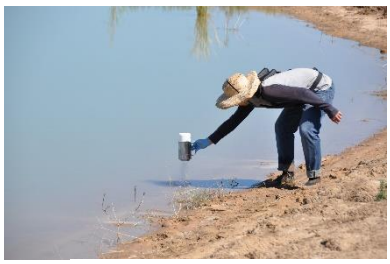
New technology: Evaporation mitigating solutions for Australian cotton water storages.

1. What is the project about?

Ultra-thin monolayer technology is a potentially cost-effective method of reducing evaporation. However, current commercial monolayer products have low performance, are readily disrupted by wind, and need to be frequently reapplied. Research being conducted as part of this project is identifying more effective mono-layer solutions that can be used in conjunction with physical barriers to mitigate wind impacts on monolayer films, reducing water storage evaporation losses.



Applying the monolayer

2. Why do irrigators need to know about it?

Cotton industry research shows that evaporation losses from farm water storages represents the major loss of water on cotton farms, estimated to be between 20 – 40% of water stored. Although there are existing technologies to reduce evaporation, such as physical covers and floating systems, these technologies often have significant capital costs. The aim of this project is to provide a potentially lower cost alternative by combining the use of monolayer technologies with low-cost physical barriers.

3. How will the research benefit irrigators?

The technologies being developed and tested as part of this project will help to reduce the amount of water growers will need to purchase, or alternatively increase the volume of water available for irrigation. The economic benefits being greatest in years when water allocations are low.

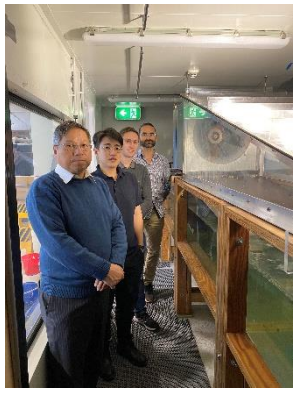
An initial economic analysis using the results to date found for an example irrigation system, by reducing evaporation the combined barrier and monolayer technology increased farm irrigation water use efficiency from 64% to 69% and increased the cotton gross margin by $36/ML (9%).

4. Key results to date

During the 2020/21 period, field trials of the barrier design and monolayer were successfully conducted in water channels at the Yanco Agricultural Institute. Pre-trial preparation included replacing the existing liner and installing barriers and sensors. Despite delays due to COVID-19 several evaporation trials were completed investigating the impact of barriers and monolayer plus barriers on water evaporation. Data including water depth and environmental conditions was collected over a 3-to-4-week period for each trial.

These trials demonstrated that the barriers themselves reduced evaporation by 10.3% on average with some days (e.g., with strong wind) showing evaporation savings above 23%. Barriers with the monolayer showed a reduction of 9.9% on average with some days showing evaporation savings above 29%.

Larger scale field trials on an irrigation dam and another set of channel trials will be conducted over the 2021/22 summer.



The research team with the tank used for initial trials.

Australian Government
Department of Agriculture, Water and the Environment

This project is supported by funding from the Australian Government Department of Agriculture, Water and the Environment as part of its Rural R&D for Profit program.

For more information visit the Smarter Irrigation for Profit website.

Smarter Irrigation for Profit Phase 2 Podcast. Available at: https://smarterirrigation.com.au/minimising-evaporation-from-water-storages/
Smarter Irrigation for Profit Phase 2 Economic case study: Evaporation mitigating solution for Australian cotton water storages. Available at: https://smarterirrigation.com.au/wp-content/uploads/2021/06/Evaporation-mitigating-solution-for-Australian-cotton-water-storages.pdf

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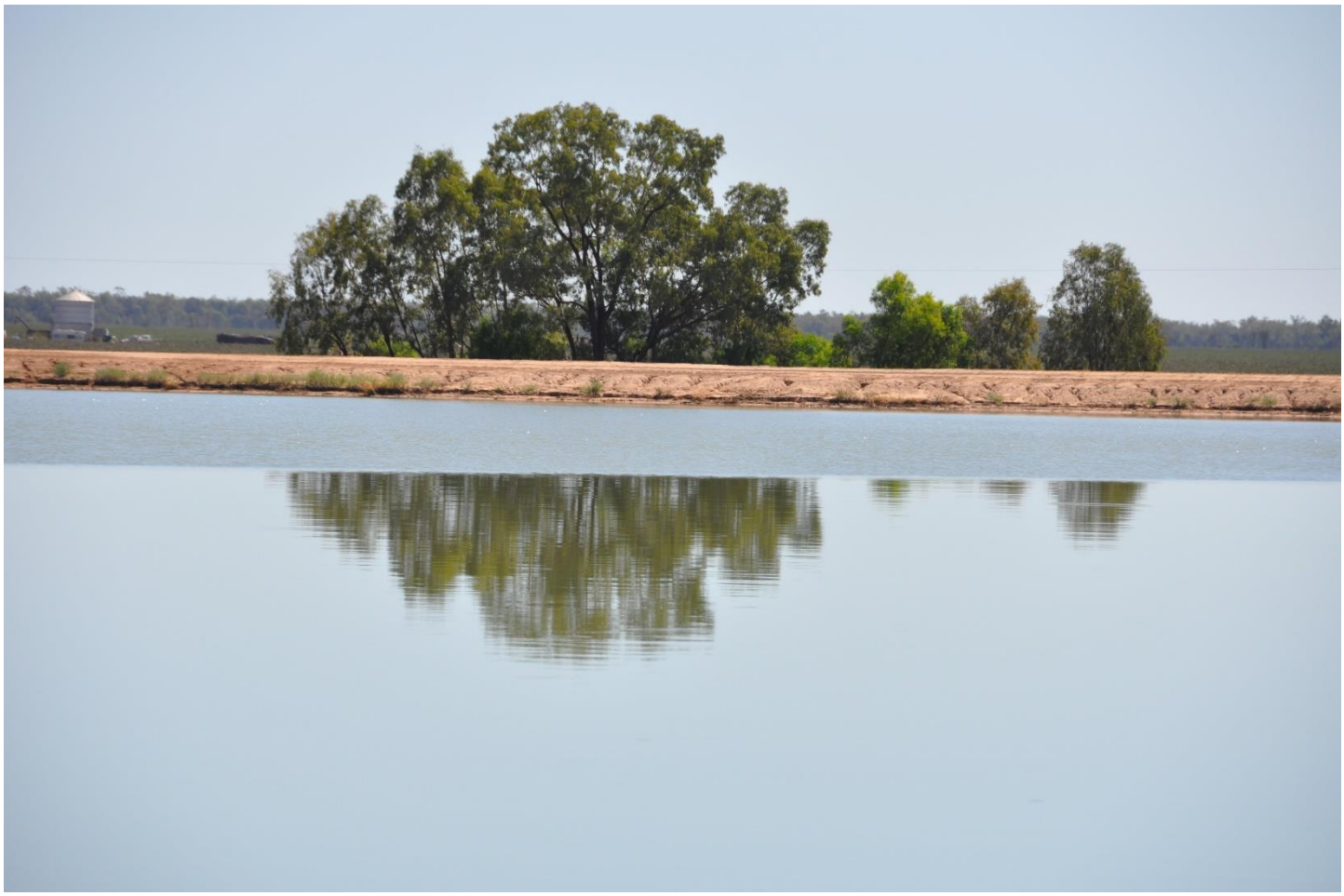

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