The Dollars and Data

Evaluating the Real Costs of Conservation

The economics of winter cover crops

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Cover crops should not be thought of in terms of short-term returns

Observed means: 74 site-years in Wisconsin no-till corn and soybean systems

Change versus no cover	Corn	Soybean
Following-crop yield	−2.3%	−1.3%
Net return before payments	**−$55.92/ac**	**−$43.47/ac**

Why results vary: seed and fieldwork costs; establishment and termination; water and nutrient competition; crop response and purchases avoided.

Stute, SARE LNC21-456 final report. Study means and prices; not national averages or specialty-crop forecasts.

Five ways to think about a cover crop

Do not assume a short-term profit increase. Identify the reason it could be worthwhile.

A cover crop can be…	The question to answer
1. A tool for a specific problem	What is the opportunity cost of this problem?
2. A substitute for an input or task	Farmer labor time. An expensive input
3. An investment in the soil	Can you or someone else reap benefits in the future?
4. Protection against a loss	Insurance against downside risks?
5. A service others help pay for	Preventing soil or chemical input runoff.

A decision framework, not a promise of five separate income streams.

1. Solving a Specific Problem
Herbicide Tolerant Weed Control
A worked example

Cereal rye for Palmer amaranth in Southern cotton

Cereal rye cover	Arkansas, 2019–20	Georgia, resistant Palmer, 2012–13
Weed treatment	Reduced weeding labor −$9.00	−$6.97 herbicides
Cover crop cost	+$35.06 (rye 75 lb/acre)	+$88.91 (rye 90 lb/acre, 40 lb N, rolling)
Yield changes	2019: +89 lb (not significant; poor stand) 2020: +196 lb lint/acre (significant)	+2 lb lint/acre
Net return	**2019: +$8.50** **2020: +$113.31**	**−$80.51**

Arkansas: rye paid when rye had a good stand.
Georgia, resistant Palmer: same yield, $81 less net return.

Farr et al. (2022), Weed Technol., Tables 3, 10; Shurley et al. (2014), Beltwide Cotton Conf., Tables 2–3.

Continuous management is still needed

Seedbank: viable seeds can remain for years.

Georgia burial study: 9–22% of Palmer amaranth seed was still viable after 36 months. This is not a measured cover-crop depletion rate.

Resistance: reducing numbers does not restore susceptibility.

Keep preventing seed return and scouting for escapes.
A clean-looking crop is not evidence that the old herbicide works again.

A cover crop can suppress the weed. It does not reset resistance.

Sosnoskie et al. (2013), Georgia seed longevity; Oreja et al. (2022), eight-year resistance study.

Choose the cover crop for the job: biomass first

Grasses build biomass; legumes supply N; brassicas give fast fall cover.

Cover crop (plant family)	What it delivers	Nitrogen counted
Cereals (grass): cereal rye, wheat, oats	Most biomass, slowest to break down: weeds, erosion, soil carbon	No fixed N; holds leftover N, can tie up N early
Legumes (broadleaf): crimson clover, hairy vetch	Most N; less biomass, breaks down faster	60–75 lb (crimson clover), 80–100 lb (hairy vetch)
Brassicas (broadleaf): radish, turnip	Fast fall cover; taproots open compacted soil; can winter-kill, leaving little spring residue	No fixed N; takes up leftover N in the fall
Mixes: cereal + legume (± brassica)	Biomass plus some fixed N; each part does its own job	No extra N credits for legumes in a mix

For weeds, erosion and soil carbon, start with a high-biomass cereal.
Add a legume only if you will cut the N rate, and count it separately.

NC State AG-869; Sievers & Cook (2018); Roberts (UA); Chen & Weil (2010); McClelland et al. (2021); Shurley et al. (2014).

Grazing: compare avoided forage cost with cover cost

Cereal rye on soybean field; no yield gain assumed.

Affected cost	No cover: feed hay	Cover: graze rye
Hay purchase (1,093 lb at $80/ton)	$43.72	$0
Cover crop seed and seeding	$0	$37.00
Subtotal of costs shown	$43.72	$37.00
Avoided cost minus cover establishment	**—**	**+$6.72/acre**

Assumptions: 1,500 lb rye dry matter × 50% use = 750 lb usable forage.
Hay is 88% dry matter with 22% feeding loss. Existing spring burndown; no added termination cost.

Savings depend on quality of the stand, number of hay purchases replaced, etc.

Myers, Weber & Tellatin, SARE (2019), Table 4, note 7 and baseline costs. Historical assumptions; not a field-trial return.

Aid Transition to No-till

What the cover crop supplies in the first years without tillage

Early no-till years can cost yield

Across 610 studies, no-till yields were lower on average. The gap was smallest where residue stayed on the surface.

Residue protects the soil surface

Less crusting and sealing. Cover crops raised water infiltration about 35%; no-till alone showed no significant change.

Roots do some of the loosening

Cover crop roots grow through compacted layers and leave channels the next crop follows. Radish did this better than rye.

Residue takes over weed control

Heavy rye residue suppresses weeds that tillage used to control (slide 5). A thin stand does not.

A cover crop supplies the residue and roots that loosen the soil for new no-till. It can reduce the challenges of the transition.

Pittelkow et al. (2015), Nature; Basche & DeLonge (2019), PLOS ONE; Chen & Weil (2010), Plant and Soil; Farr et al. (2022).

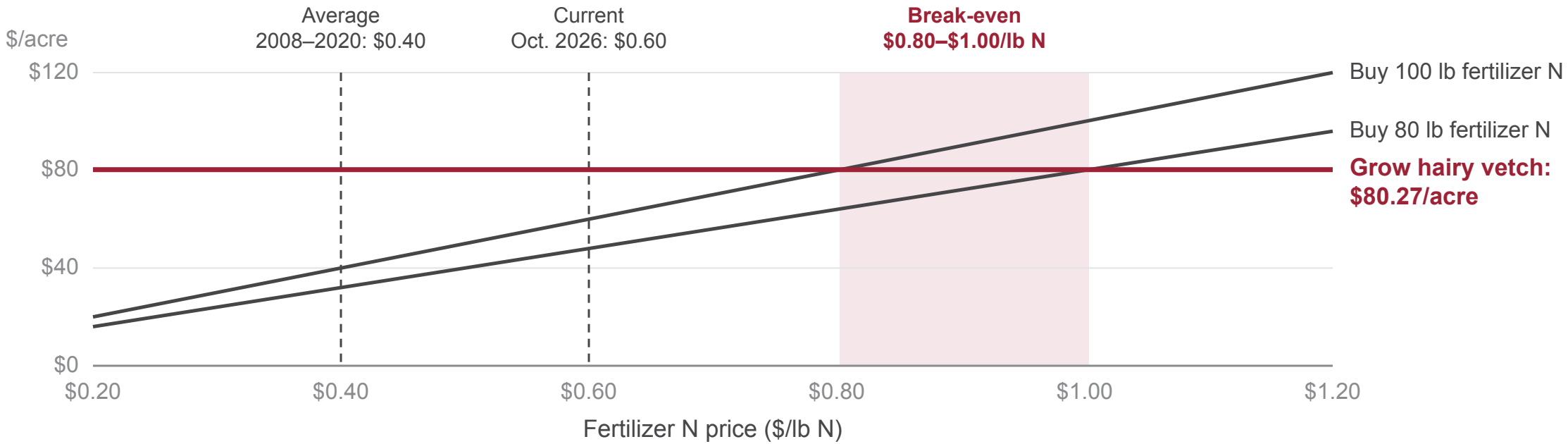
2. Replacing an Expensive or Risky Input

Labor Time

Some Examples

Input Cost Replacement: Nitrogen

Hairy vetch costs $80.27/acre to grow and supplies 80–100 lb N

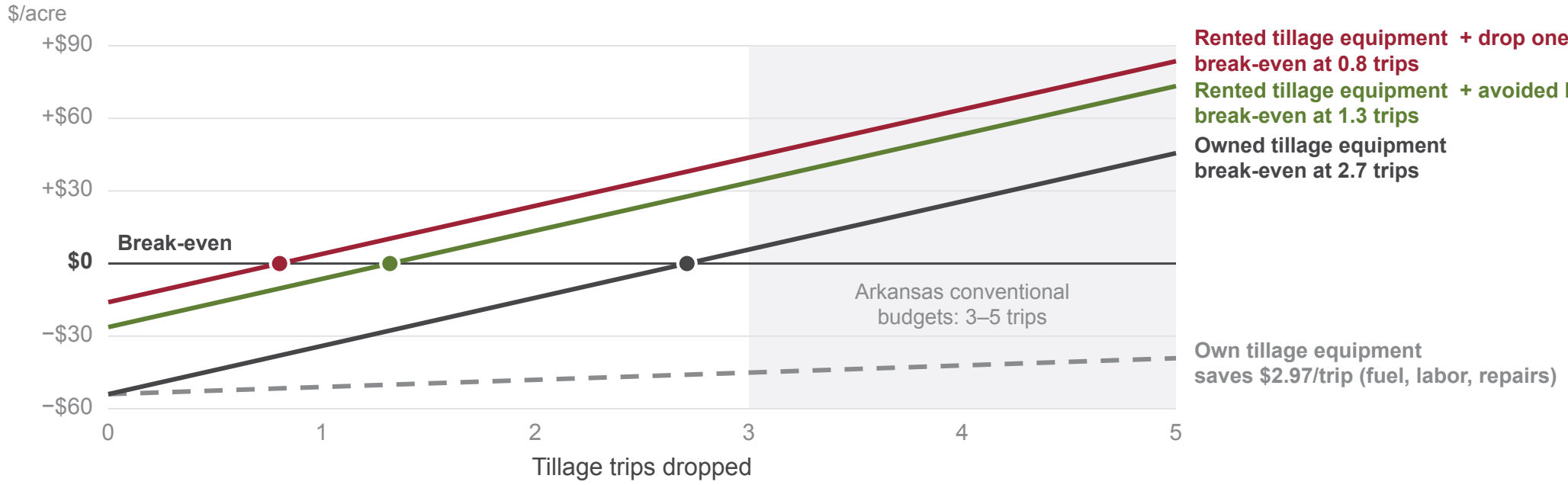


Vetch N costs $0.80–$1.00/lb; fertilizer N is $0.60 today.
N would have to rise 34–67% for vetch to pay its way.

Vetch seed $2.40/lb × 20 lb (Green Cover, 2026); drill $19.05, spray $8.50 (Iowa custom rates, 2026); interest 7.5%, 10 months; N supplied: NC State AG-869; anhydrous: farmdoc daily, DTN.

Input Cost Replacement: Labor and Field Passes

Net change in return vs. conventional tillage without a cover crop



Own the tillage tools: dropping trips saves only fuel and labor.
Hire them: rye pays after about 3 trips, sooner with other savings.

2026 Arkansas crop budgets (trips, own-equipment costs, cotton PRE: Brake + Cotoran $29.50); Iowa custom rates 2026 ($19.92/trip, $8.50 spray); rye $53.98, vetch $80.27 (slides 11–12); avoided N: 90 lb at $0.60/lb.

3. An Investment in the Soil

The focus is biomass accumulation and time horizons

The investment questions

Will I hold the land long enough?
What measurable change do I expect?
How does it create economic value?

The evidence is mixed

Maryland trials after 5–7 years:
net returns versus no cover
corn about $60–90/ac lower;
soybean about $60/ac lower.

Time creates an opportunity for benefits to develop.

White et al. (2022), organic vegetables; Zhang et al. (2024), Maryland corn and soybean. System-specific results.

How many years to recover the early losses?

SARE corn budget, change in return versus no cover, $/acre. Cover crops combined with no-till

Year	Annual return	Running balance	Balance with 7.5% interest
Year 1	−$31.36	−$31.36	−$31.36
Year 2 *	−$14.97	−$46.33	−$48.68
Year 3	+$1.42	−$44.91	−$50.91
Year 4 *	+$9.66	−$35.25	−$45.07
Year 5	+$17.90	−$17.35	−$30.55
Year 6	+$17.90	**+$0.55**	−$14.94
Year 7	+$17.90	+$18.45	**+$1.84**

Corn breaks even in year 6, or year 7 with interest.

Myers, Weber & Tellatin (2019), Tables 4–5. * Years 2 and 4 interpolated; years 6–7 held at year 5. Illustrative, before payments.

4. Protection Against Losses

The 2012 drought: crop insurance vs. a cover crop

Corn, per insured acre, all plans and coverage levels (RMA Summary of Business)

2012	Illinois insurance	Arkansas insurance	Cover crop (SARE)
Average coverage level	79%	59%	—
Liability per acre	$814	$403	—
Total premium (premium rate)	$50.61 (6.2%)	$40.13 (10.0%)	—
Farmer-paid premium	$22.17	$11.12	$37 cost
Indemnity / drought benefit	$310.97	$41.52	+$58.70 yield income
Net to the farmer, 2012	**+$288.80**	**+$30.40**	**+$27.34**

A cover crop can help reduce losses in waster stress years. Relative returns increase in higher risk areas.

USDA RMA Summary of Business by coverage level (calculated). SARE (2019), Table 4: national budget at 2012 prices.

5. Subsidized Off-Farm Services

Credits and Off-Sets

Environmental credit payments

Cereal rye on a farm already in no-till, $/acre

	Before payment	With Bayer cover crop payment
Cover crop cost (rye)	−$53.98	−$53.98
Credit payment for the cover crop	—	+$6.00
Change in return from cover cropping	**−$53.98**	**−$47.98**

No-till payment: another $6, but earned with or without the cover crop, so it does not offset the rye.
Terms: 5-year contract per field, practice every year, 10-year retention.

A $6 payment covers about a ninth of the rye.
The 10-year commitment comes with it.

Bayer Carbon Program, 2026 terms (bayerforground.com/carbon-initiative). No nitrogen-credit market found open to Arkansas row crops.

Stacking EQIP with a credit payment

Cereal rye, $/acre: Bayer's $6 plus EQIP

Situation	Before payments	With Bayer $6	EQIP needed alone	EQIP needed, stacked
Already no-till (no trips to drop)	−$53.98	−$47.98	$53.98	**$47.98**
Own tillage tools, drop 3 trips	−$45.07	−$39.07	$45.07	$39.07
Hire tillage, drop 2 trips	−$14.14	−$8.14	$14.14	$8.14
Hire tillage, drop 3 trips	+$5.78	+$11.78	$0 (already ahead)	$0 (already ahead)

Stacking lowers the EQIP payment needed by $6.
Check both contracts before counting both payments.

Bayer allows other programs only if no carbon assets are created and the other program permits it. Bayer: 10-year retention; EQIP: limited contract years.

Additional Consideration

Know your risks

Maximizing your Experience with Cover Crops

Best practices with cover crops maximize the potential for positive experiences

Decision	Rule of thumb
Mix for the cash crop	Legumes or broadleaves before corn reduce pest transfer. Legumes can add nitrogen for the corn crop
When to plant	Early. Arkansas: Sept 15–Oct 15. Georgia Coastal Plain: by Halloween. Allows for biomass accumulation before winter. Later planting is possible but reduces options
When to terminate	Rye 10+ days before corn; earlier in a dry spring to reduce pest transfer and moisture competition
Irrigated vs. rainfed	Biomass rather than yield gains via water infiltration benefits is typically the goal in irrigated systems
Should I no-till?	Only if passes disappear. Returns increase if the equipment is rented
Seed costs	Price pure live seed. Broadcasting needs ~15% more seed

Plant early, pick the right plant family, terminate on time, and price the whole stand.

Roberts (UA); UGA Extension; Acharya et al. (2017); Garba et al. (2022); Light et al. (2022); mixture review; SDSU/NRCS.

Are Cover Crops Right for My Farm?

A summary of findings and parting comments

Do cover crops make sense on my farm?

It can make sense when…

A specific problem costs you money
It replaces a purchase, pass or labor
You will hold the land long enough
Bad years are a real risk
A program helps pay

Think twice when…

No pathway applies
Benefits arrive after your tenure ends
No payment bridges the shortfall
The shortfall exceeds your limit
You can’t plant or terminate on time

Know the cost per acre and for the farm, before and after assistance.
Start small, keep a check strip, and review the case each year.
A clear reason and a known cost make a sound decision.

Stewardship is a legitimate reason too, as long as the cost is known and affordable.

Questions?

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