

# Salinity guidelines for irrigation: Case studies from Water Research Commission projects along the Lower Vaal, Riet, Berg and Breede Rivers

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## Abstract

A vast number of projects on salinity in irrigated agriculture were funded by the Water Research Commission (WRC) during the past 40 years. However, due to the diversity of the projects it is virtually impossible to cover all aspects thoroughly in a paper of limited length. Thus this review focuses mainly on projects along the Lower Vaal, Riet, Berg and Breede Rivers in South Africa. The results on the water quality of these rivers indicate that irrigation has led to the deterioration of water sources. There is a direct relationship between river water quality and soils irrigated. Fortunately, effective land-suitability guidelines were developed and applied during the establishment of the major irrigation schemes. This facilitated the management of soils under irrigation. The results from long-term irrigation case studies along the Lower Vaal River and Breede River show that the quality of soils can be improved. The opposite is also true where mismanagement occurred. Research on the salinity threshold of major crops (grapevines, wheat, maize, groundnuts, etc.) confirmed the empiric nature of the guidelines. It is suggested that a more dynamic approach be used for managing salinity under irrigation at farm level, i.e. the use of models. Amongst others, future research should focus on determining the spatial and temporal distribution of salt in irrigated soils.

**Keywords:** crop response, electrical conductivity, sodium adsorption ratio, soil type, water quality