

# The effects of permanent netting enclosures on fruit production and water efficiency

Many farmers in the southern connected system of the Murray-Darling Basin have undertaken significant infrastructure upgrade projects over the last ten years, funded through programs such as the Australian Government's On-Farm Irrigation Efficiency Program (OFIEP) and the South Australian River Murray Sustainability Program (SARMS).

## Aim

With the aim of understanding more about the benefits of netting permanent crops, Natural Resources South Australia Murray Darling Basin (Natural Resources SAMDB) and Primary Industries and Regions South Australia (PIRSA) have teamed up to run a three year on-farm trial to investigate the potential benefits that permanent netting enclosures have on water use efficiency and farm productivity in fruit production blocks. This investigation builds upon the findings of a 2014 project by the Apple and Pear Association of South Australia, which looked at how netting protected fruit from hail damage and birds. This project produced initial evidence that water use efficiency (WUE) was higher under netting enclosures compared with trees without protection.

Two trial sites have been established near Loxton in the Riverland of South Australia; an Apple property with 100 ha of producing trees under nets and a Citrus property with 20 ha of producing trees under nets. Automated

Weather stations and soil moisture probes have been installed in netted and adjacent open blocks to measure differences in climatic conditions such as temperature, relative humidity, solar radiation, wind speed, soil temperature and evapotranspiration.

## What is the study looking at

- crop water requirements and water use efficiencies between netted and un-netted trees
- cost benefit analysis of the investment in netting
- benefits netting enclosures can bring to production systems, comparing this to return on investment
- influence the nets have on fruit yield, quality and fruit characteristics
- consequence of change in climate under netting and what this means for the fruit produced



## For further information:

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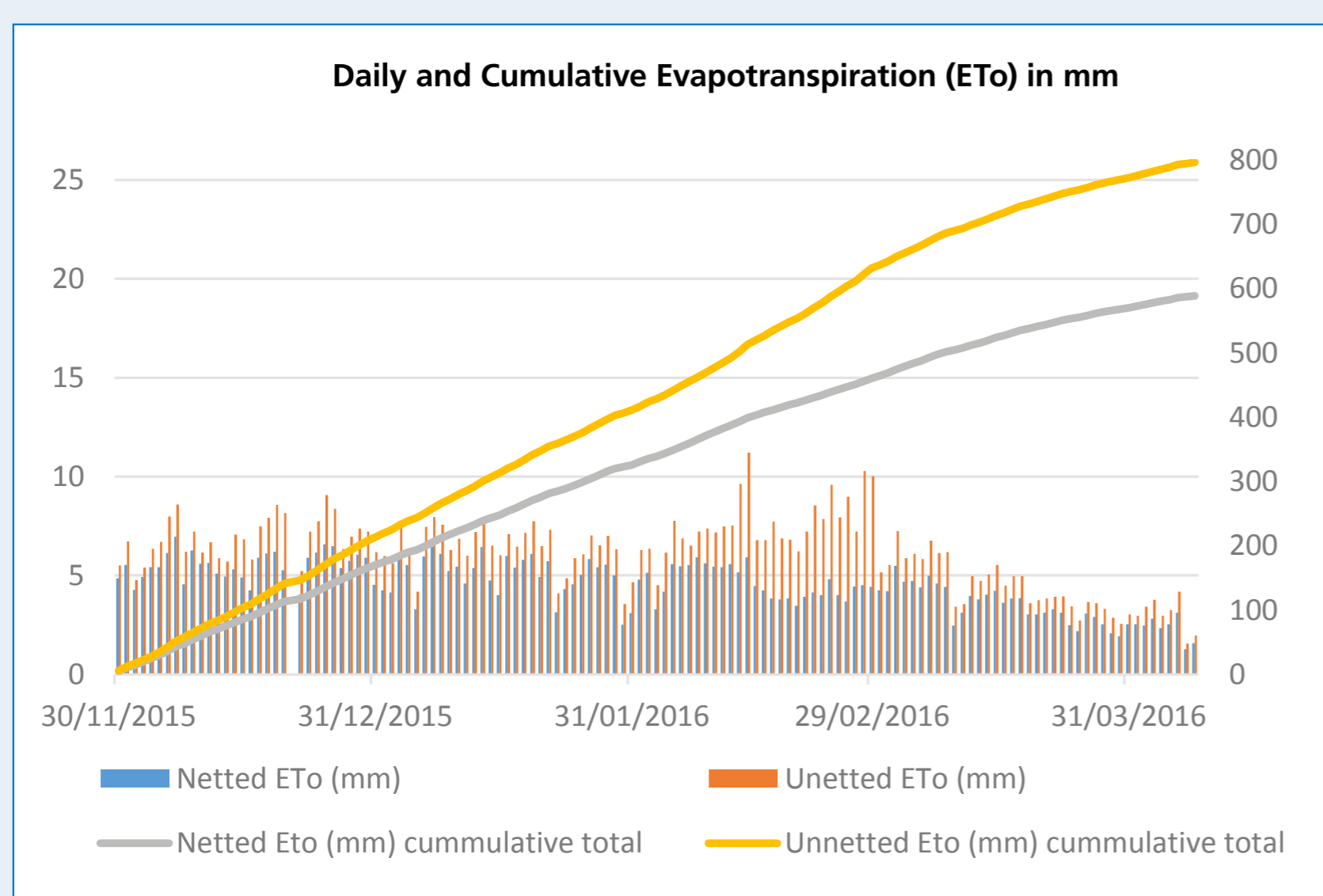
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## The results so far

Results have shown a reduction in evapotranspiration rates in the netted blocks. This is thought to be largely due to a reduction in wind speed. Reduced solar radiation in the netted areas also enabled increased yield and higher quality of fruit produced.



Daily and cumulative netted vs. un-netted evapotranspiration from November 30 2015 to April 11 2016

Treatment	Sunburn	Wind damage	Fruit colour	Vigour
Control	40%	20%	30%	Low
Netted	10%	5%	40%	Moderate

**Table 1.** Scoring of fruit (sunburn and wind damage) and tree damage (wind damage) as well as tree performance (vigour and fruit colour) for the control and the netted orchard block.

Treatment	SPI	SSC (Brix)	Sun damage (%)	Firmness (kg)
Control	4	13	33	8.29
Netted	4	14	6	8.58

**Table 2.** Quality assessment for fruit harvested 11th April 2016. Assessments - starch pattern index (SPI), soluble solid concentration (SSC - brix), and fruit firmness (firmness - kg) performed on 20 random fruit from each block. Sun damage (%) was assessed on 100 random fruit.

Treatment	11.04.2016	22.04.16
Control	0.5 (0.9)	0.4 (0.7)
Netted	5 (5.7)	19 (21.6)

**Table 3.** Number of bins harvested from the control and netted blocks on two harvest dates - 11th April and 22nd April 2016. The number of bins in italics are calculated per ha as the blocks are different sizes - 0.56 ha control and 0.88 ha netted.