A tour of reduced tillage systems on vegetable farms

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VVBGA Annual Meeting

The University of Vermont

Many vegetable farms rely on routine tillage

- Weed control
- Quicker residue breakdown
- Clean bed prep/ easier for planting seeding
- Enables rapid rotations
- Aesthetics
- Scale and equipment

No-till is in vogue!

- Improves soil quality
- Reduced erosion
- Labor savings (?)
- Legendary profits (?)
- Because it seems like the right thing to do

No-Till Growers

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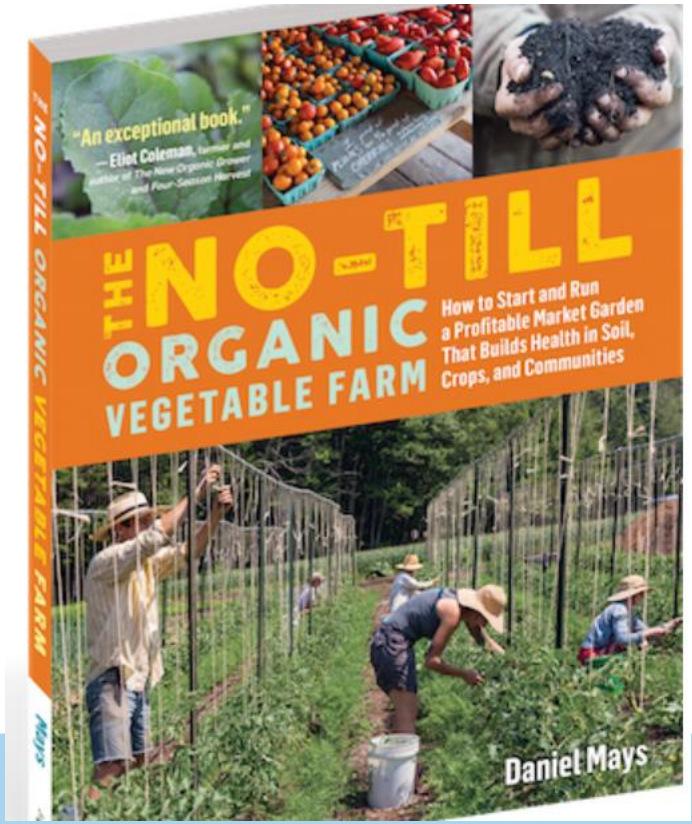

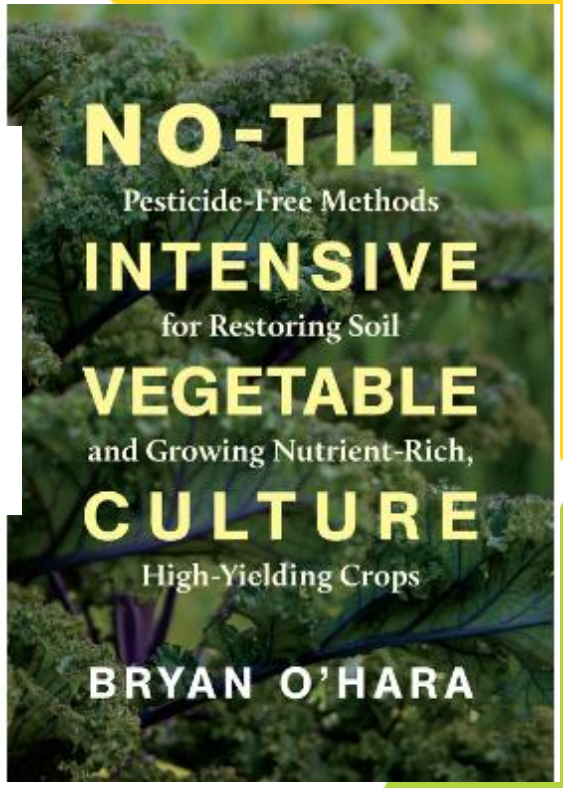

There are many ways to reduce tillage in an economic, scalable way.

Reduce tillage intensity

Use reduced tillage as a rotational tool

Integrate reduced tillage into existing systems

Strategy #1: mulching

Straw is a big expense but reduces cultivation and weeding labor.

Ananda Gardens, Montpelier

Wildstone Farm, Pownell

Strategy #1: mulching

Mulching with cut and carry cover crops is a lot of labor but suppresses weeds, adds organic matter, and nutrients

Root 5 Farm, Fairlee

Strategy #1: mulching

Deep compost mulch creates weed free beds and adds nutrients; surface applied wood chips protect walkways

Bread and Butter Farm, Shelburne

Ananda Gardens, Montpelier

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Strategy #2: tarping

Tarps eliminate weeds and can speed up cover crop break down

Root 5 Farm, Fairlee

Diggers' Mirth, Burlington

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Strategy #3: crimped cover crop

Organic no-till into cover crop

Tarping or solarizing is an important step in organic no-till systems

Evening Song Farm, Shrewsbury

Strategy #3: crimped cover crop

One challenge is to create an opening in the rye without exposing too much soil.

System works best with later season brassicas or cucurbits

Evening Song Farm, Shrewsbury

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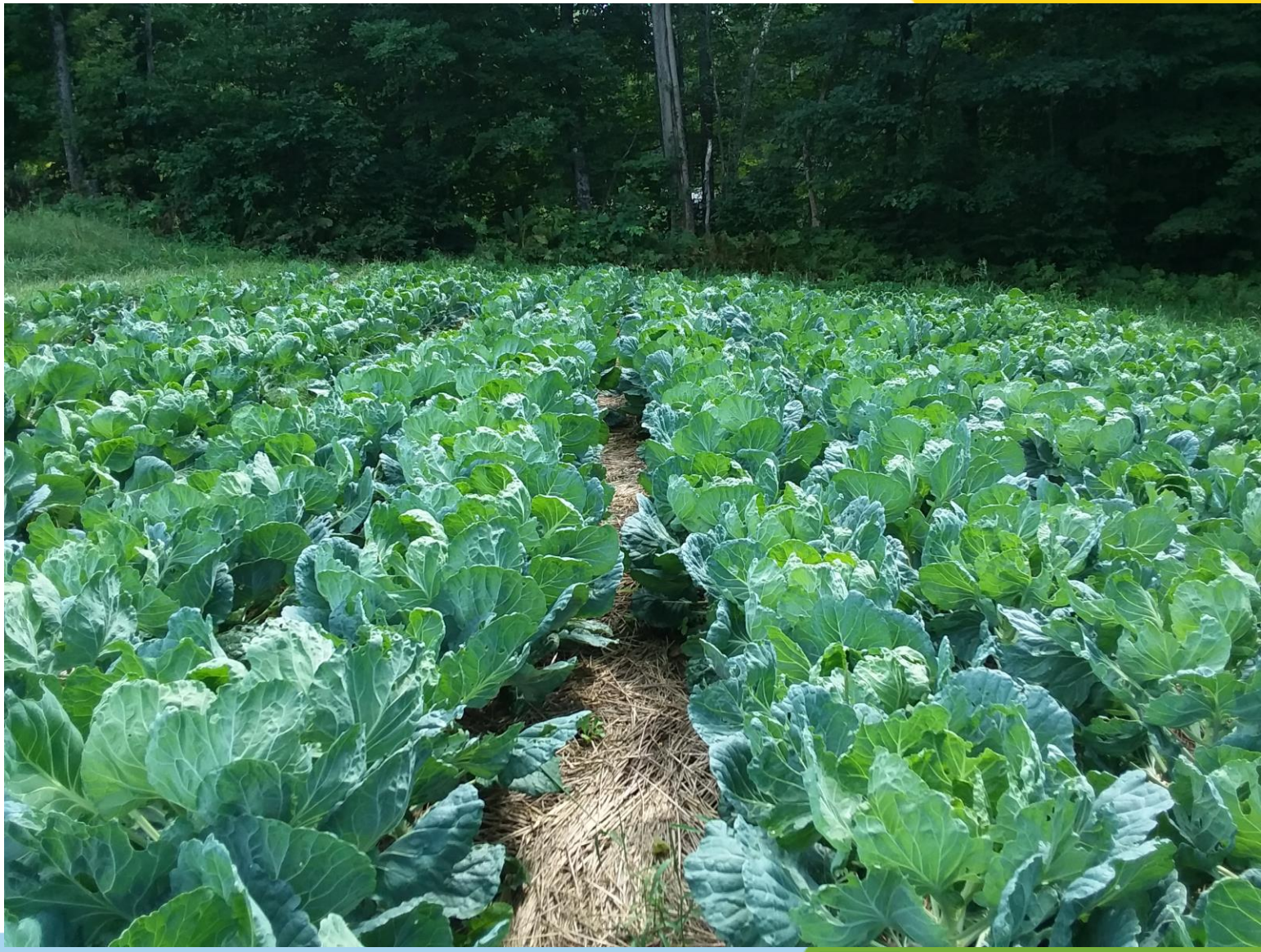
Strategy #3: crimped cover crop

Yields are great.

Challenges include:
slugs, weeds, scalability.

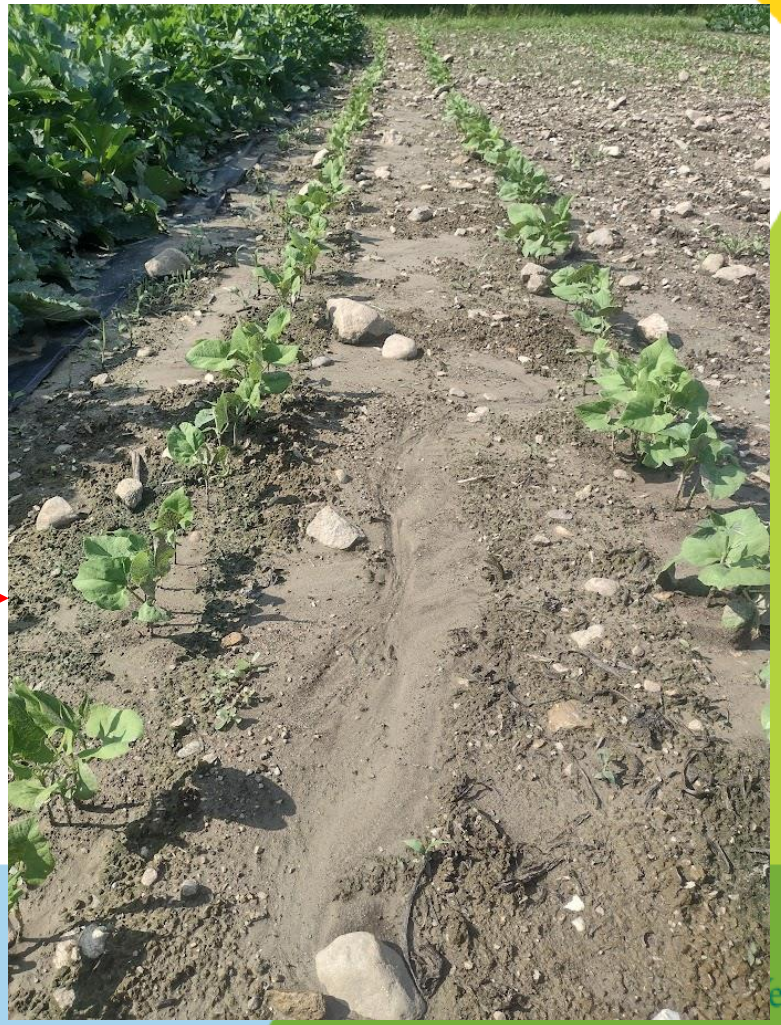


Strategy #3: crimped cover crop

No-till holds up very well after 6.5 inches of rain (July 10, 2023)

High residue no-till

Surface tillage (1-2”)



Evening Song Farm, Shrewsbury

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Strategy #4: living wheel tracks & walkways

Living mulches hold soil in place—same field, different years.

Mighty Food Farm, S. Shaftsbury

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Strategy #4: living wheel tracks & walkways

Dutch white clover maintains living mulch for multiple seasons

Edgewater Farm, Plainfield, NH

Strategy #5: reduce number of passes

No till drills decrease tillage and increase cover cropping opportunities

Deep Meadow Farm, Ascutney

Strategy #5: reduce number of passes

No till transplanters allow planting directly into residue or cover crops

Red clover knocked down for transplanting

Otter Point Farm, West Haven

Strategy #6: permanent bed system

Restricting travel to same wheel tracks every year reduces compaction and lessens need for deep tillage

Elmer Farm, East Middlebury

Strategy #7: reduce number of passes

Sometimes you unwillingly reduce tillage-- this corn had to go into the ground before the soil was dry enough to incorporate the cover crop.

Flail mowed yellow blossom sweet clover provided all the crop N needs for this sweet corn crop

Elmer Farm, East Middlebury

Strategy #8: shallower tillage

Reduced tillage may be as simple as adjusting equipment or fewer passes

Old photos—guess the farmers

Strategy #9: get new equipment

Spaders, power harrows, or stone buriers can reduce trips across the field and do less damage to soil tilth

Intervale Community Farm, Burlington

Fully Belly Farm, Monkton

Strategy #9: get new equipment

Deep zone tillage equipment allows planting directly into cover crop

Recent research shows reduced yields in organic no till systems--except when tarps were used

Tarping and mulching effects on crop yields, profitability, and soil nutrients in a continuous no-till organic vegetable production system

Published online by Cambridge University Press: **10 January 2024**

Ryan M. Maher, Anusuya Rangarajan, Brian A. Caldwell, Shuay-Tsyr Ho, Mark G. Hutton and Peyton Ginakes

Show author details

No till yields were limited by nutrients, not weeds.

Tarping was a key to making no till systems profitable

Reducing tillage depth by 50% did not negatively impact yields

No till practices stratify soil properties with a greater concentration of nutrients on soil surface → potential N and P losses to the environment.

Questions?

Thank you!

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