

Module 7 - Financial Benefits of Cover Crops

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Outline

- Partial budgets of cover crop establishment
- Tracking impact on profitability
 - Output
 - Input
- NRCS financial assistance for establishment of cover crops



Cost of Cover Crop Establishment

- The cost of establishment depends on the cover crop species being planted.
- The more species being considered, the higher the cost to plant will be.
 - Some particular species such as daikon radishes and turnips can be quite costly per pound of seed.
- The application method chosen impacts the cost as well.
 - Airplane vs. Drilled vs. Spreader Truck
 - Coverage varies between each method.



Parameters for Budgets

- All costs are on a per acre basis.
- Seed costs were provided from NRCS and were part of a budget project in Gibson County, TN in 2015.
 - Seed costs do vary, but are still approximately the same in 2018 as in 2015.
- Application costs are estimates provided by NRCS and UT Extension.
- All budgets are approximations and farmers' actual expenses will vary.

Establishment Budget #1

Planting Costs (Broadcast Per Acre w/ truck)	\$ 5.00
Seed Cost (5 Species Cover Crop)	
Cereal Rye at 20 lbs. per acre (\$0.42/lb.)	\$ 8.40
Wheat at 26 lbs. per acre (\$0.32/lb.)	\$ 8.32
Crimson Clover at 4 lbs. per acre (\$2.38/lb.)	\$ 9.52
Turnips at 1 lb. per acre (\$3.92/lb.)	\$ 3.92
Radishes at 2 lbs. per acre (\$2.66/lb.)	\$ 5.32
Total Establishment Costs per acre:	\$ 40.48

Establishment Budget #2

Planting Costs (Drilled)	\$ 10.00
Seed Cost (5 Species Cover Crop)	
Cereal Rye at 20 lbs. per acre (\$0.42/lb.)	\$ 8.40
Wheat at 26 lbs. per acre (\$0.32/lb.)	\$ 8.32
Crimson Clover at 4 lbs. per acre (\$2.38/lb.)	\$ 9.52
Turnips at 1 lb. per acre (\$3.92/lb.)	\$ 3.92
Radishes at 2 lbs. per acre (\$2.66/lb.)	\$ 5.32
Total Establishment Costs per acre:	\$ 45.48

Establishment Budget #3

Planting Costs (Broadcast Per Acre w/ plane) *Seeding rates increased by 25%	\$ 14.00
Seed Cost (5 Species Cover Crop)	
Cereal Rye at 25 lbs. per acre (\$0.42/lb.)	\$ 10.50
Wheat at 32.5 lbs. per acre (\$0.32/lb.)	\$ 10.40
Crimson Clover at 5 lbs. per acre (\$2.38/lb.)	\$ 11.90
Turnips at 1.25 lb. per acre (\$3.92/lb.)	\$ 4.90
Radishes at 2.50 lbs. per acre (\$2.66/lb.)	\$ 6.65
Total Establishment Costs per acre:	\$ 58.35

Costs vs. Returns

- When deciding to adopt cover crops, one must look at the return along with the costs.
- Returns typically come in the form of:
 - Higher yields
 - Reduced fertilizer
 - Reduced herbicide use
- Added costs can also develop in the form of:
 - Increased pests
 - Expenses related to the termination of cover crops



Tracking Financial Impact of Cover Crops

- USDA/NRCS has developed a decision-aid tool
 - Cover Crop Economics Decision Support Tool
 - Developed by Lauren Cartwright (Missouri State Economist-USDA/NRCS) and Bryon Kirwan (Illinois State Economist-USDA/NRCS)
 - Spreadsheet is designed to assist producers in deciding the cost of cover crop implementation and benefits provided from cover crops.
 - Decision-aid File can be downloaded from:
<http://www.conservationswebinars.net/webinars/cover-crop-economics-decision-support-tool/?searchterm=Economic>

Cover Crop Economics - Short Term Analysis

The Short Term analysis assesses the immediate cost and benefits. After completing of the short term analysis, an option is available to expand that information to a long term analysis.

Please refer to the "Instructions" worksheet for more detailed guidance on using the tool and entering data.

To get started with a new model, select the current rotation length and then select the "Start Model" button. Enter/edit information in the white boxes. To open an existing default scenario, select the "Defaults" button and follow the instructions provided.

Defaults

Button options: "Start New Model" will clear all entries and take you back to the start of the model.

Start New Model

Clear Entries

Scenario Description

Cotton_Corn rotation. Producer incorporates cover crops in the fall after harvest of each cash crop.

Rotation

Cover Crop - Cash Crop 1

Cover Crop - Cash Crop 2

Any existing model default scenarios are listed below. To create new defaults, run a new model and at the end of the the long term analysis you will have the option to create a default scenario based on the information entered.

To apply the information from an existing default scenario listed below to the model, double click on a default scenario name below.

Default Scenario Names: Double click on a name to open

- 2 Yr Rotation: SoybeansCorn NoGrazing
- 2 Yr Rotation: SoybeansCorn withGrazing
- 2 Yr. Rotation: CottonCorn
- 3 year rotation: Corn Soybean Wheat DCBean
- 3 year rotation: Corn Soybean Wheat Graze

Close

Entering the Crop Data

You will need to enter the yield for each crop along with a current price you can expect to receive for the crop.

Rotation	
<u>Cover Crop - Cash Crop 1</u> Enter cash crop name (e.g. corn, soybeans, wheat): Cotton	<u>Cover Crop - Cash Crop 2</u> Enter cash crop name (e.g. corn, soybeans, wheat): Corn
Yield Units (e.g. bu, cwt, ton): lb	Yield Units (e.g. bu, cwt, ton): bu
Baseline Yield (unit/ac): 1000	Baseline Yield (unit/ac): 150
Value of Crop 1 (\$/unit): \$0.77	Value of Crop 2 (\$/unit): \$3.60

Costs Related to the Cover Crop

Costs

Cover Crop Establishment and Management

Refers to the cover crop that precedes cash crop 1 if applicable
(Use Text Box Below to enter description of cover crop utilized)

crimson clover

Seeding Rate (lb/ac)	30
Seed Cost (include inoculant as needed) (\$/lb)	\$1.70
Calculated Seed Cost (\$/ac)	\$51.00
Planting Cost (\$/ac)	\$20.00
Termination cost (\$/ac) <input type="button" value="Calculate"/>	\$10.00
Increased management costs (\$/ac)	\$0.00
Total Costs Cover Crop Est. & Mgt. (\$/ac)	\$81.00

Yield Decrease

Enter 0 if no yield decrease is expected

Crop Yield Decrease (%)	0%
Crop 1 Decrease (\$/ac)	\$0.00

Other Costs (Enter Description of Cost in Text Box)

Other Cost (\$/ac) \$0.00

Total Cost (\$/ac) \$81.00

Cover Crop Establishment and Management

Refers to the cover crop that precedes cash crop 2 if applicable
(Use Text Box Below to enter description of cover crop utilized)

cereal rye (35 lbs/ac), crimson clover (8 lbs/ac), brassica (1 lb/ac)

Seeding Rate (lb/ac)	44
Seed Cost (include inoculant as needed) (\$/lb)	\$0.66
Calculated Seed Cost (\$/ac)	\$29.04
Planting Cost (\$/ac)	\$20.00
Termination cost (\$/ac)	\$10.00
Increased management costs (\$/ac)	\$0.00
Total Costs Cover Crop Est. & Mgt. (\$/ac)	\$59.04

Yield Decrease

Enter 0 if no yield decrease is expected

Crop Yield Decrease (%)	0%
Crop 2 Decrease (\$/ac)	\$0.00

Other Costs (Enter Description of Cost in Text Box)

Other Cost (\$/ac) \$0.00

Total Cost (\$/ac) \$59.04

Benefits of Cover Crops

- The decision-aid tool highlights four main benefits:
 - Direct nutrient credit (fertilizer reduction)
 - Pesticide reduction
 - Yield increase
 - Erosion reduction



Direct Nutrient Credit

- The N, P, and K credit will vary based upon the cover crop species planted (i.e. legumes tend to provide more N).
 - Soil sample can provide this data.

<u>Direct nutrient credit</u>		<u>Direct nutrient credit</u>	
<i>Enter Nutrient Values:</i>			
Nitrogen (\$/lb):	<input type="text" value="\$0.39"/>		
Phosphorus (\$/lb):	<input type="text" value="\$0.43"/>		
Potassium (\$/lb):	<input type="text" value="\$0.37"/>		
N, reduction in purchased N (lb/ac)	<input type="text" value="0"/>	N, reduction in purchased N (lb/ac)	<input type="text" value="30"/>
P, reduction in purchased P (lb/ac)	<input type="text" value="0"/>	P, reduction in purchased P (lb/ac)	<input type="text" value="0"/>
K, reduction in purchased K (lb/ac)	<input type="text" value="0"/>	K, reduction in purchased K (lb/ac)	<input type="text" value="0"/>
Total Nutrient Credit Benefit (\$/ac)	\$0.00	Total Nutrient Credit Benefit (\$/ac)	\$11.70

Pesticide Reduction (or increase)

- The impact on herbicide use will take a few years to be viable.
 - Vary from field to field and weed pressure

<u>Herbicide/insecticide/fungicide input reduction</u>		<u>Herbicide/insecticide/fungicide input reduction</u>	
<i>Costs include chemical and application</i>		<i>Costs include chemical and application</i>	
Herbicide Costs (\$/ac)	\$80.00	Herbicide Costs (\$/ac)	\$30.00
Percent Reduction	30%	Percent Reduction	10%
Insecticide Cost (\$/ac)	\$0.00	Insecticide Cost (\$/ac)	\$0.00
Percent Reduction	0%	Percent Reduction	0%
Fungicide Costs (\$/ac)	\$0.00	Fungicide Costs (\$/ac)	\$0.00
Percent Reduction	0%	Percent Reduction	0%
Total Reduced Herbicide/insecticide/fungicide benefit (\$/ac)	\$24.00	Total Reduced Herbicide/insecticide/fungicide benefit (\$/ac)	\$3.00

Yield Increase and Erosion Benefit

<u>Yield Increase</u>		<u>Yield Increase</u>	
<i>Enter 0 if no yield increase is expected</i>		<i>Enter 0 if no yield increase is expected</i>	
Crop Yield Increase (%)	<input type="text" value="10%"/>	Crop Yield Increase (%)	<input type="text" value="0%"/>
Crop 1 Increase (\$/ac)	<input type="text" value="\$77.00"/>	Crop 2 Increase (\$/ac)	<input type="text" value="\$0.00"/>
<u>Erosion Reduction</u>		<u>Erosion Reduction</u>	
On Site Lost Fertility Value (\$/ton):	<input type="text" value="\$2.10"/>	← Value is very subjective.	
Off Site Water Quality Damages (\$/ton):	<input type="text" value="\$4.93"/>		
<i>Enter the amount of erosion in tons/ac that is prevented from leaving the field(s) by the addition of cover crops.</i>		<i>Enter the amount of erosion in tons/ac that is prevented from leaving the field(s) by the addition of cover crops.</i>	
Erosion Reduction (ton/ac)	<input type="text" value="4"/>	Erosion Reduction (ton/ac)	<input type="text" value="4"/>
<i>Enter other costs prevented due to reducing erosion such as machinery costs to repair erosion in the field or ditches.</i>		<i>Enter other costs prevented due to reducing erosion such as machinery costs to repair erosion in the field or ditches.</i>	
Erosion Repair (\$/ac)	<input type="text" value="\$0.00"/>	Erosion Repair (\$/ac)	<input type="text" value="\$0.00"/>
Total Erosion Benefit (\$/ac)	<input type="text" value="\$28.12"/>	Total Erosion Benefit (\$/ac)	<input type="text" value="\$28.12"/>

Other Benefits Embedded in Tool

<u>Other Benefit</u> (Enter Description of Benefit in Text Box)		<u>Other Benefit</u> (Enter Description of Benefit in Text Box)	
<input type="text"/>		<input type="text"/>	
Other Benefit (\$/ac)	\$0.00	Other Benefit (\$/ac)	\$0.00
<input type="button" value="Close Grazing"/>			
<u>Grazing Infrastructure Costs</u>		<u>Grazing Infrastructure Costs</u>	
Fence (\$/ac)	\$0.00	Fence (\$/ac)	\$0.00
Watering Facilities (\$/ac)	\$0.00	Watering Facilities (\$/ac)	\$0.00
Added Labor/Management (\$/ac)	\$0.00	Added Labor/Management (\$/ac)	\$0.00
Grazing Costs (\$/ac)	\$0.00	Grazing Costs (\$/ac)	\$0.00
<u>Grazing Stockers</u>		<u>Grazing Stockers</u>	
Additional Expected Daily Gain (lb/head/day)	0	Additional Expected Daily Gain (lb/head/day)	0
Value of Gain (\$/lb)	\$0.00	Value of Gain (\$/lb)	\$0.00
Days of Grazing	0	Days of Grazing	0
Stocking Rate (head/ac)	0	Stocking Rate (head/ac)	0
Grazing Benefit (\$/ac)	\$0.00	Grazing Benefit (\$/ac)	\$0.00
Total Grazing Benefit (\$/ac)	\$0.00	Total Grazing Benefit (\$/ac)	\$0.00
<input type="button" value="Open Baling"/>		Additional sections of of production that cover crops can benefit.	
<input type="button" value="Open Seed Production"/>			

Short Term Analysis Results

- The final product of the tool is designed to show you the economic benefit over the two years being evaluated.

Total Benefit (\$/ac) \$129.12

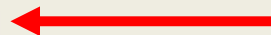
Total Benefit (\$/ac) \$42.82

Short Term Analysis Results

Cover Crop - Cash Crop 1	Results Explanation
Total Cost (\$/ac)	\$81.00
Total Benefit (\$/ac)	\$129.12
Net Benefit (\$/ac)	\$48.12

Cover Crop - Cash Crop 2	
Total Cost (\$/ac)	\$59.04
Total Benefit (\$/ac)	\$42.82
Net Benefit (\$/ac)	-\$16.22

Continue to Long Term Analysis



Cover crops are a long-term investment. So, the long-term analysis is worth taking a look at.

Analysis Results

Profitability versus Affordability: (Economic versus Financial Analysis)

The **Economic Analysis Results** compares the amortized costs and benefits and answers the question; Is this management change profitable over the lifespan of the analysis? The answer is yes if the Net Benefits (\$/ac/yr) is positive. The Net Benefits equals the total amortized benefits minus total amortized costs. If the Economic Analysis Net Benefits result is negative, then this is not a good investment overall economically.

The **Financial Analysis Results** answers the question; Is this management change affordable? Depending on the variables in the model, on a year to year basis there may be a negative net benefit, especially in the first few years of utilizing cover crops in the rotation until the longer term soil benefits are realized. In a partial budget frameworks, such as this analysis, a short term negative net benefit indicates the cost of the investment in the soil in order to benefit from the long term benefits of improved soil health. The producer can use this analysis to determine if he/she can afford this investment, or use the model to assess alternative to make the investment more affordable for the operation.

Economic Analysis Results:

Summary:	
Analysis Lifespan (years)	25
Short Term Benefits (\$/ac/yr)	\$87.99
Long Tem Benefits (\$/ac/yr)	\$18.79
Total Costs (\$/ac/yr)	\$70.61
Total Benefits (\$/ac/yr)	\$106.78
Net Benefits (\$/ac/yr)	\$36.17

Financial Analysis Results:

Year	Costs (\$/ac)	Benefits (\$/ac)	Net Benefit (\$/ac)
1	\$81.00	\$129.12	\$48.12
2	\$59.04	\$42.82	-\$16.22
3	\$81.00	\$129.12	\$48.12
4	\$59.04	\$42.82	-\$16.22
5	\$81.00	\$129.12	\$48.12
6	\$59.04	\$42.82	-\$16.22
7	\$81.00	\$129.12	\$48.12
8	\$59.04	\$42.82	-\$16.22
9	\$81.00	\$129.12	\$48.12
10	\$59.04	\$42.82	-\$16.22
11	\$81.00	\$157.78	\$76.78
12	\$59.04	\$71.48	\$12.44
13	\$81.00	\$157.78	\$76.78
14	\$59.04	\$71.48	\$12.44
15	\$81.00	\$157.78	\$76.78

Menu Options:



View Graphs

View Print Summary

Save Model

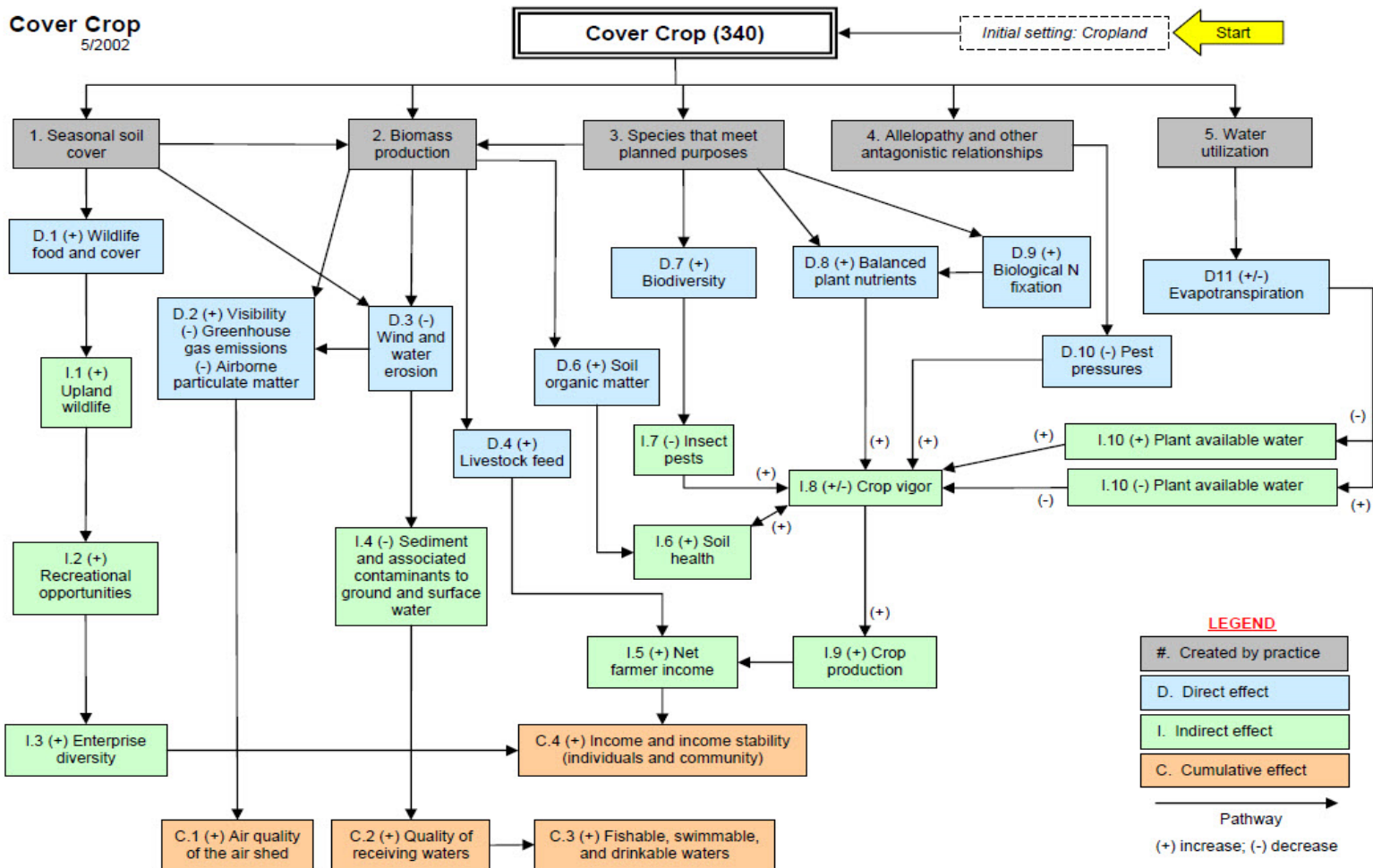
Manage Default Scenarios

Return to Short Term Analysis

Financial Impact of Cover Crops

- There is not a single cover crop mix that is a **guaranteed** to increase yield or reduce expenses.
- When it comes to financial impact, cover crops' advantages and disadvantages will vary from farm to farm and from year to year.
- Example:
 - In a dry year, cover crops can help hold moisture to improve yields.
 - In a wet year, cover crops may delay planting to the point that yields are reduced.

Cover Crop
5/2002

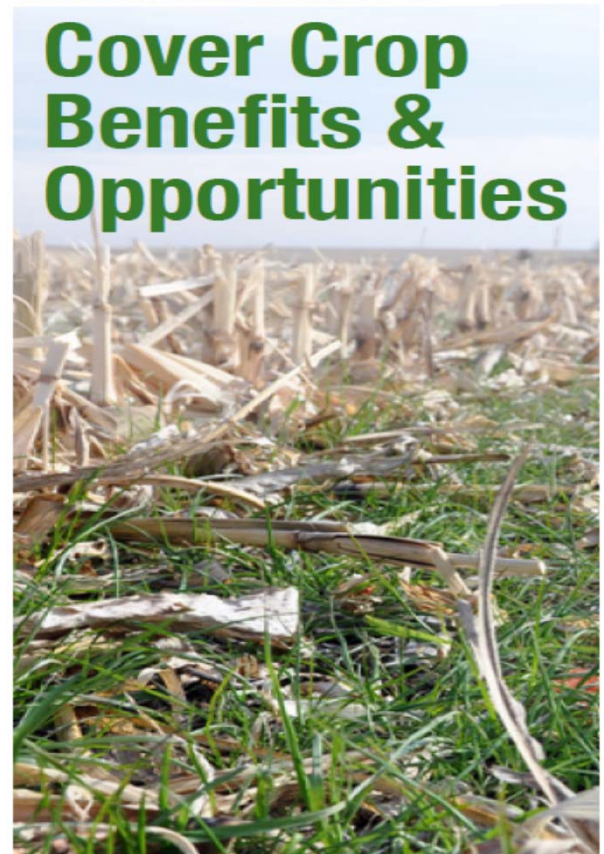


Note: Effects are qualified with a plus (+) or minus (-). These symbols indicate only an increase (+) or a decrease (-) in the effect upon the resource, not whether the effect is beneficial or adverse.

The diagram above identifies the effects expected to occur when this practice is applied according to NRCS practice standards and specifications. These effects are subjective and somewhat dependent on variables such as climate, terrain, soil, etc. All appropriate local, State, Tribal, and Federal permits and approvals are the responsibility of the landowners and are presumed to have been obtained. All income changes are partially dependent upon market fluctuations which are independent of the conservation practices. Users are cautioned that these effects are estimates that may or may not apply to a specific site.

Financial Assistance Available to Farmers

- Funds are available to help farmers with the establishment of cover crops.
- NRCS allows farmers 3 years to gain experience planting cover crops.
- Funding is through EQIP
- Payment rates based on seed mixture.
- Contact your local NRCS office for more details.



Reimbursement Rates

Fiscal Year	Effective Date	Single Species	Multi Species (5)	*Note
2018	October 1, 2018	\$51.50 - \$72.61	\$74.04 to \$88.85	
2019	October 1, 2017	\$20.27	\$45.39	*Actual values could vary upon species planted.

***Note: These are the cost share reimbursement rates. Participants will receive this amount regardless of the actual cost.**

Conclusion

- Financial impact of cover crops is a combination of the impact on both inputs and outputs.
- Cover crops are a long-term investment.
 - To truly realize their economic benefit, farmers have to look at multiple years of data on **their farms**.
- NRCS and universities have created many tools to help with measuring the financial impact of cover crops.
- NRCS provides cost share in establishing cover crops.

Questions?

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