

Irrigation scheduling

What is irrigation scheduling?

Irrigation scheduling is applying the right amount of water at the right time. Basically, scheduling aims to minimise any water stress on the pasture (either too wet or too dry) and minimise any run-off or unnecessary drainage loss. **So scheduling is about timing and volume applied.**

Why should I schedule?

Every user of water needs to ensure that they are using water conservatively and appropriately in recognition of the rights and needs of other water users, including the river itself, and to ensure that everyone can continue to enjoy the water resources of our State for generations to come.

Irrigation studies on the LMRIA have shown that pasture stress could be occurring in as little as 10 days in summer. With a “typical” irrigation interval of 20 days pasture could be subjected to moisture stress for up to 50% of the time. This has serious implications for pasture productivity and quality.

There is a need for a reliable and accurate means of scheduling irrigations, especially on laser levelled paddocks re-sown with shallow rooted perennial pasture varieties more susceptible to moisture stress than traditional paspalum based pasture.

However: Irrigation Scheduling is only one part of getting the watering right!

Scheduling is only one component of a **total management package** which will help you to grow and utilise more feed resulting in better production. You must be prepared to ensure that your drainage is good, watering structures are big enough, paddocks are laser levelled where suitable, and that you can vary your grazing rotation to utilise any extra feed. Maintenance of the irrigation infrastructure is also important—weed control, drain depth, check bank condition, etc.

How should I schedule irrigations?

There are a range of methods that can be used to schedule irrigation, a cheap, simple and effective way to schedule when to water is to monitor evaporation. Evaporation can be monitored on farm by making and IRRIGAUGE or Evaporimeter or you can use data collected at a local weather station.

Why evaporation?

This is because the water use of pasture is closely related with the rate of water lost by evaporation from a Class A evaporation pan as used by the Bureau of Meteorology. Evaporation from the IRRIGAUGE or cut down drum (evaporimeter), in turn, is related to evaporation from a Class A pan.

Pasture water use varies according to the weather and therefore the level in the IRRIGAUGE or home made evaporimeter will also vary, subjected to the same weather changes as the pasture. When rain falls the water level rises as does the soil water level.



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Evaporation monitoring is cheap and easy for the following reasons:

- ease of installation
- ease of use
- low maintenance requirement
- no need to install in paddocks therefore convenient to read
- low cost.

Local Automatic Weather Station Data

Local weather data is available from the SA MDB NRM Board's Regional Automatic Weather Monitoring Network www.aws-samdbnrm.sa.gov.au

A full suite of weather information is available from the Mypolonga weather station including daily evapotranspiration data which can be used to inform irrigation scheduling. In addition to this logging rainfall monitoring sites are located at River Glen and Wellington East and rainfall data is updated every hour on the website.

What is an IRRIGAUGE?

The IRRIGAUGE is a device you can make from rain gauge.

Trials conducted on the Lower Murray swamps have compared the IRRIGAUGE to Class A pan evaporation and tensiometers and found the IRRIGAUGE to reliably predict irrigation on established laser levelled pastures. While not as accurate as tensiometers, the low maintenance requirement and ease of use provide a distinct advantage.



IRRIGAUGES installed and numbered to match watering sections. The black lines mark the irrigation point for summer and autumn/spring.

How do I make an IRRIGAUGE?

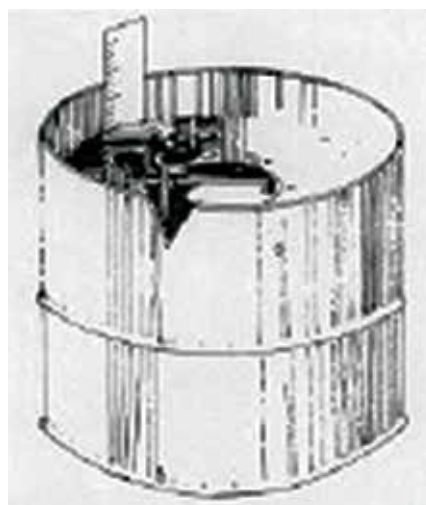
Using a Nylex rain gauge remove the top and the small inner gauge, drill a hole in the side of the larger gauge 1 cm from the top (this prevents you overfilling the gauge and makes sure you fill it to the same level each time) then measure with a ruler down the side of the gauge and mark with a texta or ear tag pen at 90mm, 110mm and 120mm—see photographs below.

How do I use them?

IRRIGAUGES can be grouped together in a convenient location for reading (such as by the main gate to the swamp) but must be exposed to the same wind, sun and rain as the swamp paddocks. Gauges should be numbered to correspond to paddock or irrigation section numbers. One IRRIGAUGE is required for each watering section.

Install on a post or dropper 140cm above the ground. On laser levelled paddocks re-fill the IRRIGAUGE when the paddock is watered and irrigate the paddock again when the level drops to 100–110mm in summer or 110–120mm in spring and autumn. If making your own IRRIGAUGE, measure with a ruler down the side and mark with texta or ear tag pen these levels.

On non-laser levelled paddocks the IRRIGAUGE can still be used as a guide, however, the gauge should not be re-filled until all the surface water on the paddock is gone. This should also be the case on lasered paddocks which may still have poor drainage or where over-watering has occurred. The IRRIGAUGE level at which the paddock is scheduled for irrigation can also be fine tuned by checking soil moisture with a “dig stick”.



Left: A “dig stick” which can be hammered into soil. Twist and withdraw, then examine soil profile for moisture. Available from Murray Machining, Murray Bridge.

Right: Farm Evaporimeter made from cut down 200 litre drum.

How do I make a homemade evaporimeter?

A farm evaporimeter is made from cut down 200 litre drum.

Cut off the base of a 200 litre drum approximately at a third of the height of the drum—just above the first “rung”. A V-notch is cut in the top edge of the drum—see diagram. This assures that the drum, or evaporimeter, is able to be re-filled to the same level after each irrigation. A plastic ruler is glued to the inside of the evaporimeter with the “0” of the ruler level with the bottom of the V-notch. The evaporimeter should be covered with bird netting to prevent animals from drinking from or falling into it. Ensure the evaporimeter is placed on level ground in an open situation receiving the same exposure to wind, sun and rain as the crop. The evaporimeter is filled with water and evaporation recorded from the ruler in millimetres. As rainfall is included in the evaporimeter readings, there is no need to allow for a reduction in irrigation requirement.

LMRIA paddocks should be irrigated when the reading reaches 70 to 80 mm. A record sheet can be drawn up to enable the accumulated evaporation total for each watering section to be individually recorded.

How do I get the volume of water to apply right?

With a water meter you should be aiming to apply no more than one megalitre of water per hectare of paddock per irrigation. So a 4 ha paddock should not get much more than 4 megs per irrigation. This can be easily achieved on good lasered paddocks, but more

difficult on non-lasered paddocks. Paddocks since the millennium drought are also using much more water and may take some time to ‘settle down’.

On all paddocks the aim must always be to try to reduce the amount of surface runoff. Surface runoff is water that is wasted and not used by the pasture. It also takes with it valuable fertilisers and manure. Also, wet and boggy paddocks do not grow good feed.

Indicators that you have used too much water will be:

- slow irrigation time—anything over about an hour per hectare of paddock to a maximum of 6 to 8 hours depending on flow rate.
- slow drainage off the paddock—surface water should all be gone within 12 hours of shutting the sluice gate or siphon.
- difficulty in keeping ryegrass and clover in the pasture
- obvious wet areas, particularly at the ends of paddocks.

Problems with supply structures—channels, sluices, paddock inlets, etc—will limit your ability to apply the right amount of water and may be beyond your control to change. However, any paddock can have it’s irrigations successfully timed by IRRIGAUGE or evaporimeter as long as you do not start recording evaporation or re-fill your gauge until all the surface water is gone.

For further information on Irrigation Scheduling please contact Michael Cutting from the SAMDB NRM Board on 85365 619



Remember: you can't schedule irrigations properly if you can't control your water supply

- Siphons and sluices must be in good condition
- Delivery channels must be clean and weed free
- Drains must be clean and weed free
- Toe drains and re-use systems must be in good order and flowing properly
- Paddocks should be level and well graded for best flow
- If your flow rate through the sluice/siphon/channel is low, water one paddock at a time to maximize flow

For more information contact: Monique White on 0400 972 206 or monique@dairysa.com.au



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