

# Climate Change Adaptation Research Grants Program

## - Primary Industries Projects

### **Project title:**

Will Primary Producers Continue to Adjust Practices and Technologies, Change Production Systems or Transform Their Industry—An application of Real Options..

**Principal investigators:** Associate Professor Greg Hertzler

**Lead organisation:** The University of Sydney

### **Objectives:**

The overall objective is: Determine the thresholds for transformational change across Australia in wheat dominated agriculture, subject to climate change.

To achieve this we have the following sub objectives:

- Build capacity and skills in the economic analysis of adaptive and transformational responses to climate change
- Use transects across space to identify future scenarios for more favourable areas as they become less favourable with climate change
- Use data from previous research and collect additional data to model the transformations from wheat dominant systems
- Use climate data to assess the trends and increasing variability of crop and pasture production
- Use the real options framework to find the thresholds for switching from wheat to mixed cropping to livestock to extensive grazing
- Calculate the option values growers will pay to avoid making a mistake and switching inappropriately, the transactions costs of reversing a mistake and the expected time until growers will switch.

### **Project design and methods:**

The overall objective is to determine the thresholds for transformational change across Australia in wheat dominated agriculture, subject to climate change.

To date climate change research has been dominated by bio-physical modelling with only limited economic analysis, usually based on methods which do not account adequately for risk, uncertainty and thresholds. The proposed workshop will allow the knowledge and experience of people investigating climate change in agriculture to be shared and to examine how Real Options can be best applied to adaptive and transformational decisions. By involving both experienced and early career economists the workshop will contribute to developing skills and capacity in the economic analysis of climate change responses.

### *Timing*

- The first year of the project will include the workshop, collation and supplementation of data and development of the conceptual framework for modelling the responses of wheat dominant agriculture in NSW using Real Options.
- The second year will include collation and supplementation of data and modelling for SA and WA. This will help build a complete picture of transformational change for Australian wheat dominant agriculture.

### *Deliverables*

- The first deliverable is a workshop for experienced and early career researchers and other invited individuals.
- The second deliverable is an interim report on transformation of wheat dominant agriculture in NSW.
- The third deliverable is a final report for NSW, SA and WA. The fourth deliverable is journal articles which will be prepared as the project proceeds.