Applying seasonal climate forecasting for profitable and sustainable resource use

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Introduction

• There is growing recognition of the need to better match the vagaries of the Australian climate with more flexible farming systems. This is reinforced by evidence of climate change and its effect on climate variability.

• Seasonal climate forecasts (SCFs) are being promoted as a technology to reduce climatic uncertainty and aid decision making by Australian rural industries.

• Advances in the accuracy of climate forecasts have led to some optimism about their economic value. The extent of this value depends on whether SCFs lead to decisions that either reduce losses under poor climatic conditions or make gains under good conditions.

Climate variability in Australia

• Australian agriculture experiences one of the most variable climates in the world. Anderson (1987) estimated that climate variability accounts for around 40% of the variation in Australia’s agricultural income.

• Climate variability leaves agricultural producers exposed to high levels of production risk when making decisions about the choice of outputs and inputs.

• Variability also leads to the adoption of conservative practices which reduce the negative effects of climatic extremes but come at the expense of reduced agricultural incomes and higher resource degradation.

Seasonal Climate Forecasts

• The best-defined pattern of inter-annual rainfall variability is the El Nino-Southern Oscillation (ENSO). Research and experience over recent decades has shown that ENSO plays an important role in explaining rainfall patterns in Australia.

• SCFs have been issued in Australia since 1989 and are primarily based on the SOI. Statistical based systems, using the SOI or SSTs (sea surface temps), are the major source of SCFs but dynamic climate models are rapidly improving.

Research objectives

• There has been limited research on the economic value of SCFs in typical broadacre farming systems in Australia and little research on their environmental benefits.

• This research aims to identify opportunities where farmers can profitably incorporate SCFs into their farming systems; evaluate their contribution to reduced land degradation and improve the allocation of research resources into the area of climate variability. It will focus on the effects of perfect and currently available SCFs on:
  - farm profitability;
  - the type and intensity of agricultural land use; and
  - land degradation (soil erosion and deep drainage).

• Subsidiary objectives are to assess how the values of perfect and currently available SCFs are influenced by levels of risk aversion, the level of state variables (eg. soil moisture) and prices attached to land degradation effects.

Expected outcomes

• A better understanding by farmers, agricultural industries and policy makers of the value of SCFs and how they can best be utilised.

• Development of more sustainable farming systems that better match crop and livestock decisions to pending climatic conditions.

• Better targeting and allocation of climate research resources through the identification of SCF attributes of most significant value.