Submission for Inquiry into the coordination of the science to combat the nation's salinity problem

Submission from the Northern Murray Darling – Water Balance Group

Summary and recommendations

Several scientific issues are still to be resolved before clear management and policy can be defined. As is pointed out by Lyle and Purcell in their report (appendix 1), salinity and water balance issues are relatively well studied in the Tablelands and Slopes areas and the southern Murray Darling Basin (MDB), but major research in the northern part of the Basin is still lacking. In addition, coordination of research between research organisations and groups could be improved.

Specific recommendations are:

1. The Northern Murray Darling – Water Balance Group (NMD – WBG) has been trying to fill a gap in research needs in the Northern part of the MDB by establishing a cooperative research program. Expansion and strengthening of this program in particular in the area of Natural Vegetation and integration with the socio-economics would deliver important outcomes for this part of the basin.

2. The Cooperative Research Centres are, through their cooperative nature, by definition the best vehicle for such integration of research and delivery of outcomes. However cooperation between different CRC's in the northern MDB under a program such as the NMD – WBG would best improve integration, rather than establishing a "Super" CRC. Possible CRC's in this area would be: the Australian Cotton CRC, the CRC for Catchment Hydrology, the CRC for Irrigation Futures and the CRC for Freshwater Ecology. Establishment of a strong research program where these CRC's cooperate under a common umbrella such as the NMD – WBG, would allow optimal integration and interaction between the research, professional and educational communities.

3. Building and managing national and state databases containing publicly funded research data, rather than outcomes. The data should be recorded and reported in consistent (international standard) SI units. These databases should be accessible by other publicly funded research projects (possibly for a small fee to manage access); and

4. Creating flexible natural resource management policies, which can be adapted to local conditions, without threatening the overall natural resource management goal of the policy are better due to the uncertain nature of the current science.

Introduction

The Northern Murray Darling – Water Balance Group (NMD – WBG) was established in 2001 under auspices of the Australian Cotton CRC. The NMD – WBG combines scientists of NSW Agriculture, Queensland Department of Natural Resources and Mines, CSISO Land and Water and The University of Sydney. The group was established after

identifying common interests between researchers, and identifying the lack of a strong integrated research program on water balance issues in the Northern Murray Darling Basin. Over the last three years the group has been working effectively on establishing an integrated research and extension program on the water balance of the Northern Murray Darling Basin with particular attention to recharge in relation to salinity (see appendix 1). The envisioned program would encompass research components in dryland and irrigated agriculture and in natural vegetation. These research components would be coordinated within one program and be tied to a strong extension program building on existing components of the Australian Cotton CRC and state initiatives in Queensland and NSW. In the last three years several components of this program have been established, largely through funding of GRDC, CRDC and the Australian Cotton CRC and recently a small component funded by Land and Water Australia. Currently, the main goals of the NMD – WBG are:

- Promote research and extension on the water balance and recharge in the Northern half of the Murray Darling Basin

- Improve interaction between researchers in the area of groundwater recharge and the water balance in dryland and irrigated agriculture

- Establish common methods of research and facilitate exchange of data and ideas in research

- Promote delivery of research outcomes in this area to extension programs

The NMD – WBG is currently organising a technical workshop on measurement of the water balance and recharge to groundwater in the Northern half of the Murray Darling Basin.

COMMENTS ADDRESSING THE TERMS OF REFERENCE OF THE INQUIRY

Use of the salinity science base and research data in management coordination and implementation of salinity programs

The origin of the NMD – WBG lies in the frustration of researchers working in the Northern Murray Darling Basin with the predominant focus on salinity research in the Southern irrigation areas and dryland areas on the tablelands. It seemed that most of the management and implementation of salinity programs was based on this (in our view) one-sided research. Such bias is also echoed in the papers released by the Wentworth group, in which most of the water resource and salinity comments and solutions are aimed at problems in the Southern Murray Darling Basin, and, in particular, at issues surrounding the river Murray.

The NMD – WBG believes that the applicability of the current southern and dryland research to the Northern part of the MDB is not obvious, and, in particular, it seems to ignore the climatic and geological differences between the two regions. In particular:

- Summer versus winter-dominated rainfall;
- Differences in cropping practices and crops, for example irrigated cotton versus rice and irrigated pasture; and

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- Extensive areas of heavy clay soils which shrink and swell.

This bias towards the southern MDB and Tableland research is understandable, considering the much larger problems with relation to salinity in these areas. The problem is exacerbated by the lack of natural resource information in the Northern MDB, such as evident from the recently released salinity atlas from the Murray Darling Basin Commission (Kendall, 2002). In this atlas, a large part of the Northern Murray Darling Basin is mapped as an amorphous red blob, ignoring much of the research currently being conducted in this area.

This lack of relevant research and data could lead to unrealistic management and implementation programs in the Northern regions. Treating the whole of the Murray Darling Basin with a broad brush in terms of policy is unrealistic and ignores the complexity of the natural systems and can contribute to confusion in the farming community. These comments are echoed in a recently completed scoping study (Appendix 1).

Linkages between those conducting research and those implementing salinity solutions, including the coordination and dissemination of research data across jurisdictions and agencies, and to all relevant decisions makers.

Solutions to the nation's salinity problems are complex and in many cases not achievable within a lifetime. It is therefore imperative to be pro-active and to act early rather than late. This means that management to combat salinity should preferably be applied in areas not yet experiencing salinity. The long response times of many of the natural systems means that we are not yet seeing the true scale of the problem.

There are two major problems in this:

- It will be difficult to change landholders management if a problem is not visible or eminent; and

- Research cannot always deliver a clear solution to many of the natural resource complexities.

These two problems mean that it is sometimes difficult to deliver a clear message to relevant decisions makers, since there are competing interests in the policy and research area. While the policy area would like a clear message, the research area is cautious due to the complexity of the problem.

The data problem and uncertainty

Being pro-active means that research is often asked to deliver warnings in the form of predictions (simulation model outputs) of natural resource issues such as the occurrence of salinity or deep drainage. In order to make these predictions we not only need a model, which somewhat represents the reality, we also need the data to verify and parameterise the model. Australia is a large continent with a small population and data for natural resource studies are therefore scarce. As researchers we tend to use whatever data we can find and many of us now report uncertainties with our studies (see for example the recent National Land and Water Audits). However the implementation and decision making layer tends to ignore the uncertainty component of the research and base its policies purely on the research outcomes.

Although databases exist for research outcomes and projects (such as Streamline), no nationally or state managed databases for research data exist. This means that precious data, which is collected, has the danger of disappearing in the researcher's bottom drawer.

The apparent lack of overall data also means that many of the policies and simulation models are based on the same datasets and studies. Transplanting such policies outside the boundaries of the study area are not recommended, but happen often.

An example of such a gap in data is the Northern part of the Murray Darling Basin, which means that making pro-active management of deep drainage and salinity difficult.

Data required to understand the problem and provide advice to policy makers are necessary at all scales. Spatial and remote sensing data are valuable for analysing the causes and impact of salinity at a broad scale. However they are generally high in cost and hence there is a lack of availability to the research and extension community. These data should be made freely available to all publicly funded research.

Some possible solutions

1. Building and managing national and state databases containing publicly funded research data, rather than outcomes. The data should be recorded and reported in consistent (international standard) SI units. These databases should be accessible by other publicly funded research projects (possibly for a small fee to manage access); and

2. Creating flexible natural resource management policies, which can be adapted to local conditions, without threatening the overall natural resource management goal of the policy are better due to the uncertain nature of the current science.

3. Establishing strong research programs in areas with data gaps, an example of this is the NMD – WBG.

Adequacy of technical and scientific support in applying salinity management options

If we want to be pro-active in combating salinity, the amount of technical and scientific support is totally inadequate. The natural resource problems are of the same size and complexity as many of the life threatening diseases and in some cases are more difficult and require a far longer period of time to address. Yet, the area of natural resource management receives only a fraction of the total funding of human health.

In addition, cooperation between different agencies working in the salinity area is not optimal. The nature of scarce competitive funding has not encouraged sharing of data and information. Projects tend to run for a limited time, and much of this time tends to be concentrated on data acquisition. Actual dissemination and interpretation is mostly lacking due to the lack of infrastructure and long-term support. Problems always seem to become larger and more complex and this means that proposed funding in the grant application is not always sufficient for full completion of the project.

Strengthening the CRC program, through the cooperation between several CRC's in a common research program could bring together research and scientific support to develop workable and realistic salinity management options. In this, we believe that there is more value in smaller, independent and targeted CRC's (such as the Australian Cotton CRC)

working together in common "generic" projects, such as the environment, than in trying to develop a "Super" CRC that covers the whole area. The environment or the salinity issue is too complex to be tackled by a "Super environment/salinity" CRC, but is best served by a group of CRC's working together in a common program.

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References
"Basin Irrigation and Salinity Mapping Atlas of Data Edition 2.0 - August 2002"
Matt Kendall - Manager Salinity MDBC 70 pages.

Appendix
Lyle, C. and Purcell, J. 2002. Proposed research program for better catchment planning and water resource management.