

COMPOST IN BROADACRE PRODUCTION FACT SHEET

Using compost in broadacre production

Compost is a nutrient rich, soil like product derived from organic materials through controlled decomposition harnessing biological processes to break down the organic matter into simpler substances. The organic matter is transformed into a valuable resource that can be used in many applications across agriculture, horticulture, landscaping and environmental management.

Compost provides a potential valuable resource in broadacre production as it can replenish soil quality and fertility, where there may have been a loss or reduction of key nutrients such as carbon, nitrogen, phosphorus and potassium over time through harvesting, stubble fed to stock or cutting of hay.

When used as a supplement with fertiliser, compost can reduce costs and improve outcomes. Fertiliser is a key input in broadacre production, and it is becoming increasingly expensive and often inefficient. Only two-thirds of nutrients applied as synthetic fertilisers are retained by the plant, with a significant amount of nutrients being lost via volatilisation (gas into the atmosphere) or through runoff and leaching through the soil.

Reducing fertiliser reliance and supplementing with compost can boost fertility and nutrient absorption in a broadacre crop, whether it's wheat, barley, oats, maize, canola, lucerne and sorghum. Compost can also improve soil structure and soil water holding capacity, which is critical in low rainfall seasons.

Broadacre production is a high user of urea, which contributes to greenhouse gas emissions through the release of methane and nitrous oxide. Compost on the other hand has the reverse effect, reducing greenhouse gas emissions and sequestering carbon, as well as reducing the reliance on synthetic fertilisers and pesticides.



Types of Organic Amendments used as Compost

Mature composts

The maturity and stability of composted products impact the performance of the compost once it is incorporated into the soil. Mature compost exhibits lower levels of phytotoxicity and is more stable, with a low nitrogen drawdown index (NDI). This means low nitrogen immobilisation potential, ensuring minimal nitrogen competition with plants.

Mature compost provides organic matter to improve physical soil characteristics as well as a good source of bacteria and micro-flora to stimulate invertebrate activity, which can improve plant uptake of nutrients.

Composted coarse mulch

Contains larger woody particles that have been through the composting process and can be screened into both fine and coarse mulches. These can originate from raw mulches that are composted, or oversized woody material produced from the composting process.

Pelletised compost

Pelletised compost can be customised based on the nutrient content of the pellets. A pelletised compost provides an alternative option for compost application as each pellet is a consistent size with consistent chemistry. Pelletised composts also provide ease of application through the use of spreaders or seeders.

Benefits of compost for broadacre production

Compost can improve the soil's physical, biological and chemical properties and, as a result, improve the productivity and quality of broadacre crops. Key soil benefits include:

- **Physical** – Compost adds organic matter and organic carbon to soils, which improves soil structure and water infiltration, as well as air porosity and nutrient holding capacity.
- **Biological** – Compost provides soil organic matter as the feedstock to microbes which are vital to soil health. They break down organic matter and enrich the soil with important nutrients, boosting fertility and facilitating nutrient uptake by plants.
- **Chemical** – Compost acts as a good pH buffer, providing good nutrient use efficiency.

The greatest benefits can be seen when compost is applied to broadacre cropping soils which are:

- **Deficient in a range of nutrients** – compost provides a slow release of nutrients, trace elements and carbon, particularly to paddocks with a history of hay or silage.
- **Eroding and leach nutrients** – compost enhances soil structure by increasing the formation of soil aggregates.
- **Light, sandy and low in organic material** – compost is rich in organic matter, containing a diverse population of bacteria and fungi.
- **Low in cation exchange capacity (CEC)** – compost increases nutrient holding capacity through the formation of soil aggregates. This allows nutrients to be made progressively available for plant uptake.
- **Acidic** – composts can have a neutralising effect on pH when applied to some soils.

Improving plant health

The beneficial microbes in compost, such as fungi and bacteria, can minimise the impact of disease-causing organisms, therefore helping to reduce disease pressure and encourage plant vigour in broadacre production. Compost can also provide habitat and food for natural enemies of many insect pests.

Applying compost in broadacre production

Compost can be incorporated into the soil or applied to the surface as a soil conditioner. Pelletised compost can be spread by conventional fertiliser spreaders at different rates.

An application rate of 5-10t/ha is considered a baseline application rate; however, this can change when taking into consideration soil and budget constraints. It is best that you speak with a local agronomist for application rates specific to your area.

Compost in broadacre cropping is normally applied with the lime application. Rates can vary depending on the soil pH and other soil physical, chemical and structural constraints.

AS4454: Composts, soil conditioners and mulches

The Australian Standard AS4454 Composts, soil conditioners and mulches provides a framework for defining and classifying compost, soil conditioners and mulches based on their composition, processing and intended use. While voluntary, it is referenced in most regulatory composting guidelines to establish minimum requirements for production, characterisation and quality testing.

Case study: Compost contributes to resilient, healthy soils in NSW

“Compost is like a sugar hit. It actually helps the microbiology in the soil because ... it's got lots and lots of biology in it and that biology actually helps fire the paddock up and get it going.” – Steve Nicholson, NSW

Located near Forbes in central New South Wales, Eniver Farms is a classic mixed farming operation producing wheat, barley, canola, faba beans, lucerne, pastures, perennial pastures and livestock.

Owner and agronomist Steve Nicholson began using composts in broadacre production as part of a long-term strategy to improve the structure and nutrition of the sodic grey clay soils on the property. The health and resilience of the soils were transformed through minimum tillage practices and adopting a crop rotation with oats and green manure crops, as increasing the crop biomass improved root infiltration.

After five years, Steve introduced compost to the crop, which has improved water infiltration rates and increased moisture in the summer. The paddock is now cycling and using less urea.

Source: Australian Government (<https://www.dcceew.gov.au/about/news/compost-broad-acreage-farming>)

Further Information

- Sub-soil amelioration using composts in cropping and grazing systems in Victoria – Federation University: <https://aora.org.au/wp-content/uploads/2024/10/What-is-subsoil-amelioration.pdf>
- Compost for Cropping – An Introductory Grower Guide – SoilCQuest - <https://www.soilcquest.org.au/wp-content/uploads/2023/08/Compost-for-Cropping-Guide-SoilCQuest.pdf>

