



Adaptive management is about finding solutions to the big questions associated with mixed farming.

PHOTO: EMMA LEONARD

# Adaptive management

**Making robust business decisions requires more than just financial information** By Cam Nicholson

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HISTORICALLY, RESEARCH, DEVELOPMENT and extension (RD&E) has focused on isolated agronomy and animal husbandry issues – for example, varieties, herbicides, fertilisers, disease, rotations, sowing equipment, livestock reproduction, genetics and grazing management – but rarely looked at how these factors interact across the whole farming business.

The task of synthesising this RD&E information into a whole-farm system has largely been left to the individual farmer. As every farming situation is unique, this approach has been logical but the adoption process can be complex and have flow-on effects to other parts of the business. Consequently, change is often considered too hard and does not occur. In part this was observed during the first Grain & Graze program (2004–09).

To help encourage adequate consideration of the appropriateness of a component to an individual farming business, Grain & Graze 2 is piloting an adaptive management program. Grain & Graze 2 is supported by the GRDC and the Australian Government through Caring for our Country.

Adaptive management is about finding solutions to the big questions associated with mixed farming. It is not a simple one-size-fits-all approach but a

complex pairing of opportunity with an individual's attitude to risk. Using a range of methods, the project aims to help growers make better decisions based on a range of factors, not just the bottom line.

Before better decisions can be made for an individual business an understanding of risk and uncertainty is required.

There is a constant tension between risk and reward. Risk creates returns; decisions can be taken that reduce risk but this usually comes at the cost of lower returns. As human beings we usually want both – high returns and low risk – so decisions often trade some risk for some return.

Often 'risk' and 'uncertainty' are used interchangeably but there is a useful distinction: 'risk' has a known probability or odds that something will happen, while 'uncertainty' involves unknown odds.

In reality, farming operates on a continuum, from strong, known odds (the probability end) all the way to totally unknown odds, where we use estimates or guesses. The uncertainty end of the continuum is the real killer in agriculture.

Uncertainty cannot be removed and we have to learn to live with risk if a return is to be generated. However, by better understanding the odds of the risk, more informed decisions can be made.

For example, in Grain & Graze 1 many trials aimed to establish which winter wheat variety was most suited to grazing and grain production. Data for three common varieties – Amarok<sup>®</sup>, Mackellar<sup>®</sup> and Marombi<sup>®</sup> – generated from numerous trials over a four-year period was analysed. All had a similar grain-yield response after grazing. The average feed on offer (FOO) up to growth stage (GS) 30 was also similar (Table 1).

On average, all three varieties produced similar amounts of feed on offer, so if a feed budget for a mid-May sowing was constructed, about 1000 kilograms of dry matter per hectare would be expected from any of these varieties at a typical sowing time.

However, delving further into the results suggested a very different story, which is hidden when only the average is considered. The range of feed on offer between trials was very high, which was primarily a reflection of the seasonal conditions.

On further analysis the volatility of the feed on offer could be seen. In Table 2 (see page 10) the coefficient of variation (CV) is very high; the lower this figure is the greater the variation from the mean.

Everything that has a risk has a probability that falls within the standard bell curve (Figure 1). From Table 2 it can be seen that there is still a 67 per cent chance that with a May sowing of Mackellar<sup>®</sup>, feed on offer could range from 590 to 1410kg DM/ha – that is, within the dark blue area of the bell curve.

A conservative risk manager may choose

Figure 1 Standard deviation diagram

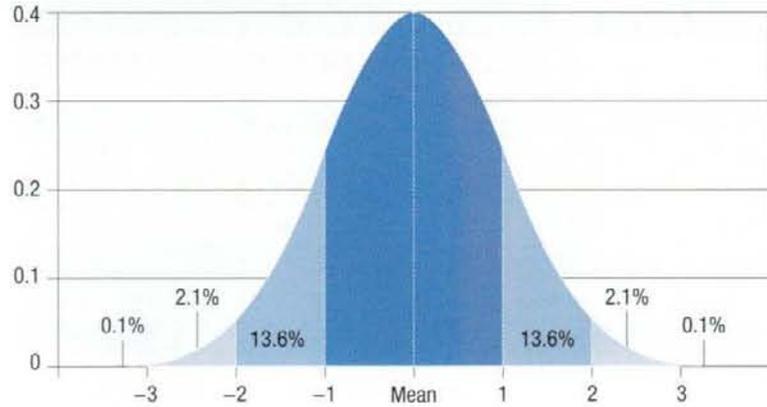


Table 1 Average feed on offer (FOO) up to GS30 for three varieties of winter wheat at early and typical sowing times

Variety	Early sowing (mid March) (kg DM/ha)	Typical sowing (mid May) (kg DM/ha)
Amarok <sup>®</sup>	1420 (n=7)	1105 (n=7)
Mackellar <sup>®</sup>	1475 (n=3)	1000 (n=7)
Marombi <sup>®</sup>	1310 (n=4)	1005 (n=8)

n = number of trials analysed

WHAT APPLIED IN THE PAST MAY OR MAY NOT WORK IN THE FUTURE.



Consultant Cam Nicholson is encouraging probability rather than averages to be considered when producers are assessing the risk of adopting new practices.

**Table 2** Feed on offer (FOO) up to GS30 for Mackellar<sup>(d)</sup> wheat at early and typical sowing times

	Early sowing (March)	Typical sowing (May)
Number of trials	7	7
Average FOO (kg DM/ha)	1475	1000
Maximum FOO (kg DM/ha)	2560	1730
Minimum FOO (kg DM/ha)	800	590
Coefficient of variation (CV) (%)	47	41
67% chance within this range (kg DM/ha)	790 – 2160	590 – 1410
95% chance within this range (kg DM/ha)	100 – 2850	180 – 1820

590kg DM/ha as the figure to use in the feed budget, while a grower prepared to take on more risk may choose 1410kg DM/ha and stock accordingly. This is an individual choice, but without the extra analysis both would be using averages.

In the absence of such detailed data, past experience and insight into the future have to come into play, which can include rules of thumb. However, these should not be used without question; what applied in the past may or may not work in the future.

An understanding of the potential loss as well as the potential gain is required for good decisions; people remember losses. As Professor Daniel Kahneman of Princeton University wrote, “the pain of loss is twice as great as the pleasure of gain”.

A potential trap with complex decisions is to overanalyse things. Decision-making paralysis from too much analysis is common. The reality is that some decisions can only be made with less-than-perfect information on probability. In this situation the aim is to develop options that are more ‘robust’.

A robust decision or solution, as defined by Rod Marsh of NetBalance, is one that:

- remains viable under the widest range of possible solutions;
- is insensitive to broken assumptions;
- increases flexibility and preserves options;
- maximises value when planned as part of a portfolio of actions; and
- builds in redundancy.

The adaptive management program aims to demonstrate the principles and practices of making better decisions to help individuals adopt practices and structures most suited to their objectives, needs and attitudes to risk.

The program is a pilot funded by the GRDC and being coordinated through Southern Farming Systems but rolled out in all Grain & Graze regions. □

GRDC Research Code SFS00020  
More information: Cam Nicholson, 0417 311 098,  
nicon@pipeline.com.au; www.grdc.com.au/SFS00020

## DOLLAR\$ AND \$ENSE

**A range of approaches is being supported to help keep growers informed about farm business management**

DOLLAR\$ & \$ENSE is a new regular column in the GRDC’s flagship publication, *Ground Cover*. Written by business management experts, this column aims to keep *Ground Cover*’s readership up-to-date with the latest information on farm business management.

*Ground Cover* was launched in February 1993 as a quarterly publication; now it is published six times a year and is distributed free of charge to more than 41,000 growers, consultants, agronomists, researchers and industry representatives. As the most widely read grains industry publication, *Ground Cover* provides an important method of communicating information to the industry on a range of pertinent topics.

The Dollar\$ & Sen\$e column is one of seven new investments by the GRDC in the area of farm business management. All of these are reported in this *Ground Cover* supplement.



In the first Dollar\$ & Sen\$e column in the January–February 2011 issue of *Ground Cover*, the issue of debt retirement was addressed. For many businesses debt has doubled, but this has been offset by an increase in land values, resulting in equity remaining at about 70 per cent. The column looked at other implications of increasing

debt, such as exposure to interest rate fluctuations and the ability to service greater debt loads.

In the previous issue (March–April), the Dollar\$ & Sen\$e column tackled decision making and discussed the concept of the Decision Guide. This concept was presented at the GRDC’s Victorian Adviser Update by Phil O’Callaghan. He demonstrated how the impact of individual paddock decisions could be assessed in relation to the whole farm business.

In this issue of *Ground Cover* (May–June) the column is looking at tax strategies, and see page 2 for information on a GRDC Adviser Update, ‘Understanding the farm business’, to be held in Adelaide on 17 May.

Dedicating a regular, branded column to the topic of business management in its flagship publication is another indication of the importance the GRDC places on communicating this information to growers. □

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More information: Phil O’Callaghan, 03 5441 6176,  
phil@orm.com.au; www.grdc.com.au/ORM00003