

# PREMIER'S SCIENCE AND RESEARCH FUND 2009

## **Climate Change, Communities and Environment: Building research capability to identify climate change vulnerability and adaptation options for South Australian landscapes**

A new and exciting research team will form and grow to position SA natural resource management research and regional implementation in the vanguard of adaptation to climate change. The multi-agency team will identify those conservation areas and land use practices that are most at risk from adverse effects of climate change and identify adaptation strategies and policy options to support planning and implementation by regional natural resource management agencies. The research intends to identify alternative regional land use, institutional, service and business arrangements that will assist the adaptation of regional communities to warmer temperatures, less reliable rainfall and more limited surface water resources.

The project seeks to answer the following critical questions.

1. With improved projections of climate change effects at regional scale, what conservation, production and community components are most vulnerable and what actions can be taken to assist adaptation to climate change?
2. How can the condition of soil, water and biota resources in a region be best maintained and improved with confidence that incentives and management actions taken will not adversely compromise some other part of the system, especially given likely climatic change?
3. What are the best management investments and where should they be made to get the best improvement in natural resource condition and look after the jobs and services for the regional community?
4. How do we make robust decisions now that will still be applicable and valuable in 30 to 50 years?

The proposal aims to bring a group of talented researchers together into a world class team with critical mass, focussed on planning for adaptation to climate change in South Australia's regions. The highest risk areas will be identified using state of the art computer modelling and multi-criteria spatial optimisation. The most vulnerable environments and communities are those that are both at the highest risk from the impacts of climate change, and, have the lowest adaptive capacity.

The project will bring together researchers from five organisations to work with two NRM regions in SA. The key partners involved are:

- University of Adelaide
- CSIRO Sustainable Ecosystems
- South Australian Research and Development Institute and Primary Industries and Resources
- Department of Water, Land and Biodiversity Conservation
- Department for Environment and Heritage
- SA Murray-Darling Basin Natural Resources Management Board
- Eyre Peninsula Natural Resources Management Board

With input from the regional NRM Boards the research will:

- Help refine and enhance regional NRM planning and target-setting
- Assemble the extensive and diverse information about the region
- Identify priorities among competing resource management issues
- Provide a structured and repeatable information collation and analysis capability
- Provide a quantitative assessment of climate change vulnerability inclusive of risk and adaptive capacity, and the impact of alternative management options.

Our intention is to focus initially on the SA Murray-Darling Basin NRM region and the Eyre Peninsula NRM region as a way of directing the outcomes from our research and developing our capability. The first stage will be collating and standardising the information that characterises the region. During this stage we will establish the links and role of the NRM Board with activities such as the "Murray Futures" and "Riverland Futures" in the MDB NRM region and with the Farming Systems Program and "East meets West" biodiversity corridor in the Eyre Peninsula region.

Researchers will collaborate by focussing on a common goal of modelling regional systems that involve process descriptions of community, ecosystem and production systems that provide insights and evidence based options into how best to adapt to global changes. Each partner will contribute to the common goal and be bound by the sense that we can build more informed ways of deciding how to invest our limited finances in making our regions more productive and more socially responsible while still retaining and renovating its natural Australian landscape character in the face of climate change.

The research of the group will focus on:

- Regional climate change vulnerability and risk assessment leading to adaptation options.
- Improving and verifying the modelling processes used in estimating the water, carbon and nutrient balances of different crops and vegetation types with changed climate conditions
- Identifying the economic and community consequences (jobs and services) of changing land use practices to improve and conserve resource condition as an adaptation to changed climate
- Applying climate change scenarios at regional scale to identify vulnerability hot spots through assessment of risk and capacity to adapt for biodiversity, productive land use and dependant business and services
- Identifying alternative regional land use, service and business arrangements as there is less and more variable River Murray water available
- Improving the prioritising processes used to indicate the biodiversity value of different land use configurations and their connectivity

#### Outcomes – what do they mean for the region and state?

As an integral part of this research process we expect that climate change assessments will contribute to adaptation through the following:

- Joint researcher and regional NRM Board education and shared understanding of the effects, consequences and change options that should be considered
- Improved priority setting for actions coming from a stronger evidence base
- A structured evaluation process for decision alternatives
- Greater confidence in implementing and following through adaptation actions.

We expect to develop the understanding, expertise and tools that result in more evidence based planning and implementation of regional NRM. The net result will be more cost effective conservation and more resilient, viable regional communities.

#### Resources

The total project will have an investment of more than \$2.9 million over the 3 year period. The primary investment comes from the Premier's Science and Research Fund and is specifically designed to increase research and application capacity in this vital area of natural resource management and adaptation to climate change.

The investment proportions are:

PSRF 42%, University of Adelaide 28%, CSIRO 11%, PIRSA/SARDI 7%, DWLBC 7%, NRM Regions 3% and DEH 2%.

The Project will employ two Post Doctoral Fellows to work full time and hence gain valuable experience in analytical and modelling methods for developing climate change adaptation options. In addition, Research Officers will be associated with the two NRM study regions to ensure close interaction with regional groups.

#### Governance and Management

The project is subject to an overarching contract between the State of SA and the University of Adelaide. The University as project agent will establish research agreements with the partners. An Advisory Group of senior representatives from the two NRM regions, independent NRM consultants and a senior ecological researcher will provide advice to the Project leader and Team. The Project Leader, Prof Wayne Meyer will work with a Partner Management Group to deliver the project. Annual reports will be complemented with a vigorous communication and publication effort.

Wayne S Meyer

2 March 2009, 13 October 2009, 14 December 2009