

Sugar growing in Queensland



Seasonal climate forecasts were found to improve the profitability of sugarcane production systems by between \$0 and \$2,358/ha by improving harvesting time decisions.

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.

Sugarcane production

An important management decision for sugarcane growers is when to harvest the ratoon 3 crop (the last crop to be harvested). The decision is a trade-off between harvesting early to avoid costs associated with a wet harvest (standover, lodging, additional harvest time) but at lower sugar content versus harvesting later at higher sugar content but also potentially higher production costs from a wet harvest.

A skilful seasonal climate forecast may influence this decision because rainfall over September and October can influence yield, sugar content and harvesting costs.

Can seasonal climate forecasts improve sugarcane production systems?

A case study sugarcane enterprise located at Ayr in Queensland was used to test how a seasonal climate forecast could help growers make a decision about when to harvest the ratoon 3 crop.

A decision model identified the most profitable ratoon 3 harvest time (early, on time) with and without a climate forecast. Increasingly skilful climate forecasts provide greater levels of certainty about the occurrence of one of six climatic states (dry, average, mild wet, moderate wet, severe wet and extreme wet), allowing growers to make more profitable harvest decisions.

Case study at a glance: Sugar



Site: Ayr, Queensland

Decision: Harvest time for late maturing part of crop (ratoon 3)

Decision time: September

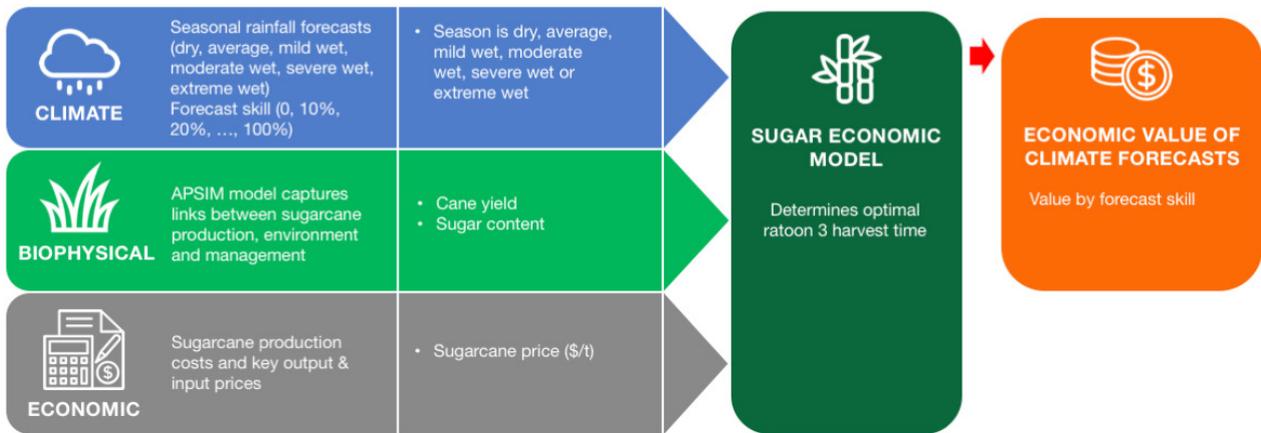
Trade-off: Harvest early and avoid potential costs of a wet harvest (standover, lodging, additional harvest time) but with lower sugar content or harvest later at higher sugar content but potentially incur costs of a wet harvest

Forecast: Rainfall (September–October)

Other drivers: nil

Forecast value: \$0–\$2,358/ha

Weighted forecast value: \$0–\$347/ha



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

Key findings

There was no economic value in forecasts of dry, average or mild wet conditions, as these forecasts did not change the harvest time decision. This is because in these climate states there were no production or economic drawbacks to harvesting on time, no matter how skilful the forecast.

Moderate wet, severe wet and extreme wet conditions can reduce profitability. Skilful forecasts of these conditions were found to be valuable as the optimal harvest time was changed to be earlier, reducing the

costs associated with a wet harvest. Moderate, severe and extreme wet forecasts had a maximum value of \$448, \$1,358 and \$2,358/ha, respectively. The greater the forecast skill, the higher the potential value of the forecast.

It is worth noting that the likelihood of moderate, severe and extreme wet conditions is low, with each only expected to occur once every 12 years. When the forecast value was weighted by the relative likelihood of the climate state occurring, the overall maximum value was much lower at \$347/ha.

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., Pudmenzky, C. and Cobon, D.H. (2018). Valuing seasonal climate forecasts in Australian agriculture: Sugar 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 sugarcane producers more generally.

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