

Grain growing in southern Australia



Seasonal climate forecasts were found to improve the returns for grain growers in southern Australia by between \$0 and \$20/ha by improving winter cropping decisions.

Photo: NSW DPI

How can seasonal climate forecasts provide economic value to farming enterprises?

Seasonal climate variability is a key source of year on year variability in farm profitability. Seasonal climate forecasts provide opportunities for farmers to better match farm decisions with upcoming climatic conditions. These forecasts can provide economic value if they change management decisions to capitalise on opportunities in good

seasons or minimise losses in poor seasons.

While seasonal climate forecasts help manage production risks associated with climate variability, they do not remove the impact of a particular climatic event. For example, a skilful forecast can reduce uncertainty about drought occurrence, but drought influences productivity and profitability however well farmers are able to anticipate it.

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An important management decision for grain growers in southern Australia is what winter crops to sow and to what area. This decision is made within rotational considerations and is a trade-off between planting potentially more profitable crops with higher in-crop rainfall requirements versus less profitable crops with lower in-crop rainfall requirements.

A skilful seasonal climate forecast may influence this decision due to the relationship between rainfall and crop yield.

Can seasonal climate forecasts help growers make better winter cropping decisions?

A case study grain enterprise located at Birchip in Victoria was used to



Photo: NSW DPI

test how a seasonal climate forecast could help farmers make winter crop mix decisions in April.

A decision model identified the most profitable crop mix (canola, wheat, barley and fieldpea) with and without a climate forecast. Increasingly skilful climate forecasts provided greater levels of certainty about the occurrence of one of three climatic states (dry, average and wet), potentially allowing growers to make more profitable winter cropping decisions.

Case study at a glance: Southern grains



Site: Birchip, Victoria

Decision: Winter crop mix and area

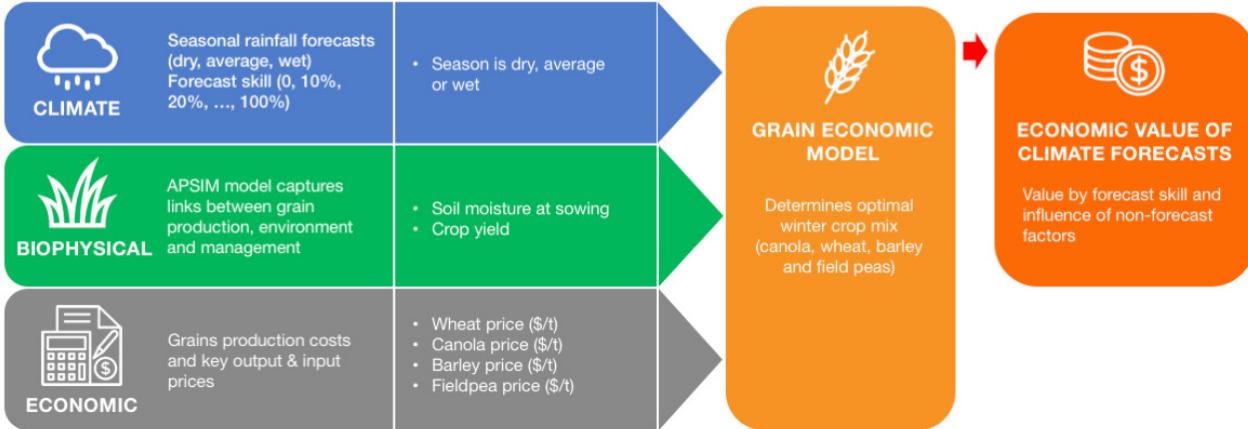
Decision time: April, when crops are sown

Trade-off: More profitable crops with greater water requirements versus less profitable crops with lower water requirements.

Forecast: Rainfall (April–October)

Other drivers: Soil moisture at planting; relative crop price

Forecast value: \$0–\$20/ha



Inputs to the model used in this case study to assess the economic value of climate forecasts for grain growing in southern Australia.

Key findings

Relative crop prices were found to be an important driver of decisions prior to considering climate forecasts. Under medium price settings, wheat was found to be the dominant land use under low and medium stored soil moisture levels (25%, 50%, 75% of PAWC values). Canola was only selected at the highest level of soil moisture (100% of PAWC). Wheat became the dominant land use under low canola prices for all stored soil moisture levels. Conversely, under high canola prices, canola became the dominant land use under all stored soil moisture levels.

Climate forecasts were found to have value under medium prices (i.e. historical median), the most likely price scenario. A dry forecast was found to be valuable under the highest level of soil moisture with more certainty of dry conditions triggering a change from canola to wheat, improving returns by up to \$20/ha. A wet forecast on the other hand was found to be valuable under

low and medium soil moisture levels, with more certainty of wet conditions triggering a change from cropping wheat to canola, improving returns by up to \$18/ha. A forecast of an average climate state was found to be of no value for all decision settings. The lack of value of an average forecast state is a reflection of the limited change in climate conditions compared to the without the forecast decision.

Climate forecasts did not provide any value under either low or high canola price settings. Low canola prices (\$431/t) led to wheat being the dominant crop, while high canola prices (\$638/t) led to canola dominating. At these prices, differences in relative crop yields under all climate states were insufficient to trigger a change away from the dominant land use. No forecast value was derived as the cropping decisions were unchanged. This illustrates that the decision environment settings can have an important influence on forecast value.

Important: The results for other sites, systems and decisions will differ from those in this case study. However, it is likely that the general findings around the circumstances for which forecast value was found will provide insights for the use and value of seasonal climate forecasts for grain growers more generally.

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When can seasonal climate forecasts have economic value?

For seasonal climate forecasts to have economic value:

- the climate for the months relevant to the decision must be historically variable, and that variability must translate into variable production and economic outcomes
- production (e.g. current soil moisture or standing pasture) and market (e.g. commodity prices or supplementary feed costs) conditions are at a point where decisions are sensitive to climate forecast information.
- the seasonal forecast must have sufficient skill and timeliness for the decision to be changed.

This fact sheet is a summary of the report: Darbyshire, R., Crean, J., Anwar, M. and Cashen, M. (2018). Valuing seasonal climate forecasts in Australian agriculture: Southern grains case study. New South Wales Department of Primary Industries.



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