

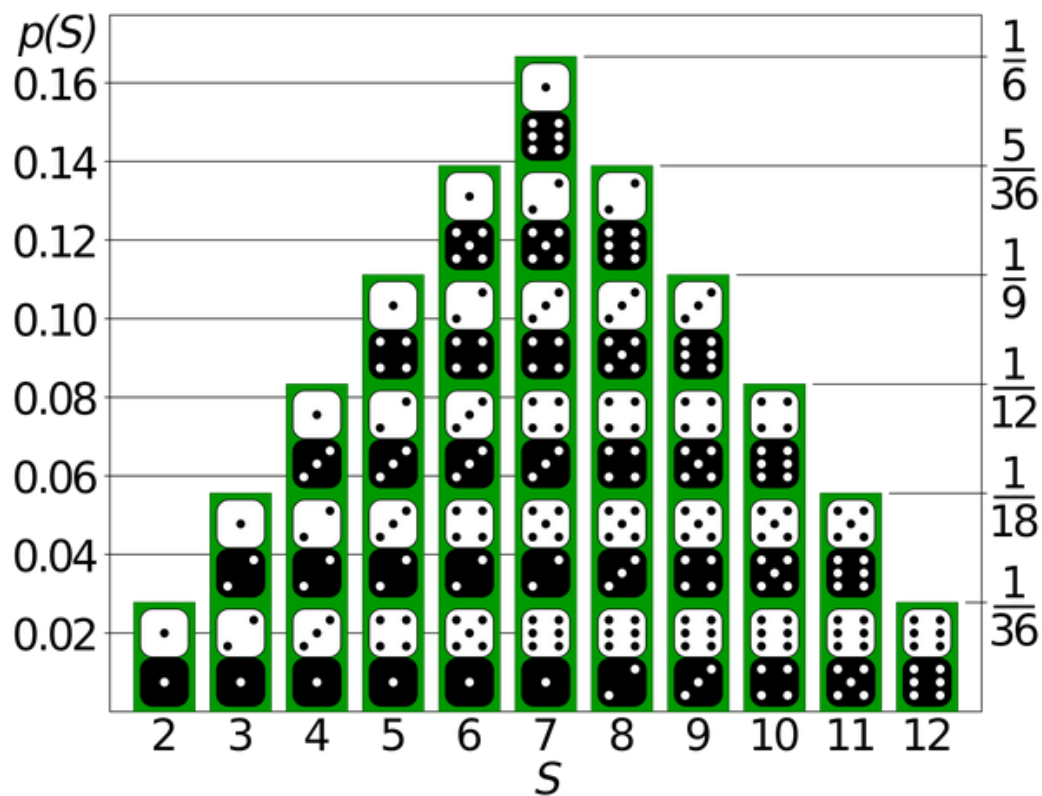
Risk versus uncertainty

26 June, 2024 by David Pannell

I want to make a distinction that has been lurking below the surface in some of the previous posts in this RiskWi\$e series: risk versus uncertainty.

I've primarily used the word "risk" so far, but sometimes I've really been talking about "uncertainty", or a mix of the two.

What is the difference? Strictly speaking, "risk" refers to a situation where we don't know what the outcome will be, but we do know the probabilities of different outcomes. Examples include rolling dice or tossing a coin. If we rolled two dice, the result could be anything between 2 and 12, but if we rolled them a million times, we know with high accuracy what the distribution of results would be.



On the other hand, "uncertainty" refers to a situation where we don't know the probabilities of different outcomes. For example, if Dave the risk-averse farmer adopts a new wheat variety, he has access to the results of research trials for that variety, but he doesn't know exactly how it will perform on his own farm. He can combine the research trial results with his own experience of growing other wheat varieties, to make a judgment about how it will perform for him, but it's just a judgment and some uncertainty remains – he doesn't know the actual probability distribution.

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As he gets experience growing the new variety, his uncertainty about its performance decreases. If he keeps growing it for long enough, he'll have a good idea of the probability distribution of its yield, although, depending on the type of practice or technology, that can take quite a while (see [PD415](#) on "Learning about the riskiness of a new farming practice").

So for most farming decisions, the farmer faces a mix of risk and uncertainty. Over time, with experience, uncertainty about a farming practice decreases, and a larger share of what is left is risk.

How does this affect decision making? I recently read a piece that said that uncertainty means that there is no basis for making a decision. In an extreme situation, where you really know absolutely nothing about a practice, that would be true, but in a practical farming situation that is never the case. There is enough information to make an educated guess.

The main difference between risk and uncertainty in decision making is the source of probability numbers to use. Under risk, the probabilities are objective and known precisely, while under uncertainty, it comes down to a subjective judgment by the decision maker. In a sense, the probabilities under uncertainty are not really probabilities – they are something like a strength of feeling.

But when it comes to making decisions, this difference does not affect the decision process. If doing Decision Analysis (see [PD420](#)), the two types of probabilities are used in exactly the same way in the calculations, or in the intuitive decision process.

Further reading

This is #14 in my RiskWi\$e series. Read about RiskWi\$e [here](#) or [here](#).

The RiskWi\$e series:

- [405. Risk in Australian grain farming](#)
- [406. Risk means probability distributions](#)
- [408. Farmers' risk perceptions](#)
- [409. Farmers' risk preferences](#)
- [410. Strategic decisions, tactical decisions and risk](#)
- [412. Risk aversion and fertiliser decisions](#)
- [413. Diversification to reduce risk](#)
- [414. Intuitive versus analytical thinking about risk](#)
- [415. Learning about the riskiness of a new farming practice](#)
- [416. Neglecting the risks of a project](#)
- [418. Hedging to reduce crop price risk](#)
- [419. Risk premium](#)
- [420. Systematic decision making under risk](#)
- [421. Risk versus uncertainty \(this post\)](#)
- [422. Risky farm decision making as a social process](#)
- [423. Risk aversion versus loss aversion, part 1](#)
- [424. Risk aversion versus loss aversion, part 2](#)