ECONOMICS of Soil Health Systems

Middle Kickapoo River Watershed of Wisconsin

FARM SIZE
1,400 acres
620 cows, 540 of which are lactating

CROPS GROWN
- Corn
  950 acres
- Alfalfa
  300 acres
- Oats/Alfalfa
  150 acres

SOIL TEXTURE
- Clay loam

SOIL HEALTH MANAGEMENT SYSTEM
- No-till production
- Cover crops
- Corn-alfalfa-oats rotation
- Soils amended with dairy manure
- Monitoring of soil nutrient levels

NET INCOME INCREASE
- Grain Corn
  $39.26/acre
- Silage Corn
  $15.41/acre

INTRODUCTION
The Jack Herricks farm in the Middle Kickapoo River Watershed of Wisconsin increased profitability by increasing corn yields with a soil health management system (SHMS) of no-till production and cover crops. No-till production has been practiced for 35 years and cover crops planted after corn that is cut as silage for 10 years.

Benefits of the SHMS reported by the farmer:
- IMPROVED DRAINAGE AND WATER INFILTRATION
- DECREASED SOIL COMPACTION
- INCREASED SOIL ORGANIC MATTER

ADDITIONAL INFORMATION ON THE FARM IS AVAILABLE IN A REPORT AND VIDEO PRESENTATION AT WWW.NACDNET.ORG/SOIL-HEALTH-ECONOMICS.

METHODS
The Soil Health Institute conducted an interview to obtain production information for evaluating economics of the soil health system based on partial budget analysis. In this approach, the benefits and costs of a soil health system are assessed by calculating changes in revenue and expenses before and after adoption of that system. The change in net farm income associated with adopting a SHMS is calculated as shown below and presented in Table 1.

Initial Management System and Reduced Expenses
- The initial management system was conventional tillage corn for grain production.
- Post-plant weed management was exclusively with herbicide in conventional tillage.
- A field trip with a field cultivator and with a vertical tillage implement were eliminated.
- Total reduced expenses were $27.51/acre.

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Soil Health Management System and Additional Expenses

- The soil health management system adopted was no-till corn for grain production with cover crops.
- Cover crop seed costs were $10.00/acre before planting corn for grain.
- A cover crop of winter/cereal rye was drilled by custom application for $15.00/acre after the preceding corn crop was harvested for silage.
- Corn for grain was planted after terminating the cover crop with herbicide.
- Post-harvest expenses due to increased yield were hauling, drying, and check-off fee for corn fed as grain.
- Total additional expenses were $51.25/acre for corn fed as grain and $12.10/acre for corn fed as silage.

Soil Health Management System Impact on Farm Income

- Additional expenses were $23.74/acre greater than reduced expenses for grain corn.
- Additional expenses were $15.41/acre less than reduced expenses for silage corn.
- Grain corn yield increased 15 bu./acre, with additional revenue of $63.00/acre.
- Net farm income increased $39.26/acre for corn fed as grain and $15.41/acre for corn fed as silage.

Table 1. Partial Budget\(^1\) Analysis, 35 Years with a Soil Health Management System on an 800-Acre Farm, $ per Acre per Year (2019 Dollars).

<table>
<thead>
<tr>
<th>Expense Category</th>
<th>BenEFITS Reduced Expense</th>
<th>Additional Expense</th>
<th>COSTS Reduced Expense</th>
<th>Additional Expense</th>
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<tbody>
<tr>
<td>Seed</td>
<td>0.00</td>
<td>10.00</td>
<td>0.00</td>
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<tr>
<td>Fertilizer &amp; Amendments</td>
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<td>Pesticides</td>
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<td>Fuel &amp; Electricity</td>
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<td>1.34</td>
<td>3.26</td>
<td>1.03</td>
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<tr>
<td>Labor &amp; Services</td>
<td>7.81</td>
<td>20.45</td>
<td>7.81</td>
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<td>Post-harvest Expenses</td>
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<td>6.75</td>
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<td>0.00</td>
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<tr>
<td>Equipment Ownership</td>
<td>16.44</td>
<td>9.57</td>
<td>16.44</td>
<td>7.00</td>
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<tr>
<td><strong>Total Expense Change</strong></td>
<td><strong>27.51</strong></td>
<td><strong>51.25</strong></td>
<td><strong>27.51</strong></td>
<td><strong>12.10</strong></td>
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<table>
<thead>
<tr>
<th>Expense Category</th>
<th>Additional Revenue</th>
<th>Reduced Revenue</th>
<th>Additional Revenue</th>
<th>Reduced Revenue</th>
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<tr>
<td>Yield, bu./acre</td>
<td>15.00</td>
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<td>Price Received,(^2) $/bu.</td>
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<td>4.20</td>
<td>4.20</td>
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<td><strong>Revenue Change</strong></td>
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<td><strong>0.00</strong></td>
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<table>
<thead>
<tr>
<th><strong>Total</strong></th>
<th><strong>BENEFITS</strong></th>
<th><strong>TOTAL COSTS</strong></th>
<th><strong>BENEFITS</strong></th>
<th><strong>TOTAL COSTS</strong></th>
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<td><strong>Total Change</strong></td>
<td><strong>90.51</strong></td>
<td><strong>51.25</strong></td>
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<td><strong>12.10</strong></td>
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<td><strong>Change in Net Farm Income</strong></td>
<td><strong>39.26</strong></td>
<td><strong>15.41</strong></td>
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\(1\) Expenses and expected yields based on farmer reported production practices. (https://soilhealthinstitute.org/economics/)