

YOUR FREE READER'S COMPANION

The Root Cellar Toolkit

A companion to The Root Cellar Building Bible · by Warren Cobb

Thanks for picking up the book. This companion is the part you carry out to the cellar: tape it inside the hatch, tack it to a shelf post, or fold it into your fall notebook. It's the storage chart you check before you stock a bin, the materials-and-cost lists for all four builds so you can price your project on the drive to the lumberyard, a ventilation-sizing worksheet you fill in for your own room, and a blank log to print. Real numbers, straight from the book, no filler.

Almost nothing that spoils in a cellar means you built it wrong. Most "failures" are just a crop sitting in the wrong zone, or air that isn't moving, and the room will tell you which one every time if you walk it and read the dials. Keep this out there with you and check it before you blame the harvest. — Warren

Produce Storage Charts

A root cellar is not one climate, it's a stack of them. Cold, damp air settles to the floor; warm, dry air rises to the ceiling. Put each crop in the zone it wants and you buy months of good eating from one harvest. All numbers below are from the book and assume sound produce, correct curing, and a cellar you actually monitor. A neglected cellar that drifts 10 degF (6 degC) warm roughly doubles the respiration of everything in it, so cut every keeping time in half.

Cold and moist group (floor and low shelves)

These want it cold, just above freezing, and very humid. Pack roots in barely-damp sand, sawdust, or peat, single layers not touching, tops trimmed to about 1 in (2.5 cm), and do not wash before storing.

Crop	Ideal temp	Humidity	Keeps	Prep notes
Potatoes	38-40 degF (3-4 degC)	90-95%	4-6 months	Cure first; store DARK (light greens them); do NOT hold below 40 degF long-term
Carrots	32-35 degF (0-2 degC)	90-95%	4-6 months	Trim tops; pack in damp sand; sweeter after a frost
Beets	32-35 degF (0-2 degC)	90-95%	4-6 months	Trim tops; pack in damp sand
Turnips / rutabaga	32-35 degF (0-2 degC)	90-95%	4-6 months	Trim tops; strong odor, ventilate
Parsnips	32-35 degF (0-2 degC)	90-95%	4-6 months	Frost converts starch to sugar; damp sand
Celeriac	32-35 degF (0-2 degC)	90-95%	4-6 months	Trim; pack in damp sand
Cabbage	32-35 degF (0-2 degC)	90-95%	2-4 months	Strong odor; isolate or ventilate well
Leeks	32-35 degF (0-2 degC)	90-95%	2-4 months	Stand upright in damp sand, roots down
Apples	32-35 degF (0-2 degC)	~90%	2-5 months	Strong ethylene; own bin, far from roots
Pears	32-35 degF (0-2 degC)	~90%	2-4 months	Ripen off the tree; strong ethylene

Cool and dry group (high shelves, near the ceiling)

These want air, not damp. Store on open shelves or in mesh, never packed in sand, so air moves around every one.

Crop	Ideal temp	Humidity	Keeps	Prep notes
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Onions	32-40 degF (0-4 degC)	60-70%	5-8 months	Cure until necks papery; keep DRY and airy
Garlic	32-40 degF (0-4 degC)	60-70%	5-8 months	Cure 2-3 weeks; mesh or braids, never sealed
Shallots	32-40 degF (0-4 degC)	60-70%	5-8 months	Braid or net bag
Winter squash (butternut)	50-55 degF (10-13 degC)	50-70%	4-6 months	Cure first; long keeper
Winter squash (hubbard)	50-55 degF (10-13 degC)	50-70%	5-6 months	Longest keeper; store whole and uncut
Winter squash (acorn)	50-55 degF (10-13 degC)	50-70%	1-2 months	Does NOT cure; shortest keeper, eat first
Pumpkins	50-55 degF (10-13 degC)	50-70%	2-3 months	Cure first; leave a stub of stem on

The warm-corner exceptions

Two crops fool people. Sweet potatoes are a WARM crop, not a root-bin crop: chill them below 55 degF (13 degC) and they take injury, so give them the warmest corner you have. Canned goods do not care about humidity but must stay off the cold floor (freezing cracks seals) and off damp concrete (rust ruins the seal).

Crop	Ideal temp	Humidity	Keeps	Prep notes
Sweet potatoes	55-60 degF (13-16 degC)	85-90%	4-6 months	WARM crop; do NOT chill below 55 degF; cure first
Tomatoes (mature green)	55-65 degF (13-18 degC)	85-90%	3-5 weeks	Ripen slowly in a warm corner, never the cold cellar
Canned goods / preserves	50-70 degF (10-21 degC)	dry	1+ years	Cool, dark, dry; keep OFF damp floors, keep from freezing

The ethylene rule: don't store these together

Apples and pears breathe out ethylene gas as they sit. In tiny doses it sprouts potatoes, turns carrots bitter, and wilts leafy crops. This is the single most common cellar mistake. Keep the producers at the opposite end of the room from the sensitive crops, and NEVER share a closed box, which concentrates the gas into a full dose.

Keep these apart	Because	How to separate
Apples / pears from potatoes	Ethylene breaks dormancy and sprouts them	Opposite ends of the cellar, own bins
Apples / pears from carrots	Ethylene builds a bitter compound in the roots	Separate shelf, separate container

Apples / pears from cabbage /
leeks

Ethylene wilts and yellows them

Different zone, or a closed tote for the
greens

Curing Before Storage

Curing is a short, deliberate rest between harvest and storage. It toughens skins, heals nicks, and dries down necks so rot has no doorway in. Skip it and you cut storage life hard. Note the split: potatoes cure cool and DARK, while squash and sweet potatoes want real heat.

Crop	Cure conditions	Cure time	Looking for
Potatoes	50-60 degF (10-16 degC), 85-90%, dark	~2 weeks	Skins thicken, cuts callus over
Onions / shallots	Warm, dry, airy, single layer	2-3 weeks	Necks dry to papery, skins rustle
Garlic	Warm, dry, airy, single layer	2-3 weeks	Necks papery, wrappers tight
Winter squash (not acorn) / pumpkins	80-85 degF (27-29 degC), 80-85%, airy	~10 days	Rinds harden past a thumbnail
Sweet potatoes	~85 degF (29 degC), 85-90%	5-7 days	Skins set, starch turns sweet

Materials and Cost Checklist for All Four Builds

Four cellars, four budgets. Costs are the book's rough 2026 US DIY ranges. Start with Build 1 if you can, it's the one to learn on before you commit to a big pour.

Build 1: Buried-Container Cellar (culvert / barrel / freezer shell)

Holds roughly 150-300 lb (68-136 kg). Cheapest and fastest, a weekend or two. Best for potatoes, carrots, beets, turnips.

- [] Container: HDPE or metal culvert, 30-42 in (750-1070 mm) dia, 4-5 ft (1.2-1.5 m) tall, set vertically (\$80-\$300)
- [] Drainage gravel: 3/4 in (19 mm) clean crushed stone, 1-2 cu yd (\$40-\$90)
- [] Two vent pipes (3-4 in / 75-100 mm PVC), screens, dampers (\$30-\$60)
- [] Insulated lid: panel + 2 in (50 mm) rigid XPS/polyiso core + gasket (\$40-\$90)
- [] Sealant, 1/4 in (6 mm) hardware cloth, fasteners (\$20-\$40)
- [] Cedar or treated slats for raised floor and bins (\$20-\$60)
- [] Thermometer + hygrometer (\$15-\$30)
- Total: \$245 - \$670

Build 2: Earth-Bermed Hillside Cellar

Interior ~8 x 8 to 8 x 10 ft (2.4 x 2.4 to 2.4 x 3 m). Holds a family's winter of roots plus jars. Intermediate, 2-4 weekends plus cure time.

- [] Excavation (rented mini-excavator or hired) (\$300-\$900)
- [] Footings and concrete, below frost line (\$200-\$500)
- [] 8 in (200 mm) CMU block, #4/#5 rebar, grout, mortar (\$400-\$900)
- [] 4 in (100 mm) perforated drain pipe, gravel, filter fabric (\$150-\$400)
- [] Waterproof membrane and rigid foam board (\$250-\$600)
- [] Engineered roof slab, materials or precast (\$300-\$1,000)
- [] Insulated exterior door and frame (\$150-\$500)
- [] Two vent pipes (3-4 in), shelving, hardware (\$150-\$400)
- Total: ~\$1,500 - \$4,000

Build 3: Basement Cold Room

About 6 x 8 ft (1.8 x 2.4 m), walled off in a cool north or northeast corner using two below-grade foundation walls. Beginner-to-intermediate, a weekend or two. Runs a touch warmer and drier, 40-50 degF (4-10 degC): great for onions, garlic, squash, apples, canned goods.

- [] 2x4 lumber and fasteners for two partition walls + ceiling grid (\$70-\$160)
- [] Insulation, R-13 batts or 2 in (5 cm) foam, walls + ceiling (\$60-\$180)

- [] Insulated exterior door, weatherstripped with a sweep (\$90-\$220)
- [] Two vent pipes (3-4 in / 7.5-10 cm) with dampers and screens (\$40-\$110)
- [] 6 mil poly (warm-side vapor), shelving, thermometer/hygrometer (\$40-\$130)
- Total: \$300 - \$800

Build 4: Full Poured-Concrete Underground Cellar

About 8 x 10 ft (2.4 x 3 m), ~7 ft (2.1 m) headroom. The build-once-and-hand-down cellar. Advanced, several weekends across a season. Have the earth-covered roof slab engineered.

- [] Excavation (rented or hired) (\$300-\$1,500)
- [] Concrete: footing, walls, floor, roof (\$1,200-\$3,500)
- [] Rebar (#4/#5) and welded wire mesh (\$250-\$700)
- [] Wall forms (rent) or ICF blocks (\$300-\$1,800)
- [] Waterproof membrane + protection board (\$350-\$900)
- [] Rigid foam, 2-4 in (50-100 mm), roof and near-grade walls (\$200-\$600)
- [] Drain pipe, gravel, filter fabric (\$200-\$600)
- [] Insulated door/hatch + cast-in buck (\$250-\$900)
- [] Vents, dampers, hardware (\$100-\$300)
- [] Slat shelving and floor bins (\$150-\$500)
- Total: ~\$3,300 - \$11,300

Ventilation-Sizing Worksheet

The one feature that decides whether your cellar keeps food or turns it to mush is two-pipe ventilation. One pipe does almost nothing, it has no circuit. You need a low intake dropping cold air to the floor and a high exhaust pulling warm, gassy air out near the ceiling, on OPPOSITE walls or diagonal corners so the air sweeps the whole room.

The stack principle

Cool outside air falls down the intake and pools on the floor, picks up respiration heat, moisture, CO₂, and ethylene, warms, rises, and leaves out the high exhaust. Two things drive it, and they multiply: the temperature difference (inside vs outside) and the height separation between the two outlets. Run the exhaust up as HIGH as you can, ideally through the roof, several feet above the intake mouth, and you can more than double the draft for the price of a few feet of pipe.

The sizing rule (from the book)

Size to VOLUME, not floor area. One 4 in (100 mm) intake-exhaust pair per roughly 150 to 200 cu ft (4.2 to 5.7 cu m) of cellar. Use the SAME diameter for both pipes so neither starves the loop. Oversizing is only safe if every pipe has a damper you can throttle, or a big vent will freeze your potatoes on a hard night.

Cellar size	Pipe pair diameter	Notes
Up to 8 x 8 ft (2.4 x 2.4 m)	3-4 in (75-100 mm)	One intake, one exhaust
8 x 10 to 10 x 12 ft (up to 3.0 x 3.7 m)	4 in (100 mm)	Consider a second pair
Larger than 10 x 12 ft (3.7 m)	4-6 in (100-150 mm) or dual pairs	Split pairs across corners

Fill in your own

- My cellar interior: _____ ft long x _____ ft wide x _____ ft tall
- Volume (L x W x H): _____ cu ft
- Volume divided by 175 cu ft = _____ pipe pairs needed (round up)
- Pipe diameter I'll use: _____ in (both intake and exhaust the SAME)
- Intake outlet ends near the FLOOR, height off floor: _____ in (target 4-6 in / 100-150 mm)
- Exhaust outlet starts near the CEILING, within a few inches of the top: yes / no
- Height separation between the two outlets: _____ ft (bigger is better, run exhaust through the roof)
- Intake taken from the shadiest, coolest wall: yes / no
- Damper fitted on EACH pipe: yes / no
- Insect screen + 1/4 in (6 mm) hardware cloth on every outdoor opening: yes / no
- Rain hood on the exhaust: yes / no

Blank Cellar Log

Print a few of these and keep one out at the cellar. A slow drift warm is the thing you catch on paper before you catch it by smell. Walk the cellar weekly, read the dials, pull anything soft or sprouting the moment you see it, and jot what you find. That single habit keeps a whole harvest sound.

Date	Crop	Amount stored	Temp / humidity	Condition / notes
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Adjust the vents with what you read: open on cold fall nights to bank cold into the walls, throttle down in deep winter so you don't freeze the roots, and crack them on mild damp days to purge CO₂ and ethylene. Let the dials run the vents, not the calendar.

That's the toolkit. Print it, take it out to the cellar, and keep the log going. When you're ready to break ground on any of the four builds, the full step-by-step is waiting in the book.

— Warren Cobb