THE first article in this series looked at the different types of salt and solutes that may be found in soils, measuring salinity, and crop tolerance to salinity. In part 2, ANTHONY FOX and JEANETTE CHAPMAN assess leaching and the potential limitations of different water sources.

Part 2

Water quality and leaching

CARING FOR OUR COUNTRY

Government of South Australia
Primary Industries and Resources SA

Government of South Australia
South Australian Natural Resources Management Board

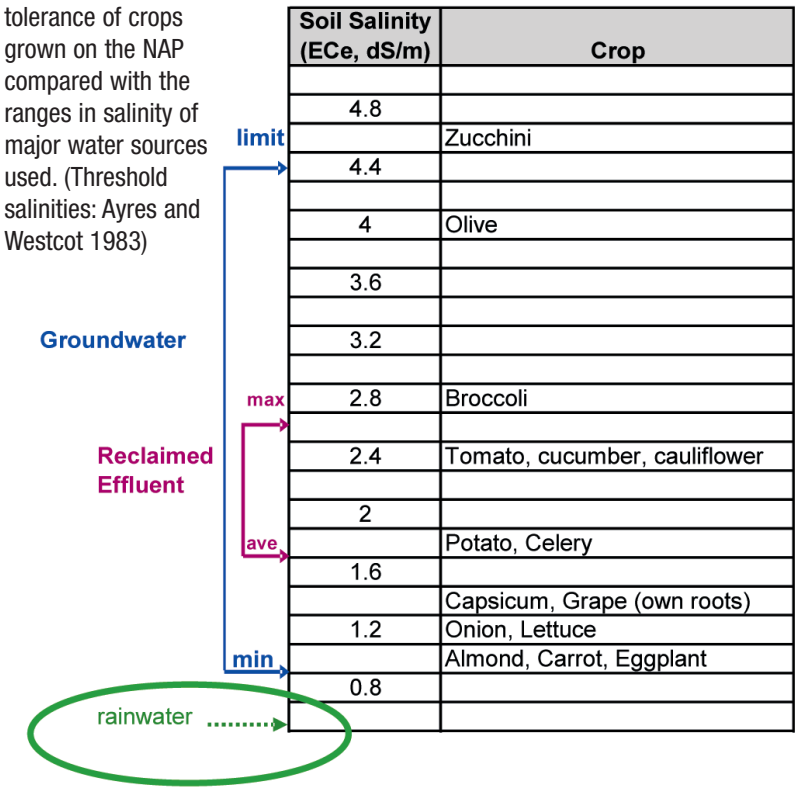
Water quality effects

LEACHING management under irrigation can at best maintain soil salinity close to the salinity of the infiltrating water.

Water quality becomes an issue when the salinity of the source water used for leaching irrigation exceeds the critical tolerance level of the crop being irrigated. When this occurs, minimising yield loss is the management goal. Each crop type will have an upper limit to water salinity that enables an economic yield to be attained.

Table 1 below compares the quality of the major water sources used on the Northern Adelaide Plains relative to the threshold values of crops grown in the district.

Table 1: Salt tolerance of crops grown on the NAP compared with the ranges in salinity of major water sources used. (Threshold salinities: Ayres and Westcot 1983)



Soil Salinity (ECe, dS/m)	Crop
4.8	
	Zucchini
4.4	
4	Olive
3.6	
3.2	
2.8	Broccoli
2.4	Tomato, cucumber, cauliflower
2	
	Potato, Celery
1.6	
	Capsicum, Grape (own roots)
1.2	Onion, Lettuce
	Almond, Carrot, Eggplant
0.8	

HORTEX
The Alliance for Sustainable Horticulture

The HortEx Alliance builds partnerships between private enterprise, government and grower associations for skills development in production, business management and marketing.

MOST irrigators on the NAP have access to groundwater with salinity at or above the tolerance level of the crop being irrigated. Reclaimed effluent is also used on the NAP. Salinity is cyclic from a minimum level during winter to a maximum allowable level of 1500 mega litres (Figure 1). Depending on crop type, planting date and time to harvest, salinity of the reclaimed effluent may be at or above tolerance levels for some or all of the growing season.

By contrast, rainfall with its low salinity is the only water source able to reduce root zone salinity below critical tolerance values of salt-sensitive crops.

Make full use of rainfall to leach salt.

Maximising leaching efficiency during rainfall events is outlined in article 4.

Transportation of salt

SALT is transported in water as dissolved solutes. Salt will therefore move into the root zone with the applied irrigation water and will stop moving when the water front stops moving. Thus salt will accumulate at the wetted edges.

Field wetting patterns are strongly influenced by irrigation system types and maintenance, full and partial surface coverage, and soil textural changes within the root zone. It is important that managers determine field wetting patterns relative to location of plant root zones.

This key strategy is especially important when establishing young plants, to avoid them becoming dehydrated.

Avoid forming salt barriers between the root system and fresher water being accessed by the plant.

Rainfall acts as a 'full coverage' system, although the physical structure of plants enables part of the intercepted rainfall to be channelled towards the base of the stem. Crops irrigated with drip and micro sprinklers or spray emitter types will potentially be exposed to two different wetting patterns, 'full coverage' as a result of rainfall, and partial coverage when irrigated (Figure 1).