Behavioural Science Update: Producers' Decision Making in an uncertain climate

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Work to date

- Supporting ARGs with social science research

- Focus group discussions (and guide)

- Interviews with growers about decision making (and guide)

- Collating decision support tools for grain growers

- Text analysis of extension materials ('how is risk communicated')

- Analysis of grain prices and marketing risks

- 36 interviews conducted to date

- Huge thank you to BCG, AMPS, GOA, MIG, WANTFA, StC, and others who've assisted

  Now → Analyse responses
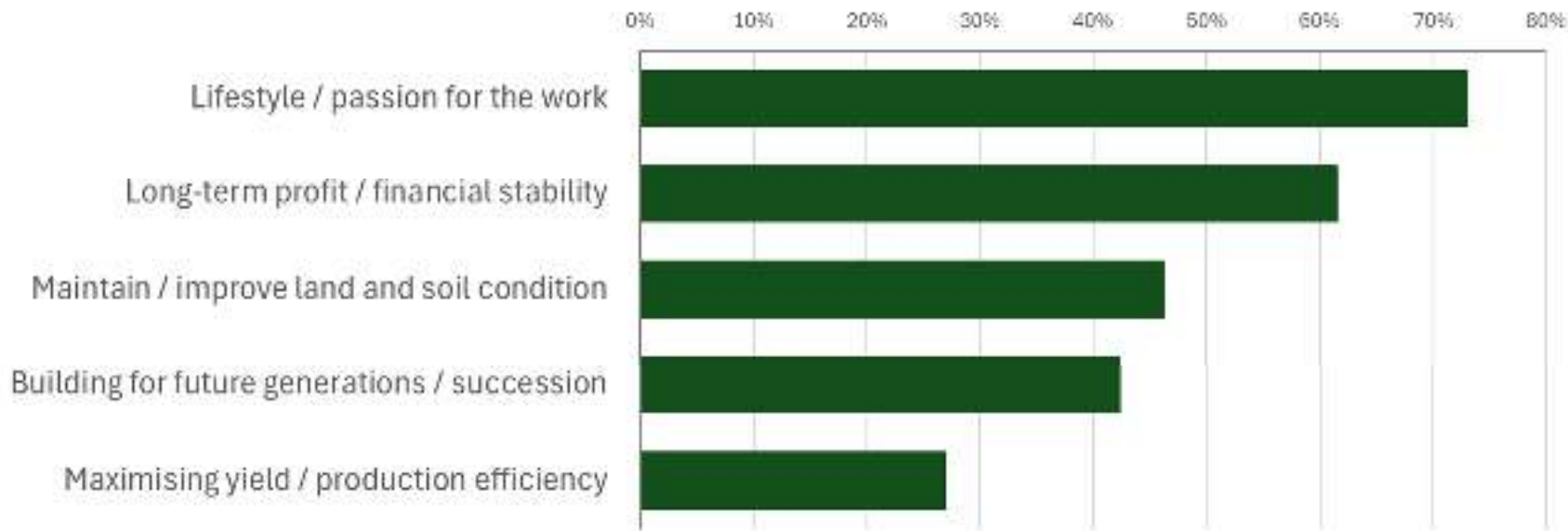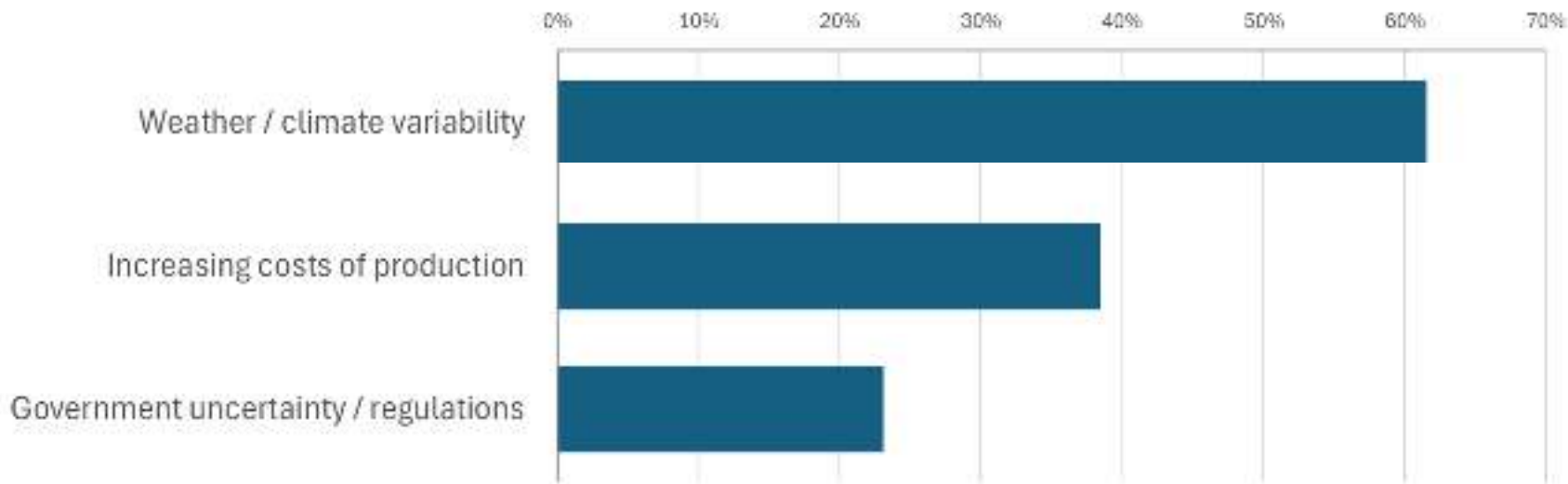
  → Revise targeted questions

Goals in farming

> Passion: *"I'm passionate about growing crops. It doesn't matter if it's for myself or for anybody else. I just love farming."*

> Succession: "*Trying to build something that they can take over in the future hopefully*"

> Maximising yield: "*Being a very good farmer, like trying to maximise our production, but really to out-compete or out-perform people in the region.*"

Most relevant risks

> "I am genuinely concerned about, not climate change, not global warming, but the climate variability we had. [..] That's the most relevant risk for long-term sustainability of the farm."

> "Government intervention and market manipulation" "Government interference, by that I mean new legislation, the willingness to push environmental targets over sustainable agricultural growth."

How are decisions made

- With agronomists, peers, spreadsheet, and a lot of 'gut feel' and intuition

- Also **Heuristics** — cognitive shortcuts or 'rules of thumb' that simplify decisions, especially under uncertainty.

- Growers combine rules-of-thumb with available data and external advice.

- Growers' rules-of-thumb are derived from extensive personal experience, historical observations, and practical considerations of specific farm conditions.

[About a planting decision:] "*You're using a bit of that gut feel I suppose of how things are placed. If you feel you've got a good profile of moisture and you're feeling a bit more confident about the season, you might say well I'll choose the higher risk cotton crop.*"

[About a N-decision:] "*You're driving to the paddock... looking at a dozen forecasts on your phone... As you're driving in, you're changing your nitrogen mix or ratio... double the rate or halve it*"

"*If we don't have like a metre of subsoil moisture, or thereabouts, we won't sow canola.*"

"*My strategy is to never forward sell more than what I think is going to be 25% production.*"

5

Difficult decisions

Machinery purchases *"Probably buying major new machinery and infrastructure is the one we tease out the most."*	50%
Nitrogen application (timing & quantity) *"Probably the nitrogen is the trickiest because we don't, well this year was a classic example, I probably put a load of urea out too many."*	42%
Land purchasing/leasing *"Land purchasing ..[is].. hard to justify, very difficult."*	38%
Crop choice and mix *"To plant or not to plant. That's probably the biggest decision."*	35%
Marketing decisions / selling commodities *"Marketing strategies ..[are].. painful. Difficult. ... I'll say very difficult."*	31%

Case study - marketing

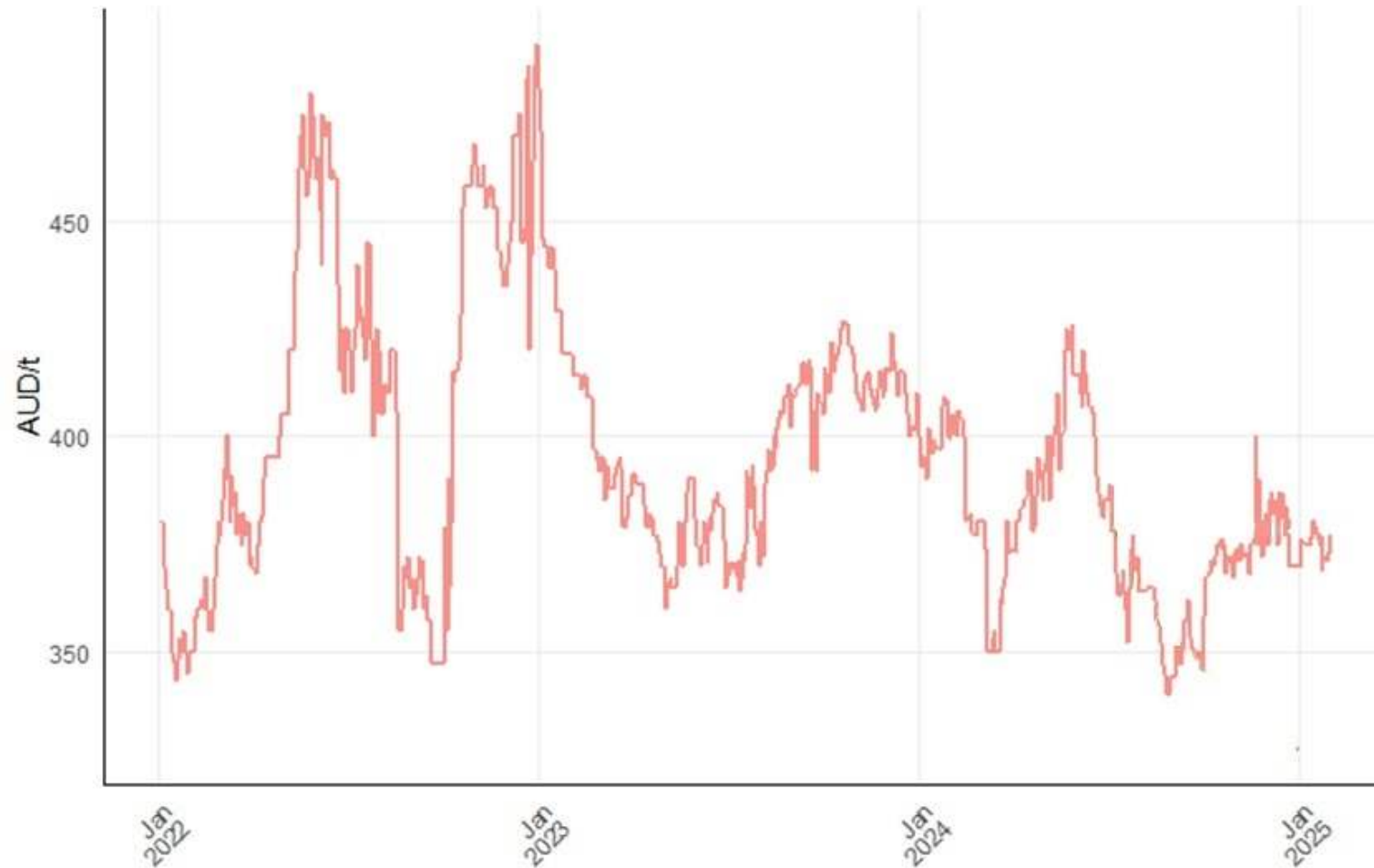- Estimating future wheat price distributions (Ben White)

- *"fear of missing out on high prices"*

- *"you know what the price was yesterday or last week or last month and you're hoping the market will get back there and it doesn't always do that"*
…..
"and you fall into a trap of inaction"

Your behavioural bias

Our brains look for patterns

APW price seasonality?
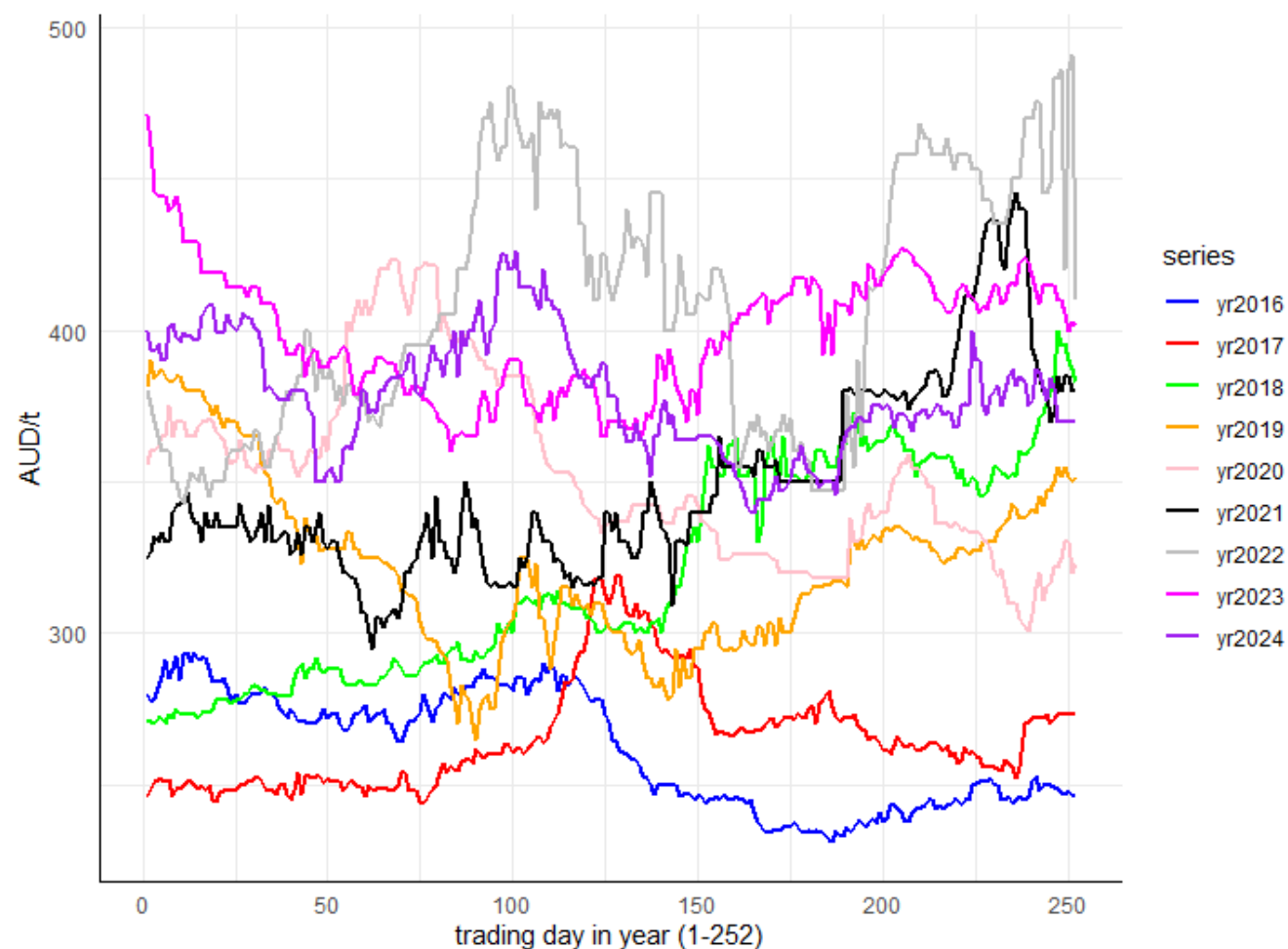
Results from price analysis

1. Most prices move unpredictably and don't follow a consistent pattern — their average level and how much they fluctuate keep changing over time.
2. The further into the future you try to predict prices, the less certain the forecast becomes — so the range of possible prices gets wider.
3. There are times when prices change a lot and times when they change only a little. This up-and-down movement, called volatility, is a useful way to measure risk.

These results hold for various grain crops (wheat, oats, barley, canola) and ports.
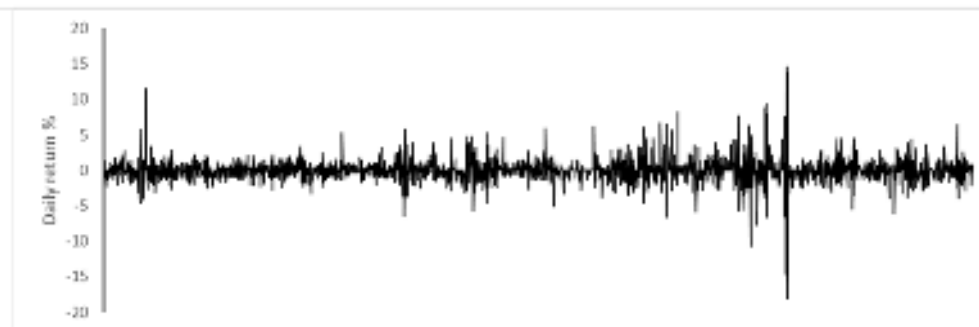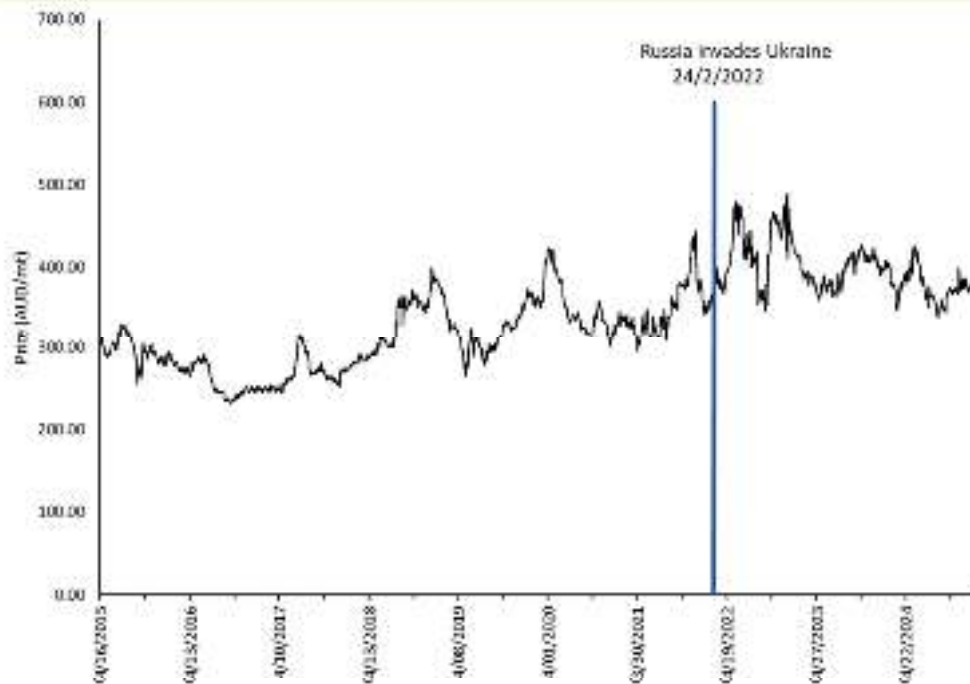
Prices are a random walk

- There is no clear stable trend (although 2025 prices are, on average, higher than 2015)
- The best forecast of tomorrow's price is today's price

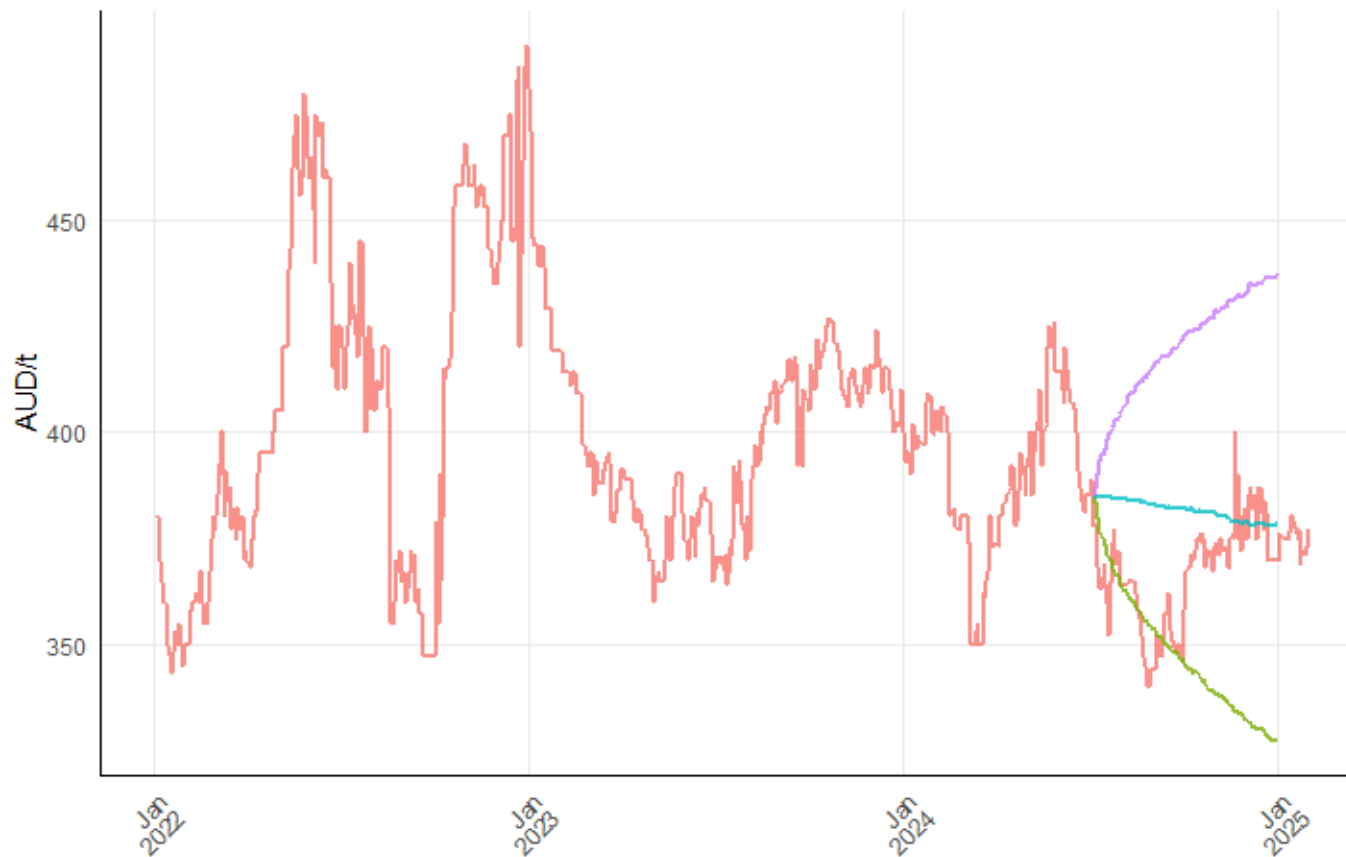- Periods of high and low volatility

11

Can we predict grain prices?

APW1 forecasts 80% credibility intervals, July 1 2024 to January 31 2025

Distributions widen over time

APW1 price distributions for different lead times (3, 90 and 126 trading days)
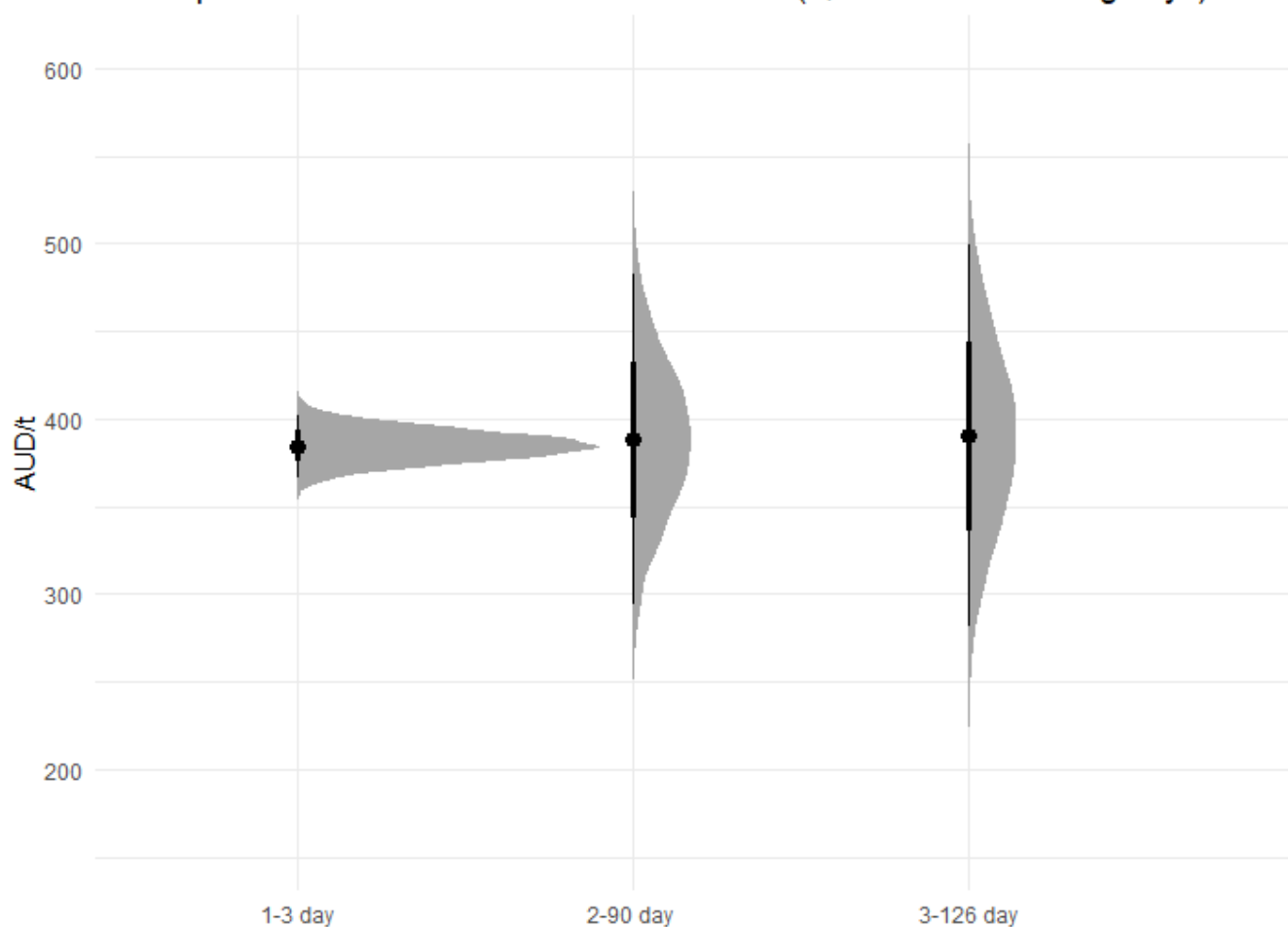
- Price distribution predicted from 1 January
- Over time, the price distribution flattens → risk increases

- This has implications for storage decisions

13

Implications

- Selling today is the low-risk strategy.

- Knowing market volatility may help speed up your decision.

- Set a farm budget, with different prices at upper and lower limits → how much does profit change with price helps you decide on a target (or floor).

- In the next slide, we have modelled expected revenues for different lengths of storage, incorporating overdraft interest and storage costs ($40/t in this example).

Storage and risk aversion

	3 days	3 months	6 months
Predicting out from 1 Jan 2024			
Mean revenue	390k	384k	377k
Min -max revenue	(332k-437k)	(69k-1,056k)	(67k-95k)
Predicting out from 1 April 2024			
Mean revenue	373k	367k	
Min -max revenue	(295k-436k)	(84k-2,260k)	

- Models are robust and can be used to generate possible price distributions (based on info up to now).
- Plan to run scenarios at different interest rates, starting dates, and risk preferences to determine value of waiting and storage risks.

15

Next steps (2025-26)

● Complete price analysis under different behavioural rules.

● Analyse interview data received to now, revise questions to be more targeted.

● Set up evaluation questions for ARGs to use to assess behavioural change.

● Continued engagement with ARGs and supporting behavioural science questions.

● Analyse risk communication in extension materials and decision-support-tools, to derive advice on how best to communicate risky decisions.

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