

# Water for Profit

## BENCHMARK – IRRIGATING PAWPAP IN CENTRAL 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 pawpaw is a soft wooded perennial plant that lives for about five years, though commercial plantations are usually replanted sooner. It normally grows as a single stem up to 4 m high. A crown of large palmate leaves at the top of the stem grows directly from the trunk.

The plant starts to flower five to eight months from planting and the fruit is ready to harvest five to six months after that.

The plants grow fastest in warmer climates with good growing conditions. The fruit forms in the axils and hangs on the tree after the leaves fall. Commercial harvesting continues for about two years until the trees become too tall to pick easily or tree losses become a problem.

Well-managed irrigation is essential in central Queensland to maximise healthy tree growth, fruit set and canopy cover.

Water stress during fruit production leads to reduced fruit size, followed by decreased tree growth with loss of flowers and young fruit. Over-watering can lead to reduced tree growth due to poor soil aeration, increased incidence of Phytophthora root rot, and leaching of fertiliser out of the root zone. Mounding to ensure good surface drainage is highly recommended.

Pawpaw roots are concentrated within the top 40 cm of soil, with a few anchor or tap roots exceeding this depth. The rate of soil moisture depletion depends on crop growth stage, crop health, evaporation and rainfall.

### Crop benchmarks

Irrigation requirements vary markedly depending on rainfall received during critical growth and fruiting periods. Published DPI figures indicate 43 t/ha/year are grown with an average of 6 ML/ha/year.

### Best practice guidelines

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 trickle) reduce salt burn on leaves and typically have a higher water use efficiency point of view. Overhead irrigation systems are not recommended for this crop in this region.

A monitoring program should be used to schedule 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.

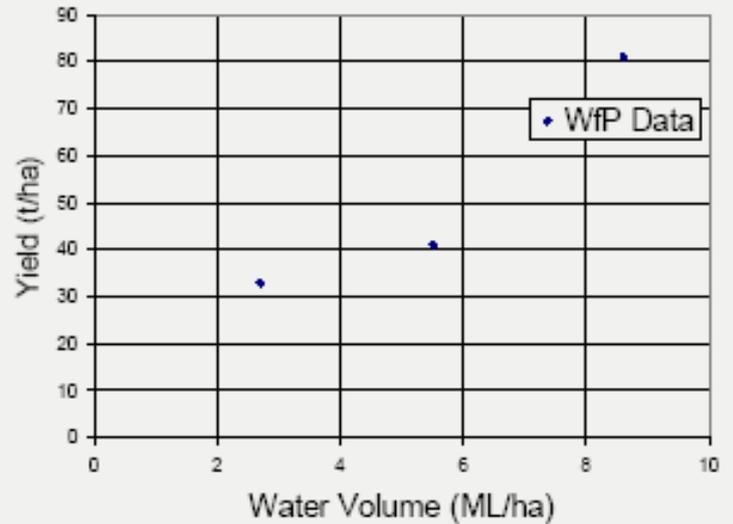
Maintaining adequate soil moisture during flowering / fruit set / fruit fill is essential for achieving optimum yields.





- Manage saline irrigation water by implementing strategies to reduce its affect on tree growth. The published threshold for saline irrigation water tolerance in papaw is 1.3 dS/m. Irrigation water supplies in the papaw growing districts of central Queensland often exceed this level and are regularly recorded over 2 dS/m and occasionally over 4 dS/m. Strategies to manage this situation are listed below.
  - Use an irrigation system that does not wet the leaves as direct contact with saline water causes leaf burn.
  - Use organic mulches under the trees to reduce the evaporation of moisture from the soil surface.
  - Alternate or mix better quality water with poorer quality water to reduce the average salinity load over time to the crop.
  - Include a leaching irrigation cycle at least on a monthly basis to reduce the concentration of salts in the root zone.
  - Use gypsum to reduce the impact of sodium salts on root growth and soil structure.
- Efficient crop water use and high yield potentials can only be achieved if other agronomic factors such as nutrition, disease and pest management are also optimised.

### Yields of papaw compared to total water applied in central Queensland



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.*