GROWER | Section 1: Getting Oriented | 3b: Your Soil Story: Soil Profile and Available Water Holding Capacity

AWHC reference by soil texture

Use this table, along with your field observations and the calculation method in Section 1 of the publication, to estimate water storage potential at each depth interval. These are reference values — organic matter content, structure, and compaction all can change a given soil's AWHC.

Soil texture	Approx. AWHC (in/in)	Water resilience implications
Coarse sand / gravel	0.03 – 0.07	Very low water storage. Dries quickly. Mulch and organic matter additions have a high impact.
Sandy loam	0.08 – 0.12	Low to moderate storage. Water moves through quickly.
Loam	0.14 – 0.18	Good storage and drainage balance. Well-suited to a range of water resilience strategies, including dry farming with adequate profile depth.
Silt loam	0.17 – 0.22	High storage capacity. Excellent for dry farming where drainage is adequate. Prone to compaction. Protect structure with minimal tillage.
Clay loam	0.17 – 0.22	High potential AWHC, but compaction reduces it significantly.
Clay	0.15 – 0.20	Lower plant-available water than clay loam because water is held too tightly. Cracks as soil dries down. Structure and organic matter are critical investments.

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Activity — How to calculate your AWHC

This approach estimates how much plant-available water your soil can store. You will identify your soil texture at each horizon from your sensory assessment and/or Web Soil Survey and use the calculation method from Section 1 of the publication. The worked example below shows the process for a representative profile.

Option 1 — Online soil assessment tools (quick estimate):

Web Soil Survey and SoilWeb provide mapped soil data, including texture and AWHC estimates, for your location. While these tools are free to use, their maps are not always accurate, especially for small plots. They can, however, give you a quick estimation of soil types in your area.

Option 2 — Calculate from pulling a soil core with an auger:

Using the texture you identified in Article 3A and the AWHC reference table above, work through the calculation below. The publication's Section 1 provides the full method and reference values for a wider range of textures.

> Note: These calculations assume no subsurface restrictions. Subsoil constraints can significantly complicate the calculation process. If you've identified restrictive layers in Article 3A, we suggest consulting a certified professional soil scientist for a more accurate estimate.

WORKED EXAMPLE — CALCULATING AWHC FOR A 60-INCH ROOT ZONE

Step 1. Estimate AWHC for each soil horizon using texture.

Example for a loam surface horizon: Field capacity (FC) ≈ 28% water by volume; permanent wilting point (PWP) ≈ 14% water by volume. AWHC = FC − PWP = 0.14 inches of water per inch of soil depth.

Step 2. Multiply each horizon's AWHC by its depth, then add all horizons to get the total for the root zone, also known as the Available Water Storage (AWS).

Horizon	Depth (in)	Texture	AWHC (in/in)	AWHC for horizon (in)
A	0–12	Loam	0.14	12 in × 0.14 = 1.7 in
AB	12–20	Loam	0.14	8 in × 0.14 = 1.1 in
Bt1	20–30	Clay loam	0.14	10 in × 0.14 = 1.4 in
2Bt2	30–60	Clay	0.12	30 in × 0.12 = 3.6 in
			Total:	7.8 in plant-available water in the 60-inch root zone

Result: This soil stores approximately 7.8 inches of plant-available water in the 60-inch root zone. See the publication's Section 1 (AWHC and yields) for how this value relates to expected yields for specific dry-farmed crops.

Now calculate your own:

Location	Effective rooting depth (in)	Dominant texture	Est. AWHC (in/in)	Total est. water storage (in)	Key limiting factor
Location 1:					
Location 2:					
Location 3:					
Location 4:					

Review your estimates and consider:

- What is the range of total AWHC across your farm locations? Which areas have the most storage capacity?
- Where would increasing organic matter have the highest return on water storage capacity?

Not sure about your calculations? Navigating subsoil constraints? Hiring a certified professional soil scientist is the most accurate option. Ask them specifically to provide AWHC estimates by horizon and to flag any subsoil constraints.

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From AWHC estimate to strategy

Based on your calculations from Article 3B.

My AWHC estimate shows…	✓	Strategy areas worth exploring first
Total water storage above 5 inches, with roots reaching 30 or more inches	☐	Strong dry farming potential. Focus on variety selection and planting timing matched to your dry season length. A small-scale reduced-irrigation trial this season may help you develop more observational data and confidence.
Total water storage between 2.5 and 5 inches with moderate rooting depth	☐	Flexible irrigation management with soil moisture monitoring to guide decisions; cover crops and mulch to extend intervals between irrigations; explore reduced irrigation on a portion of the field to understand your soil's actual limits.
Total water storage below 2.5 inches, with rooting depth as the limiting factor	☐	Addressing what's stopping roots comes first: deep-rooted cover crops, subsoil work, NRCS earthworks consultation. As effective rooting depth increases, water storage increases with it.
Total water storage below 2.5 inches, with rooting depth of 24 or more inches	☐	Organic matter building over multiple seasons — cover crops, compost, reduced tillage. Each 1% increase in organic matter can meaningfully increase AWHC. Drip irrigation to make the most of current storage in the near term.
Storage varies significantly across the farm	☐	Match crops to soil capacity across zones. Dry farming or reduced irrigation trials belong in higher-storage areas. Intensive soil building belongs in lower-storage areas. The variation itself is useful planning information.

PUTTING IT INTO PRACTICE

- What is the range of total AWHC across your farm locations? Which area has the most storage capacity?
- For your most limited location: is the constraint rooting depth, texture, or organic matter?
- Is there a location where your AWHC estimate suggests a different crop or management approach than what you're currently doing?

Carry forward: *Your AWHC estimates and limiting factors at each location carry into Article 3C, where you'll connect them to specific practice strategies.*