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## Efficient water use in the garden

Whether we take water from tanks, bores, dams or town supplies, it is important to use it efficiently. This not only saves water (and money) - it also stops plant nutrients from leaching into the environment where they disrupt natural ecosystems, particularly waterways and lakes. The following tips will minimize your water use in the garden while still producing abundant and nutritious fruit and vegetables.

### Maintain good soil structure

Well-structured soils have a large range of soil crumb sizes. This results in plenty of soil pores, allowing water to easily penetrate deeply into the soil – reducing evaporation and encouraging deep plant roots. Soils with poor structure compact easily, preventing water penetrating to plants' root zone. Compaction also promotes runoff and the danger of erosion.

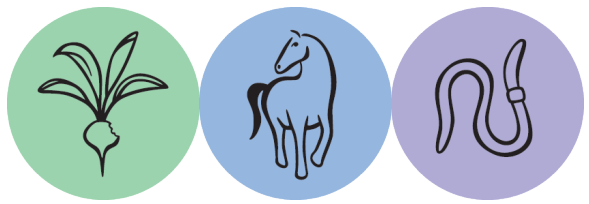
Good soil structure can be achieved by adding copious quantities of compost and other forms of organic matter such as green manures. The resulting biological activity provides the 'glues' that hold the soil particles together in various sizes of crumbs. The end product of compost is humus, which greatly improves the water holding capacity of soil.

### Water according to texture

Soil texture is the proportion of sand to silt to clay of the soil. Sandy soils are well drained and can absorb water quickly but are not good at holding it; clayey soils hold water well but are usually not well drained. Sandy soils need to be watered more often but with less water each time. Clay soil needs to be watered more slowly because it can only absorb water slowly.

### Use mulch

Mulch, whether made of organic materials such as straw or wood chips or inorganic materials such as gravel, reduces the direct exposure of moist soil to the wind, consequently reducing evaporation. Mulches keep the soil cool, which also has the effect of reducing evaporation. Mulches do not need to be spread any more deeply than 50mm to work well. Deeper mulches preserve very little extra soil moisture. Fine mulches are less effective than coarse ones. Very fine mulches can increase rather than decrease water loss. If more than about 70% of the particles have a size of 2mm or less, the mulch increases moisture loss from the soil through its wicking effect.



Efficient water use addresses many Permaculture Principles, including 'obtain a yield', 'use and value renewable resources and services' and 'produce no waste'.

Mulches that are too deep or absorbent can also be a problem: they absorb water before it can enter the soil. Mulches which are relatively coarse, do not wet easily and are about 50mm deep work best.

### Minimise evaporation

Avoid watering in the heat of the day or in very dry, windy conditions. Watering in the cool of the evening will minimize evaporation. Evaporation can also be minimized by watering the soil, not the plant: wet leaves have a large surface area which enhances moisture loss through evaporation. Don't allow water to pool: free water evaporates readily. Pools indicate that water has been applied more quickly than it can be absorbed, risking leaching and erosion.

### Water only when necessary

Watering according to a fixed schedule, such as with an automatic watering system, rarely results in efficient water use. Always check soil moisture before watering. If soil particles under the surface at the level of the root zone or slightly lower are moist enough to stick to the thumb, watering is not necessary. It may be necessary to dig a hole to gauge how far moisture has penetrated.

### Match watering regime to plant needs

Different species of plants have different water needs and the garden watering system must accommodate these. For example, if onions have too much water their maturity is delayed and their keeping quality is reduced. The water requirements of particular plants vary according to the stage they have reached in their life cycle. For example, tomatoes bearing fruit need a regular water supply to prevent blossom end rot - but when they are young, deep but infrequent watering can encourage their root system to develop so that they are less stressed in hot dry

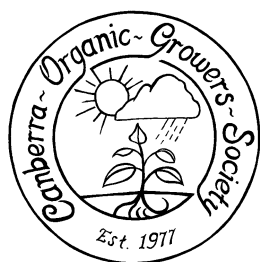
conditions later in their life cycle. More hints on the different water requirements for our common food plants can be found at <http://www.cogs.asn.au/tips-and-techniques/when-to-water>.

### Efficient watering systems

Dripper systems provide very efficient watering compared to sprinklers or hand-held hoses. Drippers are particularly useful for clay soils. Typically they deliver 2 to 4 litres per hour, which is sufficiently slow to allow absorption without runoff in most clay soils. They can be installed under mulch to reduce evaporation and they deliver water directly to the soil, avoiding evaporation from wet leaves. Individual dripper lines can be fitted with taps to allow watering to be adjusted to different plant types and different stages of a plant's life cycle. Drippers also allow for deep less frequent watering cycles to aid in developing a deep root system in young plants.

Sprinklers and hand held sprays deliver water at a much greater rate than clay can absorb. They are more suited to sandy soils. It is difficult to direct sprinklers to just wet the soil rather than the plant. Very fine sprays lose much water through evaporation, particularly in dry, windy conditions.

Wicking beds and pipes delivering water directly to the root zones of trees are also very efficient. Wicking beds deliver water to plants from a water reservoir below the soil layer in which plants are growing. Water moves towards the surface of the soil from the reservoir through capillary action, which is the wicking process. The surface soil remains dry and very little water is lost through evaporation. Similarly, pipes sunk in tree root zones and used for direct watering of the tree roots also minimizes the loss of water through evaporation.



## For further information on this topic contact

### The Canberra Organic Growers Society

The Canberra Organic Growers Society was formed in 1977 with the aim of providing a forum for organic growers to exchange information and encourage the general public to adopt organic growing methods.

To contact the Canberra Organic Growers Society or find out more about courses and workshops visit their website at [www.cogs.asn.au](http://www.cogs.asn.au)