

SOUTH AUSTRALIAN GOVERNMENT SUBMISSION TO THE
HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON
SCIENCE AND INNOVATION

INQUIRY INTO COORDINATION OF THE SCIENCE TO COMBAT THE NATION'S
SALINITY PROBLEM

Use of the salinity science base and research data (including the development of new scientific, technical and engineering knowledge) in the management, coordination and implementation of salinity programs

Scientific knowledge and information has been vital for the identification, coordination and delivery of salinity management in South Australia. Sound scientific knowledge has underpinned the management of River Murray salinity and dryland salinity for several decades.

The early salinity research and development effort in South Australia focussed on developing understanding for treatment of the causes of salinity (recharge) rather than the symptoms (discharge). This included research into the understanding of catchment processes and ground water flow systems so that the appropriate on-ground actions were undertaken in the locations that would result in effective salinity control. River Murray salinity management has required scientific understanding in irrigation and drainage, and in hydro-geological processes in catchments and irrigation districts.

The more recent application of science to improve management of the symptoms of dryland salinity (discharge areas) recognised that much of the salinity problem would not be reversible and that it would be necessary to find profitable uses for saline land and water. An example of the consequence of this research and development effort is a profitable grazing system for saline land, which has now been widely applied in the largest salinity region in the State - the Upper South East. Other initiatives now include extraction of salts from groundwaters and development of inland aquaculture using saline groundwaters.

However, further research in the hydro-geological processes that result in salt movement in the landscape, in practical methods to reduce recharge, and in strategies to better use saline resources, will refine the responses and options available for salinity management. For the River Murray, more emphasis on developing methods to reduce drainage from irrigation districts may be necessary to reduce the reliance on engineering solutions. Salinity impacts on biodiversity resources and other environmental values are not well understood and require greater coordinated research effort.

Linkages between those conducting research and those implementing salinity solutions, including the coordination and dissemination of research and data across jurisdictions and agencies, and to all relevant decision makers (including catchment management bodies and land holders)

Effective linkages must be developed to ensure adequate coordination between providers of information and users of information. South Australia supports the following existing linkages and supports the development of more efficient linking strategies:

- South Australian Dryland Salinity Committee
- Murray Darling Basin Commission
- CRC Plant Based Management of Dryland Salinity
- CRC for Irrigation Futures
- National Dryland Salinity Program
- Regional Integrated Natural Resource Management
- Centre for Natural Resource Management

South Australian Dryland Salinity Committee

In 1989 the State Government established a State Dryland Salinity Committee to develop and maintain a coordinated and collaborative approach to salinity research and development and to the management of dryland salinity in South Australia. The Committee developed a South Australian Dryland Salinity Strategy in 1990 and has a long history of identifying and coordinating South Australia's efforts to manage salinity, including the science needed to underpin the implementation of salinity programs. The Committee has initiated and developed a wide range of salinity research and development and extension projects. The Committee has recently been re-formed and now includes several regional community representatives and representatives from the key state government agencies, the University of Adelaide and the CSIRO. The input and support from the Commonwealth in this manner is acknowledged. A Technical Advisory Group with representatives from the key research and development organisations, state government agencies, extension officers and regional groups (end users) supports the Committee.

Through the South Australian Dryland Salinity Committee and the Technical Advisory Group, the salinity research and development effort in South Australia has been highly collaborative and strongly linked to the end users. This collaborative approach has been strengthened by the co-location of the key state government agencies, CSIRO Land & Water and the University of Adelaide at the Waite campus. Linkages to users have also been strengthened through establishment of salinity response teams for both dryland catchments and the River Murray, utilising funding from Commonwealth and State programs. The salinity response team model has proved effective in supporting regional communities with good knowledge and further investment is justified.

Murray Darling Basin Commission

River Murray salinity management, both in the River and in the catchments, has been effectively managed through the Murray Darling Basin Commission since the mid 1980s. While South Australia remains concerned about whether the River Murray salinity targets can be achieved, there is no doubt that cooperative efforts between all governments, and in particular the development of scientifically based strategies, has been a significant achievement and will need to continue. A more important role of the Commission has been to develop and implement salinity management policies, including the development of targets, salinity registers, and tradeable pollution rights (salinity debits and credits), which collectively, with an investment program for works, have reduced salinity levels in the River Murray.

Cooperative Research Centre for Plant Based Management of Dryland Salinity

Consistent with the collaborative approach and in recognition of the need to develop new and innovative methods to manage dryland salinity, the South Australia Government is also a partner organisation in the Cooperative Research Centre for Plant Based Management of Dryland Salinity, established in 2001. The development of plant-based solutions to salinity requires a national and collaborative approach as it is beyond the resources and jurisdiction of individual states. All research undertaken within the CRC is based on a collaborative effort across at least two states and at least three organisations.

The CRC includes an integrated program of research and development that addresses the social, economic and biophysical aspects of dryland salinity with a focus on scientific research aimed at developing technologies and applications for the development of profitable perennial farming systems.

It is noted that the new CRC guidelines place an emphasis on commercial outcomes for research and a suggestion that "public good" CRCs will not in the future be funded. While commercialisation and improved dissemination of research outcomes is supported, South Australia strongly urges that the Commonwealth continues to support CRC research on matters of national interest, in particular, critical natural resources management such as salinity, water resources and climate variability. If the Commonwealth does not deem CRCs as an appropriate funding vehicle, then South Australia urges that a new vehicle for funding such areas be developed

National Dryland Salinity Program

South Australia has been a partner to the National Dryland Salinity Program (NDSP) since its inception in 1993. This program has provided a national focus and leadership in salinity management with its goal to research, develop and extend practical approaches to effectively manage dryland salinity across Australia. The NDSP has identified and researched the knowledge gaps in our understanding of the causes and impacts of dryland salinity. It has also investigated socio-economic arrangements that encourage or impede appropriate management of salinity, new production options using saline resources and management of saline landscapes.

The NDSP included a very effective communication strategy, jointly funded by the NDSP and the states, to coordinate and disseminate research and data across jurisdictions and agencies, and to all relevant decision makers. The NDSP communications strategy included a network of state-based communication consultants with a national Communications Manager, a user friendly NDSP website and the establishment and maintenance of a salinity website for South Australia (saltcontrols), an email based information network (saltlist), and a range of regular newsletters/magazines, tailored to the needs of specific target audiences (i.e. researchers, farmers etc).

The second 5-year phase of the NDSP concluded in June 2003 and the NDSP is currently undertaking a 12 month enhanced communications year and is due to end on 30 June 2004. However, there is a clear and ongoing need for a nationally coordinated and collaborative approach to dryland salinity research, development and communication:

- to identify the research and development issues of national significance and to ensure they are adequately addressed. There is still a need for a National Program to tackle those issues that are beyond the resources or responsibilities of individual states and regions

- to ensure maximum participation and involvement of all stakeholders, including industry, government and non-government research organisations, and community
- to ensure that the efforts of all those involved are coordinated and that partnerships and collaboration between researchers are maximised
- to ensure that solutions are integrated within a landscape/NRM approach
- to support continued research and development in those areas that require a concerted and nationally coordinated approach, recognising that there are many problems that remain to be solved or are inadequately understood
- to ensure that the momentum developed through the NDSP in both research and development and communication is maintained. There is a major concern that without a national approach, salinity research and development would lose its momentum and resources for research and development would be withdrawn. This has occurred with other NRM issues (eg soil acidity) when the national approach has been removed
- a national communication program is needed to ensure research and development outcomes and approaches are widely shared and communicated to all stakeholders.

National coordination of salinity research and development and communications could be delivered through a number of arrangements such as:

- a new phase of the NDSP
- the Science and Information Working Group established via the NRM Ministerial Council
- a national forum

While there are advantages and disadvantages with each of these possible arrangements, the essential issue at this time is to ensure that a national approach to dryland salinity research and development and communication continues.

Regional Integrated Natural Resource Management

In South Australia, natural resource management programs, including salinity, are delivered through a regional Integrated Natural Resource Management (INRM) framework. The Government is currently developing legislation which will provide a legislative basis for the establishment of eight Regional INRM Groups across South Australia. The existing regional INRM groups are community based and are currently developing integrated natural resource management plans in close consultation with the local communities, primary producers, environmental groups, landholders, NRM stakeholders and government to draw together priority natural resource management needs into an integrated and efficient regional strategy.

This Regional framework has been strongly reinforced by the funding arrangements for the National Action Plan for Salinity and Water Quality.

Regional INRM Groups in South Australia are developing integrated natural resource management plans and investment strategies. This process involves

- identifying and prioritising the assets of a region (including the water, land, biodiversity and infrastructure),
- examining the threats (if any) to the assets of the region, and
- for those assets under threat, developing strategies and actions to mitigate the threats. The nature and level of intervention to be undertaken will depend on the value of the asset (environmental, social and economic values).

A strong science base and a sound understanding of the biophysical processes is critical to develop management actions that will be successful, effective and provide value for money. Where the biophysical processes are well understood and economically viable solutions are available, it is unlikely that further scientific research and investigation is required. Where the processes are not well understood or viable solutions are not known, the level of investment in research and development to improve our knowledge base will depend on the value of the assets at risk. In this way the science undertaken to assist with salinity management is driven by an asset protection approach, i.e. it is demand driven.

However, there is a risk that the science needed to improve understanding of the biophysical processes or to develop alternative and innovative solutions (including policy and institutional mechanisms) to salinity problems will be beyond the resources, charter and scale of individual regions. By their nature the regional INRM Groups will be focussed on local or regional issues and will endeavour to maximise the amount of funding directed towards immediate actions to manage salinity and other natural resource issues. Accordingly, there will be a tendency to give investment a low priority into longer-term and potentially more important research and development.

While the option exists for individual regions to pool their funds for larger scale or more basic research and development, this would come at a cost to their on-ground actions and would meet with considerable local resistance. This would also be a fragmented approach as it would be subject to the decisions made by several regions, reflecting the differing priorities within each region.

Centre for Natural Resource Management

In 2002, the Government of South Australia established the Centre for Natural Resource Management. The aim of the Centre is to create partnerships between the regional INRM Groups and scientists so that integrated natural resource management across South Australia is based on world-class research and development.

A Technical Working Group of the Centre has been established, with members selected to represent the peak scientific research agencies in South Australia. This group has been meeting with regional INRM groups to discuss their information needs that could be met through scientific research. The outcome of these discussions has been a commitment from both the research agencies and the regional groups to continue building the relationship and to seek funding from a range of sources to address key issues identified through the process. Where more than one region has raised a similar research needs, the Technical Working Group has sought to combine them into one multi-regional bid for funding. In one case, a project has been developed for the greater Lower Murray NAP region, which incorporates an area across South Australia, New South Wales and Victoria.

Research projects which are relevant to salinity management that have been identified through this process include:

- identifying future trends in salinity and drivers of salinity across whole regions
- better understanding hydrological systems in dryland and irrigated agriculture at threat of or that cause salinity
- exploring options to better manage salinity (improved soil management practices, improved irrigation systems, new industries based on perennial vegetation)

- protecting biodiversity assets from salinity (particularly wetland and floodplain ecosystems).

Adequacy of technical and scientific support in applying salinity management options

Strategies adopted in South Australia to provide support to communities have included:

- a 'catchments back in balance' initiative, supported with NHT funding, to target catchment recharge strategies by developing scientifically based catchment plans with community catchment groups and landholders
- land and water management plans in River Murray areas, to identify strategic irrigation and drainage management practices to reduce salinity risks to the River Murray
- provision of scientific support to communities, using National Action Plan for Salinity and Water Quality funding, through salinity response teams for dryland areas and the River Murray. (The purpose of these salinity response teams is to support communities by identifying scientifically based options for salinity management that are relevant at local or catchment level).

These strategies are proving effective in targeting appropriate actions to manage salinity at an appropriate scale. The level of support has been constrained by available resources. Ongoing investment in programs such as these is essential for salinity management, thereby providing catchment communities with sound, well understood, scientifically based management strategies.

One area of scientific support requires specific comment. Airborne geophysics has sometimes been identified as the key scientific strategy to understand and map the nation's salinity problems. The methodology has been used in South Australia, to complement a range of scientific disciplines (soil science, hydrogeology, modelling, engineering, ecology, agronomy etc) to improve our understanding of the causes and impacts of dryland salinity and appropriate management actions. South Australia has been careful not to over-emphasise the ability of this technology to provide answers to all salinity issues. A detailed knowledge of other disciplines is required in order to apply and interpret airborne geophysics in a meaningful way. The use of airborne geophysics to improve our understanding of salinity processes and to assist with the development of management actions is being trailed in South Australia through the National Action Plan for Salinity and Water Quality.

The results from the work undertaken so far, highlight the need for researchers to carefully target and tailor the technology for specific salinity problems and landscapes. Considerable advances have already been made in our knowledge where technology is tailored to provide data on specific features of the landscape that play a critical role in salinity management.

In response to the trials conducted in the Riverland area, a proposal for further airborne geophysics surveys and analyses has been developed to provide very specific information on water/salt movement processes to optimise the placement of a salt interception scheme to reduce salt-loads to the River Murray.

Suggested Actions

The Inquiry offers a key opportunity to refocus science and salinity management strategies. The Commonwealth should consider the following actions:

1. Ensure that the leadership and coordination in salinity research and development previously provided through the National Dryland Salinity Program continues. There is a clear and ongoing need for a nationally coordinated and collaborative approach to dryland salinity research, development and communication:
 - to identify the research and development issues of national significance and to ensure they are adequately addressed
 - to tackle those issues that are beyond the resources or jurisdictions of individual states
2. Make provision within the National Action Plan for Salinity and Water Quality for a salinity research and development fund to finance research that is of statewide importance or of a size or scale that is beyond the scope of attention of an individual region.
3. Continue to encourage regional INRM groups to include research and development as part of their investment mix in their regional Investment Strategies, in much the same way as they are encouraged to invest in monitoring and evaluation.
4. Continue to use airborne geophysics in a highly targeted manner to fill critical knowledge gaps in our understanding of salinity processes and to assist in the development of management plans for high value assets, noting that the application and interpretation of the technology requires expert knowledge and the use of multi-disciplinary teams.
5. Continue to emphasise management of dryland salinity on a catchment basis, noting that without action, predicted increased salt discharge from some catchments in the headwaters of the Murray-Darling Basin will threaten downstream water quality and River Murray salinity targets.