This curriculum was developed through a Southern SARE grant and collaboration between Tennessee State University, the University of Tennessee, eXtension.org, and USDA-Rural Development. The objective of this curriculum is to provide training on biomass energy to extension agents and local officials so that they may deliver this information to their stakeholders.
This curriculum and supporting documents can be accessed online (in full and as separate modules) at

http://articles.extension.org/pages/73919

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If you wish to adapt these curriculum materials for your own educational purposes, please contact the Curriculum Author for permission and files:

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Part II: On-farm Biodiesel Production

Federal Assistance and Economics of On-Farm Biodiesel Production

Learning objectives:

• Participants will be able to identify the federal assistance programs that can be used with biodiesel production
• Participants will be able to explain the different costs involved in biodiesel production, the revenue from meal production and the overall cost of producing biodiesel on a per gallon basis.

Materials:

• PowerPoint® slides “Federal Assistance and Economics of On-Farm Biodiesel Production”
• Lesson guide: Use the notes in this lesson guide to present information for each presentation slide.
• Factsheet: “Federal Assistance Programs for Biodiesel Production”
• Factsheet: “Economics of Small-Scale Biodiesel Production”
  Copies of both publications can also be found in the Appendix.
• Questions found at the end of this lesson guide can be used to test participants’ knowledge at the end of the presentation. This can be combined with clickers to improve audience engagement and create discussion.
• An evaluation of the presentation can be found in this lesson guide following the lesson questions.

Topics:

Value-Added Producer Grant
Renewable Energy for America Program
Biodiesel Production Costs
Biodiesel Production Revenue
Biodiesel Production Scenarios
Slide 1
This section will cover some of the federal assistance programs that can be used for biodiesel production. It will also focus on the economics of small-scale biodiesel production.

Slide 2
First, we will go over some Federal Assistance programs that are available related to biodiesel production. One of these is going to have some impact on the overall economics. Next we will go through the steps of how we identified the overall costs to produce biodiesel on a per gallon basis. This will include a look at the investment costs in the equipment, the operational costs to run the equipment and produce the biodiesel, and then finally the estimated income that could be expected from the products produced. Once we have these numbers it will be relatively simple to identify the overall production cost for comparison to regular diesel prices.

Slide 3
The objective of the program is to help agricultural producers enter into value-added activities related to the processing and/or marketing of bio-based value-added products like biodiesel. This type of grant is more for those that wish to sell their biodiesel product.

Eligible grant funds can be used for planning purposes or as working capital for value added projects, new or existing, which will increase revenue to the producer. Planning purposes can include feasibility studies or business plans.

Applicants are independent producers, farmer or rancher cooperatives, and majority-controlled producer-based business ventures. To be eligible, the applicant must produce 50% or greater of the raw commodity that will be used in this value-added product.
Eligible areas have no population restriction.

**Funds available**

Maximum Grant Amount: $75,000 for planning grants; $200,000 for working capital grants. Eligible for up to 50% of project costs.

The Fullen Brothers Farm, Ripley, TN., was awarded a $95,000 planning grant (at that time planning grants could be awarded for more than $75,000) in 2012 to identify the potential uses of an alternative crop crushing facility. The study is being conducted with the assistance of BioDimensions Renewable Oils, Inc. and is looking at specific types of oilseeds, their individual qualities and subsequent production as well as crop planning and rotation.

*Slide 4*

REAP helps finance the purchase of renewable energy systems or to make energy-efficiency improvements on already existing buildings/systems. These systems will require a business level feasibility study as part of the application if the requested amount is over $200,000. If a feasibility study is needed, the cost for this can also be included in the overall project costs in the same grant application.

The REAP funds can be used for the purchase and installation of renewable energy systems such as biomass, hydroelectric, anaerobic digesters, geothermal, hydrogen, wind and solar. Energy systems involving biomass include any that produce fuel like biodiesel, thermal energy or electricity from biomass.

Eligible applicants are agricultural producers and small businesses located in rural areas. Urban agricultural producers may also be eligible. Agricultural producers must derive at least 51% percent of their gross annual income from agricultural operations.

Any area except cities with populations over 50,000 or the adjacent urbanized area is eligible.

**Funds available**

Renewable energy system grants: $2,500 to $500,000

Eligible for up to 25% of project costs.

Energy efficiency improvement grants: $1,500 to $250,000

Eligible for up to 25% of project costs.

Loan guarantees: $5,000 to $25 million
A company, greenGALLON solutionsTM, Cookeville, TN., used a $462,500 grant to purchase biorefinery equipment to increase biodiesel capacity in 2008. The company’s strategy is to create a strategic network of its green MICROTM refineries to meet the growing demand for alternative fuels.

More information about both of these programs can be found by contacting the State Energy Programs Coordinator:

Adia Holland
(615) 783-1373
adia.holland@tn.usda.gov

Since you already have a good understanding of the process involved, this slide simply breaks up the process into two parts; the production cost and the revenue. Under the production cost is going to be the oilseed you are using…what were the costs involved in producing the seed? For our purposes we are going to use canola since that is probably going to be the best feedstock for Tennessee.

Next we have the conversion technology which we now know involves a seed press and a biodiesel processor. These are going to vary based on the size and output of the equipment that is used. In our scenario we will be incorporating the seed press and biodiesel processor that is used by Tennessee State University (TSU). The costs of production will include the cost of the equipment and the operation costs for electricity and chemicals. With the seed press we are able to adjust the rate of production, but faster production meant lower efficiency. TSU did some research that measured the overall output of oil and meal at different speeds so these numbers are used in the calculations for the costs of production. For the purpose of this presentation, we are going to use the “medium” rate of production from the seed press. Technically, the lowest rate is most efficient and will produce a better quality meal that could get a higher price. Since the values based on the quality of the meal are not known we were not able to take this into account. The products are obviously going to be the biodiesel that can be used in producers’ equipment along with the canola meal which can be fed to the producers’ animals or sold to other producers.
Slide 6
This is an overview of the equipment costs involved. The methanol recovery system, if you remember, would allow for the glycerol to be improved which may allow for it to be used in some other way. Either sold to industry or used as an animal feed. This potential for resale was not included in the calculations that will be shown today. The installation cost was basically the cost for the hopper that would feed the seed into up to 4 seed presses at one time. This leads to an overall initial investment cost of $18,835. Assuming a 10-year loan period under full financing, the estimated annual interest payment at the interest rate of 4.5% is about $848 which leads to an annual loan payment of $2,380. So this is the interest plus the payment on the principle of the loan for each year. The overall capital costs and interest on a per gallon basis will depend on the annual production of biodiesel. You can see how they will change based on annual production of 1000 to 2000 gallons.

Slide 7
This slide shows the costs of operation to produce biodiesel. The methanol cost is about $0.36 per gallon while the potassium hydroxide required is $0.24 per gallon which leads to the $0.60 per gallon that you see. The maintenance costs reflect just general wear and tear. The total processing cost includes the capital and interest plus the operating costs. Again you can see how it will change based on overall production.

Slide 8
This slide focuses on the feedstock cost. The average variable production cost of canola is $160 per acre. This is based on a UT enterprise budget and only includes the variable costs. The capital cost of the farm equipment involved is excluded since winter canola production is considered as an extra source of income. Currently the average canola yield in Tennessee is 2100 lbs per acre according to the National Winter Canola Variety Trials. Based on relative oil yields, this gives a feedstock cost between $2.15 and $2.73 per gallon. The range that you see here is based on the 3 different rates of oil extraction from the seed press that I mentioned before. The slowest speed is going to be more efficient
and produce the greatest yield of oil on a per acre basis. For our analysis we used the medium rate as an example.

**Slide 9**
Now if we take the median production level of 1500 gallons per year we end up with a feedstock cost of $2.65 per gallon of biodiesel, operation cost of $1.45 per gallon, and investment and interest cost of $1.82 per gallon of biodiesel produced. This leads to an overall biodiesel production cost of $5.92. Current diesel prices at the pump are about $X.XX per gallon which is much less than it takes to make biodiesel so after all this we find out that it is not economically feasible, right?

**Slide 10**
Not quite. We haven’t added in the value of the seed meal that is produced during the seed pressing. The meal provides anywhere between $2.17 and $3.17 per gallon of biodiesel produced depending upon the rate at which it is produced. Remember higher rates will produce more meal, really it is a higher weight meal, because a lot of the oil will end up in the meal as a result since it is less efficient. If we take the “medium” speed that I mentioned before, the amount of meal produced will give a value of $3.03 per gallon.

**Slide 11**
Now if we take the $5.92 per gallon in total production costs and we subtract the $3.03 per gallon that we can achieve in revenue from the sale or use of the canola meal we will end up with a final production cost of $2.89 per gallon. If you look at the other scenarios on the table the production costs can be further reduced.

The next one is the subsidized valuation. This is if a producer gets a REAP that was mentioned at the beginning that covers 25% of the costs. This will reduce the overall capital costs and result in an overall production cost of $2.44.

The other possible scenarios are for sharing the equipment among farmers. The process lends itself to this quite well. Most likely a producer won’t be using the equipment 24/7 for 365 days out of the year. They
will probably use it to produce the fuel they need for the feedstock they have and then much of the time it might be idle. That allows for multiple users to make their own biodiesel and reduces the initial capital costs by spreading it over multiple owners. This can really reduce the production costs to very low values. Regular diesel probably won’t hit anything this low ever.

Test their Knowledge - Questions for the audience

Q: What grant provides assistant for producers that wish to produce and use their own biodiesel?
A: The Rural Energy for America Program (REAP)

REAP will reimburse up to ___25%___ of the biodiesel equipment costs

Q: If a group of 5 farmers purchased the equipment necessary to produce biodiesel, what would be the relative cost to produce biodiesel on a per gallon basis?
A: $1.41

The product that makes biodiesel production from seed economically viable is the ___canola meal___.

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**Evaluation**

Please give us your feedback regarding this activity. Your feedback will help us improve the activities you attend in the future.

Name of Activity: Federal Assistance and Economics of Biodiesel Production

**A. Instruction**

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The specialist was well prepared.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. The specialist presented the subject matter clearly.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**B. General Learning and Change**

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have a deeper understanding of the subject matter as a result of this session.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. I have situations in which I can use what I have learned in this session.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. I will change my practices based on what I learned from this session.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**C. Specific Learning**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Before this program I knew...</th>
<th>Now I know...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal assistance programs for biodiesel production</td>
<td>Very little</td>
<td>1</td>
</tr>
<tr>
<td>Economics of on-farm biodiesel production</td>
<td>Very little</td>
<td>1</td>
</tr>
</tbody>
</table>

**D. Specific Practices**

<table>
<thead>
<tr>
<th>Practice</th>
<th>Before this program I did...</th>
<th>In the future I will realistically do...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seek information related to biodiesel production</td>
<td>Very little</td>
<td>1</td>
</tr>
<tr>
<td>Apply for the REAP or VAPG programs</td>
<td>Very little</td>
<td>1</td>
</tr>
<tr>
<td>Produce biodiesel</td>
<td>Very little</td>
<td>1</td>
</tr>
</tbody>
</table>

**E. Satisfaction with Activity**

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would recommend this program to others.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**F. Other comments?**

Thank you for completing this survey!
Renewable Energy for America Program (REAP)

REAP helps finance the purchase of renewable energy systems or to make energy-efficiency improvements on already existing buildings/systems. These systems will require a business level feasibility study as part of the application if the requested amount is over $200,000. If a feasibility study is needed, the cost for this can also be included in the overall project costs in the same grant application.

What can it be used for?

The REAP funds can be used for the purchase and installation of renewable energy systems such as biomass, hydroelectric, anaerobic digesters, geothermal, hydrogen, wind and solar. Energy systems involving biomass include any that produce fuel like biodiesel, thermal energy or electricity from biomass.

Who is eligible?

Eligible applicants are agricultural producers and small businesses located in rural areas. Urban agricultural producers may also be eligible. Agricultural producers must derive at least 51% percent of their gross annual income from agricultural operations.

Any area except cities with populations over 50,000 or the adjacent urbanized area is eligible.

How much is available?

- **Renewable energy system grants:** $2,500 to $500,000 Eligible for up to 25% of project costs.
- **Energy efficiency improvement grants:** $1,500 to $250,000 Eligible for up to 25% of project costs.
- **Loan guarantees:** $5,000 to $25 million

Example of award recipient

A company, greenGALLON solutions™, Cookeville, TN., used a $462,500 grant to purchase biorefinery equipment to increase biodiesel capacity in 2008. The company’s strategy is to create a strategic network of its green MICRO™ refineries to meet the growing demand for alternative fuels.
For more information:
or contact your Tennessee Rural Development Energy Programs Coordinator:

Pamela Crozier
(615) 783-1367
pamela.crozier@tn.usda.gov

**Value-Added Producer Grant (VAPG) Program**

The objective of the program is to help agricultural producers enter into value-added activities related to the processing and/or marketing of bio-based value-added products like biodiesel. This type of grant is more for those that wish to sell their biodiesel product.

**What can it be used for?**

Eligible grant funds can be used for planning purposes or as working capital for value added projects, new or existing, which will increase revenue to the producer. Planning purposes can include feasibility studies or business plans.

**Who is eligible?**

Applicants are independent producers, farmer or rancher cooperatives, and majority-controlled producer-based business ventures. To be eligible, the applicant must produce 50% or greater of the raw commodity that will be used in this value-added product.

Eligible areas have no population restriction.

**How much is available?**

Maximum Grant Amount: $75,000 for planning grants; $200,000 for working capital grants.

Eligible for up to 50% of project costs.

**Example of award recipient**

The Fullen Brothers Farm, Ripley, TN., was awarded a $95,000 planning grant (at that time planning grants could be awarded for more than $75,000) in 2012 to identify the potential uses of an alternative crop crushing facility. The study is being conducted with the assistance of BioDimensions Renewable Oils, Inc. and is looking at specific types of oilseeds, their individual qualities and subsequent production as well as crop planning and rotation.

For more information:
www.rurdev.usda.gov/BCP_VAPG.html
or contact your Tennessee Rural Development Energy Programs Coordinator:

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Support for this publication was provided by the USDA National Institute of Food and Agriculture through a Capacity Building Grant.

Dean - Dr. Chandra Reddy, Associate Dean for Extension - Dr. Latif Lighari
The feasibility of farm-scale biodiesel production from oilseed crops has been investigated for oilseed-producing regions (for instance, see Kenkel & Holcomb, 2008), and processing oilseeds into biodiesel is an emerging area. According to University of Vermont Extension (UVM), production of oilseed crops is rare and small-scale oilseed and on-farm biodiesel production remain largely unproven concepts. Farmers generally perceive that they have neither the necessary equipment nor experience to raise these crops. However, if farmers could grow and harvest oilseed crops, press the seeds into vegetable oil and oilseed meal, and process the oil into biodiesel, they could independently produce both liquid biofuel and livestock feed. Early experience with pressing oilseeds into vegetable oil and meal has shown that on-farm oil and meal production is technically feasible (Stebbins-Wheelock et al., 2012).

Production cost and returns are key concerns when deciding to invest in on-farm biodiesel production. Understanding the key economic issues relating to biodiesel production can help potential biodiesel producers make more informed decisions (eXtension, 2012). The cost of biodiesel extraction includes capital costs and variable costs. Capital cost includes the initial investment for equipment and variable costs include chemical, labor, fuel, electricity and annual repair costs.

### Equipment

For on-farm biodiesel production, farmers need to purchase a new or used oilseed expeller press. The expeller uses a motor-driven screw to push the oil-containing seeds against a small outlet under significant pressure to extract the oil. According to UVM, expelling is a continuous method and can reduce meal fat content to 6%–7% and capture 50%–85% of the available oil. To press well, the seed must be clean and have a moisture content of 6% to 9%. If the seed is wet, it does not flow through the nozzle well, and if it is too dry, the press grinds the seed to dust. A biodiesel processor converts the oil to biodiesel using chemicals and the cost of a biodiesel processor varies depending on its size. The cost of an 80 gallon processor varies between $4,000 – $5,000 and an oil press unit is around $8,000 with an additional $2,100 for installation. The equipment cost for a methanol recovery system at current market price is $3,495. Assuming a 10-year loan period under full financing with initial investment cost of $18,835, the estimated annual interest payment at the interest rate of 4.5% (FBU, 2014) is about $848. The depreciation cost per gallon of biodiesel depends on the annual production of biodiesel. For example, depreciation costs per gallon of biodiesel with annual production of 1000, 1500 and 2000 gallons in the unit described above are $1.88, $1.26 and $0.94, respectively.

### Processing Cost

The biodiesel production process requires an alcohol like methanol for the transesterification process (for more information on the transesterification process see de Koff 2013; 2014). About 8 gallons of methanol are needed for a 40 gallon batch of biodiesel. If methanol costs $1.80 per gallon, then each gallon of biodiesel requires $0.36 of methanol.

Potassium hydroxide is one of the common catalysts required to facilitate the reaction between the oil and alcohol to create biodiesel. About 4 pounds of potassium hydroxide is required for a 40 gallon batch of biodiesel. Given that the market price for 45 pounds of potassium hydroxide is around $107, it makes up about $0.24 of the cost for every gallon of biodiesel.

The estimated electricity cost is $0.77 per gallon of biodiesel.
Based on the annual total production of biodiesel in the system, total processing costs could vary from $2.79 to $4.23 per gallon of biodiesel (Fig. 1).

![Figure 1. Estimated processing costs per gallon of biodiesel. Note, these costs exclude feedstock and labor costs.](image)

Note, these costs exclude the feedstock cost. Below, we use canola as an example feedstock for determining cost and revenue. In Figure 1, the labor costs were also excluded since economists often treat labor costs differently and some small-scale producers consider their biodiesel production as a hobby and do not place a value on their time involved (eXtension, 2012).

**Canola Feedstock Cost**

Average variable production cost of canola is about $160 per acre excluding capital costs. The capital cost of the farm equipment involved is excluded since winter canola production is considered as an extra source of income. Since the oilseed expeller can be run at different speeds (low, medium and high), the overall biodiesel yields and costs will differ based on these rates and could vary from $2.15-$2.73 per gallon. With this feedstock cost, total production costs (feedstock + processing) of a gallon of biodiesel could range from $5.53-$6.38.

**Revenue**

In addition to the biodiesel produced, the seed meal produced by oilseed pressing is also of value. The seed meal can be sold or used as an alternative animal feed. As mentioned previously, the seed press can operate at different speeds so the yield of oil (which is converted to biodiesel) as well as the seed meal could vary according to the selected operating speed. The following estimations of biodiesel (Table 1) and seed meal (Table 2) yield and revenue are based on a per acre basis.

**Table 1. Estimated revenue generated from biodiesel production on a per acre basis.**

<table>
<thead>
<tr>
<th>Operating speed</th>
<th>Total oil yield (lbs/acre)</th>
<th>Biodiesel Yield (gallons/acre)</th>
<th>Biodiesel Revenue ($/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>572</td>
<td>74</td>
<td>$283</td>
</tr>
<tr>
<td>Medium</td>
<td>464</td>
<td>60</td>
<td>$230</td>
</tr>
<tr>
<td>High</td>
<td>451</td>
<td>59</td>
<td>$223</td>
</tr>
</tbody>
</table>

*Oil yield is based on two year average (2011 & 2012) winter canola seed yield from national winter canola trials in Tennessee. Accordingly, per acre seed yield was taken as 2,100 lbs.

*The efficiency of oil extraction in the small processing unit ranged between 0.54-0.69 so biodiesel yield from an acre of canola is lower than theoretically expected.

*Biodiesel price was based on US Department of Energy alternative fuel price for the Mid-West region in October 2013.

**Table 2. Estimated revenue generated from seed meal production (per acre or per gallon of biodiesel).**

<table>
<thead>
<tr>
<th>Operating speed</th>
<th>Total Meal Yield (lbs/acre)</th>
<th>Meal Revenue ($/acre)</th>
<th>Seed Meal Value ($/gallon)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1518</td>
<td>$161</td>
<td>$2.17</td>
</tr>
<tr>
<td>Medium</td>
<td>1639</td>
<td>$183</td>
<td>$3.03</td>
</tr>
<tr>
<td>High</td>
<td>1653</td>
<td>$184</td>
<td>$3.14</td>
</tr>
</tbody>
</table>

*Higher operating speed produces comparatively higher meal yield due to the greater amounts of unextracted oil which would affect seed meal quality.

*Canola seed meal price was based on historical price data from USDA-NARS and estimated price based on average price from 2009-2012 which was $297 per ton. Since the price of seed meal would depend on its quality, it was assumed to be $223 per ton.

The lower operating speed is more efficient at extracting oil but does take longer. The lower speed, however, will produce a higher quality meal due to its lower fat content, increasing the meal value. [Though this was not taken into account in Table 2, since actual feed values were unavailable, it is important to keep in mind.] When both biodiesel and meal are taken into account, the total revenue is $407-$444 per acre.

As mentioned previously, the cost to produce biodiesel is $5.53-$6.38 per gallon. This is higher than the current price of regular diesel. If one takes into account the value of the seed meal produced ($3.03 per gallon), the cost to generate biodiesel becomes much lower, about $2.50-$3.35 per gallon.

Farmers also have various options regarding ownership of the equipment involved in this process. Production costs and returns were evaluated under several different ownership scenarios namely individual, subsidized and
shared ownership (Table 3).

Table 3. Profitability of biodiesel production under various ownership scenarios.

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Total Processing Costs ($/gallon)</th>
<th>Total Production Costs ($/gallon)a</th>
<th>Total Production Costs with Meal Value ($/gallon)b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>$3.27</td>
<td>$5.92</td>
<td>$2.89</td>
</tr>
<tr>
<td>Subsidized (25%)</td>
<td>$2.82</td>
<td>$5.47</td>
<td>$2.44</td>
</tr>
<tr>
<td>5 farmers</td>
<td>$1.79</td>
<td>$4.44</td>
<td>$1.41</td>
</tr>
<tr>
<td>10 farmers</td>
<td>$1.64</td>
<td>$4.29</td>
<td>$1.26</td>
</tr>
</tbody>
</table>

Note: The above estimation is based on the biodiesel production under medium processor speed with annual production of 1,500 gallons, feedstock cost of $2.65/gallon biodiesel produced, seed meal value of $3.03/gallon biodiesel produced.

\(a\) Total production cost includes processing cost plus feedstock cost.

\(b\) Total production cost per gallon of biodiesel = Total production costs/gallon – value of seed meal in terms of gallon of biodiesel produced.

The type of ownership mainly affects the capital costs of producing biodiesel. Capital costs per gallon of biodiesel can be considerably reduced under shared ownership or through federal assistance programs (i.e. subsidized 25%). Therefore, farmers could receive even higher net profits per gallon of biodiesel. Also, if seed meal is priced between $0.16 - $0.20/lb ($315 - $436/ton) the production costs could be totally recovered from selling the meal.

References and Resources


Dean - Dr. Chandra Reddy, Associate Dean for Extension - Dr. Latif Lighari