

Introduction to the MDAA Moisture Widget

The widget expresses daily soil moisture in millimeters (mm). Although the values are negative in summer, they are a measure of the total depth of water stored within a specific depth of soil—in a similar way to rainfall being measured in mm.

For allotment vegetable crops, the industry standard reference depth is the top 300mm (~1 foot) of soil, which is where 80-90% of vegetable feeder roots live.

For Meopham's clay loam, the Met Office gives an optimal capacity of 90 mm of moisture in the 'root zone' – the top 300mm of our soil. In other words, if you extracted all the moisture out of 1 square metre of our soil to a depth of 300mm and at its optimal capacity, you would have 90 litres of water, say, ten standard watering cans full.

Your soil is the largest water butt on your plot!

The Met Office uses 'deficits' as a measure of moisture content

Think of soil at an optimal capacity of 90mm as a sponge ready to wash windows. We set this as 'zero moisture level'. The negative values in the widget represent a deficit in water content of the soil. If you see '-3.5mm' on any given day, our soil has 86.5mm of water down to 300 mm below the surface. This is nothing to worry about, your crops will be fine.

The daily moisture values are calculated by the Met Office Evapotranspiration Advisory Service using sophisticated modelling for all parts of the UK. Apart from being a mouthful, it's the service used by farmers to make important decisions every day.

The fundamental equation used every day is:

New deficit = previous deficit - rainfall + evaporation

Essentially the equation measures what Mother Nature adds or subtracts each day

Why doesn't hand-watering ruin the calculation?

It might seem like a plot-holder pouring 10 litres of water on their carrots breaks the widget's accuracy, but physically, three things make the baseline widget *more* useful than tracking individual watering:

1. **Spot vs. Deep Storage:** Hand-watering with a can or a hose typically wets only the top 25--50mm (1--2 inches) of soil around a specific plant. It rarely recharges the entire 300mm deep root zone across the whole plot. The Met Office baseline measures the deep 300mm reservoir that supports the whole crop ecosystem.
2. **Evaporation Spikes:** Water applied by hand during hot weather evaporates off the surface very quickly (often within 24 hours). Within a day or two, that plot's moisture level snaps right back down to align with the local calculated deficit.

3. **The "Natural State" Gauge:** The purpose of the widget isn't to log what *you* did yesterday; it's to answer: "**How much help does my soil need from me today based on what Nature provided?**"

An example of how the widget tracks Mother Nature

Every morning, the model updates its starting point automatically using real observational weather data from the previous 24 hours:

- If 12 mm **of rain fell overnight**, the starting deficit for the next 7-day forecast automatically shrinks by 12mm for every day in the next seven.
- If it was a **scorching, windy day**, the evapotranspiration penalty might increase the deficit by 15mm across all seven days.

The widget provides a quick awareness of the moisture content of our soil:

Deficit	Moisture content	Colour	Action
0.0 to -10.0mm	80.0 to 90.0mm	green	plenty of moisture in the soil
-10.0 to -25.0mm	65.0 to 79.9mm	amber	water shallow crops only
Below -25.0mm	less than 65mm	red	target root root zones.