LANDSCAPE SOUTH AUSTRALIA MURRAYLANDS AND RIVERLAND



Making Farm-Scale Compost

As the price of synthetic fertilisers continues to react with ever-changing global trade conditions, many farmers are looking for a more stable and affordable alternative. At the same time, the growing interest in soil health and regenerative farming methods are making alternative fertilisers a viable consideration for landholders.

Creating farm-scale quantities of compost on-site is one such option which provides landholder with the opportunity to improve soil health, while reducing the associated financial outlay and associated freight costs. In this fact sheet, we explore the benefits and types of farm-scale composting systems, and look at the ways in which farmers can set up their own farm-scale composting system.

Why compost?

Good quality compost provides landholders with an affordable and sustainable way to improve soil health, microbe biodiversity, soil organic matter, soil carbon, soil water holding capacity and plant-available nutrients. Compost is a great way to add humus (mineral associated organic matter) to the soil, is easy to produce and reduces farm waste.

There are 2 types of compost that can be made on farm - fungal or bacterial dominated composts. Both types are made using the same methods and take around the same amount of time.

Fungal composts are made up of a mix of 45% brown woody matter, straw, dry yard clippings and 30% green grass, green leaves and 25% manure or lucerne, and is suitable for vines, shrubs and tree crops.

Bacterial composts contain a mix of 30% brown woody matter and 45% green grass, green leaves and 25% manure or lucerne, and can be used with crops, pastures or vegetable production.

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Making your own hot thermophilic aerobic compost

Any organic matter that is found on farm can be composted - old hay rotting down, stubble, old silage, animal manure, lucerne, wood chips, vegetable scraps, leaves, animal bedding, damaged grain, etc.

You will also need:

- a hose and a water source
- a thermometer or digital infra-red gun
- a frontend loader excavator or compost turner
- a flat area with a slight slope to drain off any excess water, and
- a spade or shovel.

The process of making compost produces a lot of heat as the bacterial and fungi undergo rapid growth, whilst decomposing organic matter. The process also consumes a lot of oxygen and can dry out the compost quickly. Compost heaps need to be kept moist 45 to 55%.



Once the available organic matter has been combined, form windrows around 3 metres wide by 1.5 - 2 metres high. The windrow length will depend upon the amount of material available. Make sure all the material has been well mixed so that ingredients are uniformly distributed throughout the windrow. Once the windrows are formed, add water to get the compost moist.

Testing compost moisture levels

To test whether you have the right amount of moisture in the compost heap, pick up a hand full of mixed material and squeeze. If no water comes out of the compost but your hand is slightly damp, you have the perfect amount of water. If you can squeeze droplets out of the compost, it’s too wet.

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If the compost has the correct amount of moisture and the correct levels of ingredients, it will start to heat up in a day or 2. Once the compost reaches 55^{o}C, let sit for a 2 to 3 days, adding water if it is dry. Seeds perish after around 3 days at 55^{o}C, so composts applied to paddocks should not increase the risk of weed contamination.

When to turn compost windrows

When the temperature starts to exceed 60^{o}C, turn the compost and add water to cool it down. Do not let the compost temperature exceed 68^{o}C, as it will hamper the composting process and cause a fire hazard. When turning the compost, make sure that the outside of the heap is placed inside the heap to incorporate organic material and regulate the temperature. This will make a better compost and give all the biomass a chance to break down evenly.



Turning compost windrows and adding biochar.

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Adding water during turning is an effective way to keep compost sufficiently moist.

As composts heat up, they will dry out. The most effective way to add water is to use a high-volume water hose to wet the compost as it is being turned. If it dries out too much there is chance for the compost to repel water (hydrophobia). It is very hard to reverse hydrophobic compost, so prevention is better than cure.

Composting Do’s and Dont's

- Do regularly test the temperature and wetness of your compost. Don’t allow the temperature to exceed 60^{O}C, and ensure that the windrows are neither to dry or too moist.

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- If possible, add wood chips to compost heaps. This allows better air penetration, increases the carbon level of the compost and increases the amount of fungi as it breaks down.
- Consider adding additional minerals to suit your soil. Amendments like lime, gypsum, rock phosphate and other trace elements can be added to your compost - just make sure that they are mixed evenly through the heap.
- Don’t drive on top of windrows as this will cause air to be driven out of the compost and may turn the compost anaerobic.
- Don’t over water compost. It can cause compost to become anaerobic and smelly. If you need to dry out your windrow, turn it and add dry biomass.



Compost piles should be kept at a temperature between 50oC and 60oC.

How to tell if the compost is ready

The composting process can take up to 6 weeks or longer, depending on weather. Finished compost will resemble soil - brown in colour with an earthy smell. As the composting process concludes, windrows will be at an ambient temperature. If possible, let the compost age before use as this will increase nutrient mineralisation and microbe diversity.

Compost can be spread on to paddock or be made into a compost extract or tea, depending upon how much area needs to be treated.

Further reading

- Deceased livestock can be added to compost as an environmentally friendly alternative to letting carcasses rot in the paddock. Find out more here (https://www.epa.vic.gov.au/about-epa/publications/2050---composting-mortalities-on-farms).

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- Soil food web (https://www.soilfoodweb.com.au/) provide a number of services to help test composts, and also run regular courses in South Australia.
- Vertical composting may suit smaller-scale landholders, especially in the absence of machinery to turn windrow piles. This webpage (https://www.tenthacrefarm.com/building-the-right-compost-bin/#roundwire) provides an excellent guide on building different compost bins.

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More information

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