



Overview of the CRC for Plant Based Management of Dryland Salinity

Mission

"Through an improved understanding of the way natural and agricultural ecosystems work, the CRC will provide new plant-based land use systems that lessen the economic, environmental and social impacts of dryland salinity and thereby help to sustain rural communities".

The Challenge

The Salinity Theme of the National Land & Water Resourced Audit clearly spells out the potential impacts of dryland salinity to not only farmland, but to water resources, the environment and infrastructure (towns, roads etc.). More importantly, the Audit reinforced the scale of implementation activity that would be required to successfully manage the problem.

The business plan for the CRC recognises the magnitude of the task facing the Nation and refers to the need for "a revolution in agriculture" if we are to be successful. The business plan recognises the complimentary role of engineering activity but restricts the scope of the CRCs activity to that of plants in the landscape.

The programs of the CRC that I will describe shortly provide more detail, but firstly let us have a brief look at some background information.

Cooperative Research Centres (CRCs)

These were an initiative of Commonwealth Government in the late 1980s to bring together researchers from Universities, CSIRO, Government Agencies and the private sector in long term collaborative arrangements. The Federal Government contributes funds at an average ratio of around one to three of commonwealth funding to external cash and in-kind contributions from industry and other external sources.

There are presently 64 CRCs from a wide range of category areas. Of interest to the PUR\$L Conference, there are 15 CRCs in the Environment category (including the CRC for Plant Based Management of Dryland Salinity) and 8 in Agriculture.

The CRC for Plant Based Management of Dryland Salinity

After a two year planning phase the CRC was formally approved in January 2001, to commence business in July the same year. Community awareness of the potential impacts of dryland salinity generated wide support for the proposed CRC, with over \$100million of cash and in-kind commitment from 9 core partners and 5 supporting partners. The successful bid gained a further \$22million of Federal funds for the 7 year life of the Centre. It is the combination of strong research partners, an assured funding base and the seven year time frame that allows the Centre to develop a sound research program.



Core Partners and Supporters

Partners: Department of Agriculture WA
Charles Sturt University
Commonwealth Scientific & Industrial Research Organisation
Conservation and Land Management WA
Department of Natural Resources & Environment Victoria
NSW Department of Agriculture
Primary Industries and Resources SA
The University of Western Australia
University of Adelaide

Supporters: Australian Conservation Foundation
Grains Research & Development Corporation
National Dryland Salinity Program
Murray Darling Basin Commission
National Farmers' Federation
WA Department of Commerce & Trade
Wesfarmers Landmark

Governing Board

The CRC program dictate that there must be a majority of independent board members. With 9 core parties seeking membership, the outcome is of necessity a large board. More importantly though, if we are to be successful, a large number of stakeholders need to be involved and they form the base of independent members. The large board has elected three small committees to undertake the detailed work, so has achieved a way in which it can be effective while being inclusive. The members are listed below, with the three committee Chairs also identified.

The Board: Mr Alex Campbell – Chair
Professor Phil Cocks – CEO
Mr Ian Donges (NFF)
Mr Tim Fisher (ACF)
Mr Don Blackmore (MDBC), ‘Chair Research Committee’
Mr Richard Price (NDSP)
Ms Barbara Morrell (Independent)
Dr Lindsay Cook (Ag NSW)
Ms Lucinda Corrigan (Independent)
Mr John Harvey (GRDC)
Professor Paul Burnett (CSU)
Mr Chris McRae (DNRE Vic)
Professor Alistair Blake (UA)
Dr Don Plowman (PIRSA), ‘Chair Finance and Audit Committee’
Mr John Bartle (CALM)
Dr Bob Nulsen (Ag WA)
Professor Bob Lindner (UWA)
Mr Mick Poole (CSIRO)
Mr David Coombes (Wesfarmers Landmark), ‘Chair, Communication & Education Committee’



Overview of The five Research Programs

It is ironic that while we live in the driest inhabited continent, the base cause of dryland salinity is the inefficient use of rainfall by annual agricultural systems. The unused rainfall 'leaks' through to the ground water, causing rising water tables that mobilise salts toward the root zones of plants and foundations of buildings & roads. In effect, we are wasting our most precious resource - rainfall. The CRC's programs are aimed at addressing this situation through profitable new perennial based farming systems for the economic, environmental and social well being of rural Australia. Research activity is aimed at 70% being toward the recharge part of the landscape (ie. where rain falls and water enters the soil) and 30% the discharge (ie. into rivers, lakes and wetlands, including areas of waterlogging).

Function of natural & agricultural ecosystems

This program (P2) is aimed at improving our understanding of how natural ecosystems have evolved to cope with the Australian climate, landforms and soil types (both in recharge and discharge environments). This in turn provides a base for developing agricultural systems that have similar characteristics and thus are sustainable and make balanced use of rainfall.

New and better varieties of woody and herbaceous perennial plants

Perennial plants dominate our natural ecosystems and are better able to utilise rainfall and moisture reserves deeper in the soil profile. This program (P3) is aimed at both extending the range and profitability of existing perennials as well as seeking new woody and herbaceous plants that may have a profitable place in agricultural systems. This activity will also be look at both the recharge and discharge areas.

Land use systems with balanced water use

Farmers at this conference have become accustomed to systems of farming. ie. Rotations of crops and /or crop and pasture rotations. These systems cater for multiple benefits such as weed control, disease control, fertiliser usage, nitrogen balance, financial risk management ...etc. This program (P4) is aimed at extending these annual dominated systems to include perennials that also provide a benefit to the water balance. (Perennials of course have wider benefits ie. wind protection, erosion control, 'out of season' feed ...etc.) Systems of perennial agriculture would include more permanent woody types appropriately placed in the landscape as well as perennial crops, pastures or shrubs that are in rotation with annual production, and alley farming. Once again, these systems will include recharge and discharge areas. They will also focus on meeting the particular requirements of our different agricultural regions – taking into account rainfall patterns and soil types.

Economic and Social Assessment

As mentioned earlier, dryland salinity will only be managed by a landscape scale adoption of perennial agriculture. The terms of trade for present agricultural production clearly show that there is limited scope to fund non-profitable activity. This program (P5) is therefore of the utmost importance in ensuring that any new plants or systems that are being investigated will be profitable to those utilising them. Social issues will also be assessed, as large scale changes of enterprise can be challenging to those involved.



An example would be the changes involved in moving from horse-based agriculture to mechanisation in a previous ‘revolution in agriculture’. Not only were there economic issues to be considered in moving from horses to tractors and trucks, there were also social and educational issues. Interestingly enough, our forefathers claimed a love for their horses and dislike for smelly machines! I guess the opposite is often the case now – a love of brightly painted machines and a dislike for smelly animals!!

Education, Information exchange and Technology adoption

A vital role for the CRC is in achieving the fastest possible adoption of the outputs of the previous research programs. Being of a ‘public good nature’ and requiring such a landscape scale adoption of new perennial based agricultural systems dictates that this program (P1) receives high priority. We are fortunate to have Wesfarmers Landmark as a supporting party who will use their branch network and agronomists as a “shop-front” for the CRC. David Coombes of Wesfarmers also chairs the Board committee for education and communication. The Wesfarmers contribution will provide additional support, rather than replace the more traditional means of information exchange and technology adoption.

Supplementary Bid to extend the CRC

Of interest to the PURSL Conference is a bid presently before the CRC Secretariat to extend the activity of the CRC into two new program areas. Industry support through Australian Wool Innovation Ltd. and Meat and Livestock Australia has been a pivotal aspect in developing the supplementary bid.

Developing profitable and sustainable grazing systems for recharge and discharge pastures

The scale of perennial agriculture required and the wide dispersal of present grazing industries would indicate a strong emphasis (at least initially) toward pastures and woody shrubs for fodder. The ‘out of season’ opportunities offered by perennials will be of benefit as will resistance to drought, frost, flood etc. Once again the emphasis will be on systems of agriculture in both the recharge and discharge areas that suit the rainfall patterns and soil types of our agricultural regions.

Prospects for biodiversity in a salinising landscape

The second program in the supplementary bid is aimed at better understanding the benefits and threats to biodiversity. A good example would be the benefit to 450 plant species in WA alone that are threatened by rising water tables and a threat may be the weed potential of new perennial species developed by the CRC. Another example is the possibility of new perennial systems becoming a habitat or thoroughfare for native wildlife.



Projects of particular PUR\$ Interest

Within the program areas mentioned above, are some project areas of particular interest to this conference.

1. Development of salt tolerant cereals using ‘wide crosses’ of wheat with ‘wild’ *Hordeum* species.

Colmer, Munns, Islam, von Bothmer (UWA, CSIRO, UA, SWAS)

This project aims to identify sources of salt and waterlogging tolerance in wild barley grass germplasm to determine the best sources for crossing with wheat using cytogenetic techniques. The project will produce highly waterlogging/salinity tolerant pre-breeding material for use in Australian breeding programs.

2. Quantifying the differences in performance among tree species/genotypes on salt-affected land.

Marcar, Bird, Jackson, Theivanathan, Falkiner, Taylor. (CSIRO, FFP, DNRE, DAWA)

This project will contribute significantly to the productive use of salinised resources, and the development and adoption of species capable of growing on discharge areas. As such it will lay the groundwork for much of the CRC's genetic improvement program for discharge-area woody perennials.

3. Species zonation and floristic composition and functioning of ecosystems in areas of primary and secondary salinity in western, southern, and eastern Australia.

Rengel, Keighery, Wallace, Dixon, Colmer, Malcolm, Brown, Malcolm, Walsh, Bennell, Wilson, Tang (UWA, CALM, Kings Park, DNRE, PIRSA, CSU)

This project will study what plants grow where in native systems and how they are adapted to the stresses. This information will be used as a guide in the selection of plants for managed systems.

4. Using native herbaceous perennial species in Australia

Slattery, Mitchell, Bennett, Rogers, Snowball, Hughes, Reed, Sweeney (DNRE, UWA, WADA, PIRSA)

The project aims to collect and preserve native perennial plants with potential as forage species including those adapted to saline/waterlogged environments.

5. Profitable and sustainable grazing of saline lands in WA – Site 1

Undertaken in funding partnership with AWI, MLA and LWA under the management of NDSP

The project aims to evaluate and develop the use of saline pastures for the sustainable production of livestock.

6. National field evaluation and selection of new pasture plants from the salinity CRC to improve hydrologic stability of farming systems.

This project has a component involving the testing and selection of new pasture species and varieties for saline/waterlogged environments.



Conclusion

The brief overview of the CRC for Plant Based Management of Dryland Salinity shows that we are well advanced in establishing an exciting research program to address one of the Nation's most urgent environmental threats. While salinity management is the initial focus of resource management for the CRC, I predict that in seven years time we will see many other benefits from a perennial based 'revolution in agriculture'. There will be a wider range of environmental benefits, more profitable and diversified agricultural production systems and meaningful social and aesthetic outcomes for rural Australia.

This conference and the wider PUR\$L contribution will help direct and finetune the research program over the coming years.

Alex Campbell
Chairman, CRC for Plant Based Management of Dryland Salinity.