



ET_o, K_c and ET_c: Matching almond irrigation to crop water demand

Introduction

Evapotranspiration (ET_o) and crop coefficients (K_c) give growers a practical way to estimate how much water an almond block has and is likely to use. The key is to use them for what they are designed to do. ET_o captures the weather. K_c represents the crop and canopy. Together they provide an estimate of crop evapotranspiration, ET_c, that can be converted into an irrigation target and checked against soil, plant and system data

Calculating crop water demand:

Table 1. Crop coefficient approach, $ET_c = ET_o \times K_c$. Source: *FAO 56, Chapter 5 - Introduction to crop evapotranspiration (ET_c)*

ET_o Atmospheric demand mm for a specified period (usually daily)	×	K_c Crop coefficient	=	ET_c Estimated crop water use mm for a specified period (usually daily)
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Key point:

Do not increase K_c simply because a hot day is forecast. Most of the day-to-day weather effect is already captured in ET_o. K_c should mainly reflect the orchard, canopy and stage of development. As a starting point, K_c values can be found in the ABA's Almond Irrigation Spreadsheet on our [website](#).

Worked example:

A seven-day ET_o of 38.7mm at Robinvale was recorded for November 10th to 16th. Using a K_c value of 1.1 for moderate vigour almonds, the estimated crop water use was 42.6mm for the week. Source: [Agriculture Victoria, Robinvale evapotranspiration guide](#).

This is calculated by: $ET_o \times K_c = ET_c$

38.7mm (ET_o for the week) × 1.1 (K_c) = 42.6mm (ET_c for the week)

Turning ET_c into an irrigation schedule:

ET_c is an estimate of crop water use, not automatically the number of millimetres that must be applied through the irrigation system. Effective rainfall, current root zone water storage, irrigation efficiency, leaching requirements and system limitations also matter. Use ET_c as the water budget target, then convert that target into run time using the measured application rate for the block. Use measured pressure and flow data to confirm system application rate. Resource: [ABA Drip Irrigation Evaluation Tool](#)

Irrigation run time (hrs) = target irrigation depth (mm) ÷ measured application rate (mm/hr)

Example: 8mm target ÷ 0.8mm/hr = 10 hours

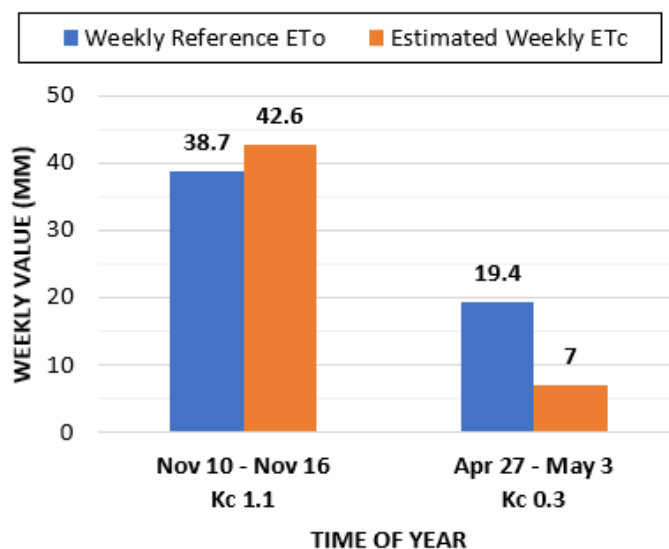


Figure 1. Agriculture Victoria weekly examples showing how ET_o and K_c combine to change estimated almond water use, ET_c. These are week specific examples, not universal K_c recommendations. Sources: [10 to 16 November 2025](#); [27 April to 3 May 2026](#)

When a hot spell is forecast:

- Check forecast ETo, not maximum temperature alone. ETo includes temperature, solar radiation, humidity and wind.
- Keep Kc aligned with canopy development and orchard condition. The weather change and resulting water requirement should primarily appear through ETo.
- Look at the cumulative water balance over several days. A small daily shortfall can become a meaningful deficit across a hot week. Compare the calculated water balance with soil moisture, plant response or other orchard monitoring, then use that feedback to adjust subsequent irrigation.
- If the system cannot deliver the required depth in one irrigation window, plan earlier and use available root zone storage, or spread irrigation across additional sets, without exceeding soil infiltration or creating deep drainage.
- Check the result against soil moisture or plant based monitoring as a feedback loop. ETc estimates demand, assisting with water budgeting and planning.
- Integrate decisions with soil moisture monitoring. ET based scheduling sees no below ground problems such as compaction, runoff, and root activity.
- Confirm pressure, flow and distribution before peak summer demand. More run time will not correct poor uniformity.



Choosing a Kc

ET scheduling relies on a critical assumption: that the Kc accurately reflects your orchard. There is no single Kc that suits every almond block. Agriculture Victoria notes that its weekly Robinvale estimates are approximate and should be adjusted for factors including variety, crop load, canopy and orchard floor management. Use the Kc values built into current ABA tools as a starting point, then check them against orchard performance and your own water balance. Also avoid mixing crop factors used with Class A pan evaporation with Kc values used with weather based ETo. The [ABA water budgeting fact sheet](#) explains that these are different coefficients and are not directly interchangeable.

This fact sheet is a guide. Irrigation decisions should also consider tree age, soil type, root zone depth, salinity, system capacity, effective rainfall, crop load and local monitoring.

For more irrigation resources visit:
almondboard.org.au/irrigation

Scroll down the page to see a variety of resources that are available to help growers.



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