

- Annual soil samples are taken for irrigated lands and assessed for total soluble salts and sodium absorption ratio and practices are adapted when required

Salinity and Sodicty

Salinisation is generally caused by poor water management such as inadequate drainage or over irrigation and/or non-uniform irrigation. Salts accumulate in the soil thereby affecting soil sustainability and crop production. Different types of salt-affected soil conditions (e.g. saline, sodic or saline-sodic soils), together with their management are discussed in SASRI Information Sheet 5.11.

Soils from irrigated lands should be sampled at 300mm intervals up to 900mm in depth and be assessed for total soluble salts measured by the electrical conductivity (EC) and sodium adsorption ratio (SAR). The threat of salinity and sodicity on sugarcane land, based on soil EC values and SAR, is given in the three tables below.

Categories and properties of saline and sodic soils:

Type	Electrical conductivity (mS/m)	SAR (ESP)	Dominant cation(s)	pH (water)	Effect on soil structure
Normal	< 400	< 6 (< 7)	None	< 8.5	None
Saline	> 400	< 6 (< 7)	Mainly Ca and Mg	< 8.5	None (osmotic interference of plant uptake of water)
Saline-sodic	> 400	> 6 (> 7)	Ca, Mg and Na	< 8.5	Early stages of dispersion
Sodic	< 400	> 6 (> 7)	Mainly Na	> 8.5	Severe dispersion and possible Na toxicity

Salinity hazard to sugarcane based on electrical conductivity (EC) value of the soil saturation extract:

Soil EC value (mS/m)	Salinity level	Effect on sugarcane growth
0-200	Non saline	None
200-400	Slightly saline	Slightly affected
400-600	Moderately saline	Severely affected
>600	Strongly saline	Very severely affected

		Sodicity hazard to cane based on critical SAR values for various soil forms:		
		Critical SAR 6 (Critical ESP 7)	Critical SAR 10 (Critical ESP 12)	Critical SAR 15 (Critical ESP 17)
		Generally poorly drained, highly dispersed grey soils derived mainly from Dwyka tillite,Vryheid sediments and sandy alluvium.	Mainly slowly draining black swelling clays associated with dolerite Pietermaritzburg and Vryheid shales, Swazi basic rocks and heavy alluvium	Mainly well drained, non –dispersive soils associated with Recent Sands and other parent materials in upland positions.
		Estcourt	Arcadia	Champagne
		Glenrosa	Rensburg	Inanda
		Katspruit	Bonheim	Cartref
		Longlands	Mayo	Clovelly
		Mispah	Milkwood	Dundee
		Kroonstad	Tambankulu	Fernwood
		Swartland	Willowbrook	Griffin
		Valsrivier		Hutton
		Wasbank		Oakleaf
		Westleigh		Shepstone
				Shortlands
		SASRI recommends that soils suitable for irrigation have an SAR less than 15 and EC less than 200 mS/m in the top 900mm of soil.		
		Reclamation measures are discussed in SASRI Information Sheet 5.11 and include surface and subsurface drainage, leaching of salts by over-irrigation, and amelioration with gypsum and filtercake.		
		Legal requirement	Irrigation with wastewater	Irrigation with wastewater
Irrigation with industrial wastewater or water from waterworks is regarded as a controlled activity (a water use in terms of sections 21(e) and 37(1) of the National Water Act, 36 of 1998) and is subject to authorisation by the Department of Water Affairs. Where the use falls within the scope of the General Authorisation (GN 399 of 26 March 2004, revised by GN 665 of 6 September 2013), then it must be registered. If not, then a water use licence is required.				
		In terms of the General Authorisation, water samples should be taken monthly to monitor and control any detrimental impact on the environment of accumulated salts, nutrients and trace elements in the soil. Samples should be analysed in a laboratory accredited in terms of SANS 17025:2005, or one which participated in a recognized Proficiency Testing Scheme or which has proof of intra- and inter-laboratory proficiency.		