Farm Water Management Plan

Plan Template

Farm Water Management Planning

Know your numbers.
Know your needs.
Know the gap.
Have a plan.

Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

SOUTHERN NSW Innovation Hub
SUSTAINABLE AGRICULTURE, LANDSCAPES AND COMMUNITIES

Corowa District Landcare

Holbrook Landcare Network

RGA RICEGROWERS' ASSOC. of Australia Inc.

RIVERINE PLAINS

Western Murray Land Improvement Group

West Hume Landcare

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Contents

This table of contents is an outline of some of the steps and details required to be able to come up with a realistic Farm Water Management Plan. It is not meant to be laid out exactly, however it is important to cover the 'topics' listed and document your own information in enough detail so you can come back to this plan in the future and know what you were thinking and planning. (Items with '*' are considered essential in a Farm Water Management Plan document.)

This template is produced as part of the Murray LLS 'Farm Water Management Planning' project, supported by the Southern NSW Innovation Hub through funding from the Australian Government's Future Drought Fund.

Contents

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Part I.
Weathering the dry

Introduction and Drought Strategy

Farm Water Management Planning

1. Introduction

1A. Property details

Property name:	
Location:	
Property size:	
Annual median rainfall:	
Enterprises:	
Household residents:	
Garden area:	

Livestock:	

Crop:	

House & shed tank:	

1B. What is the purpose of this plan?
What do you want this plan to be able to do?

1C. Farm Map

2. Drought Strategy

This will help dictate what actions you may need to take once you have done a Farm Water Budget/audit and determine the amount of water you will want to have on hand.

NOTE: (from 'Managing Drought' DPI publication) — p11. "Your drought strategy objectives should be clear and wherever possible be stated in numbers, dates or dollars." See also the '**Drought Plan – Template**' as a useful tool.

2A. Reflections on previous drought — learnings, lessons, what would you do differently?

2B. What is your overall strategy in the event of an oncoming drought/dry season 'Drought Strategy'?

1. **Do you intend to retain all stock?**

2. **If not, what classes and type of stock are you going to retain?**

3. **What numbers of each stock class would you like to retain?**

4. **How do you plan to manage those stock with regard to feeding/watering i.e. are you going to use a stock containment/management area or sacrifice paddock?**

2C. Trigger points for action prior to or during drought.

1. **At what point do you destock?** (Table with timelines)

2. **What are the ground cover trigger thresholds?**

3. **When are you doing your feed audit? — Feed On Offer (FOO) and stored**

Part II.
Water metrics

Understanding your water needs

Farm Water Management Planning

Farm water budget/audit

Total supply and demand from Table 9 and Table 10.

'Annual' TOTAL Farm 'drought' Water Budget — Based on 181 days of 'summer period' calculations	
Drought stocking	

Storage source	Available storage (ML)	Total demand from each source (ML)	Weeks of water available (at rates of consumption)	Years of storage at drought stocking rates
Dams				
Domestic & other tanks				
Totals:				

It is highly desirable in planning your farm water needs to have 2 years supply on hand.

Whether you have 'adequate supply', or a 'deficit' is calculated by:

Adequate/deficit = Total available storage (ML) – (2 x total annual demand) (ML)

Total available storage (ML)	Total annual demand (ML)	Total demand for 2 years (ML)	Supply - demand	Adequate (+ve) or deficit (-ve) (ML)

1. Quantifying Farm Water Requirements

1A. Livestock Requirements

How much water does the livestock use in summer (October to March – 181 days)?
(Refer to Farm Water AgGuide Appendix 3, Table 27, p.125)

Total daily water requirement (L) = daily requirement per head (L) x number of stock

Table 1 Livestock Water Requirements

Livestock type	Number	Daily water requirement (L)	No. days in summer	Total water required for summer (L)
Total livestock requirement:				

1B. Garden Water Requirements

How much water does the garden use in summer?
Range 10,000–30,000 L/ha/day (1-3 L/m², Farm Water AgGuide Table 11, p.16)

Total water required = area (Ha) x daily required (L) x No. summer days

Table 2 Garden Water Requirements

Garden area (Ha)	Daily water requirement (L/Ha)	No. days in summer	Total water required for summer (L)

1C. Household Water Requirements

How much water does the household use in summer?
(Refer to Farm Water AgGuide Tables 11, 12, p.16)

Table 3 Household Water Requirements

Household	Daily water requirement (L/person)	No. days	Total water required for summer (L)
No. residents:			
Evaporative air con			
Other			
Total:			

1D. General Farm Needs

(Refer to Farm Water AgGuide Table 17, p.24)
Spraying – e.g. first application requires 100 L/ha, second application requires 70 L/Ha.

Table 4 Spraying Water Requirements

	Application rate (L/Ha)	Crop Area (Ha)	Total water required per application (L)
Spray 1			
Spray 2			
Total:			

Firefighting – 10 000 L/Ha home yard. See Farm Water AgGuide Table 17, p.24.

Table 5 Firefighting Water Requirements

Firefighting	Recommended storage rate or L/area	Home yard area (Ha)	Total water to store (L)
Buildings			
House yard			
Total:			

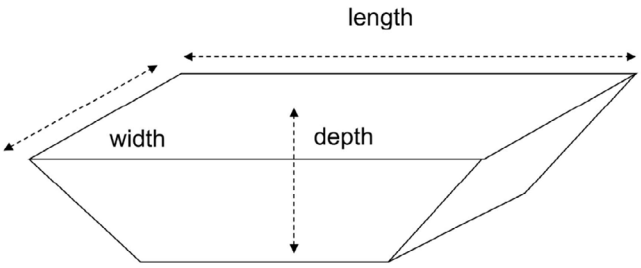
Part III.
From drop to data
Determining water storage capacity and losses — dams and tanks

Farm Water Management Planning

Rectangular Dam

Calculate the capacity of the rectangular dam:

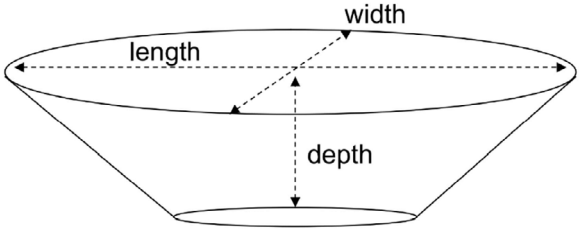
- ***Surface area (m²) = width × length***
- ***Volume (m³) = 0.4 × surface area × depth***



Circular Dam

Calculate the capacity of the round dam:

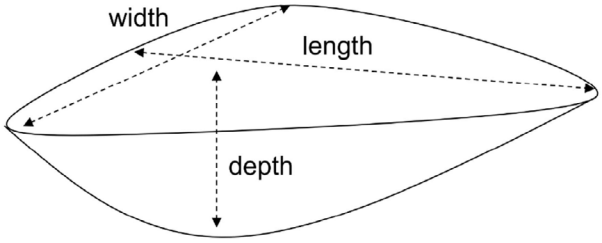
- ***Surface area (m²) = 0.8 × width × length***
- ***Volume (m³) = 0.4 × surface area × depth***



Triangular Dam (or gully dam)

Calculate the capacity of the triangular dam:

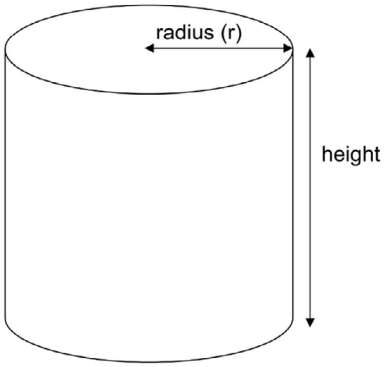
- ***Surface area (m²) = (width x length) ÷ 2***
- ***Volume (m³) = 0.4 × surface area × depth***



Estimating Tank Capacity

Calculate the capacity of the tanks:

- ***Surface area (m²) = π × r²***
  (π = 3.14, r² = r × r, where 'r' = radius)
- ***Volume (m³) = π r² × height***



1. Estimating Farm Water Storage Capacity

Table 6A Your farm dams

Water storage name	Width (m)	Length (m)	Depth (m)	Surface area (m^2)	Approx volume (m^3)	Water storage capacity (ML)
Other water storage:						
Total water storage:						

Table 6B Your farm tanks

Tank storage name	Radius (m)	Height (m)		Surface area (m^2)	Approx volume (m^3)	Water storage capacity (ML)
Other tank storage:						
Total tank storage:						
Total water and tank storage:						

To record details of additional water storages, see Appendix 1, Page 23.

2. Quantifying Losses from Dams

2A. Evaporation Loss

Your location:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean daily evaporation (mm)												
Decile 1 monthly drought rainfall (mm)												

Note: Data can be sourced from:

From the table above, determine the average (mean) daily summer evaporation (mm) in your location

Average daily summer evaporation = (sum daily mm for October to March) ÷ 6

Average daily summer evaporation = _____ mm ÷ 6 = _____ mm/day

Average summer drought rainfall = _____ mm for months October to March

Average daily drought rainfall = _____ mm ÷ 181 = _____ mm/day

Net daily drought evaporation = _____ - _____ = _____ mm/day

In Table 7A below, calculate the summer evaporation loss using this formula:

Evaporation loss (L) = surface area (m²) × (average daily evaporation (mm) - average daily drought rain) × no. days

Table 7A Your farm dam evaporation

Dam	Surface area (m²) (from Table 6)	No. days	Daily evaporation – daily rain (mm)	Total evaporation loss (L)
Total:				

2B. Seepage Loss

Estimate the seepage loss from the dams over summer.

Note: Seepage loss will depend on the material on which a dam is located and built and the quality of construction. Maximum acceptable loss is 5 mm/day — if your losses are above this, the dam needs attention.

In Table 7B below, calculate the summer seepage loss in L using this formula:

Seepage loss (L) = surface area (m²) × seepage (mm) × no. days

Table 7B Your farm dam seepage

Dam	Surface area (m²) (from Table 6)	No. days	Summer seepage (mm)	Summer seepage loss (L)
Total:				

2C. Residual or 'dead' water

Sometimes a portion of water in a dam cannot be retrieved. This is referred to as residual or 'dead' water.

In Table 8, estimate the residual water in the dams.

Table 8 Your residual water

Dam	Total volume (m³) (from Table 6)	Residual water (%)	Residual water (m³)	Residual water (L)
Total:				

Part IV.
Know your flow

Getting the water to where and when you need it

What are your options? (Based on Parts I, II and III above.)

Farm Water Management Planning

1. How long will the water last over the 'summer period'?

Table 9

Water usage over summer		Your farm	
No. of days in summer			**A**
Livestock	(Table 1)		
Garden	(Table 2)		
Household	(Table 3)		
General farm needs	(Table 4)		
Firefighting	(Table 5)		
Total summer usage:			**B**
Daily summer water consumption:	(B ÷ A)		**C**

Table 10

Total storage capacity (Litres)	(Table 6)		**D**
Less evaporation losses	(Table 7A)		**E**
Less estimated seepage losses	(Table 7B)		**F**
Less residual water	(Table 8)		**G**
Available water:	(D - E - F - G)		**H**
Days water will last:	(H ÷ C)		

2. Checking supply flow rate and trough capacity

Water must be supplied at least at the rate of stock and domestic usage. This sets the minimum flow rate that the pump and the pipework have to deliver. For our calculations, it is considered advisable to ensure all stock can be watered in a 4 hr (240 min) period. This allows for a fast steady stream of water for stock, and reduces the chances of fighting and dominance around troughs that can cause damage — i.e. broken valves, pipes kicked etc. The system needs to be able to meet this peak flow.

(Refer to Farm Water AgGuide Table 21, p.96)

Table 11

Peak flow rate for 4 hr watering (L/ min)					Trough capacity (L)	
Stock type	**Number of stock**	**Daily intake (L/head)**	**Total daily requirement (L)**	**Flow rate required (L/min)**	**Volume (L/head)**	**Trough capacity required (L)**
	A	B	A × B = C	C ÷ 240 min	D	A × D
Total:						

3. Options and actions

Planning: Take a 'big' picture approach to plan a whole system — it can be modular and rolled out sequentially.

Options:

1.

2.

3.

Options continued:

4.

5.

6. General:

Financial options:

Your estimated costings:

Item	Per-item cost $	Total cost $

Farm map with options set out:

Insert map with layout of proposed options – new dams, enlarged/ renovated dams, note actions on existing redundant dams (left open for backup, 'wet-land etc), likely route of pipes, location of pumps, tanks and troughs. Indicate where any new fencing may go.

Next steps:

Appendix 1

Other Water Sources

Water storage name	Width (m)	Length (m)	Depth (m)	Surface area (m^2)	Approx volume (m^3)	Water storage capacity (ML)
Total other water storage:						