

Estimating Plant Available Water Holding Capacity

<u>Textural Class</u>	<u>cm water/cm soil or in water /in soil</u>
Sand & loamy coarse sand	0.05
Loamy sand, loamy fine sand, Loamy very fine sand & coarse Sandy loam.	0.10
Sandy loam, fine sandy loam, sandy clay loam, sandy clay silty clay, & clay.	0.15
Very fine sandy loam, loam silt loam, silt, silty clay loam & clay loam	0.20

$$PAW = \sum(\text{horizon thickness}) \times (\text{cm water/cm soil}) \times (1 - \text{fraction of rock})$$

Classes:

Very low	PAW < 7.5 cm	or 3 inches
Low	7.5 ≤ PAW < 15.0 cm	or 3 ≤ PAW < 6 inches
Moderate	15.0 ≤ PAW < 22.5 cm	or 6 ≤ PAW < 9 inches
High	PAW ≥ 22.5 cm	or PAW ≥ 9 inches

The classes above (very low through-high) are based on an entire soil profile to a depth of either a 1.5 meters (6 feet) or a root restrictive layer whichever is shallower.

Example problem: What is the plant available water holding capacity for a soil with the following conditions:

Layer 1: Depth of 0-25 cm; Sandy loam with 20% rock content

Layer 2: Depth of 25-75 cm; Clay with 55% rock content

Layer 3: Depth of 75-150 cm; Loamy sand with 10% rock content

Plant available water calculation:

$$[25\text{cm soil} \times 0.15 \text{ cm H}_2\text{O/cm soil} \times (1 - 0.20 \text{ rock})] + [50\text{cm soil} \times 0.15 \text{ cm H}_2\text{O/cm soil} \times (1 - 0.55 \text{ rock})] + [75 \text{ cm soil} \times 0.10 \text{ cm H}_2\text{O/cm soil} \times (1 - 0.10 \text{ rock})] = \mathbf{13.1 \text{ cm of H}_2\text{O or 5.2 inches} = \mathbf{Low}}$$

More detailed listing of available water by texture.

Soil Texture	Available water capacity		
	Low	High	Average
	<i>- inch of water / inch of soil -</i>		
Coarse sands	0.05	0.07	0.06
Fine sands	0.07	0.08	0.08
Loamy sands	0.07	0.10	0.08
Sandy loams	0.10	0.13	0.12
Fine sandy loams	0.13	0.17	0.15
Sandy clay loams	0.13	0.18	0.16
Loams	0.18	0.21	0.20
Silt loams	0.17	0.21	0.19
Silty clay loams	0.13	0.17	0.15
Clay loams	0.13	0.17	0.15
Silty clay	0.13	0.14	0.13
Clay	0.11	0.13	0.12