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Reducing the business risk in expanding grain farm businesses

David Feldman, Ross Kingwell, Brad Plunkett, Quenten Thomas and Imma Farre-Codina

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Reducing the business risk in expanding grain farm businesses

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Business Expansion is risky

Increasing scale provides for efficiency gains and larger profit potential....essential for long term survival

BUT, it usually requires

- More land
- More working capital
- New technology
- More labour and training
- Better information systems and management skills

Financing farm expansion

- Conventional: Buy up the neighbours using bank finance.
- Pragmatic: Short term lease additional area.
- Emerging: Lease from foreign pension fund acquisition –Westchester model.
- Potential for broadacre: Equity Partnerships – as in NZ dairy
- Exceptional: Collaborative farming SA example.

All these strategies involve more financial risk in a changing climate....SO how can the risks be managed?

Can expansion risk be reduced by cost control strategies and clever financing?

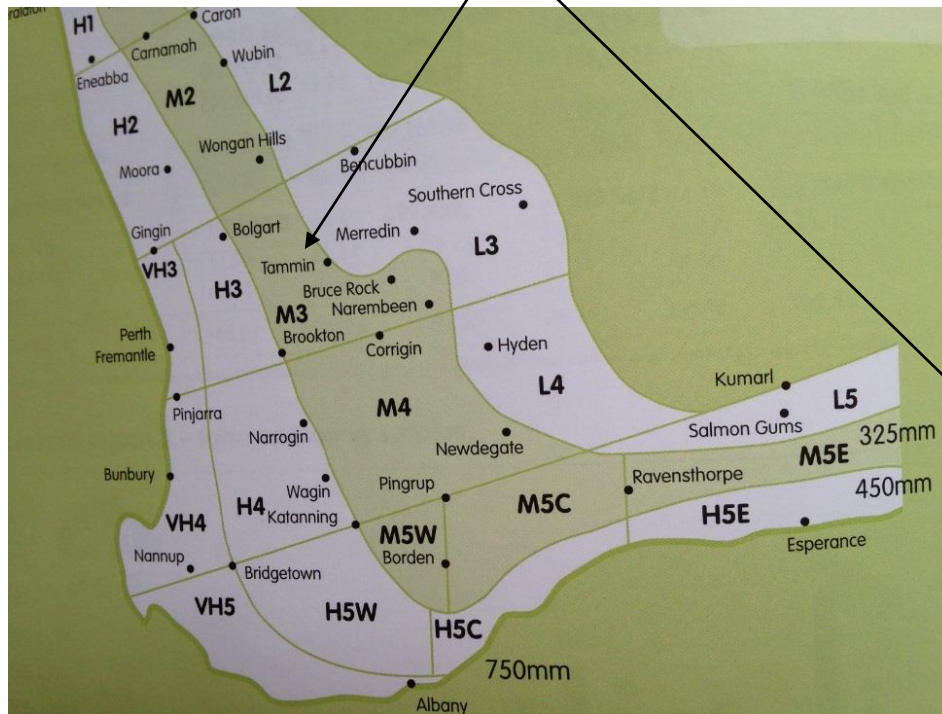
How much did the low-cost strategy reduce business risk?

- We modelled the effect of radically lower fertiliser application over historical and future seasons to better understand the



Location of the case study farm In Western Australia

- The Tammin Farm is in the medium rainfall zone (320mm)
- Australian grain cropping areas



Is lowering fertiliser cost likely to be an effective strategy to lower seasonal risk ?

- Added Nitrogen is about 25% of variable operating costs
- Reduce applied N rates to around 8 Kg N/ha. for a breakeven yield of 1.3 tonne/ha. and .7 tonne per ha. operating.
- BUT ..Profit from nitrogen fertiliser application has been a main difference between farms. Typically in M3 region between 35 and 45 units /ha.



Outline of the Modelling approach

CLIMATE MODEL f

Seasonal
rainfall and
temperature
1980-2010 and
2010-2040

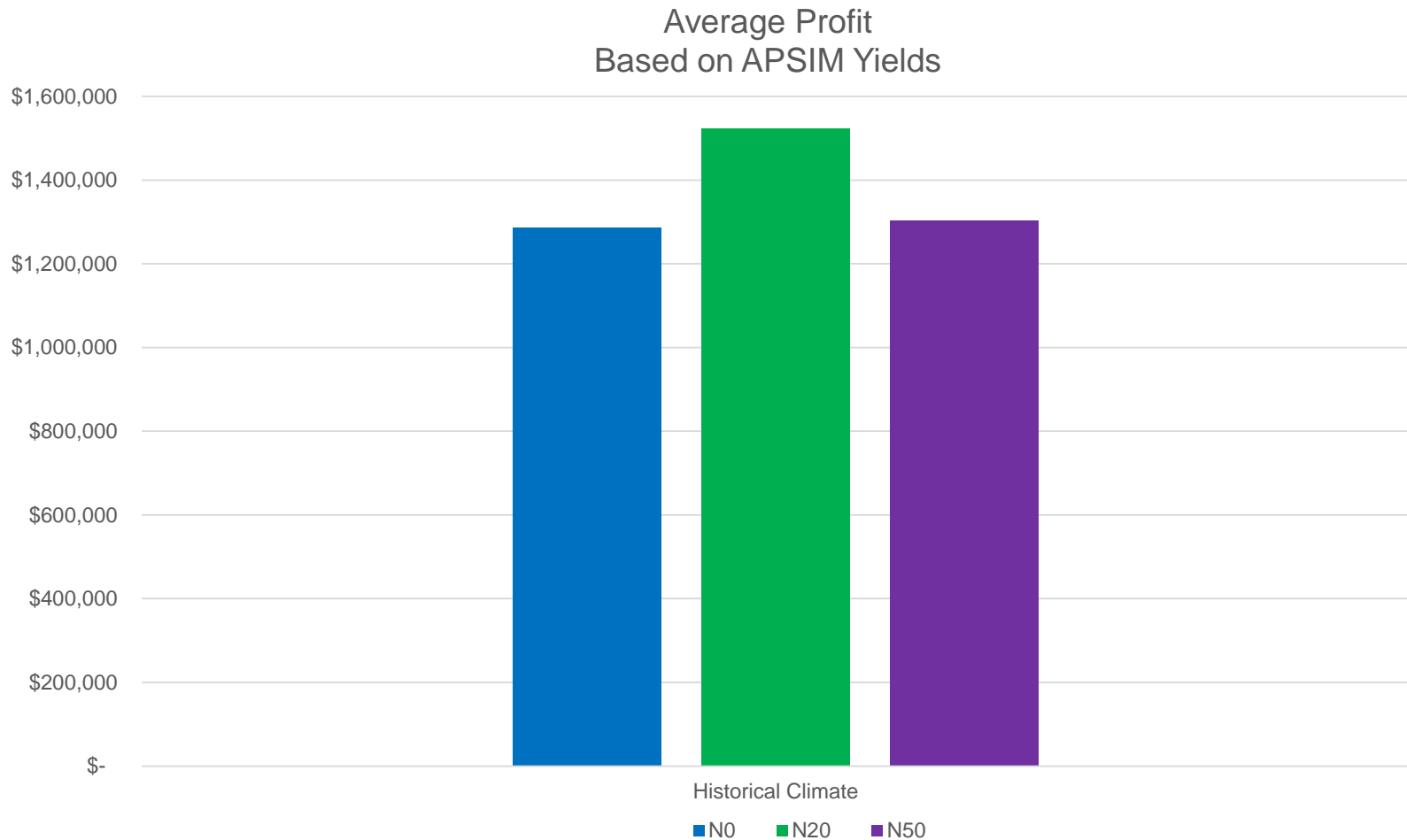
APSIM

Generates Wheat yield
from seasonal rainfall
and temperature by
daily growth simulation

Whole Farm Business Profit- and variability

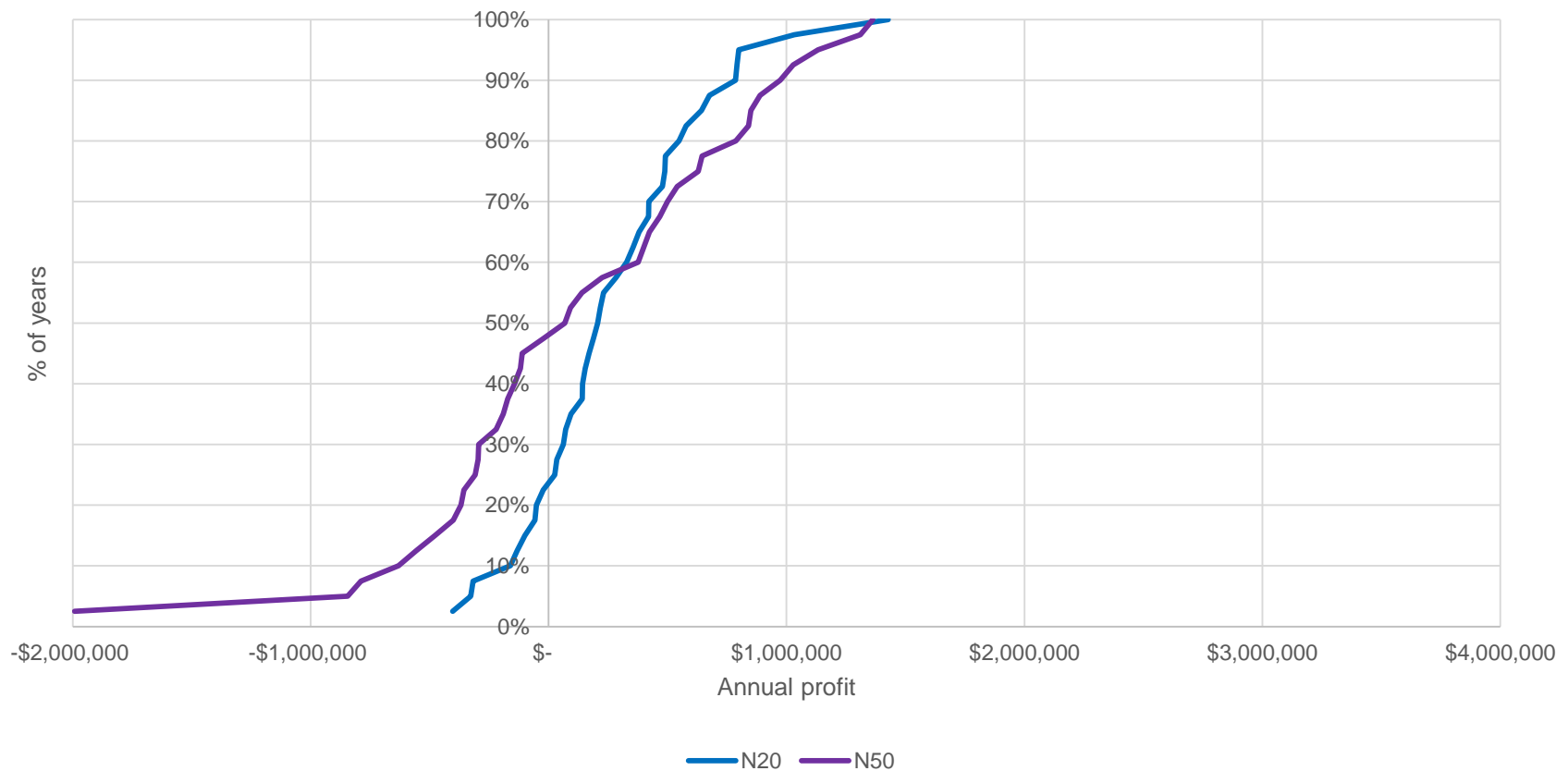
Generates whole farm
profit and distribution
for 40 seasons
incorporating crop
yields, rotations and
soil types

Results-Input Strategy



The difference function between two rates of applied N and zero for previous seasons

CDF of Annual Profits Relative to N0
using Current Climate Data



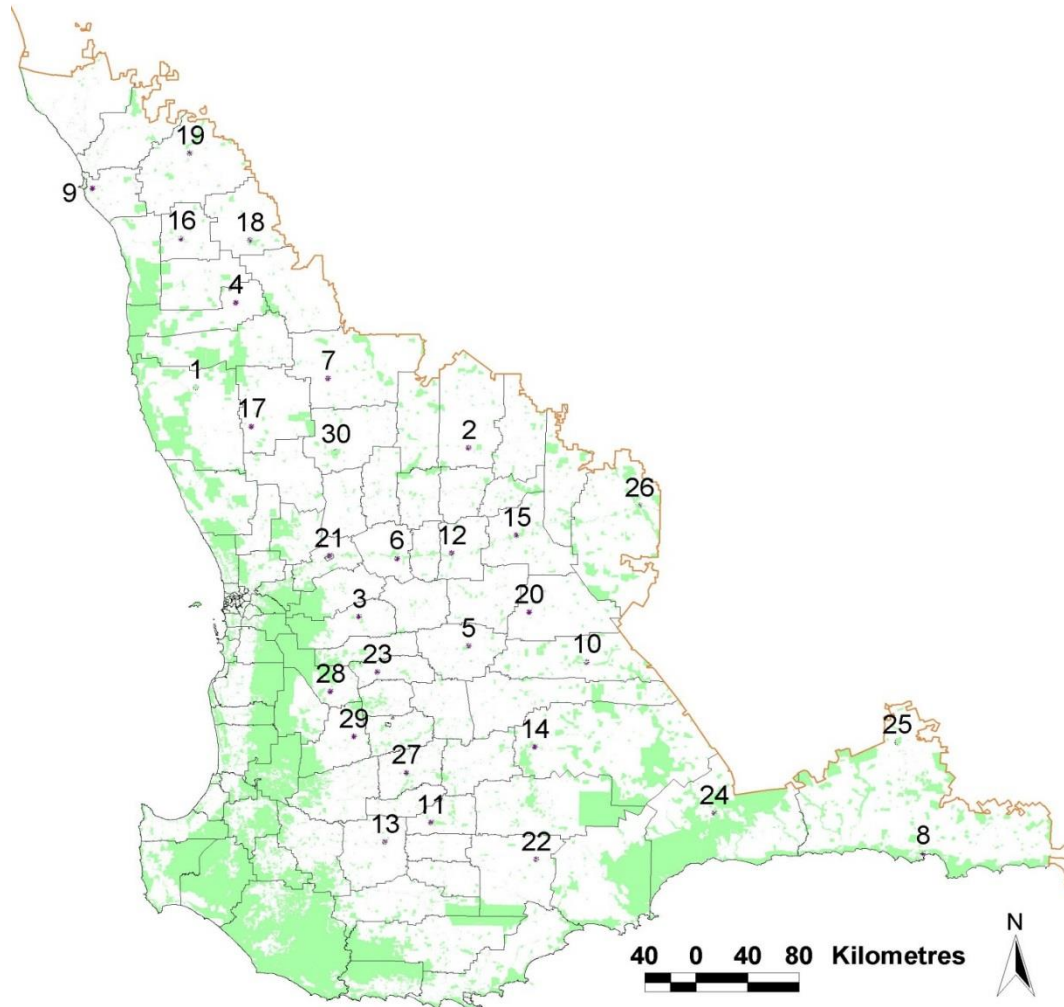
Observations



- The low cost strategy with lower N rates appears to be a very effective part of the low cost approach to managing the business expansion risk in a changing climate.
- There are many elements to lowering costs and making it work
- The next area of inquiry is whether farm expansion in a different climatic location can be a less risky option than buying the farm next door.

Can Novel Business structures reduce
Farm expansion risk?

Climate Sites in WA Wheatbelt



Possible Farm Business expansion structures

- Adjacent property with consolidation
- Remote purchase
- Joint venture

Problems in identifying opportunities

- Climate correlation may not match potential yield due to variation in the yield gap across rainfall zones
- Actual land prices in different locations can diverge from efficient risk/reward valuations

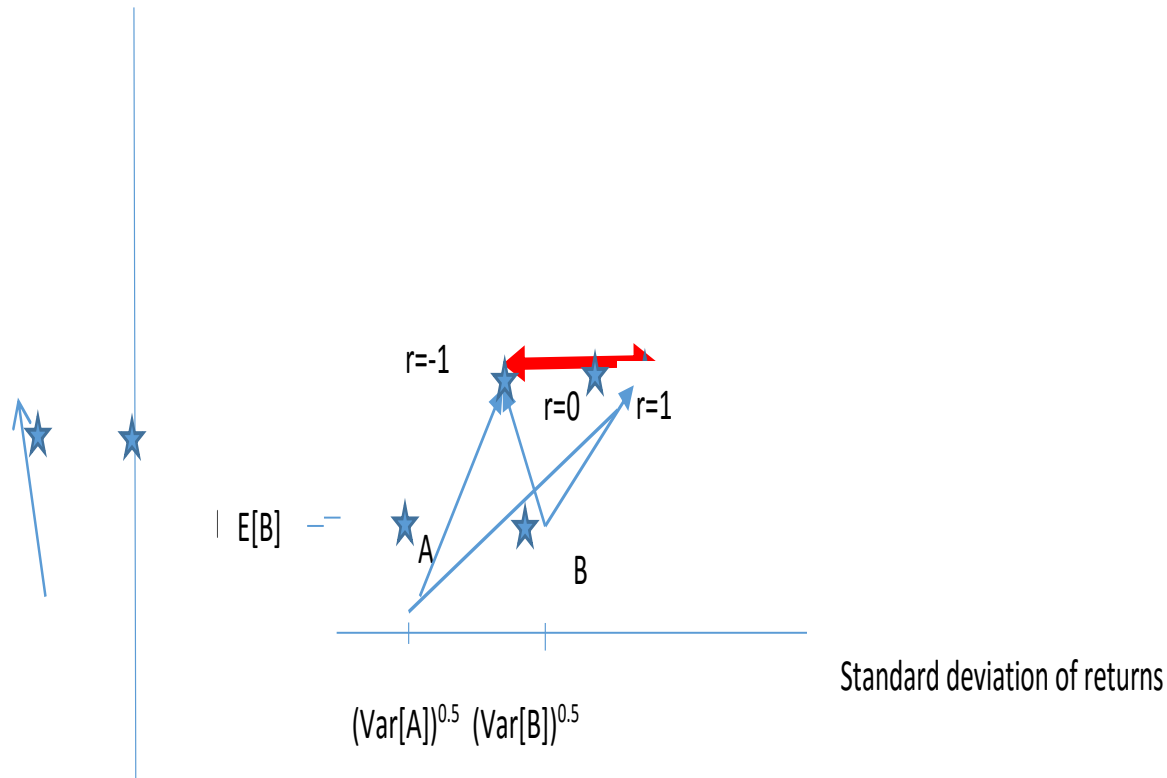
Remote combinations were ranked on combined value

- although there are opportunities for farm expansion that are less risky, identifying those opportunities is not a simple task
- $E[A+B] = E[A] + E[B]$
- $\text{Var}[A+B] = \text{Var}[A] + \text{Var}[B] + 2r \text{Var}[A]^{0.5} \text{Var}[B]^{0.5}$
(where $-1 \leq r \leq 1$)
- We expect that uncorrelated climates will result in more valuable combinations

Main Finding

Offsetting season is not the main driver of combined value

Expected returns



- Expansion with a farm of similar seasonal risk was shown to have a large influence on the value of expansion which was enhanced by the difference in climate.
- Combining assets with different riskiness may not reduce overall variability, because climate correlation is minimal in these situations.

Other considerations

- The conventional approach of adjoining expansion can also be segmented into contributions from economies of scale-reduced overhead costs and bulk-purchasing discounts.

Some big questions

- Question the economies of size or scope on offer?
- Evaluate enterprise complementarities that increase expected returns or lessen the variance of returns
- Expected returns and the variance of returns may be affected by the nature of the topography, soils, enterprises and physical assets of the farm about to be purchased?
- Question additional travel or management costs associated with the expansion?