

Case Study 1: Vineyard With Variable Soils

A grower operates a large vineyard area which straddles hills, creek lines, rocky outcrops and areas of variable soil type and depth. The irrigation system has been designed in large blocks which do not allow for the highly variable vineyard conditions. The grower is concerned that in order to get enough water to areas on lighter soils and rocky areas on rises, other areas in the same block with heavier, deeper soils are being overwatered, compromising yield and quality.

The grower would like to reduce vineyard variability, and decides that mulching areas of lighter, shallower soil

could reduce the need for frequent irrigation, saving water and allowing better management of grape quality. Using satellite imagery of the vineyard, the grower identifies a block with areas of low and high vine vigour, and correlates the information with on-ground knowledge of the vineyard conditions. Areas to be mulched are identified and the lineal metres of vine row to be treated are estimated.

The grower works closely with the compost processor to choose a material with a high proportion of coarse, woody material, and arranges

an experienced contractor to undertake the spreading. Extra soil moisture meters are installed in the mulched and unmulched areas for fine-tuning of irrigation scheduling, enabling maximum benefit to be achieved from the mulch. Next growing season, the grower uses satellite imagery to confirm the effects of the mulching strategy, and plan for mulching of the next block.



Viticulture

Organic Matter for Water Saving

It's no surprise that more and more growers are investigating the use of compost mulches in their vineyards, with conservative estimates of irrigation savings between 20 -30% when mulch is used. In some cases, water saving can be as high as 70%!

Compost mulches conserve soil moisture by preventing evaporation. Direct sunlight can heat the soil, and with warm air moving across the soil surface, moisture is drawn up from the soil and evaporates. Even a shallow layer of mulch on top of the soil can slow down this process and conserve soil moisture.

This results in the need for less irrigation – an outcome that will benefit every grower. Compost mulches are a great option to conserve soil moisture and potentially decrease irrigation, while at the same time maintaining and even increasing crop yields.



Achieving Water Savings

The first step in achieving water savings is to choose the right compost mulch for your property (see Choosing the Right Compost). Fully composted materials have been shown to be effective, but pasteurised materials can also provide substantial benefits.

In general, coarse mulch grades with woody particles are the best to use for water saving. Current recommended application rates for coarse mulches are between 50-75mm deep, and 40cm wide under vine. This type of compost

application (at 50mm) can be expected to provide you with significant water savings for two – four years.

High rates of fine composts should be avoided as they can hold moisture and prevent water from moving into the soil. A deep layer of fine particle compost can also encourage root growth in the mulch. An application rate of 25mm for fine compost mulches may be appropriate, but never apply at rates greater than 50mm.

Case Study 2: Large Vineyard, Irrigation Dependent

A vineyard manager oversees a large company vineyard that is dependent on river-water for irrigation. Recent new plantings have ensured that the maximum possible area of land is used to make the most of the water allocation. But pressure on the water source resulted in the allocation being cut by over 30%.

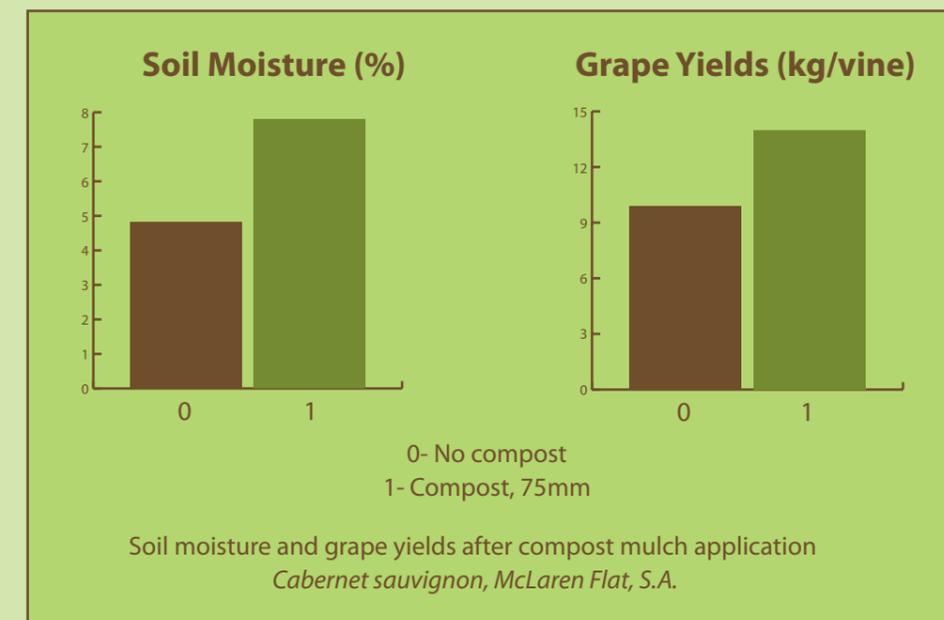
The manager now has to decide whether to sacrifice the yield on entire vineyard blocks to ensure the survival of vines, or find a way to reduce irrigation.

The manager decides to try mulching and determines that a coarse grade of green-organics compost will provide the right physical and chemical properties for water-saving. The coarse, open texture of the compost will allow transmission of rainfall and irrigation to the soil surface and along with the relatively-low nutrient content, will discourage root growth in the mulch. The woody fraction will persist on the soil for some years to assist in achieving good value from a single application.

The manager works closely with the compost processor to ensure that an acceptable grade and quality of material will be supplied and arranges to access to specialised spreading machinery.

The vineyard has extensive moisture monitoring equipment and after application, the irrigation team undertake a period of daily monitoring and review of soil moisture to ensure that the irrigation schedule will be optimally adapted to achieve maximum value from the compost mulch.

Australian researchers estimate potential irrigation savings of 20-30% with the use of a coarsely textured compost mulch



More information

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Making the most of compost mulch

To get the most out of your compost application it is essential that good irrigation management is in place. Monitoring soil moisture and understanding soil water availability will allow you to adjust your irrigation schedules to suit the needs of the crop and help maximise the benefits of your compost. This is especially important to maintain yields, particularly where a mid-row cover crop or sward is used. As well as irrigating less throughout the season, applying compost mulches can also delay the need for irrigation, often postponing the first irrigation application by a month, or one-two irrigations depending on soil type and management factors.

Good irrigation management practices will enable you to determine when you need to begin irrigating as well as how often.

Compost mulches can also be targeted to specific areas within a single irrigation block to address soil water variability. Compost has also been used successfully in this way to ameliorate the effects of salinity. Vines in areas of high salinity responded to a greater extent to remediation than vines in areas of low salinity. Applying compost in a blanket manner may not be the best approach for your block, and soil variability should be taken into account.

Additional benefits of compost mulching

Water saving is a key reason to use compost mulches, but there are also other significant gains to be made by mulch application.

Compost mulches supply additional nutrients to the soil, which can decrease the need for fertiliser. Nitrogen and phosphorous become available slowly from the mulch over a period of years, but some nutrients like potassium move readily from the compost into the soil. As up to 85% of potassium can move into the soil it is important that fertiliser programs are adjusted to account for this. This can be easily achieved using a nutrient calculator www.recycledorganics.com/product/agriculture/mulchnutcalc/mulchnutcalc.htm.

Young vines in particular can benefit from compost mulches. As well as saving water, compost mulches can increase the growth rate of young vines by moderating the fluctuations in soil moisture and temperature. This enables young vines to increase growth and also provides them with the ability to withstand periods of extreme stress. Field trials showed that young vines were able to support twice as many

bunches through to harvest when compost mulch was applied. With extreme environmental fluctuations becoming more common, compost mulches can give young vines a significant advantage.

Other long term benefits include:

- Increasing yield
- Reduce risk of crop failure – by moderating soil moisture and temperature fluctuations
- Reduce farm management costs - less need for herbicide and fertiliser applications
- Increased water filtration – reduces pooling of water and evaporation, reduced run-off and nutrient loss
- Supplying nutrients to soil – N and P slowly, Potassium more quickly (refer to 'Fact Sheet - Compost and Nutrients')
- Salinity management (ref compost for managing salinity)
- Increased biological activity
- Reduced soil strength
- Preventing erosion



Advantages of mulches

Short-term

Immediate and substantial water savings

Long-term

- Increase soil capacity to capture and store water
- Increased yields
- Moderate soil moisture and temperature fluctuations
- Reduced farm management costs
- Improved soil structure and decreased erosion



Saving Water and Saving Money

A recent cost benefit analysis using yield data from vines in South Australia showed that compost mulch applied at 10 and 50mm gave strong returns on the initial investment. When mulch was applied to 50mm depth (at \$24.50/m), an average of \$2.60 was returned on a \$1 investment!

Saving 20-30% of your irrigation as well as providing a range of additional benefits – compost mulch can significantly improve your vineyard operation.

Benefit cost (dollars returned for each dollar invested) analysis for compost mulch application to McLaren Vale vineyards (South Australian Centre for Economic Studies, 1999).

Site	Compost Mulch Depth	
	10mm	50mm
McLaren Vale – Cabernet Sauvignon	8.85	2.27
Willunga – Shiraz	4.27	1.69
McLaren Flat – mature Cabernet Sauvignon	6.47	3.86
McLaren Flat – young Cabernet Sauvignon	n.d.	2.19