Applying the right compost for your needs……

Choosing the right compost for your vegetables will depend on your specific needs. A variety of compost types can be used to achieve different aims in your crop. Regardless of your compost end-use, there are some general guidelines to follow when choosing the right product for you.
All composts must meet the Australian Standards (AS4454) as a minimum. As a general rule, compost should be free from visual contaminants and not hot. You should also ask your compost processor to provide a recent analysis of the material indicating how it meets the Australia standard.
Compost used for soil incorporation should always be fully composted and stabilised. As this material will often come in direct contact with the plant it should be of high quality and not phytotoxic (toxic to plants). Phytotoxicity can occur if compost is not pasteurised or composted properly. The toxicity index should be greater than 60% in order to minimise any negative effect on germinating plants.

Another important quality of compost for soil incorporation is the carbon to nitrogen ratio (C:N). This ratio should be below 20:1 to ensure that there is no "nitrogen draw-down". Nitrogen draw-down occurs when too much woody material is in the compost. Bacteria will draw nitrogen from the soil to break down this material.

This could starve your plants of essential nitrogen, resulting in less plant growth or even plant death.

Apply compost just before planting and incorporate it into the top 10cm of soil.

The maximum rate of application should not exceed 60m3/ha/year, applied either in a single application or split-up over the year (typical application range15-30 m3/ha). When using as mulch, apply 2-5mm thick on the bed surface.
The quickest way to improve soil conditions over an area to broadcast compost. Application of compost can be restricted to planting beds, placed in trenches or banded to reduce costs, and these approaches are recommended if compost is applied for nutrient supply and to improve crop establishment.

Reaping the rewards….

After your first compost application you will start to see the benefits, with these increasing over time. Compost can improve your soil structure and fertility as well as saving you money on fertiliser and irrigation applications. Improved crop growth and yield are also significant benefits.

To achieve these benefits consistently it is important that you implement a monitoring and management program!! Taking stock of what your crop needs and the benefits that it is getting from compost will help to maximise your vegetable production.

More information

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Vegetables

Compost and Commercial Vegetable Production

Australian research has demonstrated outstanding benefits of compost to commercial vegetable growers.

Using compost can…
- Improve soil organic matter levels,
- Increase nutrient availability,
- Improve soil structure and,
- Increase plant available water,

... giving you improved soil quality and better crop performance!

Compost has been shown to increase both crop quality and production whilst at the same time decreasing the level of irrigation and fertiliser inputs needed. Compost can also improve your soil structure and this helps to moderate against unexpected fluctuations in temperature and moisture levels that can cause plant stress and crop failure.

This all adds up to significant benefits for you and your production system – but how can you make the most out of compost?

Yield

Even the lowest rate of compost (10mm deep incorporated to 250mm depth) increased capsicum yield. Compost treatments were superimposed on the growers standard practice, without adjustment to inputs such as water and fertilizer

Growth

Larger capsicum plants could be seen in areas where higher rates of compost had been soil incorporated prior to planting. In field grown vegetables, growers have shown that a compost 'dusting' can reduce surface crusting and improve germination of crops such as carrots

Compost and your soil

Any vegetable production system may benefit from using compost, but to get the most out of your investment it's a good idea to target compost application for your specific production needs. To do this with certainty (and economically!) you need to know the current state of play on your property: **soil testing and monitoring is essential to make the most of your compost**.

Soil testing your property or individual blocks will help you identify any particular problems or areas of concern and you can target your compost applications effectively. Compost can have an impact on a wide variety of soil characteristics and production factors such as soil organic carbon, bulk density, soil fertility and nutrient and water management. Here we've listed some of the important measures you will find on your soil analysis report and how compost can help you remediate any problems, improve your soil and increase your production.

Soil organic carbon (organic matter)
Australian soils are generally low in organic matter and fertility and are considered fragile, particularly under intensive agricultural practices. One of the indicators of soil fertility is soil organic carbon -- soil organic carbon levels of 3-5% are necessary for ideal vegetable production.

Growers on the Northern Adelaide Plains (NAP) have identified low soil organic carbon as a key constraint to their longer term productivity, and soil organic carbon levels of 1% are not uncommon on the NAP. To maximise productivity and the future of the vegetable industry, soil organic carbon levels need to be raised.

Incorporation of compost can increase soil organic carbon to more sustainable

levels, above 3%, and improve the fertility and production of your soils. Soil organic carbon decreases over time so regular applications of compost will help to maintain the levels required for good vegetable production. Soil compaction and erosion are also exacerbated when soils are depleted in organic matter – other great reasons to incorporate more organic matter into your soils.

Bulk density

Bulk density gives a measure of soil porosity (number of spaces between soil particles) which can tell you how easy or difficult it will be for water and plant roots to penetrate into the soil. Soils with a low bulk density have a high pore space, are less tightly packed and have a greater potential to store water and allow for roots to grow readily. In sandy soils, bulk densities above 1.6 - 1.8 g/cm3 may cause problems with root penetration. In silt and clay soils, problems may arise at bulk densities above1.4 g/cm3*.

Improved soil structure and drainage from compost use has meant that growers can harvest sooner after rain events!

Compost reduces the bulk density of the soil, improving potential root growth, drainage and infiltration. The structure of your soil can be improved by compost use, primarily by increasing soil organic carbon in the soil. These improvements can also reduce surface crusting and sealing and allow better infiltration of rainfall and irrigation.

Cation exchange capacity (CEC)

This is a general indicator of soil storage capacity for available positively-charged plant nutrients (cations), such as calcium, magnesium, potassium and sodium. The more clay and organic matter available, the greater the ability of a soil to absorb cations and have them available for plant use. Compost increases the ability of your soil to hold on to vital plant nutrients and put them to good use.

Nutrient levels

Compost can contribute to or increase the availability of nutrients in your soil. Compost tends to have a neutralizing effect on soil pH, and changes in soil pH can affect nutrient availability. Some growers have reported a reduced need for fertilizers following compost application, as the altered soil pH has increased nutrient availability. Some of the important nutrients for plant growth are nitrogen, phosphorous, and potassium.

Nitrogen - the role of compost in providing nitrogen to soil is complex and can be influenced by a wide variety of factors such as compost quality, biological activity, and soil properties. Research has shown that soil nitrogen reserves can increase with regular appropriate compost use and this can potentially reduce the nitrogen fertiliser requirements by up to 50% on sands. Monitoring your nitrogen levels before and after compost application is important to get the balance right and assess when you can begin to reduce your fertilizer regime and start saving money!

Phosphorous – all of the phosphorous in compost can contribute over time to your soil phosphorous pool and, with regular use, reductions to your fertiliser budgets can be made. As a general rule, around 40% of phosphorous should become available in the first year, with 100% available after four years. Using compost may also increase the availability of the phosphorous currently in your soil. Your soil may have high levels of phosphorous but if the plants can't access it then you are not achieveing any benefits. Incorporating compost stimulates biological activity which helps to make more nutrients available to plants. Increased levels of phosphorous were still evident in potato cropping soil where compost had been applied almost two years previously, prior to a carrot crop.

Potassium – Research from WA has shown that potassium from compost is 100% available from the first application and within three applications, improvements to the cation exchange were such that a 20% reduction in potassium requirements was achieved.

Fertiliser savings can cover at least one half to two thirds of the cost of applying compost – start a nutrient monitoring program now to get the most out of your compost.

*sourced from National Land and Water Resources Audit

Compost and Water Management

Compost mulch

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 organic matter 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. Mulching can also help control some weeds and is particularly useful on sandy soils that may be prone to wind erosion and sandblasting of young plants.

Compost incorporation

Incorporation of compost can increase the ability of the soil to hold water, reducing fluctuations in soil moisture and potentially offering irrigation savings. This is especially the case in light sandy soils. By applying less water, growers are also applying fewer salts to their soil – salinity can be a major problem for some growers (insert link to fact sheet compost and managing salinity).

Compost can also help to buffer fluctuations in soil moisture and temperature that can cause plant stress or crop failure. Vegetable crops are more readily susceptible to these fluctuations than tree crops or vines, and compost can provide some extra protection.
Monitoring soil moisture and understanding soil water availability will allow you to adjust your irrigation schedules to suit the needs of the crop and maximise the benefits of your compost as well as help you save money. Compost can save you 10 – 20% of your irrigation inputs.

A benefit-cost analysis of trials in capsicums showed returns of $2.08 for every $1.00 invested in compost. Growers have reported other savings, such as reduced labour costs resulting from quicker potato harvest due to easier soil conditions and easier weeding. Economists have also estimated a saving of $320/ha with a 10% reduction in glasshouse irrigation.

Compost can make a difference to your bottom line.