

Water Conservation through Soil Management - Urban Areas

NOTES

Significant water savings are possible in the Adelaide area through the adoption of some simple and practical soil and plant management ideas.

Many councils are developing water management plans and are achieving substantial savings through more efficient irrigation and by encouraging reduced household use, however soil management has been largely overlooked.

Water available to plants depends not only on the amount of water from rainfall and irrigation, but also on the physical, chemical and biological properties of the soil.

The soil acts as a reservoir of water for plants between rainfall events, so increasing the holding capacity of soil can reduce the need for irrigation.

The amount of water that can infiltrate or soak into the soil depends on its physical nature or structure and how hard or compact it is.

If the soil is compact or dense it will limit the rate at which water can infiltrate or soak in and a lot will run-off into waterways. A compacted soil will also dry out more quickly and to a much greater depth than a soil with good structure.

Soil can be opened up and soil structure improved by providing the right chemical or nutrient balance.

The starting point is to check the current balance of the soil through soil testing and then applying only the amount of lime, gypsum or fertiliser that is needed.

Getting the balance right will make the soil softer, encouraging deeper plant root growth and letting more water into the soil reservoir.

A balanced soil will contain more oxygen and as a result is able to support more beneficial organisms from microbes and fungi to earthworms and this biological life also works to open the soil up and increase its water holding ability.

Better root growth due to the improved soil conditions will increase the amount of organic matter and humus in profile which will further enhance the soil water reservoir. Humus acts like a sponge and can hold four times its weight in plant available water.

Using too much fertiliser or the wrong fertiliser is not only wasteful but can also damage the soil making it tight and hard.

Councils could develop a policy of "in situ moisture conservation" for parks and reserves where all rainfall is conserved where it falls and no run-off permitted. This can be largely achieved through good soil management.

Good soil management will lead to balanced plant and turf nutrition and this is another area that can lead to significant water savings that has been largely overlooked in drawing up water conservation plans.

Water is the most limiting factor for plant growth and for every kilogram of plant dry matter produced, several hundred kilograms of water pass through the plant and are lost from the leaf surfaces by transpiration.

Plants on a good balanced “diet” will use water much more efficiently.

Water is lost from the plants through pores on the leaf surfaces called stomates. Plant nutrients like Potassium have an important role in regulating the opening and closing of the leaf pores and limiting the water lost when the weather becomes drier.

In agriculture potassium has been called “Claytons Irrigation” because plants with the right amount of potassium last a lot longer in a dry spell.

It is not simply a matter of pouring on the potassium fertiliser however, because too much is as damaging as too little.

The soil and plants growing in it need a balanced diet the same as we do – they need the right balance between the “food groups”.

A program of soil testing and adjusting fertiliser programs can be a very cost effective way of improving the amenity value of parks and gardens while achieving savings on fertilisers and reducing water use.

Another important consideration is the loss of nutrients into waterways through leaching or run-off. This pollution can be avoided by only applying the fertiliser that is needed. Identify this with a good independent soil test.

“ If you don't measure it , you can't manage it”

These principles have been applied in agriculture for many years and are a practical way of achieving significant economic and environmental benefits.

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