

Vegetable -Matters-of- Fact

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POTATO



How Much Water is in My Dam?

In dry seasons, and with limited water availability, it is important to know how much water is in your dam to assist with water budgeting for your crop.

Critical Stages for Water Management

Russett Burbanks require a consistent supply of water throughout the season.

For other potato varieties the critical times are:

1. Tuber Set – to encourage tuber set it is important not to allow soil temperatures to rise. Irrigation can help to reduce soil temperatures.
2. Bulking Up – slight stress at this stage will depress yield before there are any obvious symptoms and can affect tuber shape.
3. Final Crop Watering – while tubers are bulking up their size can be regulated by watering. Large tubers will result if the crop is watered out until the tops die.

Estimated daily transpiration loss from a potato crop in full leaf cover

Month	Victorian Highlands	Coastal Districts
	mm/day	mm/day
September	1.5	2.0
October	2.0	2.5
November	2.5	3.0
December	3.0	4.0
January	3.5	4.5
February	3.5	4.0
March	2.5	3.0
April	1.5	2.0

The above figures are for a potato crop with full leaf cover. The water percentage used by a young crop is roughly proportional to the amount of leaf cover. Simplified the water use in the early part of the season is 50% of a crop with full leaf cover.

How do I work out how much water is in my dam?

There are a few measurements that you need to know:

- Surface area
- Maximum depth

Surface Area

The surface area of a dam is calculated by multiplying the length by the width.

Example: 30 metres X 50 metres = 1500 m².

This will be the case for square or rectangular dams. Most dams start out as a square or rectangle, but over time appear to become rounded. If the dam is not exactly square, round the measurements off. Make sure to err on the conservative side.

Dams such as Turkey Nest dams can be any shape, and their dimensions may need to be approximated to calculate the surface area. Gully dams can also be of varying shapes and the formula for calculating their storage capacity is discussed later.



Volume

With the surface area depth calculated, the volume can then be determined:

$$\text{Volume (m}^3\text{)} = \text{Surface Area (m}^2\text{)} \times \text{Max depth (m)} \times 0.4$$

(Where 0.4 accounts for the batter slope on the sides of the dam)

$$\text{Example: } 1500 \text{ (m}^2\text{)} \times 5 \text{ (m)} \times 0.4 = 3000 \text{ m}^3$$

To calculate the capacity of your dam in megalitres (ML), divide the volume in m³ by 1000

$$\text{e.g. } 3000 \text{ m}^3 / 1000 = 3\text{ML}$$

Gully Dams:

You can estimate the capacity of small gully storages using this formula:

$$\text{Volume} = (\text{width} \times \text{maximum depth} \times \text{length}) / 5$$

(Where 5 is the correction factor)

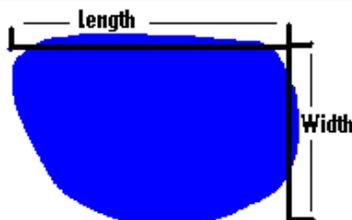
Example: Water level height up bank = 2m,
 Length = 20m, width = 10m
 Volume of excavation = 100m³
 Volume = (2 x 20 x 10 + 100)/5 = 100m³

Width and depth are measured at the embankment site and length is the distance water will back-up (you will need to add the volume of any excavations made below water level to give the total storage capacity).

If the excavation volume is not known substitute the depth of water at the deepest point as an approximation for the depth.

Refer to:

<http://www.nrw.qld.gov.au/factsheets/pdf/water/w24>.



How Much Water do potatoes need?

Knowing how much water is available in soils combined with the average consumption can be used to estimate the frequency of application and amount of water that needs to be applied.

Ballarat

Ballarat soils (clay loam) hold 37mm of water in the root zone before yield reductions occur. In January, this amount will be transpired in 10-11 days (3.5mm x 11 days = 38.5mm). This indicates that around 25mm of water would be required per week at this time of year for a potato crop in full canopy.

Depth

One way to determine dam depth is to row out into the dam and lower a weighted line over the side. When the line is vertical, measure the length of the line needed to reach the bottom. Alternatively, use a pole with distances marked on it. You will need to do this at a number of places across the dam to find the deepest point.

An alternative for smaller dams, or if no boat is available, use a fishing line with a sinker on the bottom and a float attached. The line is cast out repeatedly, with the float gradually adjusted until it's not quite floating on the surface. The distance between the float and the sinker will be the depth at that point in the dam. Again, you will need to do this at a number of places across the dam.

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