Centre Pivot performance on dairy pastures – How efficient?

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- The Tasmanian dairy industry is the largest agriculture consumer of irrigation water in the state.
- Improving the efficiency of water use is viewed as being critical to the sustainability of the dairy industry.
- Efficiency of water use is very dependent on the capability of the irrigating delivery system.
- Centre pivot are considered to have high uniformity and efficiency of use.
- This study examined the accuracy, distribution uniformity and adequacy of four centre pivots operating under normal operating conditions was undertaken.

Plate 1. Measuring the distribution uniformity (DU) of centre pivot irrigator

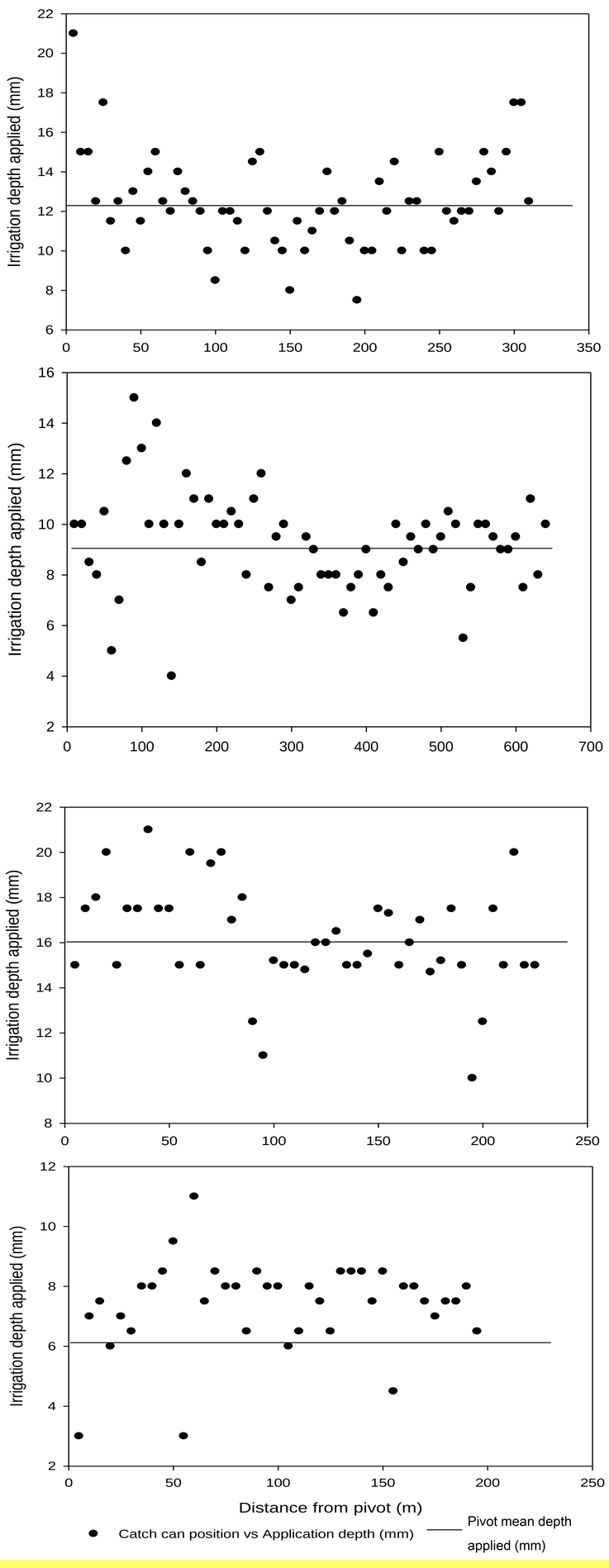

Figure 1. Application depth (mm) of four centre pivots measured at 5metre intervals .

Table 1 Irrigation performance indicators for four centre pivot on Tasmanian dairy farms

	Target application depth (mm)	Mean application depth (mm)	Distribution uniformity[1]	Adequacy[2]
Pivot 1	20*	9.8	80%	95%
Pivot 2	10	7.3	81%	89%
Pivot 3	22*	12.9	85%	90%
Pivot 4	7	5.9	86%	92%

[1] DU – Irrigation distribution uniformity calculated from catch can depth
[2] Estimate of the proportion of the field that would receive at least 80% of the target depth
* Estimate of the target application depth (mm)

- Irrigation distribution uniformity ranged from 80 to 86% and failed to reach the 90% DU recommended for centre pivots under pastoral fields.
- Although distribution uniformity was slightly below the recommended, all four pivots had an adequacy value in excess of 89%. This indicates that 89% of the field would received at least 80% of the target application depth.
- The capabilities of the centre pivots to match irrigation amounts to pasture demand will allow for improvements in the efficiency of water use for the dairy industry.

- The distribution uniformity was slightly below what was expected and irrigation application rate was found to be excessive (> 70 mm/hr) on the outer spans of the larger pivots (Plate 2).
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Plate 2. Soil surface ponding due to excessive irrigation application rates.

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