

# Impacts of water use efficiency programs on water markets

## Changing water market conditions

Irrigators in the southern Murray-Darling Basin have seen many changes in the water market in recent years. Trends affecting both demand and supply of water have contributed towards the increases in entitlement and allocation prices in recent years.

On the demand side, the cotton industry has expanded into southern New South Wales. There has also been a boom in the almond industry with a large area of new plantings. On the supply side, there has been a long term trend towards reduced water availability, due in part to climate change. At the same time, the share of water available to consumptive users has fallen as water has been recovered for the environment through Commonwealth water entitlement purchases.

Entitlement prices in the southern connected Murray Darling Basin have more than doubled in the last three to four years. Allocation prices are more variable and more likely to be driven by short run considerations such as seasonal conditions, but there has been an underlying increase in water allocation prices of \$5 per ML in wet seasons and \$150 per ML in very dry seasons since 2005-06.

The interactions of irrigators with the water market have also changed. Traditionally, irrigators often owned all the water they needed for their operations. Many irrigators are now more reliant on purchasing allocations.

To some extent, an increased reliance on buying allocations is attributable to irrigators transferring entitlements to the Commonwealth. However, it has also gained popularity as a business model more generally. While this option can make sense for some businesses, it has led to some irrigators being more exposed to risks of high allocation prices.

## Price increases from water use efficiency programs

There is growing evidence that on-farm efficiency programs with the transfer of entitlement can also lead to higher water prices.

### Case Study<sup>1</sup>:

A farmer changed from an old-style gravity channel, to a high flow modern pump and riser system. Previously much area was annual pasture with some areas irrigated only occasionally. Post upgrade the farmer increased the area irrigated and moved to most of the area being perennials. This came about largely because of the lower labour costs required with the new system. Other saved costs included reduced channel maintenance.

Due to the change in the farming system, and the transfer of water savings, this farmer was participating in the temporary market for water more frequently.

The volume of water used by participants can fall by less than the volume transferred to the Commonwealth, and water use can even increase. As a result, farmers

<sup>1</sup> RMCG (2015) – Farm Water Program Round 3 Case Studies. – October 2015. Report for Goulburn Broken CMA.

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who take part in these programs must either buy more or sell less water, which drives up water prices.

Farmers taking part in these programs irrigate more often and can apply more water to their crops to generate extra production, which results in increased water use.

Dairy farmers in northern Victoria whose farms had been upgraded increased their water use by about 50 to 100 ML per year - or 11 to 22 per cent - in years when it was profitable to irrigate, compared with farmers who did not participate in the on-farm works program.

At the same time, farmers who have transferred some of their high-reliability water shares to the Commonwealth as a condition of the on-farm irrigation efficiency program receive less water from their entitlements.

The increase in demand relative to supply causes water prices to increase for both high-reliability water entitlements and allocation water.

## Implications for farmers

The combination of increasing allocation prices and a greater percentage of irrigators sourcing allocation water and allocation products is a risk for irrigated agricultural operations.

There are also concerns about whether irrigators are understanding and managing this risk in their operations.

These market impacts also increase the risk of stranded assets, where irrigators might decide to invest in farm water use efficiency without adequately understanding the cumulative impacts on water prices.

It might be profitable for an irrigator to take part in these programs and give up entitlement if historical water prices prevail in the future, but if many other irrigators also upgrade water prices will increase and the same investment might become unprofitable.

### Case Study<sup>2</sup>:

A 2015-16 survey of Goulburn Murray irrigators found those who had not upgraded their irrigation methods had an average threshold price of \$163 per ML, in contrast to an average threshold price of \$190 per ML for those who had upgraded and transferred water entitlement.

Before an upgrade the farmer was better off selling any allocations into the market if the value of water was \$163 per ML. The farmer's value of water increases to \$190 per ML after an upgrade, so for any price between \$163 and \$190 per ML it will now be profitable to irrigate.

Within this range farmers who still own permanent entitlements will now use their own allocations instead of selling them, while farmers who do not own entitlements will buy allocation or temporary water.

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<sup>2</sup> Aither (2017) Impacts of Water Use Efficiency Programs on Water Markets. Report for Department of Environment, Land, Water and Planning.

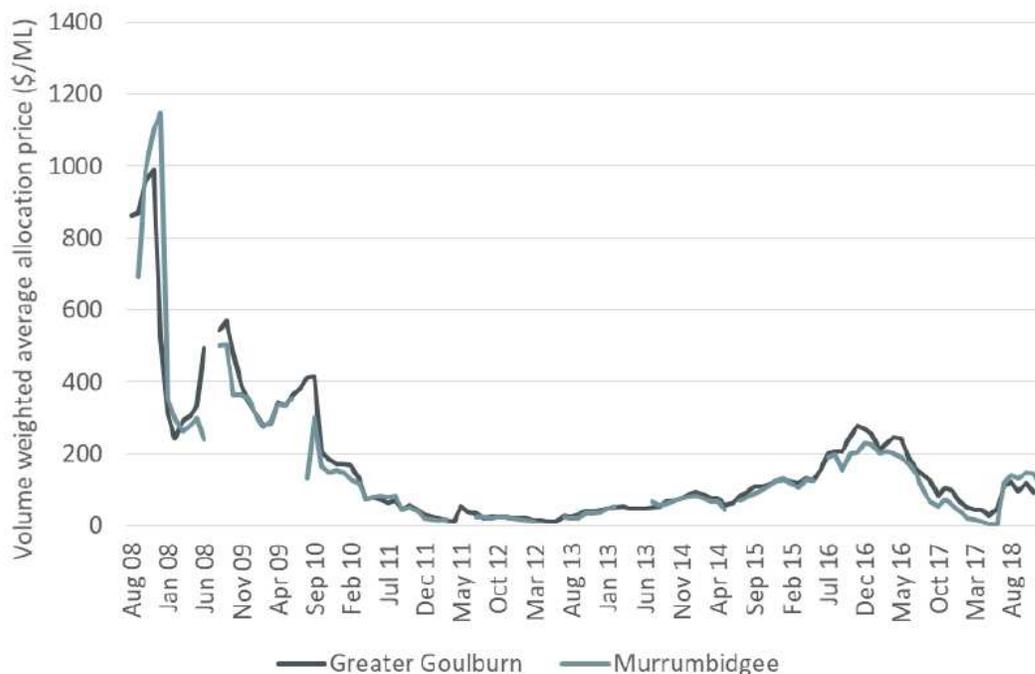
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## Implications for government programs

These impacts are also relevant for governments as they make decisions about future water recovery.

Increasing sensitivity to water allocation prices means the water market impacts of on-farm works programs are highly significant, and even modest price increases have the potential to adversely affect the viability of a large number of irrigators.

On-farm WUE programs that require entitlement transfer in any part of the southern Murray-Darling Basin (sMDB) will tend to affect prices across the sMDB. This is because, although there are some significant constraints, water can generally be traded throughout the sMDB, as evidenced by prices being largely equalised in most years (Figure 1). The ability to trade throughout the sMDB means that decisions made about participation in on-farm WUE programs with entitlement transfer in New South Wales and South Australia are likely to affect Victorian farmers (or vice versa).



Source: Aither.

Note: Missing values indicate not recorded trades.

Fig 1: Monthly average allocation prices in the Greater Goulburn and NSW Murrumbidgee

There is the risk that government co-invests in infrastructure designed to operate for decades on farms that may not still be irrigating in comparatively short periods of time.

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## Future water market conditions

Water demand by horticulture and cotton in the southern Murray-Darling Basin is projected to increase by about 380 GL per year between 2015-16 and 2020-21, equal to 630 dairy or rice farms that currently use 600 ML per year.

It is conservatively estimated that if a further 450 GL of water were recovered through on-farm water use efficiency programs, this would lead to a \$13 per ML increase in water allocation prices to irrigators in northern Victoria in average water availability years (Figure 2). The impact is likely to be higher in extremely dry years, with a conservatively estimated increase of \$18 per ML.

**Table 1: Estimated water allocation price impacts of a further 450 GL of water recovery from on-farm programs**

Scenario	Modelled price – without additional programs (\$/ML)	Modelled price – with additional programs (\$/ML)	Potential price impact of additional programs (\$/ML)
Repeat of extreme dry year (similar to 2008-09)	\$429	\$447	\$18
Repeat of average year (similar to 2005-06)	\$92	\$105	\$13

Source: Aither water allocation price model (2015 version)

For irrigators either not taking part in the program or able to upgrade their farm works, the water price impacts of an extra 450 GL of water recovery are likely to accelerate the pace of adjustment beyond the existing rapid and continuous change.

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