

## To The Point

### Soil Health Practices: Cover Crops and No-Till

Farmers are uniquely vulnerable to extreme weather events such as drought, floods, and heat. Together, these 3 phenomena caused 55% of crop losses in the United States in 2023.<sup>1</sup> One approach farmers can take to improve resiliency against extreme weather is building soil health. Healthy soils have a strong physical structure and high soil organic matter, which allows plants better uptake of nutrients they need to thrive. Cover crops and no-till offer a triple win for farmers and the agriculture industry by increasing resilience, improving environmental outcomes, and enhancing long-term profitability.

#### Soil Research

Increasing soil organic matter by just 1% can help soil retain an additional 20,000 gallons of water per acre – allowing soils to take in heavy rains and hold moisture in reserve for when plants need it most.<sup>2</sup> Many Midwestern farmers will remember the extreme flooding of the spring of 2019, when wet conditions prevented planting on over 19 million acres of farmland, leading to \$4 billion in crop insurance claims.

Research shows that farmers who consistently used cover crops and no-till saw a 24% reduction in the odds of prevent-plant losses – financial losses due to field conditions being too wet for planting.<sup>3</sup> In another soil health study, 97% of farmers who used cover crops and no-till said they increased their resiliency to extreme weather.<sup>4</sup>

Soil health practices also offer environmental benefits, including sequestering carbon and reducing nitrogen runoff into local streams and waterways. While these practices require upfront costs to transition, they can greatly decrease operational and input costs in the long term.

#### Cover Crops

Cover crops are generally planted in the winter following the harvest of a cash crop, to keep continuous living soil cover over the winter months. Living plant matter stabilizes and enriches soils throughout the winter and provides a suite of management benefits to farmers.

The ideal cover crop species, planting date, and termination strategy all depend on a farmer's unique geography, crop rotation, and goals. For example, grass species with prolific root systems can help improve soil structure and reduce erosion, while legumes add additional nitrogen, which benefits other crops in the rotation. Cover crops can outcompete weeds, and certain species may deter pests. Farmers should work closely with trusted advisers and local peers to learn more about what will work best for them.<sup>5</sup>

Farmers must consider the cost of seeds, fuel, and planting to get cover crops established. There may also be a learning curve to determine the right planting and termination schedule to maximize benefits. While cover crops can boost profitability in their first year, it may take farmers 3-5 years to realize the full soil health benefits.

#### No-Till

Conservation tillage systems aim to minimize soil disturbance and leave residue on the soil's surface after planting. In a no-till system, farmers maintain crop residue year-round and plant their crops directly into it. Eliminating the disturbance of tilling helps the soil keep its structure and integrity, which prevents erosion. Keeping this topsoil in place enables farmers to preserve the soil's nutrients and moisture. Shifting to no-till in areas with vulnerable soil can decrease erosion by up to 70%.<sup>6</sup>

No-till requires investing in specialized planting equipment that can create a channel to plant seeds without disturbing the soil. However, implementing no-till decreases the amount of fertilizer and trips needed into a field, saving farmers on fuel, input, and labor costs.

## Cost Savings

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Choosing to implement any new practice on a farm is a business decision. While both cover crops and no-till come with upfront costs, they can lead to decreased risk and increased profitability over the long term. There are also a growing number of state and federal incentive programs that offer financial and technical support to farmers who want to try out cover crops or reduced tillage.

When deciding whether to invest in soil health practices, farmers should consider the potential economic benefits:

**Increasing Net Revenue** | One study of 100 farmers across 9 states found that, while costs of implementing a soil health management system increased by \$48.00/acre, there were \$99.60/acre in benefits – leading to a net farm income increase of \$51.60/acre.<sup>4</sup> The greatest improvements were in decreased input and labor costs.

**Increasing Soil and Land Value** | Farmers can also think about the economics of soil health through the value of the nutrients and soil that these practices prevent from running off or eroding. Using this approach, emerging research from the Iowa Learning Farms found that no-till and cover crop systems save farmers \$30/acre by preventing nutrient and soil loss.<sup>7</sup>

**Accessing Cost-Share Programs** | The United States Department of Agriculture (USDA) released over \$3B over the past several years to fund projects which help farmers adopt climate-smart practices.<sup>8</sup> Large food companies and agribusinesses are also increasingly investing in sustainable agriculture projects, many of which offer direct cost share for farmers willing to try cover crop and no-till. Farmers should work with their local trusted advisers such as USDA's National Resource Conservation Service and Extension offices to find local projects.

**Accessing Carbon Credit Markets** | Healthy soils have a greater capacity to sequester carbon. They also have a stronger physical structure which reduces nitrogen runoff, protecting local water quality. By adopting these practices, farmers may be able to enroll in emerging carbon and water quality credit programs that will provide them with direct revenue for these environmental benefits.

Building healthy soils can help farmers increase their resiliency to extreme weather events and subsequent losses. Planting cover crops and conservation tillage can be valuable tools help to improve soil structure and water retention, reduce erosion, and increase crop productivity.

## Resources

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### Case Studies

- Practical Farmers of Iowa
  - Farmer-Led Research, [practicalfarmers.org/programs/farmer-led-research/](https://practicalfarmers.org/programs/farmer-led-research/)
  - Practical Cover Cropper YouTube Series, [www.youtube.com/playlist?list=PL5v5mi3djmDsyYQOOhXHgANsgFOV-KkOUp](https://www.youtube.com/playlist?list=PL5v5mi3djmDsyYQOOhXHgANsgFOV-KkOUp)
- Soil Health Case Studies, [farmland.org/soil-health-case-studies/](https://farmland.org/soil-health-case-studies/)
- Soil Health Research, [www.nacdnet.org/soil-health-research/](https://www.nacdnet.org/soil-health-research/)

### Economic Resources

- Economic Value of Cover Crops, [www.iowalearningfarms.org/resources/the-economic-value-of-cover-crops](https://www.iowalearningfarms.org/resources/the-economic-value-of-cover-crops)
- Economics of Soil Health Systems, [soilhealthinstitute.org/our-work/initiatives/economics-of-soil-health-systems/](https://soilhealthinstitute.org/our-work/initiatives/economics-of-soil-health-systems/)

### Funding Opportunities

- State and local funding opportunities may be available through trusted organizations:
  - Find Your Extension Office, [www.uaex.uada.edu/about-extension/united-states-extension-offices.aspx](https://www.uaex.uada.edu/about-extension/united-states-extension-offices.aspx)
  - Find Your Soil and Water Conservation District, [www.nacdnet.org/general-resources/conservation-district-directory/](https://www.nacdnet.org/general-resources/conservation-district-directory/)
  - Find Your NRCS Office, [www.nrcs.usda.gov/contact/find-a-service-center](https://www.nrcs.usda.gov/contact/find-a-service-center)

## Learn More & Connect

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1. 2024 Crop Insurance Update, [www.rainhail.com/pdf\\_files/MKTG/MKTG\\_0123.pdf](https://www.rainhail.com/pdf_files/MKTG/MKTG_0123.pdf)
2. Irrigation and Water Management, [www.nrcs.usda.gov/getting-assistance/other-topics/organic/nrcs-assistance-for-organic-farmers/irrigation-and-water-management](https://www.nrcs.usda.gov/getting-assistance/other-topics/organic/nrcs-assistance-for-organic-farmers/irrigation-and-water-management)
3. Strengthening Crop Insurance through Soil Health, [farmland.org/wp-content/uploads/2023/08/Strengthening-Crop-Insurance-through-Soil-Health.pdf](https://farmland.org/wp-content/uploads/2023/08/Strengthening-Crop-Insurance-through-Soil-Health.pdf)
4. Economics of Soil Health Systems on 100 Farms, [soilhealthinstitute.org/app/uploads/2022/01/100-Farm-Fact-Sheet\\_9-23-2021.pdf](https://soilhealthinstitute.org/app/uploads/2022/01/100-Farm-Fact-Sheet_9-23-2021.pdf)
5. How to Measure Cover Crop Success, [www.unitedsoybean.org/hopper/how-to-measure-cover-crop-success/](https://www.unitedsoybean.org/hopper/how-to-measure-cover-crop-success/)
6. No-till practices in vulnerable areas significantly reduce soil erosion, [aces.illinois.edu/news/no-till-practices-vulnerable-areas-significantly-reduce-soil-erosion](https://aces.illinois.edu/news/no-till-practices-vulnerable-areas-significantly-reduce-soil-erosion)
7. Economic Value of Cover Crops, [www.iowalearningfarms.org/resources/the-economic-value-of-cover-crops](https://www.iowalearningfarms.org/resources/the-economic-value-of-cover-crops)
8. USDA Press Release, [www.usda.gov/media/press-releases/2021/09/29/usda-announces-3-billion-investment-agriculture-animal-health-and](https://www.usda.gov/media/press-releases/2021/09/29/usda-announces-3-billion-investment-agriculture-animal-health-and)

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