

Profitability of Conservation Systems: A Case Study of 20 Iowa Farms

Heath Ellison, CCA 4R NMS & SSP
Iowa Soybean Association



An investigation completed by Regional Strategic, Ltd. with funding provided by the Iowa Soybean Association and the Walton Family Foundation



Participant Selection

- ▶ 20 farm operators were selected by Iowa Soybean Association staff

Participant Interviews

- ▶ Initial interviews solicited
 - ▶ General farm information
 - ▶ Crop production and conservation practices, costs, and outputs for the 2018 crop production year
 - ▶ Between 2017 harvest and 2018 harvest
 - ▶ Farm lifecycle and succession information



8 Participants Were Selected for Follow-up Interviews on 7 Topics

- ▶ Records management and information systems
- ▶ Risk management
- ▶ Cover crop valuation and monetization
- ▶ Reduced tillage
- ▶ Nitrogen management
- ▶ Land ownership impacts
- ▶ Farm transitions and succession



Covered and Non-covered Portions of Rotations Compared in 3 Ways

- Averages across all participants (17) who supplied sufficient information for comparison
- Averages for participants who produced both covered and non-covered crops in a specific rotation and could distinguish yields between covered and non-covered acreage
- Averages for participants who either covered all acreage within a specific rotation or covered no acreage within that rotation

Table 7: Production practice and cost for participants raising only covered or non-covered crops in any given rotation

| | Beans After Corn | | Corn after Beans | | Corn after Corn | |
|---------------------------------|------------------|--------------|------------------|--------------|-----------------|--------------|
| | and Cover | and No Cover | and Cover | and No Cover | and Cover | and No Cover |
| Acres | 1591.6 | 1489.0 | 1901.2 | 2181.0 | 1182.0 | 280.0 |
| Yield goal (bu./acre) | 60.0 | 60.0 | 210.3 | 212.2 | 200.0 | 204.3 |
| Actual yield (bu./acre) | 65.4 | 58.4 | 209.6 | 204.5 | 164.9 | 193.2 |
| Actual yield as percent of goal | 109.1 | 97.3 | 99.7 | 96.4 | 82.5 | 94.6 |

| | | | | | | | |
|---|-------------------------------------|------|------|------|------|-------|------|
| 6 | field cultivate pass cost (\$/acre) | 0.00 | 0.00 | 4.66 | 0.00 | 0.00 | 0.00 |
| 7 | NH3 application cost (\$/acre) | 0.00 | 0.00 | 0.84 | 0.20 | 0.00 | 1.96 |
| 8 | Strip-till pass cost (\$/acre) | 2.39 | 0.00 | 4.86 | 4.94 | 12.70 | 2.75 |
| 9 | side dress pass cost (\$/acre) | 0.00 | 0.00 | 2.37 | 3.69 | 1.97 | 7.30 |

Impact of adding covers to rotation

| Rotation | Input costs | Yield | Net profitability | 203.88 | 291.23 | 308.16 | 289.99 | 378.01 |
|---------------------|-------------|-------|-------------------|---------------|---------------|---------------|---------------|---------------|
| Corn following soy | ↕ | ↕ | ↕ | 20.00 | 19.91 | 17.92 | 12.96 | 19.35 |
| | | | | 2.00 | 2.00 | 2.21 | 2.98 | 2.00 |
| | | | | 13.50 | 12.61 | 13.96 | 14.58 | 14.24 |
| | | | | 0.00 | 0.41 | 0.56 | 0.00 | 0.46 |
| | | | | 0.00 | 4.44 | 6.25 | 0.00 | 6.07 |
| | | | | 62.48 | 104.53 | 101.93 | 111.14 | 117.21 |
| | | | | 203.88 | 310.56 | 308.16 | 314.01 | 378.01 |
| Corn following corn | ↕ | ↘ | ↘ | | 6.38 | | 16.34 | |
| | | | | 203.88 | 304.18 | 308.16 | 297.66 | 378.01 |
| | | | | 0.00 | 12.19 | 0.00 | 13.52 | 0.00 |
| | | | | 0.00 | 7.14 | 0.00 | 7.54 | 0.00 |
| | | | | 0.00 | 0.00 | 0.00 | 2.95 | 0.00 |
| Soy following corn | ↕ | ↗ | ↕ | | | | | |
| | | | | 203.88 | 310.56 | 308.16 | 314.01 | 378.01 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | | | | | | | |
|----|------------------------------------|--------|--------|--------|--------|--------|--------|
| 25 | Reported cover subsidies (\$/acre) | 6.57 | | | | | |
| 26 | Net reported costs (\$/acre) | 213.15 | 203.88 | 304.18 | 308.16 | 297.66 | 378.01 |

Cover Crop Production and Herbicide, Insecticide, and Fungicide Expenditure

- In all comparisons, the \$ value of total pesticide expenditures per acre were lower on acreage following cover crops

| | Cover | No cover | Cover savings |
|-------------------------------|--------------|-----------------|----------------------|
| Soybean following corn | 41.76 | 44.85 | 3.09 |
| Corn following soybean | 40.33 | 45.39 | 5.06 |
| Corn following corn | 42.18 | 49.79 | 7.60 |

| Row | | Beans After Corn | | Corn after Beans | | Corn after Corn | |
|-----------|----------------------------------|------------------|--------------|------------------|--------------|-----------------|---------------|
| | | and Cover | and No Cover | and Cover | and No Cover | and Cover | and No Cover |
| 18 | Fertilizer: All (\$/acre) | 55.11 | 53.85 | 85.12 | 98.29 | 91.20 | 116.10 |

- In 3 of 4 comparisons where producing cover crops was advantageous, \$/acre fertilizer costs were lower for crops following a cover
- In all 6 comparisons where corn was the production crop, fertilizer expenditures per acre for acreage following a cover crop were either equal to or lower than fertilizer costs per acre on acreage not following a cover crop
- For 2 of 3 comparisons where soybeans were produced, acreage following a cover crop showed higher average fertilizer expenditures per acre than acreage that did not follow a cover crop

On average, our participant population was targeting a nitrogen application rate 30 lbs. N/Ac over the MRTN recommendation.



Participant Cover Crop Harvest

- ▶ 5 participants harvested cover crops on 560 acres in 2018
- ▶ Harvested covers netted a total of \$78,160 (an average of nearly \$140 per acre) after harvest costs were paid
- ▶ Cover crop products include
 - ▶ Grazing – 250 acres
 - ▶ Hay – 150 acres
 - ▶ Harvesting grain for seed or feed – 160 acres
 - ▶ Straw – 4 acres
- ▶ Nearly all participants harvesting cover crops indicate an intention to expand the practice



Participant Record Systems

- ▶ Participant record keeping systems appeared to range from
 - ▶ No or minimal discernable record system (about 1/3 of all 20 participants)
 - ▶ Computerized accounting and implement-generated agronomic data (about 1/3 of participants)
 - ▶ The final third are scattered between
- ▶ Good record systems do not appear to be a function of farm size
- ▶ Good record keeping systems appear to be correlated with younger participants
 - ▶ But one of the best systems observed was on the operation of an older participant



Record Keeping Follow-up Interviews

7 selected participants with good record systems

- Generally more engaged in conservation practices
- None cultivated corn following corn
- Cover 68% of row-crop acreage (compared to 45% for other participants)
 - 4 cover all row-crop acreage
- 3 are profiting from cover crop harvests or support activities



Record System Costs Are Not Trivial

- ▶ Record system costs among 7 participants ranged from
 - ▶ \$1.50 per acre
 - ▶ \$19.69 per acre
- ▶ Average was \$5.14 per acre
- ▶ 2 had expenses of over \$10.00 per acre
- ▶ 5 had expenses below \$8.00 per acre

Measuring, documenting, and evaluating profitability is every bit as important to accelerating the pace of conservation adoption as is gathering yield data, measuring soil and phosphorus losses, calculating nitrogen loss, or evaluating soil health impacts.



IOWA SOYBEAN *Association*

Thank you

Heath Ellison

hellison@iasoybeans.com

515.494.7230

Regional Strategic, Ltd.