

Water for Profit

BENCHMARK – IRRIGATING GREEN BEANS



Benchmarking can be an effective way to identify opportunities for improved management. While benchmarking can be conducted on any area of your farming operations, this sheet provides a basis for your irrigation performance.

Crop specifics

Beans are grown in several regions through out Queensland including the Lockyer Valley, Mary River and North Queensland (Bowen). Irrigation systems used include over-head systems (typically solid-set or hand-shift) and trickle with harvest by either hand or machine. Water quality is crucial with over-head systems and to a lesser extent with trickle. To minimise potential production losses the electrical conductivity of the irrigation water should be less than 1.0 dS/m.

Beans are very sensitive to water stress during flowering, pod set and pod enlargement. Irrigation management can influence the profitability of bean production.

In this crop 80 percent of water is extracted from the top 30cm, with 60 percent from the upper 20 cm. Times from planting to harvest can vary between 55 and 75 days depending on winter/ summer plantings.

Extra water required during warmer months is slightly offset by a quicker growing cycle and typically more rainfall.

Beans should be planted into moist soil and irrigated shortly after. The duration of irrigation events should be small when crop is emerging, increasing as the crop develops a bigger root system.

Avoiding moisture stress during crop development will aid in creating a moist, crisp bean. Similarly lower production may be experienced if inadequate water is provided during pod enlargement leading up to harvest. Water stress prior to harvest can lead to reduced shelf life.

The typical schedule for over-head systems is 12 - 22 mm every 6 - 8 days. Improved yields and better quality have been achieved by more frequent, smaller duration irrigation.

While irrigation systems such as solid-set and trickle have a higher setup cost, the labour saving and potential production improvements should be considered when comparing to the cost of hand-shift.

In some areas beans are grown on steep slopes hence care needs to be taken to ensure that the high-pressure variations do not cause large deviations in water application. Utilising trickle on sloping country is a difficult operation that requires careful management and potentially higher cost infrastructure.

Crop benchmarks

The total crop water requirement is 1.6 - 4 ML/ha depending largely on a winter/summer planting. Rainfall between bean growing regions varies but average effective rainfall can be considered between 0.5 - 1.5 ML/ha. Hence the typical irrigation requirement is approximately 1.1 - 2.5 ML/ha, allowing for inefficiencies and drainage losses. Higher or lower irrigation usage may be necessary depending on seasonal rainfall. Best practice yields are in the range of 11- 13 t/ha.

The numbers below are total water usage (i.e. irrigation plus effective rainfall) for plantings under various climates, rainfall, planting times and soil types.

Best practice guidelines

Practices that have been shown to improve irrigation performance growing beans are detailed below.

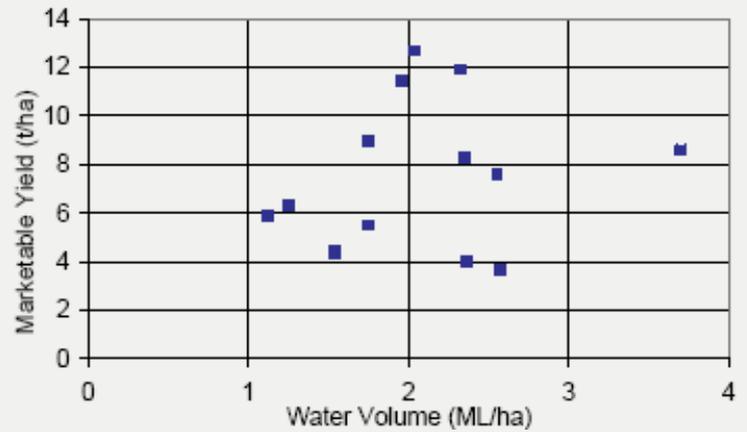
- The active root system is the top 30cm so irrigation events should be targeted to within this depth.
- Critical tensiometer values for beans are around 30 - 40 kPa pre-budding, declining to 30 kPa after flowering.





- Ensure irrigation system has the capacity to meet seasonal and peak water requirements. Regular maintenance and performance evaluations should be conducted.
- A monitoring program should be used to schedule both the timing of irrigations and the volume of water to be applied.
- Uniformity of application systems is critical, especially in machine harvested crops.
- Adequate soil moisture should be maintained during plant establishment to ensure a uniform plant stand.
- Efficient crop water use and high yield potential can only be achieved if other agronomic factors such as nutrition, disease and pest management are also optimised.

Yields of beans compared to total water applied



For more details contact the Growcom members access line on 07 3620 3844.