

Water for Profit

SOIL WATER AND TEXTURE



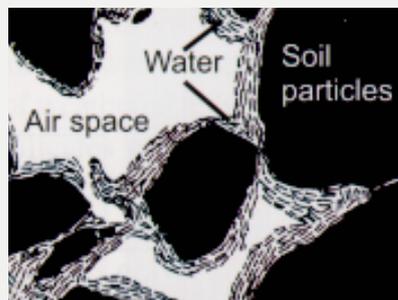
WATERFORPROFIT

Introduction

The total amount of water that a crop can take from a fully wet soil before it suffers stress is referred to as the readily available water (RAW) content. When a clay soil is wet to field capacity, practically all of the pore space is filled with water. However, in a sandy soil, a much lower proportion of the pore space remains filled with water because water drains out of the large pore spaces between the particles. Hence, both the volume of soil water available for crop use and the amount of irrigation water that should be applied to a crop will be dependent on the texture of the soil.

What's holding the water?

Water clings to the surface of soil particles but drains out of large pore spaces. Plant roots can draw off only the "available" part of the clinging water layer.



Small soil particles (e.g. clays) have a greater surface area to which water can cling and smaller pore spaces. Hence, water retention is closely related to the soil texture as it influences the surface area of the particles and the size of the pore spaces between them.

Calculating the volume of water in your soil

If you have a measure of the volumetric moisture content at any point in time, then the volume of water in the crop root zone can be calculated simply by multiplying the volumetric moisture content by the depth of the root zone. For example, if the volumetric moisture content is 35 per cent and the root zone is 300 mm deep then the volume of water = $0.35 * 300 \text{ mm} = 105 \text{ mm}$

Note: only a small proportion of this water is likely to be available to the plant.

Calculating the RAW for your soil and crop

To work out the RAW of your soil you need the texture for your soil, the rooting depth of your crop and some idea of how much you are willing to stress the crop. For example, a bean crop growing on a loam soil with a rooting depth of 0.3 m and a strategy to irrigate at -40 kpa would have the following calculations.

From table 1, the RAW for a loam soil at -40 kpa is 65 mm/m. Hence, for a rooting depth of 0.3 m, RAW = $65 \text{ mm/m} * 0.3 \text{ m} = 19.5 \text{ mm}$

For more details contact Growcom on 07 3620 3844.

Table 1: Effect of Soil Texture on Readily Available Water Content

Soil texture	Readily available water (mm/m) between -8 kPa and:				
	-20 kPa	-40 kPa	-60 kPa	-100 kPa	-200 kPa
Sand	30	35	35	40	45
Loamy sand	45	50	55	60	65
Sandy loam	45	60	65	70	85
Loam	45	65	75	85	105
Sandy clay loam	40	60	70	80	100
Clay loam	30	55	65	80	105
Clay	25	45	55	70	90

Disclaimer: This information is provided as a reference tool only. Seek professional advice for irrigation specifics.

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Queensland Government

