Irrigation Tips

Information sourced from www.savewater.com.au

Selecting an irrigation method
Consider the following factors when selecting an irrigation method:

- The particular crop to be grown - physical requirements, crop layout and water use characteristics;
- Soil and topography - soil water properties and elevation changes;
- Climate - evaporation rates, wind, rainfall;
- Water supply - quality, amount, delivery rate and frequency (see below);
- Labour requirements - skill, amount and availability requirements;
- Automation capacity;
- Fertigation capability;
- Energy/power available for pumping;
- Environmental conditions - impact and regulations;
- Farm machinery and equipment requirements; and
- Cost - capital and operating.

Water can be supplied to horticulture crops via several different application methods.
Consider the following when selecting an irrigation applicator (ie. sprinkler, etc):

- Coverage - wetted area;
- Precipitation rate - (should be less than soil infiltration rate);
- Required hydraulic operating conditions flow and pressure;
- Water quality requirements - treatment and filtration;
- Uniformity of discharge from outlet;
- Effectiveness of application - efficiency, losses, stream characteristics; and
- Mechanical properties - design, materials, operation, functioning, reliability.

Choosing the right irrigation system for your crops
Flood Irrigation...

- Has many limitations for providing the water needs of tree crops;
- Does not allow accurate control over the rate of application, i.e. cannot supply more or less water;
- Makes it difficult to avoid over cultivation of soil and resultant breakdown of its structure;
- Causes uneven watering due to differing infiltration rates in areas with variation in soil types within an irrigation shift;
- Causes water loss below the root zone on deep sandy soils (highly permeable), wasting water, leaching nutrients and adding to the water table;

- Causes poor aeration of the root zone in heavy clay soils (low permeability) where watering time must be extended to allow water to penetrate;
- Requires more labour to perform the irrigation;
- Prevents access to trees for cultural operations, particularly spraying and harvesting, for several days after watering;
- Promotes weed growth and hinders control efforts; and
- Does not allow fertigation.

Many producers continue to rely on existing flood irrigation systems because the instalment costs of a new system are too high. Efficiencies can be made in flood irrigation by ensuring that the water is reaching the rootzone, rather than moving sideways or percolating into watertables. The following management tools can help to improve the efficiency of flood irrigation:

- laser levelling;
- monitoring flow rates; and
- matching crop to soil type and watertable depth.

Sprinklers

Sprinklers partially avoid the soil problems associated with flood irrigation. Sprinklers generally water the entire orchard area. In a cultivated orchard this can limit access to the block. However, sprinkler irrigation is compatible with permanent sod culture, which along with other benefits, allows quicker access after irrigation.

The most common form are low throw types that sit on the ground and are normally connected to a length of flexible hose so they can be moved out of the way of machinery. In some cases each sprinkler is shifted between rows to water the next row in a separate irrigation. This method reduces the number of sprinklers and lateral lines required in the orchard, but is not ideal from a management perspective, adding to labour costs and complicating irrigation scheduling.

Mini-sprinklers can provide similar performance to low-level impact sprinklers, but require less pressure to operate. This reduces the size and cost of pumping equipment required.

Mini-sprinklers are more prone to failure to start than impact sprinklers. Sprinklers should be checked at the start of each irrigation, as it is common that a few will need assistance to start. Mini-sprinklers are also more prone to blocking and physical damage than low-level impact sprinklers.

Some orchards use overhead sprinklers mounted on high permanent standpipes that clear the tops of trees. Unlike other irrigation systems overhead sprinklers wet all of the tree's foliage and can therefore be used for frost control. Wetting the foliage has disadvantages. The leaves take up salt from the irrigation water. The likelihood of disease infection is also increased.

Overhead sprinklers are exposed to wind, which disrupts evenness of watering and the height above the ground leads to high evaporative losses on hot windy days. Overhead sprinklers are not readily accessible, thus any repairs or the cleaning of blocked jets is time consuming. Note: overhead irrigation is not recommended for stone fruit production.

Drip

Drip irrigation is most suited to high-density orchards. Drip systems allow accurate amounts of water to be supplied regularly to a small area of the root zone. Such a system can be used to restrict the vegetative growth of the trees, an important part of management in high density planting. In a wide spaced orchard supplying, large trees with sufficient water can pose problems with a drip system, particularly in the four weeks prior to harvest.

Drip irrigation is not designed for applying water to large root systems. To obtain adequate water distribution and application rates, two to three dripper lines per row of trees are required. Drip irrigation is more suited to areas where cooler climates and higher rainfalls reduce the need for high volumes of water application. It is also the most efficient irrigation system as the water is supplied directly to the root system, an important consideration where water supplies are limited.