

## ROI vs. Yield

*Data collection and analysis maximizes output per dollar invested.*

**Every farmer has low performing spots** from drainage or sandy knolls. Data tracking enables you to assign costs to these areas and make more informed decisions.

This isn't much different than how factory managers gauge different production variables like labor and material cost, although weather is more of a factor. Stated another way, what is the highest allocation of working capital, this field zone or that field zone?

Seth Lawrence, based in Brook, Indiana, uses data to make profit maps instead of yield maps. He knows which agronomic practices and field zones are most profitable. His data-tracking technology manages equipment cost and identifies ROI (return on investment) on agronomic decisions. Input ROI by soil type or zone varies because some soils are more productive than others.

*Seth Lawrence relies on profit maps based on reams of data, instead of yield maps.*

His data also removes emotion from rent negotiations, Lawrence says. Detailed records favored walking away from a 1,300-acre potential rental parcel that wouldn't pencil out for his operation. With existing landowners, the Lawrences use Iowa State University Extension's flex rent calculators to identify what works for both sides.

Other profit-boosting moves include consolidating equipment and labor with a neighbor, planting soybeans before corn and customizing fertility, fungicide, tillage and hybrid decisions.

Maximizing output per unit of input builds profits and sustainability, says Dave Muth, Iowa farmer and creator of AgSolver, a field zone-based profitability software owned by EFC Systems. AgSolver is one of several software programs Lawrence uses.

### KNOW THE NUMBERS

Lawrence uses several data-tracking programs to support his decisions. Harvest Profit, for example, tracks his input expenses/quantities and profit and loss in real time based on today's market prices, market positions and hedges. Knowing his numbers extremely well enables Lawrence to craft a marketing plan to quickly identify opportune moments to take a profit.

In 2018, before the soybean export tariffs, he'd locked in 52 bushels per acre at a \$9.83 average cash price by April 13.

His best investment continues to be installing pattern tile. Each dollar spent has returned \$50 per acre, on average, based on a 10-year tile-amortization schedule. On family ground, he's seen up to a 45-bushel increase in corn yields on ground that otherwise couldn't move much water and a 10- to 15-bushel increase in soybean production.

Data also enables him to preview the payback of fungicide, biologicals and various hybrids.

For agronomic decisions, he relies on tools including Harvest Profit, John Deere Operations Center, Climate FieldView, FARMserver, I.F.A.R.M., Sentra (NDVI drone imagery) and EFC Systems AgSolver.

Not everyone wants to spend that much time at a desk, so Lawrence's Decision Farming LLC data-consulting service documents these decision options for clients. He's gained valuable perspective from viewing other operations across more variable soils and topographies. His Newton County loamy soils are less variable.

Comparing hybrids and several seeding rates, Lawrence compares which hybrid and seeding rate was most profitable on which soil types/fields. His best ROIs result from corn populations of 34,000 to

36,000 per acre with double-stack hybrids. This saves about \$13 per acre over triple-stack hybrids, he says.

He's also tracked various fertilizer treatments. In 2018, he applied a large percentage of N (nitrogen) on corn preplant (anhydrous ammonia with N-Serve) followed by planting applications (2 x 2 application of 28% N combined with in-furrow applications of N, P [phosphorus], K [potassium], S [sulfur], Zn [zinc] and insecticide).

In-furrow applications showed a net gain at \$12.10 per acre the in 2017 and 2018 (costing \$24.33 per acre and increasing corn yields by 10.5 bushels per acre based upon corn sold at \$3.47).



### SOYBEANS BEFORE CORN

Lawrence's yield data also supported planting soybeans before corn. Planting beans as early in April as possible gave him a two-year total-farm soybean yield average of 76 bushels per acre compared to 55 to 65 bushels for traditional planting schedules (planting a month to a month and half later).

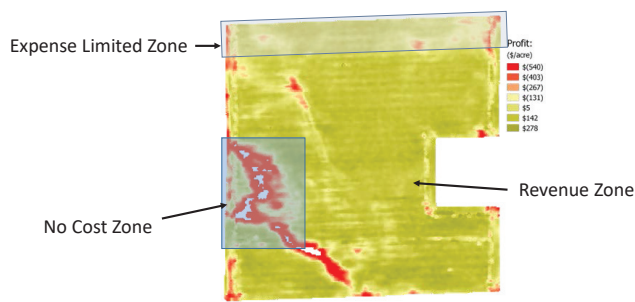
He's also moved to a lower maturity: Group 2.3 to 2.8 compared to Group 3.1 to 3.8 before. For the 2019 crop season, Lawrence added maturities in the mid- to late 1s and also tested populations down to 100,000 seeds per acre.

### RIGHT-SIZING EQUIPMENT

Sharing equipment and labor with a neighbor was a major strategic cost-cutter. When the Lawrences do buy equipment, it complements the neighbor's fleet. Instead of buying a new corn head recently, they opted to allocate that machine just to soybeans, as their 1,940 total soybean acres outweighed 1,360 corn acres. Running two combines in beans and a third in corn helped them finish corn and beans by Oct. 23 in a difficult 2018/2019 harvest season with lodging.

Buying a larger self-propelled sprayer will conservatively save \$40 to \$64 per acre, enable direct-injecting multiple products and allow more timely, >

## Field Zones Plot Profits



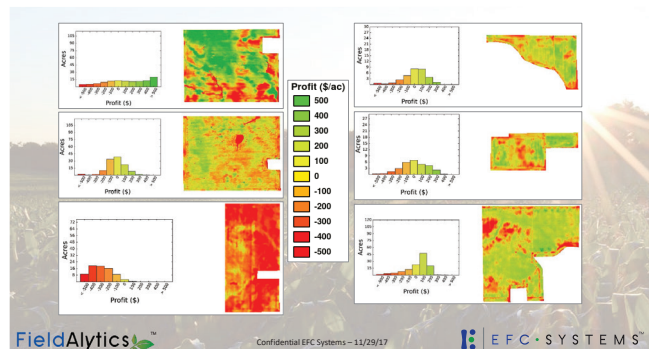
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EFC SYSTEMS

### ROI-Focused Agronomic Management

Viewing this field's profit potential with AgSolver FieldAlytics, the revenue zone has profit potential of \$5 to \$278 per acre. The red No Cost Zones represent areas where input application loses between \$131 to \$540 per acre. The Expense Limited Zone at the top deserves close input-level scrutiny in order to break even or profit.



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### Impact of Subfield Variability on Profit

Profit maps instead of yield maps reveal field zones that can lose or make up to \$500 per acre, depending on how you manage them. In some cases, idling the red zones makes you more profitable, AgSolver's Dave Muth says.

SOURCE: EFC SYSTEMS AGSOLVER



*Combining equipment and labor with a neighbor to cover 3,600 acres (weather permitting) in 15 days saves more than 50% for Jack Lawrence (left) and son Seth.*

possibly more accurate application than commercial applicators. “Working together, we can plant all 3,300 acres in 15 days or better, if necessary,” Lawrence says.

#### TWO PLANTERS, NARROW ROWS

Lawrence also switched from 30-inch soybean rows to 20-inch using two planters. “Many data sets showed a positive ROI in narrower row beans,” Lawrence says. “We close the canopy faster and can still run down the rows with sprayers. We’ve had good yield results and better late-season weed control from earlier canopy closure. We haven’t had any mold issues.

“Beck’s Hybrids’ hard data on bean-row width has shown a significant advantage over 30-inch beans in our area,” he adds. “Their multirow width planter continues to add more data from multiple widths in the same field, something that would be hard for us to do on our own.”

#### APPLICATION ADVANTAGE

Lawrence found a 3- to 4-bushel-per-acre soybean yield advantage with a fungicide/biological trial. Data tracking reveals a \$9.66-per-acre product cost and a 3-bushel increase (at \$9.24 soybeans) amounts to \$18-per-acre ROI. Each field had a 120-foot check strip of unapplied beans to test the effectiveness of the application and the ROI. Lawrence will continue to test these products for a multiyear data set.

#### TILLAGE TESTS

Comparing no-till and vertical tillage with similar fields, soils and conditions, Lawrence has seen a \$10- to \$15-per-acre ROI with vertical tillage (VT). “Higher yields from VT more than offset added trips, labor, fuel and equipment costs over no-till, given weather risks of cold, wet springs,” he says.

More consistent residue sizing and soil warming in wet springs hedges their weather bets, the data shows. “We now hit everything in fall with a Landoll VT to size and mix residue, then spring preplant anhydrous followed by 40-foot Great Plains Turbo-Max to even out the seedbed before planting.” Lawrence kept some fields in no-till to compare results and consulted Beck’s Hybrids trials, too. He’s seen better residue breakdown, earlier soil warming in spring and more even seedbeds and emergence. He also tracks fuel use by power unit and by implement to further refine equipment sizing and fuel economy.

#### RETAILER ERRORS

Meticulous records showed Lawrence’s fertilizer dealer billed him for more product than his inventory showed. His Harvest Profit input reports, with corresponding inventory and product usage reports, identified the error. “Harvest Profit allows me and my retailer to track inputs by operation, by entity, by farm or down to the field level, across multiple entities and ownership structures,” he explains. Having profit and loss by field also smooths out banker meetings. They use this information to project the new crop year, in-season, and consider potential expansion. His banker’s interested in using Lawrence’s software for other clients to mitigate some risk by knowing an operation’s numbers more precisely.

#### HYBRIDS SELECTION/POPULATION

Lawrence’s data-consulting practice illustrates the ROI of variable-rate seeding on more variable soils than his own: “Comparing ROI by hybrid, by zone [using AgSolver and budgets/cost data from Harvest Profit] gives us a pretty clear picture which zones handle high, medium and low populations based upon ROI rather than straight yield,” Lawrence says. He bases calculations on each field’s soil type, yield history and hybrid. “After harvest, we compare crop budgets to actual seeding and harvest results. Clients need a pretty good data set to benefit from this technology.”

Lawrence can answer the question: Where is the best investment of \$1? “For us, it’s drainage; for others, it may be something else. But, we like to remove the guesswork.” ///