

Using @RISK modelling to examine risk in Mallee cereal and legume rotations

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A model developed by Rural Directions Pty Ltd using @RISK, an add-on to Microsoft Excel, was used to assess risk and net profit associated with rotational sequences in the Northern Mallee of South Australia.

@RISK uses multiple probability 'Monte Carlo simulation'. The model was used to analyse, 5000 seasonal outcomes in relation to yield and price for nine rotational sequences practiced in the northern SA Mallee for a model farm. In comparison, a grower might experience only 40-50 seasons in their entire farming career.

Percentile 10, 50 and 90 yields and prices were inputted into the model, together with variable costs for each crop. Estimated yield benefits and penalties associated with following crops were also considered (i.e. increases in wheat yields following break crops). Estimated fixed costs for the model farm (depreciation, finance costs and overhead costs) for the model farm were also included into the model.

In the simulation, the baseline sequence was continuous cereal with alternating wheat and barley. The continuous cereal sequence was compared with a range of rotational sequences involving legume break crops including field peas, chickpeas and lentils as well as vetch pasture and vetch hay. Sequences including canola and fallow were also analysed.

In the analysis, continuous cereal achieved a profit in 38% of years. The inclusion of pulse crops chickpeas and lentils in rotations improved the risk profile. Crop sequences including chickpeas were profitable in 59% of years and those including lentils were profitable in 53% of years. Average Net profit per hectare per year over the six-year sequence for continuous cereals was -\$20.89, whereas sequences including chickpeas and lentils returned \$123.13 and \$59.86 respectively.