

# Use of crop models to manage water and salinity in Australia



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## THE PROBLEM

Australia has:

- 30 million ha of land affected by salinity
- 2 million ha of irrigated land
- 25 - 30% of irrigated land is affected by shallow watertables

## SWAGMAN (Salt, Water and Groundwater Management) MODELS

CSIRO Land and Water has developed a suite of models to facilitate the problems of rising water tables and salinisation in irrigated areas.

- SWAGMAN Whatif - Understanding irrigation, water tables and salt
- SWAGMAN Destiny - Simulating crop responses to salt and waterlogging
- SWAGMAN Farm - Ensuring optimum mix of crops to minimise recharge and maximise farm profits
- SWAGMAN Options - Optimising crops within a region
- SWAGSIM - Linking irrigation and crops to groundwater response

### SWAGMAN Destiny

SWAGMAN Destiny is a model designed to help land managers estimate future trends in crop yields, groundwater levels, salinisation and production costs on an annual basis for up to 30 years.



#### Processes

- Water balance with piezometric interaction
- Salt balance
- Crop growth
- Response to aeration, water deficits and salinity

#### Inputs

- Crop
- Soil
- Weather
- Hydrology

#### Example: Simulation of responses to salinity

- Crop: Grapevines
- Soil: Terra Rossa (Oxisol)
- Location and weather: Coonawarra, south-eastern Australia (Mediterranean)
- Scenario: Crop response over 10 years to irrigation water (1.8 dS/m) above a shallow water table with salinity of 3.0 dS/m.

### THE RESPONSE

- SWAGMAN models are being used for policy development, regional land use planning and irrigated farm management.
- SWAGMAN Destiny has been successfully used for teaching, project consulting and to produce summary results for management guidelines.

### SWAGMAN Destiny Outputs

