



Water efficient irrigation options

As a result of climate change and the rising costs of inputs, many growers are looking to make their business more efficient – including improving water usage efficiency. One of the main ways to do this is in the irrigation system. Installing or switching to a more water efficient irrigation method can substantially reduce the cost of water, improve yields, plant water usage efficiency and reduce waste.



Drip irrigation – the most water efficient system

Drip irrigation (also known as trickle irrigation) is widely recognised as the most water-efficient irrigation method. Studies comparing furrow vs. drip irrigation found an increase in potato yield of 26–28%, whilst sprinkler vs. drip reported an increase in water usage efficiency of 27%. Comparing furrow and drip irrigation on tomatoes in the field, an increase in yield of 20% was reported.

There are two types of drip irrigation:



Surface drip irrigation is water efficient, but sub-surface systems are **even more so**. Subsurface drip irrigation improves the water savings of surface drip by up to 30%, but they require more initial capital to install and sometimes specialised installation equipment.

DRIP IRRIGATION	
ADVANTAGES	DISADVANTAGES
Reduces water usage compared to other systems	Initial costs can be high
Improves water usage efficiency	Installation requires manual labour (esp. subsurface systems)
Potential to reduce runoff and pollution	Requires specialist machinery (subsurface systems)
May reduce weed occurrence	Regular and sometimes costly maintenance
Negates water loss to the wind	Not suited to large-scale systems due to cost
May reduce fungal disease on vegetation	
Pairs well with fertigation and smart systems	



Fertigation

The addition of liquid or water-soluble fertiliser to the irrigation system.

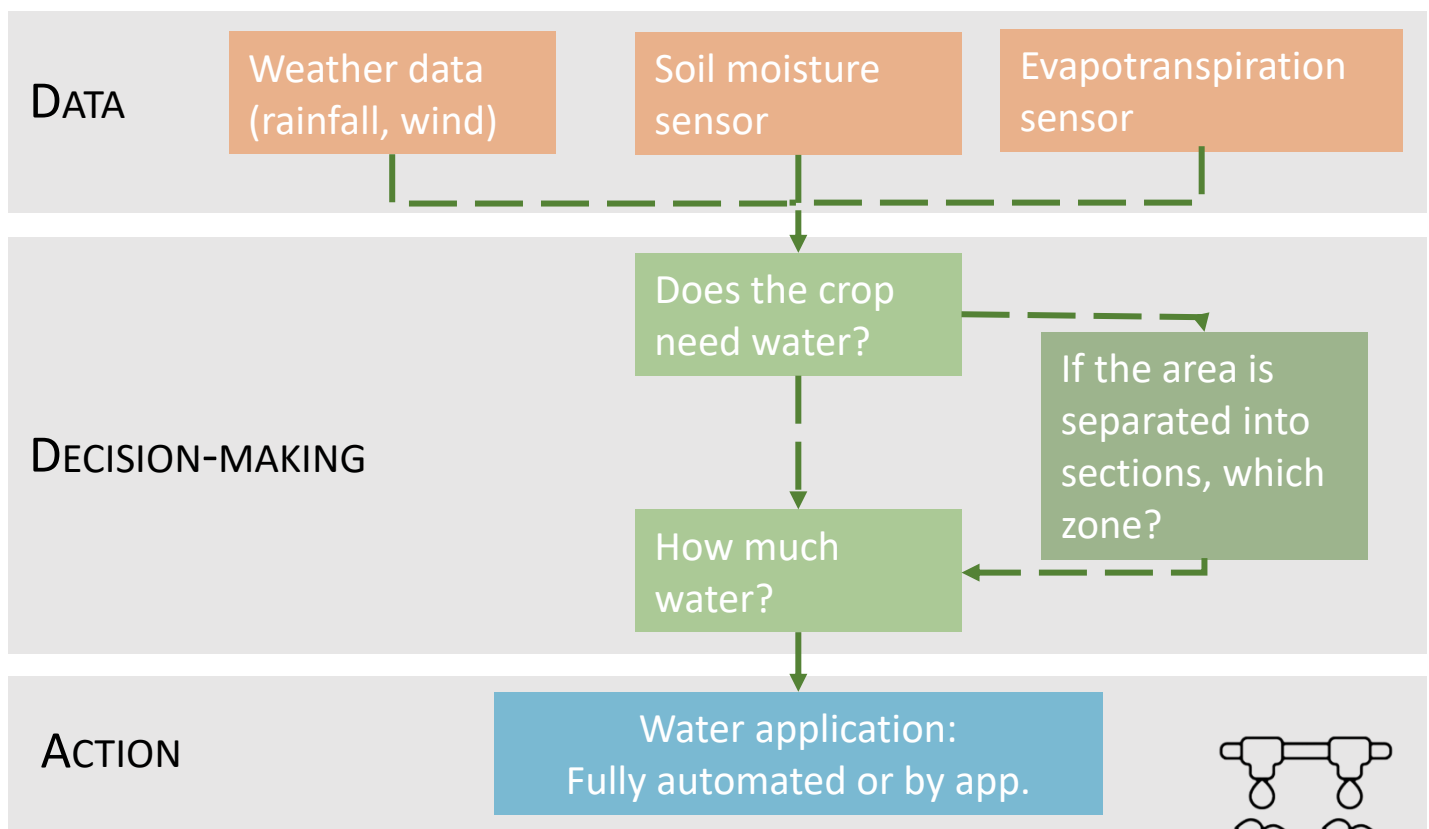
Used with drip irrigation, fertigation is highly efficient and has the potential to reduce fertiliser usage. Using drip fertigation over conventional methods has shown up to 39% increase in yield of tomatoes and 28% improvement in water use efficiency.

The specific amount of fertiliser and what could be saved will vary depending on the plant, farming system, soil type and characteristics.



Smart irrigation

Smart irrigation systems use sensors to enable more efficient and accurate irrigation and fertiliser application.



Smart systems come in many forms and can use a number of different sensors, including:

- **Soil moisture** – buried in the root zone.
- **Evapotranspiration** – estimates water loss from the plant based on historical patterns or real-time weather data.
- **Rain and freeze** – stops irrigation if rain starts or temperatures are freezing.
- **Wind** – interrupts irrigation in high wind to avoid waste.
- **Weather data** – meteorological data from a publicly available source.

A fully automated system will then have a decision making process about whether the crop needs water, how much and in which areas before starting irrigation. Others might be controlled by the grower using an app.

All studies comparing smart systems to farmer-operated ones report improvements in water usage efficiency, overall water use, nutrient usage and/or yield.



Studies report:

Irrigating tomatoes in the field based on real time data (rather than historical) increased yield by up to 35% and reduced water usage by up to 22%.

Glasshouse grown tomatoes under drip irrigation controlled by soil moisture sensors reduced water usage by 63% whilst still maintaining good soil moisture content. Fruit yield increased by up to 17% which was due to improved nutrient usage by the plant.

Useful resources

[Scientific article: Smart fertigation in tomatoes](#)

[Drip irrigation systems](#)

[AHDB: How to manage fertigation well](#)