SKILL GUIDE · WATER & FOOD

Regenerative Agriculture: Cover Crops, No-Till & Composting

The Act of Thriving's Long-Run Sustainability chapter makes the case that a garden meant to feed a household for decades, not just this season, has to return the nutrients it removes rather than depending on outside fertilizer forever. This guide is the actual technique behind that case: real cover crop species, timing, and seeding rates, the no-till method layer by layer, and a compost system built to the numbers, and the do's and don'ts, that actually make it work.

Cover crops: what to plant, and the timing that actually matters

A cover crop's job is holding and rebuilding soil between real harvests, not producing food itself.

Species	When to sow	Seeding rate	What it does
Crimson or red clover	By mid-September for reliable establishment	About ½ lb. per 1,000 sq. ft. broadcast by hand	Fixes nitrogen; red clover grows slower and is the standard choice for a longer-sitting bed
Hairy vetch	By mid-September	About ½–0.6 lb. per 1,000 sq. ft.	Fixes significant nitrogen, but reseeds itself aggressively enough to become its own weed if not terminated on schedule
Cereal (winter) rye	Can go in as late as early October and still help	About 2–2.5 lb. per 1,000 sq. ft.	The most forgiving, latest-plantable option; also the hardest of the three to kill once it's grown past a certain point

Sowing late enough that a cover crop doesn't establish real growth before winter wastes the seed; each of these has a real cutoff, not an approximate one, so plant on the schedule above rather than whenever there's a free weekend. Broadcast seed evenly by hand over prepared or lightly raked soil, then rake lightly again or walk over the bed to press seed into contact with the soil; most of these germinate fine without being buried at a specific depth the way a vegetable seed needs to be.

WARNING

Terminate 2–4 weeks before spring planting, not the week of

Killing a cover crop right before planting doesn't give its residue time to break down or its natural plant chemicals time to leach out of the soil, both of which can suppress the seeds you plant next. Cut it down with a mower, string trimmer, or scythe, or smother it under a tarp, 2 to 4 weeks ahead of your actual planting date. Rye left to grow past pollen shed, and vetch left past this window, both get noticeably harder to kill by cutting alone.

No-till: building fertility by not disturbing it

No-till (also called sheet mulching, lasagna gardening, or sheet composting, depending on who's teaching it) skips tilling or double-digging entirely and instead layers organic material, cardboard or newspaper to smother what's already growing, then compost, mulch, and more mulch, directly on top of undisturbed soil. The soil's own fungal networks and worm channels stay intact instead of being broken up every season, which is the actual mechanism behind the method's real benefits: less compaction, better water retention, and less weeding once a mulch layer is established and reapplied through the season. The tradeoff is patience again: a freshly sheet-mulched bed needs a season to break down before it's as workable as tilled soil, so this is a method to start the season before you need the bed productive, not the week you need to plant.

The actual layers, from the ground up: mow or cut whatever's growing down close to the soil first, no need to remove it. Lay plain cardboard (packing tape and glossy printed labels removed) or several sheets of newspaper directly over that, overlapping edges by several inches so weeds can't find a seam to grow through. Wet that layer down thoroughly, cardboard that's still dry doesn't smother anything and blows around. On top of that, add 2–4 inches of compost or aged manure, then 3–4 inches of mulch (straw, wood chips, or shredded leaves) as the top layer. Water the whole thing in well after building it, and again periodically through the season if rain doesn't do it; a dry sheet-mulched bed decomposes far more slowly than a moist one.

Composting: the real numbers behind a pile that actually heats up

A compost pile that just sits there is composting slowly no matter what; a hot pile, one that actually reaches 131–170°F and finishes in weeks instead of a year or more, needs to hit specific, real targets, not just "browns and greens mixed together."

Factor	Real target	Why
Carbon:nitrogen ratio	25:1 to 30:1 by volume, roughly 3 parts "browns" (dry leaves, straw, cardboard) to 1 part "greens" (food scraps, grass clippings, manure)	Too much nitrogen goes anaerobic and smells like ammonia; too much carbon simply never heats up
Pile size	At least 3x3x3 ft (about 1 cubic yard)	Below this, a pile can't retain enough of its own heat to reach hot-composting temperatures regardless of what's in it
Moisture	45–60%, like a well wrung-out sponge	Too dry stalls the microbial activity that generates heat; too wet goes anaerobic the same way excess nitrogen does
Turning	Every 3–7 days during the 4–12 week hot phase	Reintroduces oxygen the decomposition process consumes; a pile that's never turned cools down and slows to cold-compost speed

A simple, real starting recipe

Three wheelbarrow loads of dry leaves, two wheelbarrow loads of fresh grass clippings or food scraps, and two or three handfuls of already-finished compost or garden soil as a microbial inoculant, built as one pile rather than added to gradually. Building it all at once, instead of trickling material in over weeks, is what actually gets a pile hot; a pile that never gets enough mass at once to self-insulate stays a slow, cold pile no matter how long it runs.

WARNING

What never goes in the pile

Meat, dairy, and cooking oil or grease attract pests and rot rather than compost cleanly. Diseased or heavily weed-seeded plants can survive a home pile's heat and reinfect the garden wherever the finished compost ends up. Pet or human waste can carry pathogens a backyard pile doesn't reliably kill. Treated or painted wood, glossy or coated paper, and anything synthetic (plastic ties, produce stickers, synthetic fabric) don't break down and contaminate the finished product instead.

Finished compost has a specific, checkable look and feel, not just an elapsed time: dark brown to black and crumbly, like rich soil rather than recognizable scraps; a pleasant, earthy smell with no trace of ammonia or rot; none of the original material still identifiable by eye; the pile itself has stopped generating heat and feels roughly the same temperature as the outside air; and it's typically shrunk to about half its original built

volume. A pile that still smells sour, still has visible chunks, or still feels warm at the center isn't done yet, give it more time and another turn or two rather than using it early.

How this ties back to the rest of this site

None of this replaces the crop-specific technique in Row Crop & Raised Bed Gardening, the simple annual rotation already covered in What to Grow, or the multi-year design in Building a Food Forest; it's the soil-fertility layer underneath all three, the actual mechanism Long-Run Sustainability is describing when it talks about nutrients coming back to the land instead of leaking away with each harvest cycle.

Sources

- Cover crop species, sowing deadlines, and reseeding risk: University of New Hampshire Extension; University of Maryland Extension
- Cover crop termination timing and method: Iowa State University Extension; Cover Crop Strategies
- Cover crop seeding rates by species: USDA NRCS; Penn State Extension
- No-till/sheet-mulching method, layer order, and mechanism: UC ANR; Eartheasy
- Compost carbon:nitrogen ratio, pile size, moisture, and turning frequency: Planet Natural; Compost Magazine; Fine Gardening
- What not to compost and signs of finished compost: Morning Chores; Reencle; UF/IFAS Extension