, a dry mill plant would lose the full 70 percent of the biodiesel feedstock market. The actual decline is likely to be somewhat smaller since reduced biodiesel demand would reduce industrial corn oil prices which would stimulate other non-food use. However, given the role of industrial corn oil as a biodiesel feedstock the new equilibrium demand and price is expected to be lower than in the presence of the biodiesel industry.

livestock slaughter and rendering industry. Increased use of these products as biodiesel feedstocks increases demand for livestock. EIA reports that 793 million pounds of beef tallow, white grease and poultry fat were used as a biodiesel feedstock in the first 9 months of 2012. This suggests an annual rate of nearly 1.1 billion pounds for the full year. USDA reports production, prices, and per head values for the primary byproducts beef tallow, lard, and choice white grease.<sup>7</sup> These data can be applied to cattle and calf and hog slaughter numbers for Iowa to estimate production.

A recent study on the impact of biodiesel demand on animal fats and tallow prepared for the National Biodiesel Board by Centrec Consulting indicates that biodiesel demand accounts for 60 to 72 percent of the increase in the value per head of these byproducts for beef cattle over the past five years and 60 to 74 percent of the increase in the value per head for hogs (Centrec 2012).

We estimate the contribution of biodiesel to byproduct values using yields published by USDA, 2012 average prices for edible and inedible tallow for cattle and lard and choice white grease for hogs, and changes in byproduct prices caused by biodiesel demand. Applying the price elasticities for tallow and lard with respect to soybean oil discussed in footnote 3, in the absence of an Iowa biodiesel industry, tallow, lard, and white grease prices would be about 36 percent lower than actual. As shown in Tables 3 and 4, byproduct values for cattle would be \$12.21 per head lower than current values and hog byproduct values would be \$1.11 per head lower without Iowa biodiesel production.

Table 3  
Impact of Byproduct Demand on Iowa Cattle

	Edible Tallow	Inedible Tallow	Total Tallow
<b>Actual (2012)</b>			
Yield (lb/cw)	1.20	4.50	
Actual Price (\$/lb)	\$0.44	\$0.48	
Value (\$/cwt)	\$0.53	\$2.17	\$2.70
Value (\$/hd)	\$6.56	\$27.11	\$33.68
<b>Without Biodiesel</b>			
Price (\$/lb)	\$0.28	\$0.31	
Value (\$/cwt)	\$0.34	\$1.38	\$1.72
Value (\$/hd)	\$4.18	\$17.29	\$21.47
<b>Biodiesel Impact (\$/hd)</b>			<b>\$12.21</b>

<sup>7</sup> USDA/AMS Weekly Byproduct Drop Value Cattle, LS 441, and Hogs, LS 446.



Table 4  
Impact of Byproduct Demand on Iowa Hogs

	Lard	Ch. White Grease	Total
<b>Actual (2012)</b>			
Yield (lb/cw)	1.72	0.50	
Actual Price (\$/lb)	\$0.52	\$0.42	
Value (\$/cwt)	\$0.89	\$0.21	\$1.10
Value (\$/hd)	\$2.44	\$0.57	\$3.01
<b>Without Biodiesel</b>			
Price (\$/lb)	\$0.33	\$0.26	
Value (\$/cwt)	\$0.56	\$0.13	\$0.69
Value (\$/hd)	\$1.54	\$0.36	\$1.91
<b>Biodiesel Impact (\$/hd)</b>			<b>\$1.11</b>

### **Impact of the Iowa biodiesel industry on Iowa farms**

The impact of biodiesel production and demand on commodity prices has a substantial impact on the profitability of Iowa crop and livestock farms. We evaluated the impact of biodiesel on three specific farm operations.

1. A row crop farmer with 800 acres split 50/50 between corn and soybeans

A farm that primarily grows corn and soybeans benefits substantially from the Iowa biodiesel industry realizing increased net revenue through higher commodity prices. Holding acres planted constant, commodity production and the associated costs will not change, but farm cash receipts in the absence of the biodiesel industry will fall due to lower crop prices, resulting in lower net farm revenues.

Table 5  
Impact of Biodiesel on an 800 Acre Iowa Corn and Soybean Farm

	Actual 2011/12 Corn	Actual 2011/13 Soybeans	Actual 2011/14 Aggregate
Yield per acre (bu)	172.0	50.5	
Ave Farm Price (\$/bu)	\$6.20	\$12.60	
Gross Revenue (\$/ac)	\$1,066.40	\$636.30	\$1,702.70
Var. Oper Costs (\$/ac)	\$299.12	\$208.85	\$507.97
Net Revenue (\$/ac)	\$767.28	\$427.45	\$1,194.73
Net Revenue 400 ac	\$306,912	\$170,980	\$477,892

	Without Biodiesel Corn	Without Biodiesel Soybeans	Without Biodiesel Aggregate
Yield per acre (bu)	172.0	50.5	
Ave Farm Price (\$/bu)	\$5.87	\$11.56	
Gross Revenue (\$/ac)	\$1,008.87	\$583.64	\$1,592.51
Var. Oper Costs (\$/ac)	\$299.12	\$208.85	\$507.97
Net Revenue (\$/ac)	\$709.75	\$374.79	\$1,084.54
Net Revenue 400 ac	\$283,899	\$149,915	\$433,814
<b>Change in Net Revenue</b>	<b>-\$23,013</b>	<b>-\$21,065</b>	<b>-\$44,078</b>

Variable production costs for a corn and soybean farm were taken from the estimated costs of crop production for Iowa published by the Iowa Agricultural Extension Service. If no changes are made to planting and production, the only impact on crop farmers from no biodiesel production will be provided by lower corn and soybean prices. Applying the price increases resulting from a 29 percent increase in 2012 soybean oil use for biodiesel discussed above to 2011/12 marketing year farm-level prices indicates that the typical Iowa farm with 400 acres each of corn and soybeans would realize a 9.2 percent decline (\$44,078) in net revenue if there were no Iowa biodiesel industry.

2. Impact on a farmer feeder with 1,200 acres split 50/50 between corn and soybeans who feeds 3,500 cattle per year

An Iowa farmer who grows corn and soybeans and feeds 3,500 head of cattle annually benefits substantially from the biodiesel industry. As shown in Table 6, net returns from 600 acres each of

corn and soybeans benefit from higher crop prices. Without an Iowa biodiesel industry, net revenues from crops would decline by 9.2 percent, or \$66,177.

The current environment is challenging for the cattle industry both nationally and in Iowa. Estimated returns for finishing steer calves to choice slaughter weights published by the Iowa Cooperative Extension Service indicate that Iowa cattle feeders lost money in 2012. However, the absence of an Iowa biodiesel industry would have resulted in a larger loss than actually occurred.

An Iowa farmer who feeds cattle benefits from the biodiesel industry primarily through higher revenues. Without a biodiesel industry a farmer that feeds 3,500 head would realize modestly lower production costs despite higher protein (DDG) prices. In large part this is due to a smaller credit for on farm feed use. Estimated budgets for Iowa cattle feeding published by the Iowa Agricultural Extension Service indicate that each head of cattle consumes 47.7 bushels of corn and nearly one ton of protein. ISU livestock economists report that Iowa cattle feeders feed relatively little soybean meal using instead Distillers grains, corn gluten and syrup as a protein source. In place of expensive hay, Iowa cattle feeders use crop residues such as corn stalks and soybean straw which is readily available. Distillers grains prices are affected both by corn (the feedstock) and soybean meal (the competition) prices. In the absence of an Iowa biodiesel industry, lower corn prices are partially offset by higher Distillers dried grains prices.

Revenue from marketings for cattle is higher than would be the case without a viable biodiesel industry. The change in revenue shown in Table 6 results from the price impacts on cattle from increased demand for soybean oil as discussed earlier and byproduct demand shown in Table 3. Because of the impact of demand for fats and oils to produce biodiesel, the biodiesel industry supports higher byproduct (inedible and edible tallow) values that are reflected in the selling price for finished steers. As a result without a biodiesel industry, an Iowa farmer who feeds 3,500 head would realize a loss of \$76,231, three and a half times more than with a biodiesel industry. The bottom line is that biodiesel has a net positive impact on finishing cattle in Iowa.

In addition, aggregate net profit for a farmer who grows corn and soybeans and feeds 3,500 head of cattle would fall \$121,251 in the absence of biodiesel production. In other words the biodiesel industry boosts net farm profit by 17 percent. The details of the impact of biodiesel on a combined corn, soybean and cattle feeding operation are detailed in Table 6.

Table 6  
Impact of Biodiesel Industry on an Iowa Farm Growing  
600 Acres of Corn, 600 Acres of Soybeans and Feeding 3,500 Cattle

	Actual 2011/12 Corn	Actual 2011/12 Soybeans	Actual 2011/12 Crops	Without Biodiesel Corn	Without Biodiesel Soybeans	Without Biodiesel Crops
Yield per acre (bu)	172.0	50.5		172.0	50.5	
Ave Farm Price (\$/bu)	\$6.20	\$12.60		\$5.87	\$11.56	
Gross Revenue (\$/ac)	\$1,066	\$636	\$1,703	\$1,009	\$584	\$1,593
Var. Oper Costs (\$/ac)	\$299	\$209	\$508	\$299	\$209	\$508
Net Revenue (\$/ac)	\$767	\$427	\$1,195	\$710	\$375	\$1,085
<b>Total Crop Net Revenue</b>	<b>\$460,368</b>	<b>\$256,470</b>	<b>\$716,838</b>	<b>\$425,849</b>	<b>\$224,872</b>	<b>\$650,721</b>
<b>Without Biodiesel</b>						<b>(\$66,117)</b>

	Assumptions		Value	Assumptions		Value
Cattle Fed (head)	3,500			3,500		
Steer Price (\$/cwt)	\$122.39			\$121.12		
Market weight (lbs)	1,250			1,250		
<b>PRODUCTION COST</b>						
Corn	\$6.20		\$1,035,090	\$5.87		\$979,247
DDG (30% dry, 70% wet)	\$119.61		\$397,690	\$125.57		\$417,506
Crop Residues	\$35.00		\$44,345	\$35.00		\$44,345
Minerals & Nutrients			\$56,000			\$56,000
Purchase Price			\$4,166,334			\$4,124,671
Other Operating Costs			\$301,105			\$301,105
Credit for on farm feed			<b>(\$460,368)</b>			<b>(\$425,849)</b>
Total Costs			\$5,540,196			\$5,497,025
<b>REVENUE</b>						
Marketings			\$5,354,599			\$5,256,294
Credit for manure			\$164,500			\$164,500
Total Revenue			\$5,519,099			\$5,420,794
<b>Net Profit from Cattle</b>			<b>(\$21,097)</b>			<b>(\$76,231)</b>
<b>Without Biodiesel</b>						<b>(\$55,134)</b>
<b>Total Net Crops &amp; Cattle</b>			<b>\$695,741</b>			<b>\$574,490</b>
<b>Without Biodiesel</b>						<b>(\$121,251)</b>

3. Impact on a farmer feeder with 1,200 acres split 50/50 between corn and soybeans that finishes 16,000 hogs per year

An Iowa farmer who grows corn and soybeans and finishes hogs also benefits from the biodiesel industry. The impact of biodiesel on crop profitability for the hog farmer that grows 600 acres each of corn and soybeans is the same as for a cattle feeder. In the absence of a biodiesel industry profits from producing and marketing corn and soybeans would fall \$66,117 or 9.2 percent.

Without a biodiesel industry, higher costs for soybean meal and Distillers grains virtually offset lower corn prices. When also factoring in a smaller credit for on farm feed use, in the absence of the biodiesel industry total production costs for hogs are higher. Increased demand for fats and oils as shown in Table 4 supports a higher market hog price through increased lard and choice white grease byproduct values than would be the case in the absence of a biodiesel industry. As a result without a biodiesel industry, an Iowa farmer who weans and finishes 16,000 hogs would realize a loss of nearly \$118,000, more than twice than with a biodiesel industry. The bottom line is that biodiesel has a net positive impact on weaning and finishing hogs in Iowa.

When combined with net revenues from corn and soybeans, an Iowa farmer who grows both corn and soybeans and finishes 16,000 hogs annually earned \$130,851 (or 19.7 percent) more in net profit than would be the case in the absence of a biodiesel industry. The details of the impact of biodiesel on a combined corn, soybean and hog finishing operation are detailed in Table 7.

Table 7  
Impact of Biodiesel Industry on an Iowa Farm Growing  
600 Acres of Corn, 600 Acres of Soybeans and Finishing 16,000 Hogs

	Actual 2011/12 Corn	Actual 2011/12 Soybeans	Actual 2011/12 Crops	Without Biodiesel Corn	Without Biodiesel Soybeans	Without Biodiesel Crops
Yield per acre (bu)	172.0	50.5		\$172.00	\$50.50	
Ave Farm Price (\$/bu)	\$6.20	\$12.60		\$5.87	\$11.56	
Gross Revenue (\$/ac)	\$1,066	\$636	\$1,703	\$1,009	\$584	\$1,593
Var. Oper Costs (\$/ac)	\$299	\$209	\$508	\$299	\$209	\$508
<b>Net Revenue (\$/ac)</b>	<b>\$767</b>	<b>\$427</b>	<b>\$1,195</b>	<b>\$710</b>	<b>\$375</b>	<b>\$1,085</b>
<b>Total Crop Revenue</b>	<b>\$460,368</b>	<b>\$256,470</b>	<b>\$716,838</b>	<b>\$425,849</b>	<b>\$224,872</b>	<b>\$650,721</b>
<b>Without Biodiesel</b>						<b>(\$66,117)</b>

	Assumptions		Value	Assumptions		Value
Sows	841			841		
Pigs/litter	8.50			8.50		
Litters/yr	2.24			2.24		
Pigs Finished	16,013			16,013		
Hog Price (\$/cwt)	\$63.85			\$63.19		
Sow price (\$/hd)	\$140.00			\$138.60		
Market weight (lbs)	270			270		
<b>Cost to wean 12# Pig</b>	<b>\$44.70</b>		<b>\$757,949</b>	<b>\$44.54</b>		<b>\$755,095</b>

<b>Cost to finish to 270#</b>						
Corn	\$6.20		\$1,226,380	\$5.87		\$1,160,217
Soybean Meal	\$377.67		\$360,359	\$429.20		\$409,526
DDGS	\$224.13		\$60,800	\$235.30		\$63,830
Other Direct			\$407,912			\$407,912
Indirect Costs			\$526,383			\$526,383
Credit for on farm feed			-\$460,368			-\$425,849
<b>Total Costs</b>			<b>\$2,879,416</b>			<b>\$2,897,109</b>
<b>REVENUE</b>						
Marketings			\$2,760,499			\$2,714,118
Cull Sows			\$65,934			\$65,275
<b>Total Revenue</b>			<b>\$2,826,433</b>			<b>\$2,779,393</b>
<b>Net Profit from Hogs</b>			<b>(\$52,983)</b>			<b>(\$117,716)</b>
<b>Without Biodiesel</b>						<b>(\$64,734)</b>
<b>Net Profit Hogs &amp; Crops</b>			<b>\$663,855</b>			<b>\$533,005</b>
<b>Without Biodiesel</b>						<b>(\$130,851)</b>

## Conclusion

The biodiesel industry has a significant positive impact on the Iowa agriculture economy. Increased demand for soybean oil and other vegetable oils and fats supports higher prices for corn, soybeans, soybean and industrial grade corn oil, cattle and hogs. In addition increased demand for feedstocks to produce biodiesel also increases the value of cattle and hog byproducts such as tallow, lard and choice white grease. These higher values are reflected in the market price for hogs and finished steers. Without the demand for fats and oils from the biodiesel industry, revenue from marketings would decline. As a consequence of these impacts Iowa farmers who grow corn and soybeans benefit from higher net revenues as do Iowa cattle and hog producers. Finally, Iowa ethanol producers benefit from increased revenue provided by increased demand and higher prices for industrial grade corn oil.

Without a viable biodiesel industry, the entire Iowa agriculture sector would suffer reduced profitability and lost revenue.

## REFERENCES

Baier, Scott, Mark Clements, Charles Griffiths, and Jane Ihrig. "Biofuels Impact on Crop and Food Prices: Using and Interactive Spreadsheet". International Finance Discussion Paper No. 967. Board of Governors of the Federal Reserve System. March 2009.

Bard, Sharon and Chris Schroeder "Impact of Biodiesel Demand on Soybean Meal Prices" Presentation to the NBB Conference, February 8, 2012.

Centrec Consulting Group, LLC. "Biodiesel Demand for Animal Fats and Tallow Generates an Additional Revenue Stream for the Livestock Industry". September 2012.

Iowa State University. ISU Extension, Estimated Costs of Crop Production in Iowa- 2011.

<http://www.extension.iastate.edu/agdm/crops/pdf/a1-20.pdf>

Iowa State University. ISU Extension, Livestock Enterprise Budgets for Iowa, 2012.

<http://www.extension.iastate.edu/agdm/livestock/pdf/b1-21.pdf>

Iowa State University. ISU Extension. Estimated Returns for Farrowing and Finishing Hogs or Producing Weaned Pigs in Iowa, 2012. Addendum to M-1284c.

Iowa State University. ISU Extension. Estimated Returns for Finishing Medium No.1 Yearling Steers to Choice Slaughter Grade, Iowa-So. Minnesota. 2012. Addendum to M-1284a.

U.S. Energy Information Administration, Form EIA-22M "Monthly Biodiesel Production Survey"

USDA/AMS Weekly Byproduct Drop Value Cattle, LS 441, and Hogs, LS 446.