

# Putting a thin lid on evaporation losses

Farm dams and larger water storages around Australia lose as much as 40 per cent of their water to evaporation. Research is now concentrating on a safe, cost-effective and innovative way of reducing this loss using a liquid surface layer.

Reducing evaporation losses begins with good dam design – deep, narrow dams retain water more effectively than wide, shallow dams, and well-positioned shady windbreaks mitigate the evaporative effects of both sun and wind.

Another way of reducing evaporation from water storages is to simply put a protective cover over the surface. Plastic or shade cloth covers, for example, can be installed to cover small dams, but are obviously not a feasible solution for larger commercial dams.

The CRC for Irrigation Futures is studying alternative ways of providing protective covers for large dams, focusing on what are known as ‘monolayers’.

These spray or pump-on mixtures instantaneously disperse over the water surface, forming a thin protective layer that reduces evaporation loss. The mixtures are usually alcohol-based, which creates the rapid dispersive effect.

Monolayers are easy to apply, cheaper than plastic or shade cloth covers – which cost around \$7–12 per square metre – and have minimal impact on any plants and animals in and around the dam.

But monolayers can only reduce evaporation loss by 10–40 per cent at best compared with shade or plastic covers, which can reduce losses by 70–95 per cent according to a study by the National Centre for Engineering in Agriculture at

the University of Southern Queensland, Toowoomba.<sup>1</sup>

Mr Erik Schmidt, who is leading the CRC for Irrigation Futures’s research on the use of monolayers for dam evaporation mitigation, points out that farm dams can range in size from 0.25 ha to hundreds of hectares.



While plastic covers can be used to prevent evaporation from small dams, spray or pump-on monolayers are more appropriate for large dams like this one. CRC for Irrigation Futures

**‘With just 50 per cent adoption of the technology, we could save 292 000 megalitres of water a year from being lost through evaporation.’**

‘While plastic covers are suitable for dams up to 5 ha in size, larger dams from 5 ha to hundreds of hectares need another solution, such as monolayers.

‘Monolayers are an obvious solution for large storages because they are relatively easy to use and cost-effective. But they are not as stable as physical covers and require re-application every few days.

‘In this CRC project, we aim to get a better understanding of how monolayers work. We will look at the impact of wind and quantify the impact of environmental factors such as ultraviolet light and bacteria on decomposition of the monolayer.

‘Our aim is to improve performance and develop more stable products and

application techniques. We are working closely with the CRC for Polymers and the Cotton Catchment Communities CRC in this regard.’

The research will assess the performance of a number of different monolayer products, including two prominent brands, the cetyl alcohol/lime-based Water\$avr and

a new silicone-based product called Aquatain (see page 5).

Both products claim to be biodegradable and compliant with Australian food product standards, reducing potential environmental impacts and accidental leakage into potable water systems.

According to Mr Schmidt, even the 30 per cent reduction in evaporation afforded by monolayers could result in sizeable water savings for Australian farmers.

‘With just 50 per cent adoption of the technology, we could save 292 000 megalitres of water a year from being lost through evaporation.

‘This could lead to additional crop

production of \$146 million a year as well as increased environmental flows.’

The project will also lead to improved technologies and systems for evaluating evaporation and seepage losses from water storages.

Mr Schmidt says the project is one of three within the CRC’s program to develop irrigation ‘toolkits’ to improve the performance of the agricultural sector in irrigation areas.

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<sup>1</sup> Craig I, Green A, Scobie M and Schmidt E (2005). *Controlling Evaporation Loss from Water Storages*. Queensland Department of Natural Resources and Mines/National Centre for Engineering in Agriculture, University of Southern Queensland, Toowoomba, NCEA Publication No. 1000580/1.