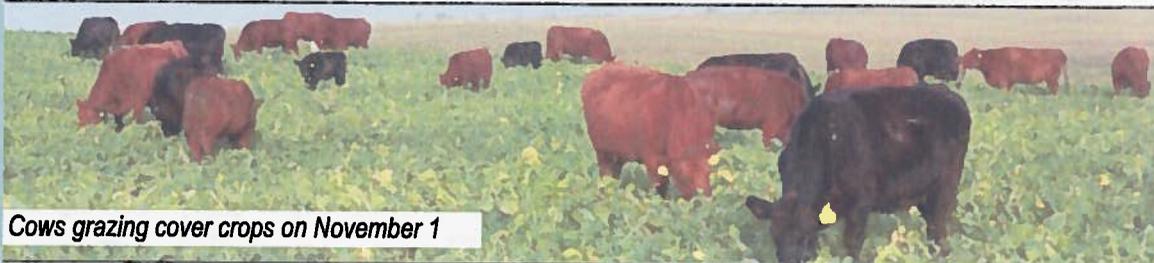


# Adding Cover Crops to Continuous Corn with Grazing

Missouri Cover Crop Economics Case Study 2  
June 2015

*Costs and benefits are highly variable from operation to operation. The information presented here is provided as an introduction to the economic variables associated with adding cover crops to a continuous corn and grazing operation. For an operation-specific analysis refer to the For More Information section.*



Cows grazing cover crops on November 1

Photo Credit: Dr. Ken Nimrick

## Introduction

Utilizing cover crops provides many benefits to soil and water resources. However, some farmers may question the affordability of incorporating cover crops into their operations. Partial budgeting is a tool to help answer that question.

In a partial budget analysis the focus is on changes in the operation. To keep the analysis relevant to the operation, the focus of this assessment is on the on-farm cover crop costs and benefits. Additionally, only benefits that can be easily expressed in dollar terms are assessed.

When assessing the economics of cover crops, time horizon matters. The short term (typically less than 10 years) assesses the immediate economic impact of adding cover crops. The long term assesses the continued long term utilization of cover crops which may lead to additional economics benefits (aka: Soil Health).

## Case Study

A farmer has a combination cow/calf and cropping operation, and is utilizing winter cover crops to integrate grazing on the crop acres to reduce feed costs and improve the soil health on the crop acres. Both the cash crop and cover crops are no till planted. He has been grazing cover crops for seven years. There are 540 acres of cropland and 600 acres of pasture in this part of the operation. He has approximately 200 cows and calves in spring and fall. The cropland is planted to short season (88-day corn) each spring. Corn harvest occurs late August or early September, and cover crops are immediately no till planted. The cover crop mix utilized is as follows:

Cover Crop Species	Seeding Rate (lbs/acre)
Triticale	20
Purple Top Turnip	4
Oats	20

In general, the cows and weaned steers are turned out to graze the cover crops the beginning of November. The grazing is not intensively managed. On average the cows graze the cover crops for six weeks and are then removed from the cover crops.

Prior to planting the following corn crop, the cover crop is terminated with glyphosate and the field is no till planted back to corn. The farmer has not seen a significant difference in yield between the 88-day corn and longer season varieties planted elsewhere on his operation. In addition, he has not experienced negative impacts of the cows on the cropland such as compaction or ruts. He feels that the no till and cover crop helps the soil be more resilient to the animal impacts, and he is careful to remove the cows before they over-graze the cover crops.



## Use Partial Budget Analysis to Assess the Economics of Cover Crops

- Focus only on what changes (adding cover crops).
- Focus on the Costs and Benefits realized on-farm.
- Focus on benefits that can be easily monetized.

## In General

- Keep your cover crop seed and planting costs as low as possible to meet your objectives.
- Good management is the key to maximizing the benefits of cover crops.
- Incorporating grazing is a reliable way to capture short term benefits from cover crops.

## For More Information

To assess the costs and benefits for your farm a spreadsheet based tool is available to download from the [NRCs Missouri Soil Health Website](http://www.nrcs.usda.gov/missouri-soil-health-website)

## Contact

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## Analysis

### Costs

Cover Crop Before Corn		Grazing Infrastructure	
Cover Crop Seed (\$/acre) - Winter Triticale, 20 lbs/acre, \$0.31/lb Purple Top Turnip, 4 lbs/acre, \$1.70/lb Spring Oats, 20 lbs/acre, \$0.30/lb	\$19.00	Fence (\$/acre) <sup>1/</sup>	\$49.17
Cover Crop Planting (\$/acre)	\$20.00	Watering Facilities (\$/acre) <sup>2/</sup>	\$71.52
Cover Crop Termination (\$/acre)	\$10.00		
<b>Total Cost (\$/acre)</b>	<b>\$49.00</b>	<b>Total Cost</b>	<b>\$120.69</b>

### Benefits

Cover Crop Before Corn	
Grazing Value (\$/acre) - 2.7 AU/ac, 35 lb/AU/day forage demand, 42 days grazing, \$80.00/ton forage value	\$158.76

### Results

#### Short Term

Grazing Infrastructure One Time Investment Cost \_\_\_ -\$120.69/ac  
 Cover Crop mix for grazing before Corn net benefit \_ \$109.76/ac  
 Year 1 Net Cost \_\_\_\_\_ -\$10.93/ac

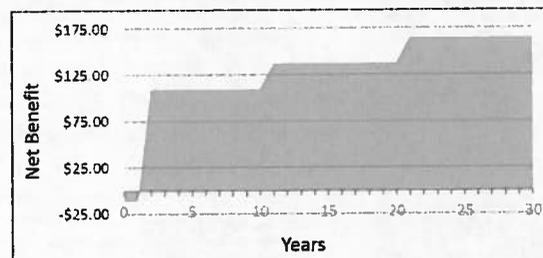
#### Long Term

If the farmer continues to utilize cover crops in his rotation he will experience improvements in the physical and biological properties of the soil. One way to measure this improvement is through soil organic matter. For each 1 percent increase in soil organic matter (based on increasing the active carbon content in the soil) approximately 20 lb/acre of plant-available nitrogen becomes available. Additionally, the water-holding capacity of the soil increases, reducing the risk of drought-induced yield reductions in dryland farming systems. Assuming it takes this farmer 10 years to increase soil organic matter 1 percent, the additional benefits after year 10 are \$27.50/acre/year.

Long Term Benefits	
Soil Fertility (\$/acre/year) - 20 lbs/acre plant available N at \$0.55/lb	\$11.00
Water Storage (\$/acre/year) - avoided yield reduction due to drought <sup>3/</sup>	\$16.50
<b>Total Long Term Benefits (\$/acre/year)</b>	<b>\$27.50</b>

#### Combining the Short Term and Long Term Results

Year 1	Net Cost	-\$10.93/acre
Years 2-10	Net Benefit	\$109.76/acre
Years 11-20	Net Benefit	\$137.26/acre
Years 21-30	Net Benefit	\$164.76/acre



### Conclusion

**Incorporating grazing of cover crops into a cash crop operation is a reliable way to capture short term benefits from cover crops and increase the overall profitability of the operation. To maximize the long term soil health benefits of the cover crops, grazing must be managed to balance the forage needs of the livestock with the needs of the living organisms in the soil. Over grazing cover crops can have a negative effect on long-term soil health benefits.**

1/ Grazing Infrastructure - Fence details: Total perimeter 4 strand hi-tensile electric fence = 13,720 ft at \$1.70/ft = \$23,324. Total internal 1 strand electric temporary fence = 6,720 ft at \$0.48/ft = \$3,225.60. Total fence investment = \$26,550 /540 acres = \$49.17/ac

2/ Grazing Infrastructure - Watering Facility details: Three freeze proof faucets and portable tanks are utilized. Portable tank + freeze proof faucet = \$223.00/each \* 3 = \$669.00. Assume 15,000ft of pipeline needed at \$2.53/ft = \$37,950. Total watering facility investment = \$38,619/540 acres = \$71.52/ac.

3/ Assuming a possibility in any given year of a 2% yield reduction due to a drought period. Corn at 165bu/ac \* \$5/bu \* 2% = \$16.50 average annual benefit from avoided yield reduction.