WaterSmart Dams

Making dams work again

GETTING MORE WATER INTO DAMS

Below average, and seasons with lighter rain events mean less runoff. A dam is only as good as the catchment - size and threshold to generate runoff are key.

ROADED CATCHMENTS

A compacted clay surface generates runoff with less rain. In Merredin, a retrofitted roaded catchment now captures runoff from storms and small rainfall events. A well-maintained roaded catchment runs on ~**8-12mm** of rainfall.

LINED CATCHMENTS

Using a high-performance catchment surface (such as PVC or HDPE) boosts runoff while taking less cropping land than a roaded catchment.

Repurposed Tarp Trial – Jacup

- Begins running water after **0.8mm** of rain.
- Compared to roaded, the tarp catchment:
  - Captured 169 mm of additional rainfall from 0.8 - 8 mm rain events (47% of the total rainfall, May 2023 to November 2024),
  - extra **830,000L** (0.83ML) runoff into the dam.

How much runoff would have occurred without the tarp?

Three scenarios modelled on the Jacup 0.65ha catchment using May 2023–Nov 2024 rainfall data.

Catchment Type	Total Runoff	Water Cost ($/kL)
Tarp	1.87 ML	6-9
Roaded	0.87 ML	1-3
Natural/paddock	0.33 ML	17-28*

*cost of carting water including direct water cost, labour/time, infrastructure & depreciation

Scan to check out SEPWA's video on tarp installation

GETTING MORE WATER INTO DAMS

SUB-SURFACE DRAINS

Tile and V-drains can be a solution to manage waterlogged paddocks, increasing crop yields and reducing equipment bogging. **Can this drained water be used to refill a dam, or is it too salty?**

Kojonup Site

Winter 2023 & 2024

- 440 mm of rainfall, generated 1.55 ML of flow.
- Flow was highly variable between years.
- Water was fresh - average salinity 1,275 mg/L (Livestock need <2000 mg/L).

Darkan Site

August/September 2023 & Winter 2024

- 478 mm of rain, 2.4 ML runoff.
- Constant trickle flow Jul-Sep 2024.
- Flow was highly variable between years.
- 230 mg/L average salt load, salinity levels comparable to human drinking water.

Summary: average to above-average rainfall years generated inflows of very fresh water, a great resource to top-up a dam. Very little inflow in low-rainfall years...so you still need a good catchment.

KEEPING WATER IN DAMS

Water Loss- Evaporation & Leakage

Every dam loses water to evaporation & leakage... but how much is lost, and how much is actually available by the end of summer for livestock or next years spray program?

The project benchmarked annual losses at three dams between Sept 2023 - 2024:

- Merredin 5ML dam: evaporation was 1.64m and leakage 0.92m (**~2.5m annual loss**)
- Duranillin 5.3Ml dam: evaporation was 1.44m and leakage 1.1m (**~2.5m annual loss**)
- Duranillin 2.6Ml dam: evaporation was 1.44m and leakage 0.66m (**~2.1m annual loss**)

Benchmarking dry season available water, in the event of no rainfall:

- If every dam entered Oct 1st at 100% capacity, all had less than half of their full capacity available by April 1st (i.e. 5ML dam has <2.5ML of available water).
- If every dam entered Oct 1st at 20% capacity, all were left with no available water supply.

A good dam needs a well-sized, high-performing catchment to maximise water before summer. Explore how to size your dam and catchment with the Water Evaluation Platform.

DAM COVERS

Modified pool covers have been installed at two locations to understand how effective they are at reducing annual evaporation, compared to the regional average:

- **Kojonup:** 177 m² cover reduced total evaporation by 28%
- **Gardiner:** 506 m² cover reduced total evaporation by 36%

Measurements found that the dam cover reduced evaporation by ~70% under the covered area, with seasonal variation (max efficiency in summer, minimum in winter). Costs ranging from **~$13–15/m²** (excl. delivery/install).

> *Since installing the cover, we've seen less bank erosion due to reduced wave action.*
>
> - Demonstration site hosts

VEGETATED DAMS

Vegetation reduces wind speed which decreases evaporation by ~20-30%*.

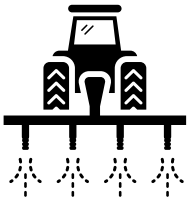
*Department of Agriculture WA, Farmnote 72, 2002

Benchmarking at an 8.2ML Kojonup dam (right) with 3-4m trees in 2024, showed 28-32% less evaporation than regional average evaporation. Fringing vegetation also filters inflows, reducing turbidity.

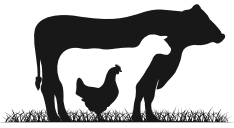
WATER QUALITY- FIT FOR PURPOSE

The project sampled 68 water sources across the Merredin region used for production, and found that water quality varied depending on its source (e.g. rainwater, dams, bore, and scheme water).

Water quality can fluctuate throughout the year, particularly after heavy rainfall or prolonged dry periods so regular water sampling is recommended.



Spray chemical performance relies on good-quality water. Some chemicals are very sensitive to water quality. **Test your water quality regularly (especially: pH, turbidity, salinity, and alkalinity) and match this against chemical label requirements, and seek expert advice.**



Livestock health and production also rely on high-quality water. **Regularly sample dam water salinity, particularly as water levels drop.** High levels of organic and faecal matter or fine sediment (turbidity) can negatively impact livestock. **A well-maintained silt-trap will improve water quality and boost livestock production**.

Check out GRDC Spray advice here

Scan here to check safe salinity levels for livestock with Saltlandgenie

Planning a dam upgrade? Want to expand or make your dam catchment more efficient?

The Water Evaluation Platform helps you:

- Analyse your dam's performance over time.
- Optimise dam and catchment size and type.
- Estimate your dams water loss from evaporation.
- Assess the costs and benefits of improving your dam and catchment

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Water Evaluation Platform Official release June 2025. Beta version available now for eager testers!

Contact: cwss@uwa.edu.au

Australian Government
Department of Agriculture, Water and the Environment

Future Drought Fund

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