



## CLIMATE case study

# Utilising climate tools for better managing farm inputs

**Farmers Toby and Susie Moore understand the importance of interpreting information to manage climate risk on their Walgett property, 'Walma,' particularly at key decision making times.**

The Moore's operate an extensive farming enterprise that includes both dryland and irrigated farming, as well as rangeland grazing on the rich alluvial flood plain in the lower Namoi catchment. Toby also chairs the Walgett Cotton Growers Association.

Understanding the local climate in terms of the drivers of rainfall and temperature has been a critical survival skill that Toby has embraced as a farmer. Toby studied biochemistry and biology at university, and made a career in the pharmaceutical industry before returning to the family business.

He has adapted skills in analysis, due diligence and critical thinking to aid his decision making in agriculture. Applications for this information include more efficient use of farm inputs and improved agronomy practices, which in turn also assist to minimise greenhouse gas emissions.

### **Knowing the key climate drivers**

With so much information and commentary available on weather and climate, it can be a complex task to sort sea surface temperature indicators, atmospheric indicators and seasonal models when planning cropping regimes or livestock stocking rates.

The Moore's preparation for the spring sowing of a cotton crop commences at least two seasons ahead, with plans made for likely crop row spacing, nitrogen

fertiliser application rates for an estimated cropping area, and most importantly, available irrigation water.

"With early stage analysis of available irrigation water for the coming season, together with stored soil moisture and seasonal forecasts, we can plan for a range of likely scenarios when procuring inputs such as seed, fertiliser and diesel for irrigation pumps," said Toby.

"Knowing where indicators such as Niño 3.4 sea surface temperature and the Southern Oscillation Index (SOI) need to be for the rainfall outlook to be more favourable, and in which months there is a



stronger correlation to rainfall, or no correlation at all, helps me to understand how to interpret seasonal forecasting models in conjunction with the computer generated guidance maps that tend to dominate our decision making.

“Looking at the climatic rainfall analysis from CottonInfo for the Walgett area, the SOI is a key indicator of rainfall from May right through until spring planting.

“In the summer months there is very little connection with the El-Niño Southern Oscillation, but if we know rainfall processes are completely random in these months, at least we don’t need to take too much notice of the El Niño-Southern Oscillation commentary that often dominates media headlines.”

In terms of understanding basic climatic processes, Toby believes the best way to separate the indices is to break them into two basic functions, moisture supply (sea surface temperature indices) and moisture delivery and activation (atmospheric indicators).

“The rain making processes work pretty much the same as my irrigation system, we have a moisture supply component - ocean temperatures, and a delivery component - a series of pumps and channels representing the atmosphere.

“When the ocean indices are in the wrong place, the available moisture for rain events is reduced, just like a storage dam being low, so it is a lot harder for the atmosphere to deliver a decent rain event.

“Similarly when moisture supply is average or good (warm sea surface temperatures in the Indian and Pacific oceans), we need a favourable SOI and Southern Annular Mode to transport and activate the moisture to make it rain, a bit like starting our irrigation pumps and filling the channels.”

One of the key things Toby has learnt from CottonInfo climate workshops is how the atmosphere and ocean temperatures work together, and what to watch for in the winter and spring seasons when the connection with these indicators is strongest.

“Watching the smooth line of sea surface indicators can give some guidance as to what the atmospheric moisture supply will be like on a long lead time. In this year, 2015, unfortunately all the models seem to be saying we are now in an El Niño and it will continue for the remainder of the year.

“But out here the SOI really is the key indicator of rainfall throughout winter and spring. so I’ll be keeping an eye on that.”

### Climate tools and information

Through attending CottonInfo webinars and workshops, Toby has developed a basic outline of the climate indicators he’s looking for to make crop selection, irrigation and fertiliser decisions for each season at his Walgett property.

**Table: Suggested seasonal risk management plan for farming operations at Walgett.** (The ‘X’ indicates the seasons when a climate indicator is likely to provide relevant information for the Walgett region).

Information source/indicator season	Winter	Spring	Summer	Autumn
Seasonal (3 monthly) rainfall outlooks	X	X		
Seasonal temperature outlooks	X	X	X	X
Multi-week rain/temp models	X	X	X	X
Southern Annular Mode		X		
Southern Oscillation Index	X	X		
Sea surface temperature indicators	X	X		
Madden-Julian Oscillation			X	

Understanding El Niño-Southern Oscillation (ENSO) modes of variability in an historical context can also facilitate a greater understanding of the risks associated with extremes in seasonal elements affecting crop production, and help interpretation of forecasting information.

Interpreting the strength of ENSO connections with rainfall and temperature extremes can lead to better adaptation strategies in the farming businesses, including more accurate nitrogen fertiliser management and reduced on farm greenhouse gas emissions.

“Knowing which indicators and drivers to watch through different seasons does help streamline the process when making decisions,” said Toby.

“The fortnightly summary in the CottonInfo e-news Moisture Manager also saves me time searching for the modelling results. What I’m looking for is a clear trend from a range of sources to give me confidence that something is going to change. At least then I can try and run some scenarios in our business and manage my farm inputs in advance.”

### **CottonInfo Moisture Manager**

Like Toby Moore, cotton growers can stay informed about the latest climate risk management information for better decision making (including more efficient use of farm inputs and agronomy practices to increase over all efficiency and minimise greenhouse gas emissions), by subscribing to the [CottonInfo Moisture Manager e-newsletter](#).

This e-newsletter is a fortnightly summary of international forecasting models, climate indicators, expert opinion and local analysis delivered by CottonInfo.

### **For more:**

For information or to organise a climate workshop in your area, contact:

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Or visit the CottonInfo website:

- Climate page: [www.cottoninfo.com.au/climate](http://www.cottoninfo.com.au/climate)
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## The CottonInfo Moisture Manager

In this edition:

- [Latest weather and climate news](#)
- [Australian rainfall totals \(week ending 27 June 2015\)](#)
- [Summary of climate indicators](#)
- [Rainfall and temperature guidance summary - weekly](#)
- [Rainfall tercile probabilities](#)
- [Rainfall and temperature guidance summary - seasonal](#)

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