

Cotton production with limited water

How much do I plant?

When water becomes the limiting resource for cotton production, the first question growers need to consider is 'How much cotton should I grow with the water I have?' To answer this, you need to know the total water supply available from all sources including river and bore allocations, on farm storage and off-allocation pumping.

Studies and simulations for the Darling Downs have indicated that you need 5.2 megalitres (ML) of supply per hectare. This includes the requirement for pre-irrigation, calculated on an irrigation efficiency of 75% to ensure a break-even yield is attained in 9 out of 10 years. An irrigation efficiency of 75% refers to water used by the crop as evapotranspiration and includes storage, distribution and application losses. At irrigation efficiencies less than 75%, figures will need to be adjusted. (To estimate your farm irrigation efficiency refer to WATERpak topic 2.1).

Do not risk low crop yields by stretching water over too large an area of crop. Positive crop margins for smaller areas are better than negative ones for large areas. Work out the area you are able to fully irrigate and choose fields with good yield history, in proximity to the best storage and efficient supply.

If you want to grow a greater area than you have water for, then consider whether dryland cotton is an option. For more information on dryland cotton refer to *Dryland Cotton Production Guide 2002*.

Agronomic considerations

Nitrogen

The potential for water limited crops to utilise applied nitrogen is reduced and they will not exhibit the same responsiveness as where water is not limiting. In addition, excess nitrogen leads to the development of a large canopy, resulting in increased water requirements and a potential delay in maturity, resulting in a need for continued water supply.

Varieties

Choose cultivars to suit your region and consider varieties with long fibre length as staple length is affected by water stress. Studies have shown that dryland and okra-leaved varieties are better adapted to low water situations.

Sowing dates

While delayed planting is an option to increase chance of receiving rainfall, this must be weighed up against potential yield decreases and increased

production costs from a later maturing crop. Simulation output for the Downs showed that yield potential decreases after 30 October with a water supply of 4-6ML. With reduced water, sowing dates can be delayed up to 15 November but bear in mind the crop will be yield-limited.

Row configuration

When irrigation supply falls below the required 5ML/ha, a partially irrigated skip row system becomes an option. Although the skip configurations often have a yield penalty, this can be offset by lower production costs and reduced risk of quality characteristics that could incur discounts. The interval between irrigations increase with skip row plantings and careful monitoring is necessary to time irrigations correctly. Similar yields from single skip and solid planted cotton on the Downs have been obtained, with the skip row receiving only half the water of solid planted cotton. Such results are more likely in seasons with good soil moisture reserves and effective rainfall events. Row configurations are another tool for risk management during limited water situations.

Irrigation strategies

The general practice when irrigating with limited water is to maintain normal irrigation practices. Do not stretch irrigation intervals beyond the target deficit. If you have to stretch the irrigation interval then have an understanding of the likely effects of this at different crop stages so that you can minimise the impact. It is better to skip the last irrigation or slightly delay the first irrigation than stressing the crop at flowering when the crop is more sensitive. Skipping the last irrigation can reduce fibre length and increase micronaire in Bollgard® II.

Bollgard® II varieties are less able to compensate for water stress late in flowering and stretching water at this time will have a larger impact on Bollgard® II compared to conventional cotton.

This information was sourced from WATERpak. For further information or to obtain a copy of WATERpak please contact the Darling Downs extension team.

DATE CLAIMER

*Cotton and Grains Irrigation Workshops
Scheduling 1*

Date: Wednesday 26 September

Location: Dalby DPI&F Meeting Room

Time: 2.00-5.00pm

If you are interested and would like to attend the Dalby workshop please contact Jenelle Hare on 46690825.