



Department of Agriculture
Government of Western Australia

Agency Position on Salinity Issues

Deep Drains

The Issue

Dryland salinity currently affects 1.8 million ha of land and it is predicted that about 6.1 million ha may be affected to some extent in the future. These lands either have, or may eventually have, watertables within 1 m of the soil surface for much of the year and be subject to salinisation. Groundwater levels within 2 to 3 m of the soil surface may occur over much greater areas.

Deep open drains are constructed to 1.5 to 3 m deep in order to lower watertables and facilitate leaching of soil salts from within the root-zone. This generally improves production from the affected areas. In some cases deep drains have been used to manage other water-related problems in the landscape such as waterlogging and flooding.

There is considerable debate and divergence of opinion on the impact, economics and downstream environmental consequence of deep open drains.

Background

Deep open drains have been used as a means of salinity management in WA since the 1970s, and their construction and the development of linked drainage systems has become more widespread in recent years. The expansion of salinity and the apparent lack of management options have focused community attention on this issue resulting in a strong push to use engineering options to alleviate the problem.

Some rural communities view deep drains as the only immediate and effective solution to the rising groundwater-salinity issue. In a review of the efficacy of deep open drains, Coles *et al.* (1999) stated that of the 25 sites reviewed 18 landholders indicated that the drains had alleviated waterlogging and salinity problems to some extent, while four said it had no impact and three were undecided. Long-term monitoring information on the impact of deep drains in managing dryland salinity in WA is limited. However, anecdotal evidence suggests appropriate design and

placement of drains can have a significant impact on crop production, watertables and water movement in the unsaturated zone.

Long-term trials are planned in a number of wheatbelt catchments to determine the effectiveness of deep drains and to assess the design and impact of linked drainage systems. Effluent disposal is one of the major problems associated with deep drains and will also be assessed to develop practical and environmentally acceptable options for management and disposal.

Agency position

The agency recognises deep drains as a management option for controlling salinity.

- Deep drains should be one component of an integrated catchment management plan.
- Deep drains may reduce the severity and impact of dryland salinity, and in some cases, prevent continued expansion of salinity upslope.
- Deep open drains may present a significant hazard to downslope receiving areas (sources of sediment, nutrients and water) if not properly designed to ensure stability of the drain base and batters.
- Appropriate problem definition, planning, design and placement of drains in the landscape is essential to maximise the effectiveness of drains and minimise any off-site impacts.
- Groups or individuals intending to install deep drains must lodge a Notification of Intention to Drain with the Commissioner of Soil and Land Conservation at least 90 days prior to commencing installation.

Related literature/publications

Bettenay, E. (1978). Deep drainage as a method of treating saltland. *Journal of Agriculture Western Australia* 19:110-111.

Coles, N.A., George, R.J. and Bathgate, A.D. (1999). An assessment of the efficacy of deep drains constructed in the wheatbelt of Western Australia. Department of Agriculture Bulletin 4391.

Ferdowsian, R., Ryder, A.T. and Kelly, J. (1997). Evaluation of deep, open drains in the North Stirlings area. Department of Agriculture Resource Management Technical Report 161.

George, P.R. and Nulsen, R.A. (1985). Saltland drainage: case studies. *Journal of Department of Agriculture* 26:115-118.

George, R.J. and McFarlane, D.J. (1993). Managing dryland salinity with drains and pumps. In: Proceedings. Land Management for Dryland Salinity Control Conference, Bendigo.

Keen, M. (1998). Common conservation earthworks used in Western Australia. Department of Agriculture Resource Management Technical Report 185.

Nulsen, R.A. (1982). Review of current drainage investigations in Western Australia. Department of Department of Agriculture Division of Resource Management Technical Report 8.

Speed, R.J. and Simons, J.A. (1992). Deep drains - a case study and discussion. Department of Department of Agriculture Division of Resource Management Technical Report 133.

Soon to be released: Kristy Chandler (July 2002) Dept of Agriculture of Western Australia; Audit of Deep Open Drains in the Western Australia Wheatbelt.