

Water for Profit

BENCHMARK – IRRIGATING MANGOES IN NORTH QUEENSLAND



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

The mango is a tropical evergreen tree that is grown in areas with cool dry winters and hot wet summers. It flowers in late winter and is harvested in summer.

Good tree management practices can reduce cyclic annual variations in fruiting.

In north Queensland, mango growing is conducted predominantly in the dry tropical areas including the Bowen, Burdekin and Atherton Tableland districts. In these areas, wet monsoonal conditions stimulate strong vegetative growth after fruit harvest with a cool dry winter ideal to encourage plant dormancy prior to spring flowering.

Due to prolonged dry periods, irrigation is essential in most years to set a good crop of mangoes. Crop waterlogging from rain and/ or irrigation can cause a reduction in yields and fruit quality especially close to harvest and also stimulates vegetative growth during dormant periods leading to poor flowering and fruit set.

The root system of a mango tree has feeder roots and deeper taproots. The feeder roots extend around the tree to within 30 cm of the trunk and are most active in the top 60 - 80 cm.

Critical growth stages are listed below.

- Flowering and fruit set – water stress during flowering can result in poor flower development and will limit fruit set. Start watering when most floral buds have begun to grow.
- Fruit development – water stress during fruit development results in increased premature fruit drop and reduced fruit size. Any water stress during the last month of fruit development can increase the risk of sunburn. To overcome this, irrigation may be needed during the hottest part of the day.
- Preharvest – reduced irrigation before harvest helps advance maturity of the fruit and increase fruit dry matter content. Irrigation should be slightly reduced one to two weeks before harvest.
- Postharvest vegetative growth – restart irrigation immediately after harvest to incorporate fertiliser and encourage a good autumn flush.

- Dormancy – withholding irrigation in the pre-flowering period helps slow growth, forcing the tree into a dormant phase. By withholding irrigation during this period you improve the floral induction stimulus, increase the number of terminals likely to flower and improve the final yield of the tree.

Crop benchmarks

Irrigation requirements vary markedly depending on rainfall received during critical growth and fruiting periods. Total applied irrigation varies considerably between wet and dry years. An industry survey conducted in north Queensland during 2002 found the highest water use efficiencies were achieved with yields of 9 - 11 t/ha (1200 - 1500 cartons/ha) and irrigated water use of 1.5 - 3.0 ML/ha.

Best practice guidelines

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

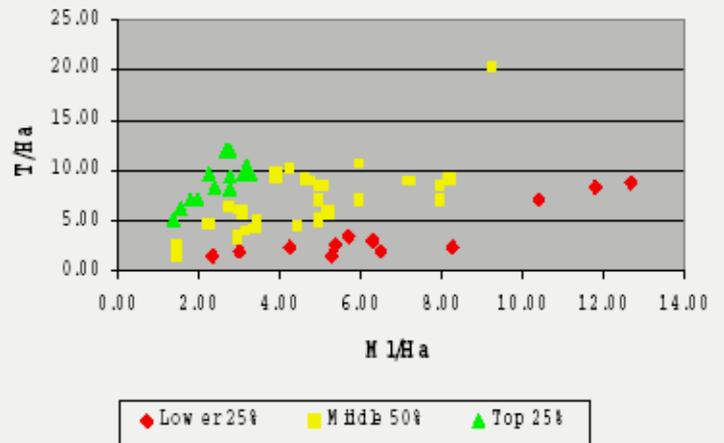
- Ensure the irrigation system has the capacity to meet the seasonal and peak water requirements. Regular maintenance and performance evaluations should be conducted.





- Systems that deliver the irrigation water under the tree without wetting the foliage (e.g. under-tree mini-sprinklers or drip) are best suited to mango from a disease management and water use efficiency point of view. Overhead irrigation systems may help to reduce sunburn slightly but are generally less water use efficient.
- A monitoring program should be used to schedule both the timing of irrigations and the volume of water to be applied.
- Tensiometers are a useful tool to assist with irrigation scheduling. If used, they should be installed at depths of 250 and 600 mm. Irrigation should occur when the shallow tensiometer reads 20 - 35 kpa.
- The movement of irrigation water in the soil profile should be monitored to ensure deep drainage is minimised.
- A layer of mulch under the tree is important to reduce evaporation and increase soil organic matter.
- Maintaining adequate soil moisture during flowering / fruit set / fruit fill is essential for achieving optimum yields.
- Efficient crop water use and high yield potentials can only be achieved if the agronomic factors such as nutrition, disease and pest management are also optimised.

Yields of mangoes compared to irrigation water applied in north Queensland (survey data)



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

Disclaimer: This information is provided as a reference tool only. Seek professional advice for irrigation specifics.

A Growcom project conducted in collaboration with the Department of Primary Industries and the National Centre for Engineering in Agriculture with funding provided by the Queensland Government's Rural Water Use Efficiency Initiative.

