E

Appendix E – Key lessons from the National Dryland Salinity Program

This appendix provides further detail on the six key messages to have emerged from a decade of the research and research coordination activities of the National Dryland Salinity Program:[1]

- Salinity costs are significant and rising, resources are limited and hence protection must be strategic:
  - ⇒ Current costs of dryland salinity are significant and are projected to increase by 60 to 70 per cent over the next 20 years.
  - ⇒ The best that can be hoped for from recharge control treatments is a slowing down of the rate of future salinisation. Rehabilitation of existing salinity damage is generally not economically viable, owing to the sluggish response of watertables to recharge reductions.
  - ⇒ The focus of policy should be on preventing future damage to high value assets, carefully prioritising on-ground investment so as not to waste money.
  - ⇒ Close attention will need to be paid to the cost-benefit of protecting public versus private assets. In some situations direct investment in public works to protect public assets may be more efficient than efforts to protect agricultural land.
  - ⇒ Engineering works will be an important and inevitable part of protecting high value assets.

1 This appendix reproduces National Dryland Salinity Program, *Submission 35.1*, pp. 1-4.

- Profitable options for reversing the trend are lacking (but under development):
  - ⇒ Salinity will not be fixed comprehensively with targeted revegetation treatments or discharge management. The hope of finding a low cost solution, such as planting a relatively small proportion of the landscape with trees in strategic areas, is no longer tenable. However, some exceptions do exist where targeted treatment may work.
  - ⇒ However, the NDSP has confirmed that because the hydrogeology of the Australian landscape is so complex, there will be parts of the landscape (principally overlying local aquifers) where treatments could yield a net benefit.
  - ⇒ To make significant progress in extensive treatments to prevent further salinisation, it will be important to develop solutions that are profitable for those managing the great majority of land—farmers and graziers. Improved farming options that increase perennial vegetation will remain the most likely means of attaining salinity management responses at the scale needed. Research in this area will be critical.
  - ⇒ Living with salt will become inevitable if profitable plant-based solutions are not to hand. Some saltland pastures have already proven viable, as well as profitable, but these need refinement and their use requires a mindset change among many farmers.
- There is no one salinity problem—it challenges us to look beyond traditional policy instruments:
  - ⇒ Results from GFS modelling confirm that the many forms of salinity expression require a corresponding diversity in response (including no response). The NDSP has advocated strategic responses based on prevention, recovery and adaptation (which may have to take into account engineering approaches and living with salt strategies).
  - ⇒ The NDSP has developed a range of strategies from analysing responses using the GFS and Flowtube, a rapid catchment appraisal model able to assess the impact of recharge control strategies on water tables. These strategies take into account perennial farming systems, engineering works and productive uses of saline lands.
  - ⇒ The externality concept, whereby the actions of some people impose a net cost on others, may not always be valid for dryland salinity. Hence encouraging land mangers to internalise off-farm ‘costs’ by creating markets in recharge credits and debits may not be appropriate for all areas. For example, ‘leaky’ farming systems in

cleared catchments can cause salinity but they can also provide twice as much water for consumptive use compared with the amount of water available pre-clearing, and can provide significantly more water than low-recharge farming systems. Socio-economic benefits generated from the 'excess' water, and from the 'leaky' farming systems themselves, may outweigh salinity impact costs or the net benefits of recharge control.

- ⇒ Even for regional and intermediate aquifers, where discharge sites are more remote from recharge areas, the externalities principle does not always hold. This is because in these aquifers the lateral movement of groundwater tends to be very slow (up to thousands of years), meaning that benefits of recharge control are usually localised — at least in the short term. Again, the gains from internalising off-site costs by defining salinity credits (or recharge rights) and allowing trade between farmers appear to be smaller than previously thought.

- Integrated catchment management must be seen as only one possible approach to deal with dryland salinity:
  - ⇒ New information on groundwater systems highlights the need to develop institutional options other than integrated catchment management in some parts of Australia. In some regions, groundwater flow systems (for example, some regional and intermediate systems) transcend surface catchment boundaries, requiring cross-catchment action to achieve co-ordinated surface and groundwater outcomes. In other regions, salinised land is a higher priority issue than salinised water resources. In these areas, planning and management on a more localised 'community of common concern' basis may be more appropriate.
  - ⇒ Tools exist at regional and catchment levels that can help target specific interventions and predict their likely responses. In particular, modelling can support better vegetation management decisions.

- Vegetation management remains the key to managing water resources, although the benefit-cost of revegetating catchments requires careful analysis:
  - ⇒ Salt carried by surface water run-off and saline groundwater discharge into waterways imposes costs on downstream users. In water supply catchments, revegetating cleared land can reduce water yield and increase stream salinity due to less dilution.
  - ⇒ Benefit-cost analysis is needed before revegetation policies are implemented to protect water resources. Where water is scarce, desalination may be more cost-effective (given the problem here is more likely to be a groundwater than surface water problem).
  - ⇒ There is a significant difference in water use between trees (or woody perennials) and grasses (perennial or otherwise). In some parts of the landscape, only trees (or woody perennials) may reduce leakage to required levels. These trees are best placed where leakage contributes significantly to groundwater recharge. In much of the remaining landscape there may be a need to provide high volumes of clean water. Managing native grasses as low input systems may provide high volumes of clean water and biodiversity benefits as well. These systems need to be explored as much as the more popular perennial-based pasture systems such as lucerne.
- Lack of capacity is an important, but secondary constraint, to managing salinity:
  - ⇒ NDSP findings indicate that lack of skills, management expertise, poor access to information and financial difficulties are by no means the most significant factors in constraining land use change. In the absence of commercially attractive treatment options, it is unrealistic to expect farmers to change their current annual farming systems in favour of perennials or agroforestry. Under these circumstances no amount of capacity building or training will facilitate change.
  - ⇒ Other constraints for moving forward lie in the lack of clarity of rights and responsibilities, ascribing cause and effect and clearly specifying the benefits and costs of different courses of action.