VALUE OF SEASONAL CLIMATE FORECASTS IN AUSTRALIAN AGRICULTURE

Beef production in northern Australia

Photo: iStock.com/Robert Downer

Seasonal climate forecasts were found to improve the profitability of beef production systems in northern Australia by between $0 and $14/steer by improving stocking rate decisions at key times.

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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Beef production in northern Australia

The core production goal of beef operations in northern Australia is to convert feed into animal weight gain. Producers aim to match the feed requirements of the herd to the availability of pasture to optimise beef production and minimise the risk of pasture degradation.

An important management decision is how many animals to carry through the wet season (October to April). This decision is a trade-off between selling animals in October at lower weights but with a lower risk of pasture degradation versus holding animals to higher weights but with a higher risk of pasture degradation.

A skilful seasonal climate forecast may influence this decision due to the relationship between rainfall and pasture growth and therefore animal weight gain and sustainable pasture utilisation.

Can seasonal climate forecasts improve beef production systems?

A case study beef enterprise located at Charters Towers in Queensland was used to test how a seasonal climate forecast could help producers make a decision about how many animals to carry through the wet season.

A decision model chose between 13 possible stocking rate strategies (8, 9, ..., 20 steers/100 ha) for the beef enterprise 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), allowing farmers to choose more profitable stocking rates.

Case study at a glance: **Northern beef**

Site: Charters Towers, Queensland

Decision: Stocking rate – what stocking rate to set before the wet season

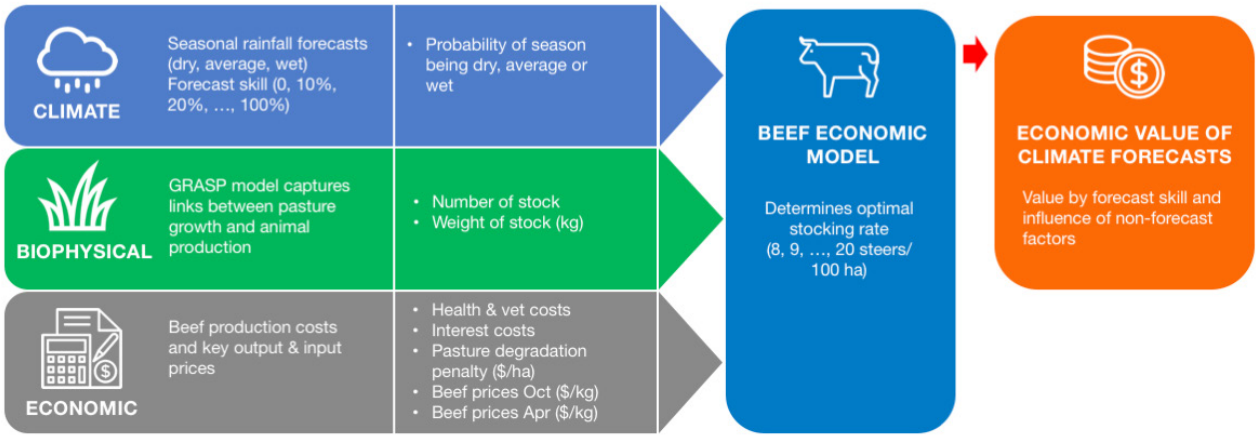
Decision time: October

Trade-off: De-stock in October at lower animal weights or hold animals to higher weights but potentially at a cost of pasture degradation.

Forecast: Rainfall (October–April)

Other drivers: Initial pasture availability; October steer price

Forecast value: $0–$14/steer



Inputs to the model used in this case study to assess the economic value of climate forecasts for northern beef production.

Key findings

Initial pasture availability in October was the major determinant of the most profitable stocking rate strategy. High and medium initial pasture availability led to a decision of stocking at high rates regardless of the climate forecast. High stocking rates were triggered by expectations of good animal weights in April with a low likelihood of pasture degradation. In contrast, low initial pasture availability provided conditions for alternative stocking rates to be considered and for climate forecasts to be influential. The optimal stocking rate under low initial pasture availability varied the most with climate forecast state and price settings, indicating that producers are more likely to change their decision based on forecast information.

Beef prices were also important. When prices were low in October, stocking rates were higher with animals retained for later sale. This was triggered by the prospect of low income from selling steers in October versus higher income from retaining them for sale in April. Equally, when prices were high in October and initial pasture availability low, there was a tendency to de-stock to take advantage of high income from selling cattle now and avoiding costs associated with pasture degradation.

Seasonal climate forecasts were found to have value when initial pasture availability was low or medium and for wet or dry forecasts. The most valuable forecasts led to decisions that ran contrary to the direction of production conditions. For example, a wet forecast when initial pasture availability was low triggered a higher stocking rate with animals retained for later sale, which was different from the without forecast decision.

While the value of seasonal climate forecasts increased as forecast skill improved, the relationship between skill and value was heavily influence by initial pasture and market conditions.

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 northern producers more generally.

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.

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