

Farm Dam Management

CIF 5032



NPSI Case study

March 2011



Situation

Subject: Maxine Schache

Location: Mildura

Enterprise: Irrigated Horticulture

Size: Various

Irrigation: Large Farm Dams (Av 400ML)

Irrigators pinpoint water loss from Farm Dams

Link with NPSI

Farm dams provide flexibility for growers to store water on-farm and optimise the use of water availability.

Up to 40% of water is lost from Australian farm dams every year due to evaporation, drainage and seepage. These losses are estimated at more than 1,320,000 megalitres. This water is worth up to \$660 million and could otherwise have been used to irrigate crops, boost environmental flows in rivers or provide water to residents each year.

The **Farm Dam Management** project was managed by the CRC for Irrigated Futures and sought to improve the quality of advice given by advisors and consultants by offering information through the Farm Dam Resource Kit and training in using software.

Maxine Schache is an extension officer working with irrigators in the Mildura area who participated in the Farm Dam project.

This case study reports on the outcomes of two workshops run in the Mildura district for irrigators and consultants.



Farm Dam with Evaporation mitigation measures in place

“The Ready Reckoner provides a useful tool to assess the cost benefit of evaporation saving technologies.”

Changes made as a result of NPSI influence

Those who attended the training workshops reported that they increased their use of the web-based tool “Ready Reckoner” and established the economic value of water losses from farm dams.

Water losses from farm dams were quantified using the “Ready Reckoner” and particularly related to seepage and evaporation from the dams being evaluated.

Once the losses were determined and the mode of loss examined, measures to mitigate losses were explored. Depending on the situation proposed, mitigation measures might include physical methods such as covers or liners or chemical using surface films or monolayers.

This enabled a business case for expenditure on mitigation of losses to be developed.

Costs of making changes

The costs to mitigate farm dam water losses vary according to dam size, seepage and/or evaporation mitigation strategy (e.g. plastic lining vs. bentonite layer). Evaporation mitigation costs depend on method (chemical monolayers vs. physical covers).

The costs for each situation are independently calculated.

Benefits of making changes

Making changes to farm dams can provide benefits through reduction in water losses through evaporation and/or seepage.

The evaporation reduction for different products is shown below with example installation and breakeven costs.

Product	Evaporation Reduction	Installation Cost (\$/m2)	Breakeven Cost (\$/ML saved)
	High - Med - Low	Low - High	Low - Med - High
Floating Covers	95% - 90% - 85%	\$5.50 - \$8.50	\$300 - \$320 - \$340
Suspended Covers	80% - 70% - 60%	\$7.00 - \$10.00	\$300 - \$340 - \$400
Chemical Covers	30% - 15% - 5%	\$0.00 - \$0.38	\$130 - \$400 - \$1100

Estimated breakeven cost is based on 2,200mm potential evaporation, all year water storage, low cost scenario and range in evaporation reduction performance (Low- Med- High).

ECONOMIC READY RECKONER
- Evaporation Mitigation Systems

ABOUT ASSUMPTIONS CASE STUDIES [Evaporation Resources webpage](#)

Demo Case Studies: [Bourke-North-Western-NSW-Cotton-Production]

Location: [Bourke, North-Western New South Wales]
Description: [Cotton Production, ...]

✓ 1. Select Storage Type: [Circular Ring Tank] ?
✓ 2. Enter / Import Monthly Evaporation Data ?
✓ 3. Enter the Average Amount of Water Stored Per Month (as a % of Total Storage Volume) ?
✓ 4. Enter the Average Percentage of Years that the Storage Contains Water (per month) ?
✓ 5. Select your Most Applicable Seepage Option: [I Have Measured the Seepage Loss] ?
✓ 6. Initial evaluation for various Evaporation Mitigation System (EMS) Evaluate

The table aims to give you initial guidance on which of the 5 evaporation mitigation systems may suit your situation. This will assist you in deciding which systems to get site-specific information on the performance and costs. The two values (\$/ML) give you the range of costs to save water from the best to worst. It uses the dam and evaporation data entered and assumptions about the performance and cost of the options as outlined below.

Evaporation Mitigation System	Performance	Cost	Cost to Save Water (\$/ML)	
Impermeable Cover	Good	Low	469.9	?
	Poor	High	5,555.9	
Shade Cloth	Good	Low	773.7	?
	Poor	High	4,514.9	
Chemical Monolayer	Good	Low	50.7	?
	Poor	High	1,288	
Modular Cover	Good	Low	302.4	?
	Poor	High	6,403.9	
Increase Wall Height	Good	Low	65.6	?
	Poor	High	203.8	

- Generally Continuous Impermeable and Shadedcloth structures are more appropriate for smaller storages (< 1ha) and where water is more scarce and expensive.
- Generally Modular systems of impermeable and shadedcloth material can be used on larger storages than continuous structures.
- Typically monolayer products are most appropriate for large storages (> 1ha) although they can be used for smaller storages.
- Increasing wall height is most appropriate when the wall size is small relative to water stored.

"Chemical treatments are less permanent and can be applied seasonally, when most needed."

The Economic Ready Reckoner used to determine economics of reducing evaporation

Impacts of making changes

The project demonstrated to irrigators and advisors that reduced water losses through evaporation and seepage from farm dams were achievable and explored the economic implications of mitigating those losses.

The project also showed improved water use efficiency was possible using evaporation and seepage mitigation measures.

Relevance to others

The information from this project is relevant for all farm dams.

References for further detail

<http://farmdammanagement.ncea.biz>

Ready Reckoner website

<http://readyreckoner.ncea.biz>

Further information

NPSI

Guy Roth
Program Coordinator
Phone: 0417 223 179

Tony Clancy
Media Coordinator
Phone: 0418 445 492

Product Code: NPSI1211
www.npsi.gov.au