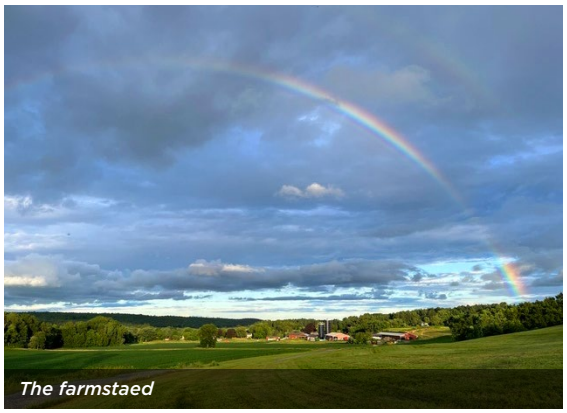
No-Till or Low-Till

Nutrient Management

# Valleyside Farm, CT
## WESTERN NEW ENGLAND RCPP SOIL HEALTH CASE STUDY

JUNE 2024



*The farmstaed*

Lucas Young is an eighth-generation dairy farmer, growing corn silage and hay alongside his father and son on 600 acres of sandy loam to supply forage to Valleyside Farm's 500 cows. The Youngs adopted cover cropping when Lucas was very young, and it is considered part of the farm's baseline operation. This case study will focus on Valleyside Farm's implementation of no-till and nutrient management.

The Youngs began experimenting with unconventional forms of tillage in 2007. Lucas' grandfather had been resistant to changing the way the farm cultivated its row crops, but as Lucas describes, "After going to college and coming home and seeing other means of tillage, I just felt as though there was a better way, a faster way, a more productive way to put our corn on the ground than what we had been doing." With encouragement and technical support from their NRCS District Conservationist, the farm purchased a vertical tillage tool, beginning their exploration into alternative methods of tilling. They initially used vertical tillage to incorporate manure without causing compaction or damaging soil structure. But over time, they found that minimizing soil disturbance was even more important than the addition of manure—leading them to transition fully to no-till by 2011.

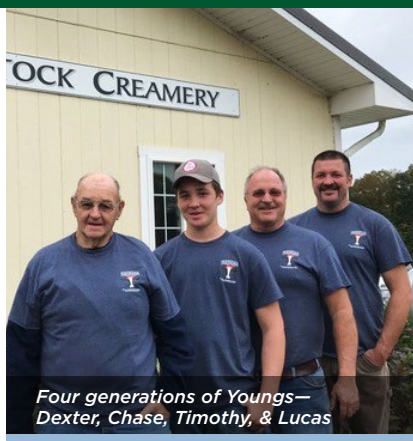
Around the same time that Lucas began changing the farm's approach to tillage, he began exploring other ways to manage the dairy's manure. With the help of an NRCS Environmental Quality Incentives Program cost-share contract, Valleyside Farm built a heifer barn with a manure storage facility.[1] Prior to having manure storage, Lucas was spreading manure every single day. Now, the farm spreads four times a year, allowing Lucas to time manure application strategically—especially before planting and during the growing season, so that nutrients are available when crops are actively taking them up. "When we were spreading every day, the manure didn't give me much value, other than phosphorus potentially come springtime." More strategic nutrient placement also means reduced runoff and leaching. The farm is situated near Little River, which drains into a public water supply. Lucas has seen the water quality of the river greatly improve, and the farm has received several awards for its efforts to that end.

### Soil Health Economic & Environmental Estimated Outcomes

Partial budgeting analysis was used to estimate the marginal benefits and costs of adopting no-till and nutrient management soil health practices on Valleyside Farm. The study was limited to only those income and cost variables affected by the adoption of these practices. The table on page 2 presents a summary of these economic effects revealing that, due to these two soil health practices, Lucas Young's net income increased by $239/ac/yr, or by $143,508/yr, on the 600-acre study area.

The largest per-acre increase on the farm is from the 60% higher hay yields, of which Lucas ascribes the majority of that boost to the farm's change in nutrient management. With the improved nutrient utilization efficiency that the manure storage allows for, Lucas takes four cuttings a year, instead of just two. On both corn and hay crops, he also sees more consistency in yields, a clear change from when the farm used conventional tillage.

Valleyside Farm's greatest cost savings is due to a reduction in fertilizer applied on both corn and hay crops—a savings of $58/ac/yr. The farm's adoption of soil health practices has led to a 30% reduction in purchased applied nitrogen (N) on both corn and hay, and Lucas no longer applies phosphorus (P) and potassium




*Four generations of Youngs—Dexter, Chase, Timothy, & Lucas*

## Farm at a Glance

**COUNTY:** Windham, CT

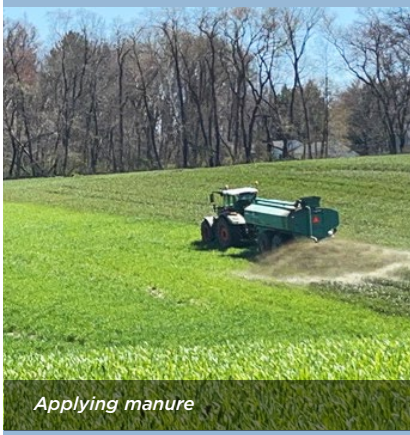
**WATERSHED:** Little River

**CROPS:** Corn silage & Hay

**FARM SIZE:** 600 acres

**SOILS:** Sandy loam on 0–15% slopes

**SOIL HEALTH PRACTICES:** No-till & nutrient management



*Applying manure*

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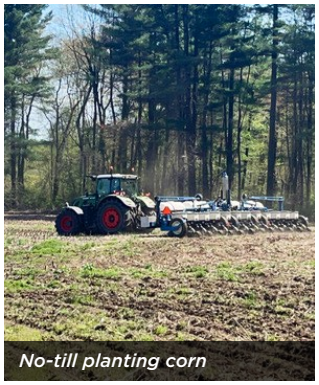
(K) at all, relying purely on manure to meet his crops' nutrient requirements. Lucas attributes most of this reduction to no-till, saying, "The soil's ability to store water and nutrients in the ground with no-till compared to when we did conventional tillage—on conventionally tilled ground, there's just a lot more loss, especially with nitrogen."



*No-till planting corn*

The Young family's second greatest savings is in machinery cost[2] reductions as a result of switching to no-till and adopting nutrient management, accounting for $42/ac/yr in fewer costs. Two and a half passes were eliminated on corn, and while Lucas spreads a higher total volume of manure now, he's no longer spreading every day.

An added benefit of no-till is that Lucas no longer has to spend time picking rocks, an annual savings of $2,000.

The farm saw two cost increases from adopting soil health practices. With the switch to no-till, more herbicide is required to terminate the winter cover crop on corn fields before planting, an $8/ac/yr additional cost. Lucas also estimates spending 20 hours per year on learning activities related to no-till and nutrient management, resulting in an annual cost of $585. He especially values opportunities to learn directly from other farmers. Hearing what has and hasn't worked for them helps him adapt new practices to fit the unique needs of Valleyside Farm.

## Closing Thoughts

Transitioning to no-till and more comprehensive nutrient management is never easy or straightforward, but Lucas states that ***"the greatest challenge is to have the courage to make changes to begin with."*** With farm viability constantly under threat from changes in the weather and the markets, it's essential that farmers evolve and adapt. Lucas encourages those who are curious about adopting soil health practices to start small, and remember that what works for one person, won't work for everyone. "You've got to find your own path. It's about challenging yourself to get somewhere different. It won't always work, but when it's successful, that becomes the driver—seeing the results of your experimenting really work."

*—Lia Raz*

## ECONOMIC EFFECTS OF SOIL HEALTH PRACTICES ON VALLEYSIDE FARM, CT (2023 PRICES)[3]

**Increases in Net Income**

**Increase in Income**

| ITEM | PER ACRE | ACRES | TOTAL |
|---|---|---|---|
| Yield increase on hay | $239 | 350 | $83,695 |
| **Total Increased Income** | | | **$83,695** |

**Decrease in Cost**

| ITEM | PER ACRE | ACRES | TOTAL |
|---|---|---|---|
| Fertilizer cost decrease due to nutrient management and no-till | $58 | 600 | $34,941 |
| Machinery cost savings due to no-till and nutrient management | $42 | 600 | $25,456 |
| Rock picking | $8 | $250 | $2,000 |
| **Total Decreased Cost** | | | **$62,397** |
| **Annual Total Increased Net Income** | | | **$146,092** |
| **Total Acres in this Study Area** | | | **600** |
| **Annual Per Acre Increased Net Income** | | | **$243** |

**Decreases in Net Income**

**Decrease in Income**

| ITEM | PER ACRE | ACRES | TOTAL |
|---|---|---|---|
| None identified | | | |
| **Total Decreased Income** | | | **$0** |

**Increase in Cost**

| ITEM | PER ACRE | ACRES | TOTAL |
|---|---|---|---|
| Herbicide cost increase due to no-till | $8 | 250 | $20,000 |
| Soil health practices learning activities (20 hrs/yr) | | | $585 |
| **Total Increased Cost** | | | **$2,585** |
| **Annual Total Decreased Net Income** | | | **$2,585** |
| **Total Acres in this Study Area** | | | **600** |
| **Annual Per Acre Decreased Net Income** | | | **$4** |

**Annual Change in Total Net Income = $143,508**

**Annual Change in Per Acre Net Income = $239**

1 Valleyside Farm received received $485,398 in 2008 through EQIP. This is not included in the analysis because cost-share is temporary and not received by all. Readers can assume that during the contract years, Lucas Young's net income was higher than presented in this analysis.

2 Machinery costs include the cost of equipment, custom hire, labor, depreciation, interest, insurance, housing, repairs, and fuel (Univ. of IL at Urbana-Champaign, Sept. 2023, *Farm Business Management Machinery Cost Estimates: Field & Forage Operations;* Iowa State University, Nov. 2023, *Ag Decision Maker: Iowa Farm Custom Rate Survey*).

3 This table represents estimated average costs and benefits attributed to adopting no-till and nutrient management over the entire study area (600 acres), where corn and hay are grown, as reported by the farmer.

- All values are in 2023 dollars.
- Prices are stated as per acre values for items that vary by area. Prices such as learning costs, which don't vary by area, are only given as total costs.
- Prices used (5yr rolling averages): Corn Silage: $53.25/ton, Hay all other: $171.06 (USDA NASS, 2022-2024, Crop Values Summary, 2019-2023 averages); Nitrogen: $.63/lb, Phosphate: $.61/lb, Potash: $.54/lb (Iowa State University, 2022-2024, Ag Decision Maker: Estimated Costs of Crop Production in Iowa, 2019-2023 averages); 2023 hourly labor rate: $29.23/hr (U.S. Bureau of Labor Statistics, 2023, Occupational Employment & Wage Statistics, First-Line Supervisors of Farming).
- For information about study methodology, see farmlandinfo.org/rshec-toolkit
- This material is based on AFT's work supported by a USDA NRCS Regional Conservation Partnership Program Programmatic Partnership Agreement #PPA-2311-A-0319.

**For more information about this study or to discuss soil health practices, contact:**
Lia Raz, American Farmland Trust, Programs & Outreach Specialist, lraz@farmland.org
**To read more about the RCPP, visit farmland.org/newengland-regenag**