



## CASE STUDY

# Australia: Managing salinity risks associated with importing irrigation water into Clare



## Summary

In Australia, a new approach to water management was needed to allow imported water to be used for irrigation without increasing the salinity of the soils or groundwater. Action was taken to develop a framework to enable irrigators to manage the environmental risks associated with the use of River Murray water for irrigation. The key lesson is that a salt management strategy is relevant for land irrigation.

## Background

The shortage of water for irrigation in the Clare district in South Australia had restricted expansion of the 4,000 hectare winegrape industry, which is known internationally for its premium wines. To further exacerbate this shortage are challenges relating to salt and water salination. Rainfall and wind carry about 8,000 t/year of salt into the district. In the year 2002-2003 the volume of water that was used for irrigation in the Clare district was 2,800ML, with 2,000 ML sourced from groundwater and the remainder from surface water. Completed in 2005, the Clare Water Supply Scheme was built to transport up to 6 G/L of additional water across the 100km between the Murray and Clare rivers, and to distribute the water through the Clare district and beyond. The environmental challenge for Clare, however, is to avoid or to manage, local accumulations of the salt which over decades will be imported into the district with the irrigation water. Assuming that Murray River water has a salinity of 400 mg/L, the Clare Water Supply Scheme has the potential to import a further 2,400 t/year of salt along into the district. If this water was left to flow out of the district, it would remove salt from the landscape. However, its use for irrigation means that salt is retained within the catchment area.

## **Actions taken**

The completely new approach to water management is based on the tonnage of salt imported rather than on the Mega Litres of water. Completed in 2005, the Clare Water Supply Scheme in South Australia was built to distribute additional water from the Murray River through the Clare River and beyond.

So that the imported water can be used for irrigation without increasing the salinity of the soils or groundwater in the Clare district, a framework has been developed to enable irrigators to identify and to manage the environmental risks associated with the use of River Murray water for irrigation.

The adopted framework has five innovative components:

1. To limit and control salt accumulation over decades, irrigation water is allocated on the basis of its salt load rather than by volume.
2. The irrigation water can be applied only in a sub-catchment where the groundwater salinity trend is decreasing; it cannot be applied where the groundwater salinity trend is stable or

increasing.

3. Irrigators use district-scale Risk Maps and they undertake property-scale soil surveys to avoid applying irrigation water (and salt) onto areas where salt will accumulate. Soils data and the Risk Maps have been provided to irrigators as geographic information system map layers on an interactive computer compact disc.
4. Equivalent salt loads are calculated to enable the exchange of a license to access existing water resources (i.e. groundwater and/or surface water) for a license to access a larger volume of lower salinity, River Murray (pipeline) water.
5. Monitoring and Irrigation Annual Reporting have been added to the conditions on water licenses.

## **Outcomes**

The Eyre Creek sub-catchment was initially a “closed” sub-catchment because the salinity in the

groundwater had been increasing gradually over time. It was the opinion of hydro-geologists and hydrologists that the increasing salinity trends were largely caused by intense groundwater development and large stream diversions, which cause salt to be retained in the sub-catchment and reduce environmental flows in downstream water-courses. Working with SA Water, DWLBC, Rural Solutions and Resource & Environmental Management Pty Ltd, the Eyre Creek irrigators successfully implemented a water management framework that reduced the volume of stream diversions and reduced groundwater pumping in exchange for imported water. Reduced the use of existing (catchment) water resources has resulted in them being returned as environmental flows to Eyre Creek, to the Wakefield River and to the groundwater system.

The adopted approach means that irrigators now have secure access to good quality irrigation water, and the environment now receives more water in the form of stream flows and base-flows, an outcome that has been achieved in a socially responsible and equitable manner.

The Eyre Creek approach has now been adopted for other sub-catchments in the district that were initially considered “closed”. These include Skillogalee Creek and Polish Hill River sub-catchments. The outcome is secure access to good quality irrigation water and improved environmental water provisions.

## **Lessons Learned**

The water licensing policies determine the locations at which salt will accumulate and the number of years that will pass before salt becomes the major issue.

A single source of regular, clear, consistent communication is essential to avoid confusion and to win support for any innovative strategy.

History shows that salt accumulation has caused the eventual failure of most irrigation schemes.

A salt management strategy is highly relevant wherever there are plans to irrigate land that has not previously been irrigated.

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**Supporting Materials**

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**Related IWRM Tools**

Training Water Professionals, Risk Assessment, Geographic Information System, The Rights of Rivers

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