

Grain growing in Western Australia



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Seasonal climate forecasts can provide marginally better yield estimates for grain growers in Western Australia and result in a better match between planned and realised forward selling strategies. However, the income effects of these improved strategies varied because of wheat price volatility.

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.

Grain production in Western Australia

Grain growers in Western Australia face both variability in seasonal conditions (production risk) and volatility in international wheat

markets (price risk). An important management decision for grain growers in Western Australia is to determine what volume of grain to forward sell in April when crops are sown.

Forward selling strategies are commonly set as percentages of the final crop, for example 30% of expected production. With climate variability affecting yields, there is often a mis-match between planned and realised forward selling strategies.

Seasonal climate forecasts can reduce this gap by helping growers better predict final yields, and so convert these percentages to actual tonnes forward sold. However, the income effects of these improved strategies are determined by movements in wheat prices over the growing season.

Can seasonal climate forecasts help growers better meet forward selling strategies?

A case study grain enterprise located at Merredin in Western Australia was used to test how a seasonal climate forecast could help grain producers meet prescribed forward

selling strategies, based on different prices in April, by predicting the total harvest volume.

A decision model assessed the alignment of the volume of wheat forward sold against forward selling strategies with and without a climate forecast. Climate forecasts were based on perfect forecasts of one of the three climate states (dry, average and wet).

Case study at a glance: Western grains



Site: Merredin, Western Australia

Decision: Forward selling strategies – what volume of grain production to forward sell in April to meet forward selling strategies

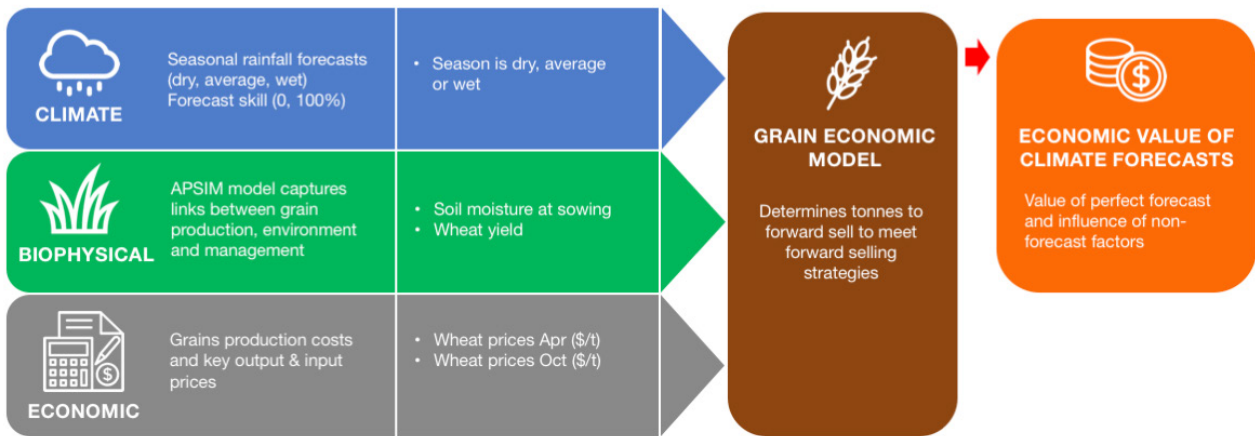
Decision time: April when crops are sown

Trade-off: Assessing if forecasts can assist in meeting forward selling strategies and how that may translate into returns given volatility of wheat prices between sowing and harvest

Forecast: Rainfall (May–October)

Other drivers: Wheat price in April

Forecast value: –\$24 to \$19/ha



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

Key findings

While a skilful climate forecast provided marginally better yield estimates (and so better alignment between planned and actual forward selling volumes), the resulting change in income between the with and without forecast scenarios was variable. The main driver of this variability was wheat price volatility where wheat prices at harvest, when the remainder of the crop is sold, are unrelated to April prices. As a consequence, movements in wheat prices during the season could result in growers being better or worse off under any given selling strategy that is fine-tuned with a climate forecast.

A skilful dry forecast lowered yield expectations and resulted in a smaller volume of grain being sold relative to the without forecast scenario. With low April prices, this was advantageous as a lower amount was sold at the low April price and more was sold at a higher price at the end of the season.

However, for high April prices, this increased certainty of the final yield had a negative effect as a lower portion of yield was forward sold at higher prices and more was sold at lower prices later in the season.

A skilful wet forecast, on the other hand, raised yield expectation and resulted in a greater volume of grain being sold relative to the without forecast scenario. With low April prices, this had a negative effect as a greater amount of grain was sold at a lower price than the without forecast scenario. However, with high April prices, this was a benefit as a greater amount of grain was forward sold in April at the higher price.

Overall, the results highlighted that forecasts could improve yield estimates and reduce the mis-match between planned and realised forward selling strategies. However, the outcome of these strategies was determined by market volatility with price risk remaining for growers making forward selling decision.

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., Guthrie, M.M. and Crean, J. (2018). Valuing seasonal climate forecasts in Australian agriculture: Western grains case study. New South Wales Department of Primary Industries.

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 western producers more generally.

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