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.
- Depending on the market, diversifying the crop rotation is one option to consider to improve net benefits and increase opportunities for incorporating 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

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Adding Cover Crops for Seed Production to a Corn/Soybean Rotation

Missouri Cover Crop Economics Case Study 3
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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 for seed production to a corn/soybean operation. For an operation-specific analysis refer to the For More Information section.

Field of Cereal Rye and Hairy Vetch grown for seed

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

Several years ago, a no-till corn-soybean farmer started looking for ways to diversify his rotation and incorporate cover crops to improve soil quality, reduce soil erosion, and increase the profitability of his operation without expanding in size. There are 750 acres of cropland in the operation. Before adding cover crops, even with no-till and terraces, the farmer experienced an annual erosion rate of 4 tons per acre on his farm. In addition to adding winter cover crops before soybeans and corn, the farmer expanded his rotation to include cover crops for seed production and double cropped sunflowers. The cover crops utilized are as follows:

Cover Crop Species	Seeding Rate (lbs/acre) Cover Only	Seeding Rate (lbs/acre) Cover + Seed Production
Cereal Rye/Hairy Vetch	30/20	56/25
Radish	2	--

After the initial year of growing cover crop for seed, the farmer has not had to purchase any additional cereal rye and hairy vetch seed because he holds back a portion of his seed production for his own use. On the acres planted to cover crop prior to soybeans and corn he purchases 2lb/ac radish to add to the cover crop mix. Corn and soybeans are no till planted into the standing cover crop and either terminated with herbicide prior to planting (in dry springs), or planted into the living standing cover and terminated after planting (in wet springs).

The addition of the cover crops has reduced the erosion on the farm to less than 1 ton per acre. The farmer has also noticed an improvement in soil quality and a significant increase in earthworm populations. The addition of the cover crops for seed production and double cropped sunflowers to his rotation has increased the profitability of his operation.

Analysis

Costs

Cover Crop	
Cover Crop Seed ($/acre) - Radish 2 lb/acre, $2.25/lb	$4.50
Cover Crop Planting ($/acre)	$20.00
Cover Crop Termination ($/acre)	$10.00
Total Cost ($/acre)	$34.50

Benefits

Rotation	Net Income ($/acre/year)	New Rotation Net Benefit ($/acre/year)
Soybean/Corn Original Rotation	$257.50	
Rye-Vetch Seed-DC Sunflower/Soybean/Corn (First New Rotation)	$315.57	$58.07
Rye-Vetch Seed-DC Sunflower/Soybean/Corn (After First Rotation)	$336.42	$78.92

Results

Short Term

Cover Crop Cost:_____ -$34.50/acre
First New Rotation Cycle Benefit: _____$58.07/acre
First New Rotation Cycle Net Benefit: _____$23.57/acre
After First Rotation Cycle Benefit: _____$78.92/acre
After First Rotation Cycle Net Benefit: _____$44.42/acre

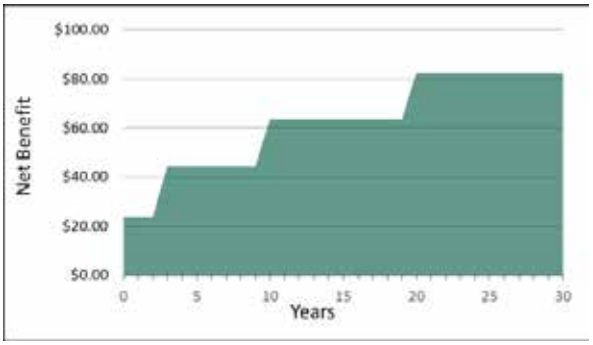
Long Term

If the farmer continues to utilize cover crops and more diversity 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 $19.00/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 1/	$8.00
Total Long Term Benefits ($/acre/year)	$19.00

Combining the Short Term and Long Term Results

Year 1-3 Rotation Net Benefit $23.57
Years 4-10 Rotation Net Benefit $44.42
Years 11-20 Rotation Net Benefit $63.42
Years 21-30 Rotation Net Benefit $88.42



Conclusion

This farmer is able to combine incorporating cover crops into his rotation to reduce erosion and improve soil health with diversifying the rotation to improve the profitability of his operation in both the short term and long term.

1/ Assuming a possibility in any given year of a 2% reduction due to a drought period. Soybeans at 44bu/ac$10/bu*2%=$8.80. Corn at 145bu/ac*$5.00/bu*2%=$14.50. Rye Seed at 30bu/ac*$9.50/bu*2% = $5.70. Vetch Seed at 300lb/ac*$1.00/lb*2%=$6.00. Sunflower at 1800lb/ac*$0.20/lb*2%=$7.20. ($8.80+$14.50+$5.70+$6.00+$7.20)/5=$8.00 (rounded)*