

***Strategic Plan:
Salinity research and management strategies for the
cotton growing areas of Australia***

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INTRODUCTION

Since the late 1980's secondary soil salinisation has been recognised as a potentially threatening problem in many of the irrigated cotton growing areas. This has been most apparent in the lower Macquarie valley and at Bourke where large earthen storage dams constructed from semipermeable soil materials have leaked. Owing to the presence of subsurface textural boundaries shallow water tables have been created in adjacent irrigated fields which have redistributed stored soluble salts within the rootzone. In Dalby and the Lockyer valley, the application of poor quality irrigation water has resulted in minor problems with salinisation of surface soil. Fortunately, there have been no widespread occurrences of secondary soil salinisation as a result of rising water tables or the prolonged use of poor quality irrigation waters.

Nevertheless, the Cotton Research and Development Corporation (CRDC) and the Cooperative Research Centre for Sustainable Cotton Production (CRC) recognise that secondary soil salinisation is of potential concern to the long term sustainability of irrigated cotton production and have become pro-active in determining this threat. To assist in developing discussion and further awareness of salinity within the industry and ensuring good collaborative ties between the CRC's core partners who are working on salinity related projects, the CRC initiated the production of a Strategic Plan. This Plan includes a mission statement and goals and provides a detailed presentation of objectives

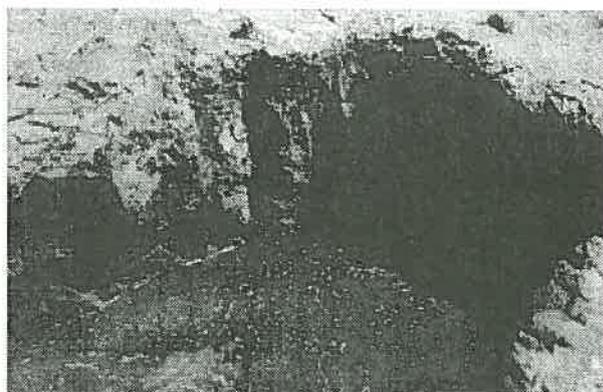


Figure 1. Shallow watertable caused by dam leakage in the Bourke area, NSW.

and strategies for education, management and research work currently being undertaken by the various core CRC partners. In addition, it indicates the linkages between education, management and research programs and their expected adoption time. The following paper provides a summary of the information contained within the Strategic Plan for salinity research and management strategies for the cotton growing areas of Australia.

AIMS

The Strategic Plan's main purpose is to:

- a) briefly state the current extent of soil salinity and shallow water tables within the cotton growing areas;
- b) raise awareness and educate the industry as to the potential threat of soil salinity;
- c) provide a framework for best management strategies to minimise the threat or spread of soil salinity;
- d) identify key gaps in knowledge to ascertain the potential threat to cotton production;
- e) describe and outline the linkages between current work in progress; and,
- f) provide a time-frame for the completion of key actions.

STRATEGIES

There are four main objectives within the plan. The first two objectives relate to increasing awareness of soil salinisation through education packages and increasing skills of irrigators, consultants, etc., in identifying symptoms and application of appropriate management actions to remediate the problem. The last two objectives are concerned with ascertaining the current and potential threat of soil salinity through research and providing management strategies for controlling the spread of soil salinity within the cotton growing areas of Australia. These objectives are presented here in summarised form.

Objective 1

To increase awareness and understanding of cotton advisors and growers of the causes, symptoms and impacts of high water tables, seepage and salinity.

Increasing awareness and education about the potential negative environmental consequences of long term irrigation will encourage discussion on ways to minimise its impact socially, environmentally and economically. This will circumvent the need for action from environmental groups, agencies and governments to enact legislation. It will also provide the necessary climate for open discussion and adoption of best irrigation practices.

Objective 2

To increase the skills of irrigators, extension officers, consultants and

researchers in identifying symptoms and understanding the processes of secondary salinity and determining appropriate management actions.

The preparation of manuals and guidelines as education and extension packages will highlight the state of the art research and management tools available to assist in determining the most appropriate course of action before secondary salinity is apparent. This will equip land holders, consultants and extension officers with the necessary information required to make decisions about most appropriate best management practices. Where salinity is well understood and apparent, more advanced kits can be developed containing general management options including crop, soil and irrigation management.

Objective 3

To increase knowledge of the current status and potential threat of secondary salinity in the cotton growing areas of Australia.

Soil salinisation is almost an inevitable consequence in extensively irrigated areas. At present the extent of the potential salinity threat is unknown in the cotton growing areas of Australia. In conjunction with education packages and implementation of management strategies to minimise the threat of soil salinisation, research is required to elucidate over the long-term what the potential threat may be. At present many research projects are being conducted covering a wide array of salinity studies. These vary from monitoring the movement and dynamics of water tables, determining optimal rotations to minimise excessive deep drainage, development of predictive models to determine areas of potential threat and measuring and mapping soil salinity at different scales.

Objective 4

To increase the knowledge of appropriate management strategies to minimise secondary salinity in the cotton growing areas of Australia.

Where salinity does occur management options which maximise yield in affected areas and minimise the potential spread or threat of secondary soil



Figure 2. Discussing suitability of slightly saline groundwater for irrigation, Dalby, Qld.

salinity are required. Research is therefore needed to provide agronomic options to combat the onset of soil salinisation and provide crop rotations to maximise soil water uptake, reducing deep drainage, which is one of the primary causes of secondary soil salinisation.

RESEARCH TARGETS

The research projects alluded to briefly in Objective 3 are for the most part funded either by the CRDC or CRC for Sustainable Cotton Production. Funding outside these groups has been successfully obtained from other funding bodies, including Salt Action. A summary of these projects, the researchers and their respective organisations, expected research outcomes and target dates for completion are provided in a summarised form in Table 1.

LINKAGES

Overall, the current research projects and management strategies being developed will contribute significantly to an increased knowledge of the processes that have the potential to cause soil salinisation in the cotton growing areas of Australia and more importantly identify the potential threat. The results obtained within each project have the scope to be used by other researchers to modify and enhance their individual work. Ideally, measurement, mapping, modelling and a monitoring protocol is developed independently with the results integrated, possibly within the SOILpak management package.

Project	Researcher	Outcomes	Target Date
Reconnaissance soil studies	I. Odeh (CRC-US)	Conduct reconnaissance surveys. Development of GIS. Identify areas of salinity threat.	June-97
Understanding the salinity threat in the irrigated cotton growing areas of northern NSW	J. Triantafilis (CRDC-US)	Development of salinity module. Determine salinity threat. Assess usefulness of aerial-EM	June-98
Modelling and management decision support tools	I. Gordon (CRC-QDPI)	Development of irrigation water quality guidelines.	June-97
Rotation cropping systems	T. Willis (CRDC, NSW)	Application and extension of appropriate cropping systems.	June-99
Geohydrologist	J. Douglas (CRC-UNE)	Quantify processes of water application and infiltration	June-98
Extension	(US, UNE, NSWA, QDPI)	Extension of research and best management strategies (i.e. SOILpak)	June-98

Table 1. Summary of projects, principal researchers, funding, research outcomes and target dates for completion.