

Risk management approach for climate adaptation in Australian agriculture

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nature of Australian agriculture:

- broad cropping
- large farms
- livestock industry (sheep – traditional livestock industry
beef - new, now large by means of output)
- cattle mostly grazed in the north
- huge cattle stations which are the size of Luxembourg, the Netherlands and Belgium combined
- wheat, oilcrops, sheep, dairy, vine and tropical crops are the main ag crops
- New South Wales has the largest output in agriculture

3 broad acre zones:

- pastoral zone
- wheat-sheep zone
- high rainfall zone

- the intensity index of Australia (1983-1997) shows that most of the area (central parts) are not changed at all, just the coastal areas (east coast, area around Melbourne, Adelaide, Perth) have changed
- the wheat yield (1860-2000) show that the overall wheat yield (t/ha) as well as the wheat yield during droughts increased due to changes in fertiliser, herbicides and varieties
- irrigation has gone up dramatically
- erosion hazards changed
- vegetation changed
- salinity hazards increased
- change in stream sediment load

all this results in highly degraded catchment areas especially in areas where most of the people live

the productivity of broad acre agriculture (1860-2000) rose, but the future is uncertain???

Climate changes in Australia:

- temperature rise
- increase in droughts
- but it is hard to say if they are over the natural variability, but the global trend is worrying
- significant risk for future drying
- extreme events change more than the slow and modest changes the underlying trends suggest
- ENSO (El Nino Southern Oscillation) – is the established trend of variability and this might change
- hot night increase more than hot days which also increase

record of extreme events:

- heat wave in 2004 (1st to the 22nd February) maximal temperature 27°C in Tasmania, 45°C in Western Australia, an overall increase by 5-6°C
- April 2005 – up to 6°C over the mean temperature for the month
- April 2005 – heat waves: 100 daily high-temperature records set around Australia
- 2-3rd February highest 1-2 days rainfall total ever recorded - flooding
- 21st of June daily rainfall in Adelaide (Southern Australia) – highest ever since recording started 168 years ago

rainfall:

already a 30 year drying trend

- it will get wetter and drier depending on the region
- west (around Perth) and east coast drier and the center of Australia will become wetter
- more water restrictions because of the droughts
- Perth and Sydney planning the constructing of a desalination plant
- a stable high pressure system led to the “never ending drought” which development can be explained by the increase of the sea surface temperature of the Indian and Pacific ocean due to climate change
- the drying is due to temperature and evapotranspiration increase

- the vegetation growth index show the dryness
 - long term droughts are related to climate change
- Increase in uncertainties especially when predicting long-term climates. Extreme events are hard to predict but these are the greater risk to farmers.

Australian agriculture:

Climate risk management: A new approach to adaptation

- Based on risk management
- Focus on adaptation and resilience
- Farmer / industry driven rather than science driven
- knowledge based

Risk assessment (the Climate Impact Science Program):

1. Establish criteria for identifying important climate change risks for farmers and assessing the risk
2. identifying the risk that climate change poses to agricultural industries, exploration of vulnerability to adapt to a changing climate including thresholds
3. analysing the risk by examining the nature and likelihood of climate change in the future
4. evaluating the risk for climate change for the industry using the information from the risk analysis to make decisions under the risk management criteria
5. treating the risk by developing and implementing risk treatment plans which establish the strategic setting for action

stakeholder driven – science comes in the middle

application of the approach

1. consultation with producers, industry and policy makers
2. science tool definition and development
3. feedback from stakeholders

Stakeholder Consultation:

Initial workshop – 40 representatives of producers and rural industries, 10 representatives of scientific community

Farming profitable in a changing climate (workshop in Canberra Dec. 2004)

- sensitivity to climate
- climate and decision making
- managing for a changing climate
- maintaining and increasing profitability
- research strategies

the producers perspective

develop a tool to systematically detects and maps changes to the metrics producers use every day

Farmers want to know reliabilities eg. How many days out of 10 do we get with 25mm of rain to grow wheat? Farmers do not want to know predictions, scenarios or forecasts, they want to know what the shift will be and how they can adapt.

The climate change wizard

Climate change will be mapped (linked) to the key drivers of agriculture and in a “language” producers use

Vulnerability assessment

The ATEAM methodology will be adopted (vulnerability is a function of exposure, sensitivity and adaptive capacity).

The adaptive capacity of the agricultural sector and rural regions is the most challenging goal.

Time horizon and questions the farmers are interested in:

variability within the season

predictions for the next 10 to 20 years

pest outbreaks and how they will be influenced by climate change

Conclusions:

Climate change is real, in the coming years Australian farmers will experience climatic patterns and extremes beyond previous experiences.

Climate change will present both thread and opportunities, those with improved knowledge of changing climate will be in the best position to benefit.

A risk management approach is the most robust strategy to deal with uncertain but potentially significant change. Industry must drive the strategy but science and government can play strong supporting roles.

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