



FARM DECISION MAKING

REVISED EDITION NOVEMBER 2020



GRDC
GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

NATIONAL



**The interaction of personality, farm business
and risk to make more informed decisions**

Grain & Graze
Profit through knowledge

grdc.com.au

Title:

Farm Decision Making: The interaction of personality, farm business and risk to make more informed decisions

Project Code: SFS000028

ISBN: 978-1-922342-13-3 (Print)
978-1-922342-14-0 (Online)

Published: June 2015

Figures and charts updated June 2020
reprinted November 2020

Authors:

Cam Nicholson (Nicon Rural Services), Jeanette Long (Ag Consulting Co), Danielle England (Aginnovate), Bill Long (Ag Consulting Co), Zoe Creelman (Southern Farming Systems), Barry Mudge (Barry Mudge Consulting), David Cornish (Cornish Consulting).

Copyright:

All Rights Reserved

This publication is copyright. Except as permitted under the *Australian Copyright Act 1968* (Commonwealth) and subsequent amendments, no part of this publication may be reproduced, stored or transmitted in any form or by any means, electronic or otherwise, without the specific permission of the copyright owner.

GRDC contact details:

Ms Maureen Cribb
Integrated Publications Manager

Telephone: 02 6166 4500

Email: Maureen.Cribb@grdc.com.au

PO Box 5367
KINGSTON ACT 2604

Copies of this booklet are available from

Ground Cover™ Direct: Free phone 1800 11 00 44

Email: ground-cover-direct@canprint.com.au

COVER: WA Cunderdin grain grower Dave Fulwood in a wheat crop.

PHOTO: Evan Collis

DISCLAIMER:

This publication has been prepared in good faith by the contributors on the basis of information available at the date of publication without any independent verification. The Grains Research and Development Corporation does not guarantee or warrant the accuracy, reliability, completeness of currency of the information in this publication nor its usefulness in achieving any purpose. Readers are responsible for assessing the relevance and accuracy of the content of this publication. The Grains Research and Development Corporation will not be liable for any loss, damage, cost or expense incurred or arising by reason of any person using or relying on the information in this publication. Products may be identified by proprietary or trade names to help readers identify particular types of products but this is not, and is not intended to be, an endorsement or recommendation of any product or manufacturer referred to. Other products may perform as well or better than those specifically referred to.



Preamble

Invariably choices in farm management are neither riskless nor simple. Risk and complexity tend to prevail and the more the more important the decision. Moreover, farmers vary both in their attitude to risk and their assessment of non-monetary factors. What best suits one farmer may not suit another.

Best-Bet farm decisions – Makeham, Halter and Dillon (1968)

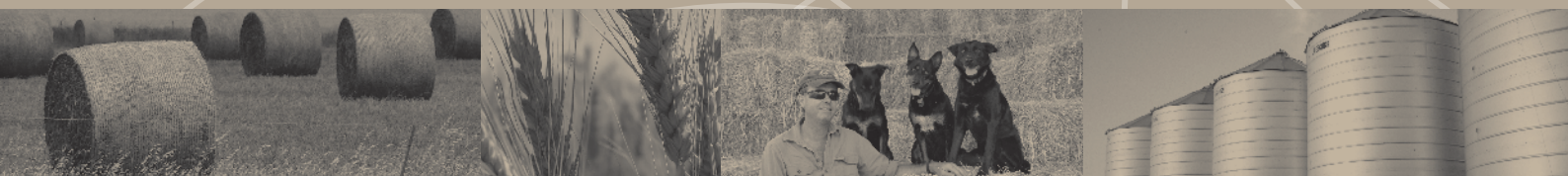
Some things change, some things stay the same. Technology may have advanced, marketing options may have evolved and margins may be tighter than five decades ago, but the fundamentals of farm management remain. At its core is decision making, choosing a path that provides a farming business with acceptable reward for acceptable effort at an acceptable amount of risk. The word acceptable is important because it requires individuals to define what is acceptable. One farming business may accept lower profits so as to maintain a lifestyle and production system that suits their goals and values, compared to another business that wishes to maximise returns but knowing they are operating at a higher level of risk and may be foregoing other opportunities. Both positions are equally valid.

This booklet is the collation of insights and experiences from the Grain and Graze program. The contents are loosely based on four important concepts that we believe need to be strengthened so farmers and advisors can make good, informed decisions.

One concept is around risk. The primary reason cited by farmers for operating mixed enterprise businesses was to manage income risk. While the concept of describing and managing risk is not new, the current information on which many decisions are made around adjusting enterprise mix does not consider or calculate the change to the risk profile of the business (apart from the general assumption that livestock are less risky than cropping). Moreover information around price and production volatility is not easy to access.

The second concept is how human nature can confound the most logical analytical analysis and argument. People make decisions and an appreciation of how people's values, goals, biases and personalities influence their decision is essential for advisors to understand how to find the 'hook' and craft a 'message' that will resonate.

Thirdly farming businesses operate within a set of basic operating principles. Understanding these principles is critical to ensure advice and decisions are made that do not jeopardise the goals and objectives of the business and ensure appropriate resource allocation within and outside of that business. This need has been exacerbated



with the growth of fee for service and retail advisors, many of whom have a strong production focus and training, but may not have had exposure to the complexities of a farming business.

Finally we assume farmers know how to make informed decisions because they make them all the time. While it is true farming requires numerous decisions, both complex and simple, tactical and strategic, good decision making is a skill. It requires discipline, a process and practice to become good at it. These decisions often have to be made quickly and with imperfect knowledge. This booklet aims to strengthen the awareness of, and approaches to decision making, taking into account risk, personalities and farm business basics.

The booklet is not a definitive account of all there is to know. Rather it provides some theory, practical examples and activities to gain a feel for each of the concepts and how they inter-relate.

A series of case studies, which highlight some common interactions between people and risk, business basics and risk, and people and business basics are available at the Grain and Graze website. A resource kit with materials and facilitation notes is also available if advisors wish to conduct any of the short exercises in this booklet with their clients. These can be ordered through the Grain and Graze website.

The farm decision making booklet was compiled by Cam Nicholson with major contributions from a group of very talented people who are passionate about agriculture and farming businesses.

Additional contributions from Nigel McGuckian and Tanya Robinson. Photographs from Cam Nicholson, Southern Farming Systems, Jeanette Long, Ag Excellence Alliance.



Front L to R:
Zoe Creelman,
Jeanette Long,
Dani England

Back L to R:
David Cornish,
Barry Mudge,
Cam Nicholson

Top: Bill Long





Disclaimer

The advice provided in this booklet is intended as a source of information only. Grain & Graze does not guarantee that these notes are without flaw of any kind or is wholly appropriate for your purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Copying of these notes and information contained within

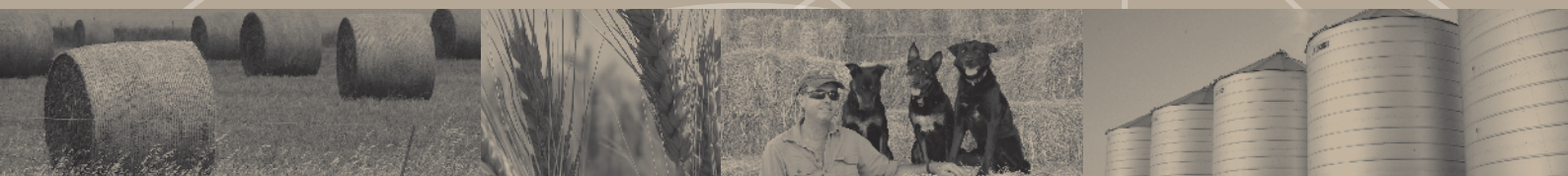
Information in this booklet may be reproduced in whole or part, as long as due recognition is given to the Grain & Graze Program and the GRDC.





Contents

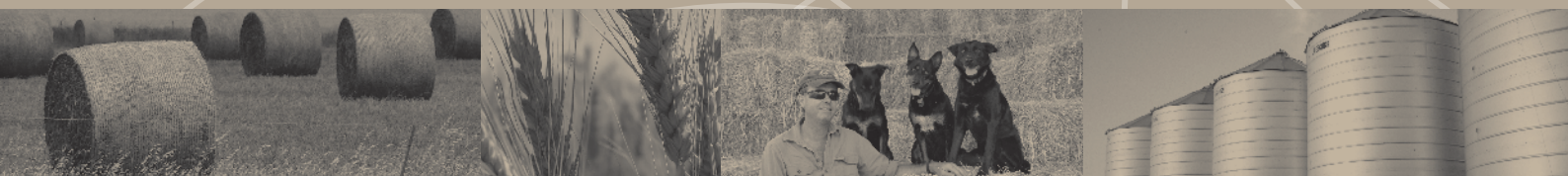
Chapter 1 Decisions	1
What's a decision?	1
Influences on decisions	2
The head, the heart and the gut	2
The head	3
The heart	4
The gut	5
Types of decisions	6
Simple decisions	6
Complicated decisions	6
Complex decisions	7
Making decisions with imperfect information and limited time – intuition and rules of thumb	8
Common traps with rules of thumb	11
Unpacking a rule of thumb	13
Approaches to enhance decision making	14
Advisors and decision making	14
Ultimately it is the farmer who has to be happy with the decision	15
Stress and decision making	15
The characteristics of a good farm decision maker	16
Chapter 2 People	17
People	17
Beliefs and values	17
Belief	17
Values	18
Personal goals	20
Emotion	21
Buy some time	21
Distance yourself	22
Use experience to picture the outcome	22
Managing change	22



Stress	23
Recovering from stress	23
The legacy of long term stress on decision making	24
Personality type	27
Where do I get my energy?	29
How do I learn?	30
How do I organize my world?	32
How personality influences temperament	33
My Temperament	33
NT – Pioneers	33
NF – Team builders	34
SJ – Dependables	34
SP – Doers	36
Implications of personality type and temperament on farm decision making	36
Allocation of jobs	36
Communication of tasks	37
Adoption of technology and practices	38
Making decisions	38
Chapter 3 Farm business basics	41
The bottom line in agriculture	41
The value of having a short term credit facility	42
The importance of cash flow, profit and wealth management	42
Cash flow	42
Profit	44
Gross margin	45
Overhead costs	45
Scale	48
Cost of Production and its link to profitability	48
Notable differences between cash flow and profit calculations	50
Assessing profit performance	50



Business Profit vs Taxable Profit	52
Profit and Taxation - getting the balance right	53
The effect of profit averaging (marginal tax rate)	53
Farm Management Deposits (FMD)	54
Wealth	54
Production and assets can both create wealth	57
Other Important Business Concepts	58
Benchmarking	58
Opportunity cost	59
Examples of opportunity costs in your business	60
Spending the marginal dollar	61
Law of diminishing returns	61
Spending on short term and long term decisions	63
Controlling costs as a way of improving returns	65
Competitive advantage	66
Chapter 4 Risk	67
Risk	67
What is risk?	67
Reward and risk	68
Risk is personal	68
Averages and risk	68
The average, middle and most frequent value	69
Ranges to indicate risk	71
Assigning risk – framing the odds	72
Using historic data (form guides) to frame the odds	75
Framing the odds for commodity prices	75
Framing the odds for yields	77
Framing the odds for lending costs	78
More on using historic information (form guides) to help frame the odds	79
Inflation	79
Major events	80
Connections between commodity prices and production	83



References	85
Appendices	87
Appendix 1: Some discussion and analysis around different rules of thumb	87
The 1/3 1/3 1/3 rule – Rule of thumb requiring adaptive use	89
Don't want to lose the potential of a paddock by leaving it fallow – Rule of thumb rejected by analysis	91
Insights from facilitating a workshop identifying and unpacking rules of thumb	92
Appendix 2: Approaches to help with decision making	93
Structured questioning	93
1. Decision Analysis Matrix	93
2. Making decisions more robust	96
3. Making a 'hard' decision 'easier'	97
Farm advisory boards	98
Making sense through personal experience (storytelling)	100
Individuals telling their story	100
Discussion groups for storytelling	101
Advisors using storytelling	102
Appendix 3: Action plan to achieve your goals	103
Appendix 4: The Sixteen Myers Briggs Type Indicators (MBTI) at a glance	105
Appendix 5: Price percentile values for a range of commodities	109
Appendix 6: Calculating standard deviation	111
How to calculate the standard deviation (and co-efficient of variation)	111
Appendix 7: Correlation between commodity types by state	112

Chapter 1 Decisions

What's a decision?

We make decisions all the time and in the main they work out OK. Understandably most of us don't spend time thinking about how we make those decisions and what might be influencing our decisions. However there are a lot of factors at play, both obvious and hidden that shape the final decision we make.

A decision is simply a conclusion or resolution reached after consideration. It is the result of processing a situation and deciding what action to take. Choosing to do nothing is a decision and may be a good decision given the circumstances.

» ***Just as farmers invest in inputs and machinery to grow and harvest crops, pasture and livestock, it is equally important to invest in and service the humans who are making the decisions. Faulty decision making is as damaging to a farm business as faulty and dysfunctional equipment.***

It needs to be recognised that decision making is a skill. This means it can be practiced and refined. It also implies there are steps or a processes that can be followed to guide a decision. Research has shown the only real difference between the top 20 per cent of profitable farmers and the rest of the industry is their ability to make the right decision at the right time.

So what are the things we need to appreciate that influence farm decision making and how can we increase the chances of a good decision being the right decision? (See side story – *The difference between a good decision and a right decision*)

The difference between a 'good' decision and a 'right' decision

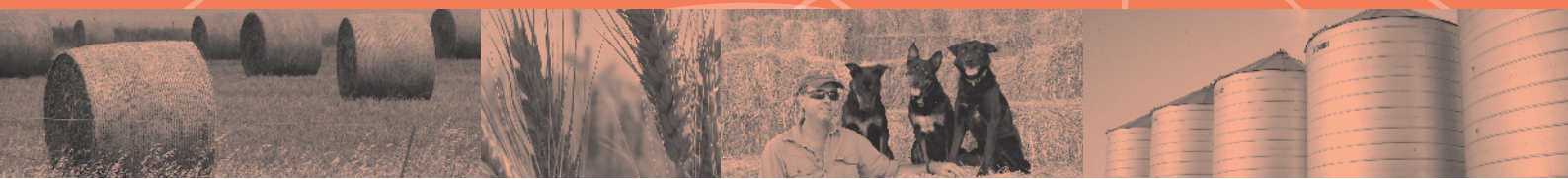
We often describe 'good' and 'right' decisions interchangeably but there is a useful distinction. A 'good' decision is an informed decision. To be informed you need to:

- appreciate the consequences of the various actions you could take
- have the least regret if it doesn't go according to plan
- increase the chances of a favourable outcome.

A 'right' decision can only be judged in hindsight – it becomes a matter of time. Also remember the decision you make today may be different to the decision you make tomorrow. Things do go wrong – and they will.

Decisions have to be made without hindsight, before the dice is rolled.





Influences on decisions

There are many explanations about how people make decisions. A commonly accepted approach involves conducting logical, rational analysis, often with the support of calculators, tools or models to determine various outcomes. These outcomes are compared and the most favourable results accepted as the best. Financial and management tools are commonly used in agriculture to provide these types of outputs (see the Business Basics section on analysis to use in different circumstances).

Yet despite taking a logical approach, how many of us have seen decisions made, or made them ourselves, that seem to defy 'logic' or sound, rational argument. This is because of additional, sometimes very influential forces that compete or conflict with the rational and logical.

Many studies support the concept that decision making is not simply rational and not always methodically thought through. The most notable in this field is scholar Daniel Kahneman from Princeton University, whose insights into the rational and irrational aspects of decision making are informative. For anyone wanting to understand how and why we make the choices we do should start with the book *Thinking, Fast and Slow* (Kahneman, 2011). However for this booklet, we present a more rudimentary approach, simply described as the head, heart and gut.

The head, the heart and the gut

Three broad centres of influence shape a decision – the head, the heart and the gut (Figure 1).





Figure 1: The head, heart and gut influence our decisions.

The head This is the **logical**, rational processing of information, the calculations and some realities we can face such as a financial position, age or health.

The gut – is **intuition**, shaped through experiences and knowledge. It allows us to make quicker decisions because it bypasses rational processes by linking past experiences and knowledge (both good and bad) with the present. Intuitive decisions are about ‘feel’.



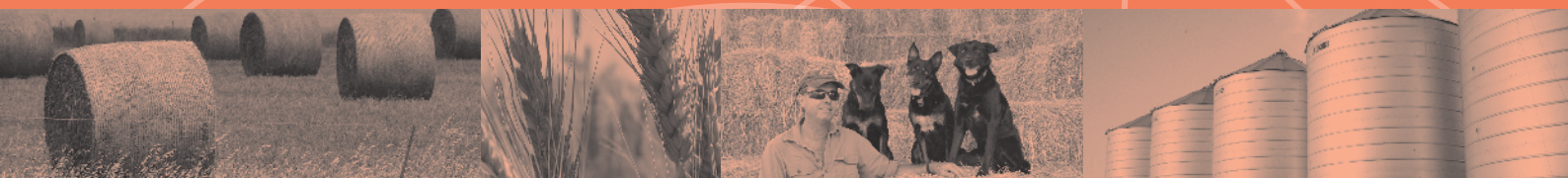
The heart which captures the **emotional** aspects of a decision. They are value-based and include a farmer's goals, beliefs and preferences. Put simply, they are a guidance system for decision making.

Image courtesy of Alice Long, AgCommunicators

The head

This refers to taking a step by step logical and orderly approach to analysing and solving a problem. It is sometimes referred to as an analytical approach.

A huge part of agricultural advice and decisions have, and will continue to be, based on information derived from using the head approach. Significant advances in agriculture have been derived from conducting logical analysis and building on previous results. A strength of the analytical approach is that it allows for objective comparison of possible options, provides transparency of how a conclusion was reached and enables others to follow the process and assumptions.



There are some analytical type approaches described in this booklet, especially around some farm financial concepts (Chapter 3) and how to consider risk in farm decision making (Chapter 4).

According to economics professor Bill Malcolm, the essence of good head analysis is to make it simple but not simplistic, aspiring for simple figuring but underpinned by sophisticated thinking.

Advances in computers have enabled researchers, advisors and farmers to conduct analysis of increasing levels of detail. This may be through using existing decision support tools, or by developing their own tools to calculate and compare various scenarios. These tools can provide a powerful means to test and learn, often enabling rules of thumb to be created (see later section about the power and influence of rules of thumb). Commonly the value of these tools diminish over time as intuition gained from their use improves.

There can also be a reluctance to trust the outputs from decision support tools, especially if the assumptions and logic are difficult to follow and adjust or the outputs don't match what is expected.

Certain personality types and learning styles favour an analytical approach to inform a decision, while other personality types rely more heavily on intuition or emotion. The implications of these differences are explored in Chapter 2.

Time is often a significant restriction on our ability to gather, analyse and interpret information to fully satisfy the head approach. To remain economical, there must be a trade-off between the 'accuracy' of a decision and the time spent researching it. This reality often means we need to compromise the analytical decision and rely on other influences in making the decision.



Better to be roughly right than precisely wrong.

The heart

This is the emotional influence on the decision. They are based on our values and fears.

As humans we all have our own values, beliefs and attitudes that we have developed throughout our lives. Values are principles, standards or qualities that guide the way that we live our lives and the decisions we make. They are the primary motivating force behind our actions and influence how we feel about our actions. Usually subconscious, values tend to be formed during childhood (up to about 14 years old) and remain fairly stable throughout our lives. They are like attitudes but are more ingrained and permanent.



Fear is a powerful emotion, often preventing us from 'having a go'. The effect of fear and loss are explored in the people section (Chapter 2), but at this stage it just needs to be recognised as a strong force in decision making.

A key point about the heart is how influential it can be in farm decision making because of the strong connection farming businesses have with family and their community.

The gut

This refers to the intuitive influence on a decision. Intuition is shaped by experiences and knowledge.

An advantage of using intuition is that it allows for quicker decisions because it bypasses much of the head or analytical process, instead relying on our 'gut feel' rather than needing specialist knowledge or technical skills. It also allows us to make decisions when there are gaps in our knowledge.

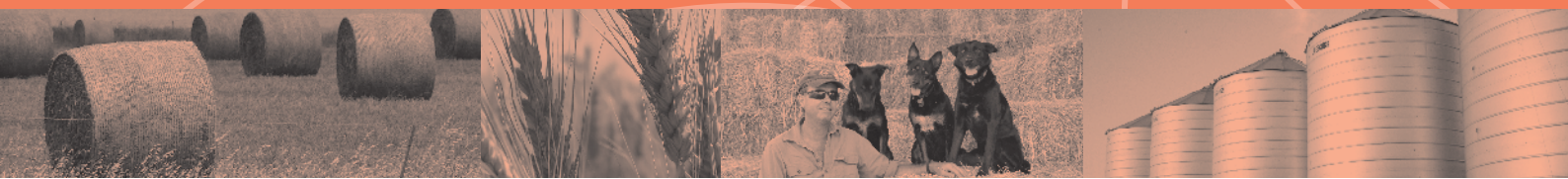
Intuition can be trusted if it can be explained.



For intuitive decisions to be 'good', the information and experiences feeding into the intuition must be good. Our intuition is influenced by many factors, including (but not limited to):

- past experience with a similar situation
- education
- stage of life, business lifecycle
- values and beliefs
- emotion
- gender
- stress level
- personal goals
- biases
- personality type
- culture.

While the decisions made might not result in the optimal outcome in hindsight, intuitive decisions are usually as good as they can be if they 'feel right'. The term 'feel right' links back to the heart influence, the emotional component of the decision. If a decision 'feels right', it is likely to be satisfying the emotional drivers.



Love him or hate him, this comment from former Prime Minister Paul Keating in 2011 neatly captures the head, heart and gut interaction.

The relative influence of the head, the heart and the gut in any decision depends on:

- the **type** of decision required
- the relevant **information** available
- the **time** we have to make the decision
- the **risk** involved
- the **personality** of the decision maker.

"The greater part of human aspiration has been informed by individual intuition and privately generated passions, more than it has been through logic or scientific revelation. "

Types of decisions

Not all decisions are the same. Typically the types of decisions farmers face fall into three broad categories – simple, complicated and complex. These have their own characteristics and need to be approached in different ways.

The need to recognise different types of thinking was highlighted by consultant Nigel McGuckian in the first Grain and Graze program, where he concluded that one of the biggest challenges farmers and advisors in mixed farming faced was dealing with the added level of complexity between two very different enterprises (Land and Water Australia, 2008). Issues around integration, risk, personal preference towards livestock, skills and stage of life were just a few aspects that made mixed farming decisions more difficult.

Simple decisions

The easiest decisions are simple. There are a few variables and there is a clear right or wrong answer. For example, deciding how much drench to give a 45kg wether may be considered a simple decision. You would refer to the label recommendation and drench accordingly.

Complicated decisions

When a number of variables are involved, but the relationships between variables are clear and well documented, a decision can be considered complicated. Deciding on a crop rotation to control weeds, avoiding herbicide resistance, creating a disease break while adding legume nitrogen would be considered a complicated decision. It may take some thinking but generally there is a 'right' answer.

Complex decisions

When a number of complicated decisions come together and interact, and the variables and trade-offs are difficult to quantify or weigh against each other, the decisions may be considered complex.

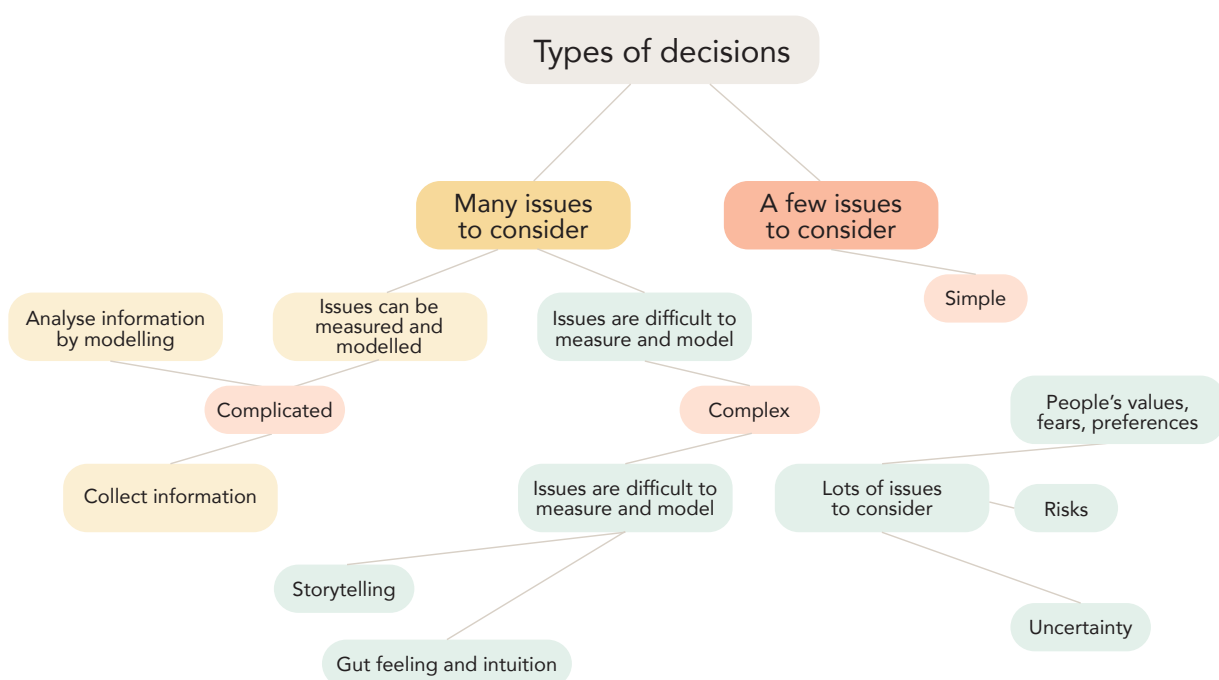
For example, deciding how many livestock to run on a farm, which also has a range of crops, is a complex decision. Although a theoretical optimum number of livestock could be calculated using a modelling approach, many variables would remain unaccounted for such as the effect on the environment, the need to manage labour, the impact on recreation time, the increased risks and long-term price forecasts. The number of variables is very high and is extremely difficult to model so it suits an individual business.

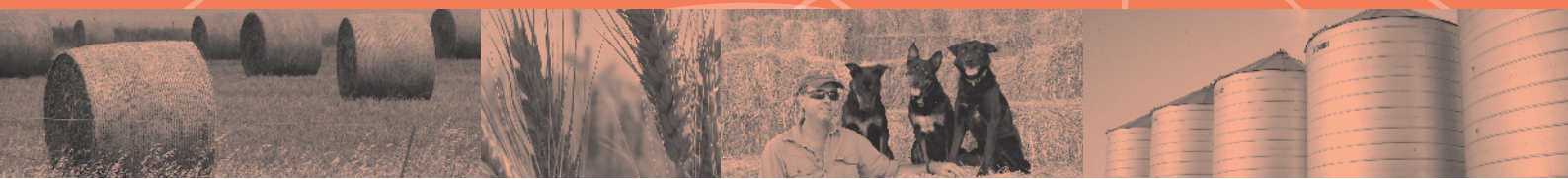
The value in knowing what decision is being dealt with is that it changes the approach to take. Generally as decisions become more complex, the heart and the gut have an increasing influence and inform the decision. By appreciating the type of decision, the appropriate type of information and discussion can be adopted.

If the decision is complex, we need to think beyond just logical analysis and use heart and gut considerations when informing and making a decision.

An alternative way of thinking about what type of decision you might be confronted with is depicted in Figure 2.

» **Figure 2:** Pathway to determine the type of decision.





You can never expect to know everything!

We live in a world where there is more information than we'll ever be able to completely know, and the gap is widening with increases in new technologies and specialised research.

We can't ever expect to have an exhaustive understanding of all the alternatives when assessing a decision because of the limitations on our time, comprehension and available information.

Herbert Simon coined the term 'bounded rationality' recognising that we will commonly have restriction on our ability to gather data and understand it and while this can limit our capacity to choose the best option, we must suffice with what we do know and make a 'best-bet' decision. This 'best-bet' decision may be to do nothing.

» ***Good decision making is often limited by our time and ability to gather information but there is only so much we can do about it.***

Making decisions with imperfect information and limited time – intuition and rules of thumb

Most decisions are made with imperfect knowledge. Rarely do we have every piece of information we would like to make a fully-informed decision, even with time on our side. Even if we did, our brains would often overload and lead us into decision paralysis. So we make decisions based on what information we have and the time we have available (See side story – *You can never expect to know everything!*)

Two factors help us make timely decisions with imperfect knowledge. These are intuition and rules of thumb.

Intuition is formed primarily through experience. It allows us to make quicker decisions because it bypasses rational processes and relies on past experiences and knowledge (both good and bad) to inform what should be done in the future. Intuition builds over time, with the more experiences and greater knowledge you have, the larger your intuitive capacity. The 'quality' of past experience and knowledge determines the

'value' of your intuition. The more experience you have on a topic (or problem), the more you read, discuss and think about it, the better your intuition.

Rules of thumb are mental shortcuts that we use to simplify and speed up decision making. They are similar to intuition in that they can be useful in bridging gaps in knowledge, allowing decisions to be made without extensive analysis. The main difference between intuition and rules of thumb is their tangibility – rules of thumb are more easily learnt, taught and transferred whereas intuition is not.

Rules of thumb are often used unconsciously. They are the thoughts that immediately come to mind and act as the starting point for a decision. Decisions guided by rules of thumb may be as basic as 'how many spoons of tea should I put in the pot?' through to 'how much of my expected yield should I forward sell?'

» ***We all use rules of thumb every day, in all areas of life.***



There may be the perception that rules of thumb weaken the information used in decision making and that a more analytical approach is required. However if the rules are well thought through and have been validated, then they can be incredibly useful. Good decisions are made based on good information, so it is important that rules of thumb have a solid foundation. For example, the use of modelling tools such as Yield Prophet, GrassGro and Grazfeed provide learning opportunities which are often distilled overtime to rules that guide subsequent decisions. This saves time and effort required for future decisions because the models do not have to be re-run.

It is common to use rules of thumb to help fast track and simplify decisions. All advisors will have their rules of thumb. In a recent series of workshops across southern Australia, farmers, advisors and researchers were asked to identify some of their rules of thumb. There were rules for all aspects of farming, from agronomy to grain marketing, financial budgeting and people (see side story – *Some common mixed farming rules of thumb*). These may be different to the rules you use!

Some common mixed farming rules of thumb

Cropping

- Expect the autumn break around Anzac Day.
- Sow wheat to the depth of a matchbox on its side.
- Only sow after ryegrass seed has germinated.
- Apply 4kg of phosphorous for every tonne of last year's crop.
- Don't choose variety based on price.

Livestock

- Every week it doesn't rain, stocking rate potential decreases by 10%.
- Add a kilo of phosphorus for each DSE/ha.
- Don't lock in more than 20% of grain before sowing.
- Sell 1/3 grain at sowing, 1/3 later in the season and 1/3 at harvest.
- \$300 is a good price for wheat.

Financial

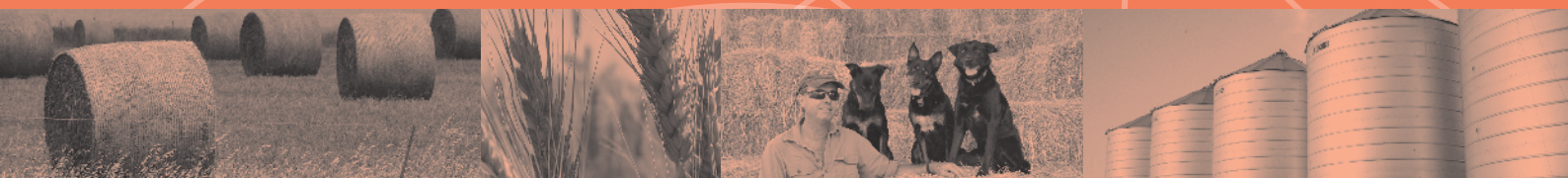
- To make a budget, inflate your costs by 10% and keep your prices constant.
- You make all your money in 2 or 3 years out of 10.
- You want to pay off new farms in 2 seasons.
- Equity of 80% or more is comfortable.

Machinery investment

- If you can't pay off new machinery in 3 or 4 seasons, then you can't afford it.
- Fallow paddocks are lost potential.

People

- If you can see your mother-in-law's underwear on her clothesline, your houses are too close.
- Every person you employ takes 20% of your time.



Some observations were made by farmers and advisors at these workshop regarding what they had learnt through discussing their rules of thumb. These included:

- Rules of thumb are often provided by an agronomist or trusted source and not questioned.
- Rules of thumb provide some comfort and there can be a fear in going away from a 'trusted' rule of thumb.
- Rules of thumb seem to emerge and evolve with people not necessarily knowing their origin. They can be difficult to trace as it is often a case of "I came across it and it made sense".
- There is considerable regional variation in rules of thumb and it can be dangerous to take them out of context in different environments.
- Stories exercise intuition. Discussing rules of thumb as stories is important as it links them to the relevant emotions and triggers memories.
- Rules of thumb are there to be broken, as there is no silver bullet.



A good rule of thumb can be very valuable if used the right way.

An example of how a rule of thumb is applied is provided (See side story – *To make a budget, inflate your costs by 10% and keep prices constant*)

To make a budget, inflate your costs by 10% and keep prices constant

South Australian consultant and farmer, Barry Mudge, commented that this rule allows for 'risk attitudes to be easily and simply incorporated into the budgetary process'. Individuals have varying levels of risk aversion which can be reflected quantitatively in the per cent inflation used in this rule. A more cautious farmer may inflate costs by 15%, while someone with a higher tolerance of risk may only factor in a 5% increase.

People have a tendency to be more mindful of the negative risk involved with cost than positive risk of gain, a sentiment summarised by Kahneman and Tversky (1979) as being that 'losses loom larger than gains'. This is reflected in the rule's emphasis on the risk of increased costs. The incorporation of per cent inflation means the rule is more adaptable than if it was a static indicator such as net profit.

The workshop participants who identified this rule associated it with valuing security and the comforting emotion that comes from being risk averse. They described the potential to adapt the rule in increasing expected price and keeping costs at the 10% inflation to give a 'bonus margin'. This provides a more optimistic prognosis when it is convenient, such as in dealings with bank managers, however it is a more risky position to make decisions from.

Common traps with rules of thumb

A potential trap with rules of thumb (and sometimes intuition) is that they are relied on when circumstances have changed or are different. They can be sticking points for change and result in missed opportunities or unrealistic expectations (See side story – *\$300 is a good price for wheat*).

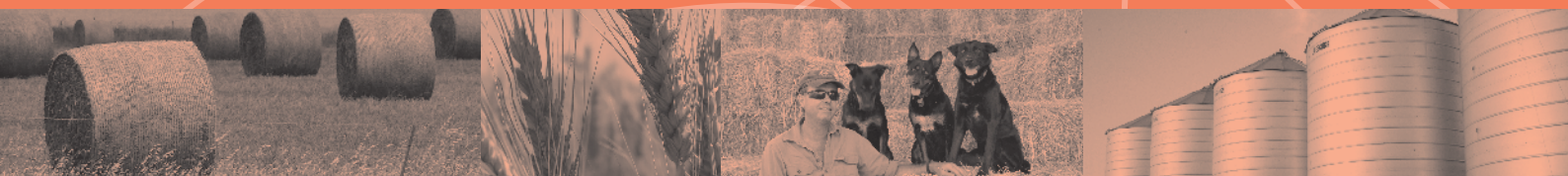
Murray-Prior and Wright (2001) write that resistance to change is partly caused by our rules of thumb being a 'friction' in the decision making process. The rules hold us back because it's what we have always done. To overcome this 'friction', there needs to be some event or experience that identifies, challenges and enables the rule to be re-affirmed, modified or disregarded. Sadly the trigger to question the rules are often significant and sometimes disastrous events.

Assumptions that underpin our rules of thumb can become so ingrained that we fail to consciously test their validity which leads to poorer decisions. They can even develop into beliefs and accepted as truths, and when challenged, people can become uncomfortable or defensive.

Routinely identifying and examining the rules of thumb that are influencing decisions (and that might be limiting change) is a useful exercise.

Rules of thumb are there to be broken.

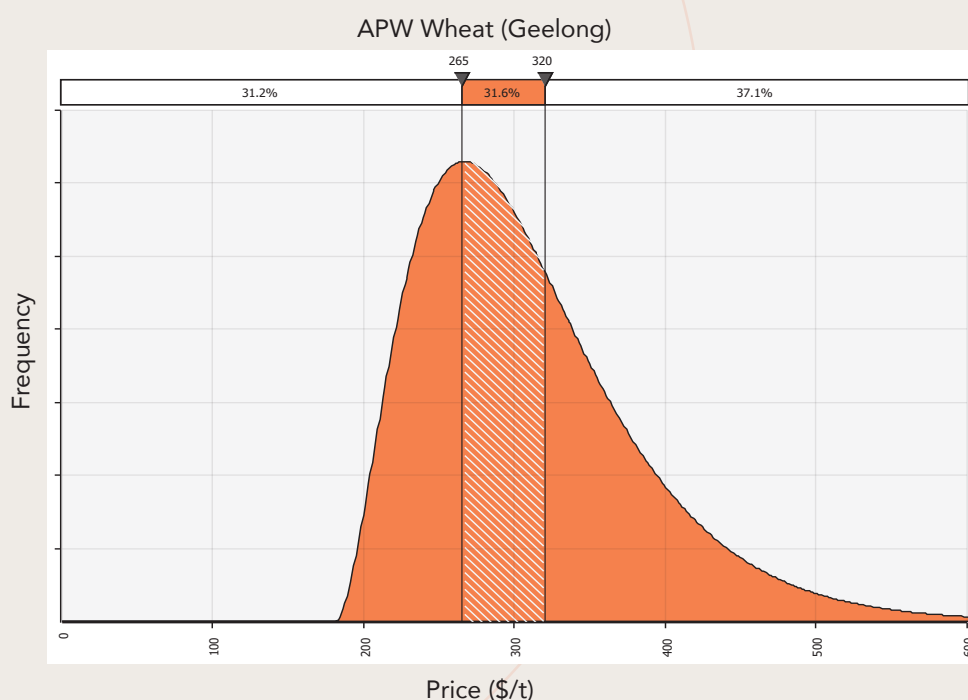




\$320/t is a good price for wheat

This rule of thumb was commonly identified by farmers when they are looking to set a price at which they will sell their wheat.

Historic information (July 2003 to June 2019) for APW wheat in Geelong would suggest \$320/t is above the average price of \$310/t (\$320/t is about a decile 6 price). However the most common price reached in this period of analysis is only \$265/t, because the price distribution is uneven around the average (see graph). If farmers had \$265/t in mind (because it is the price encountered most frequently), then \$320/t is a substantial increase (\$55/t) and may seem a good price, but compared to the average the difference is much less (only \$10/t).



To challenge the \$320/t rule further, there may be times when the rule should not be strictly adhered to. In some cases, cash flow may be more important and a price of less than \$320/t can still be a profitable decision. Mae Connelly, a W.A. grain marketer with Farmanco stated that "a good price is simply one that is profitable for your business". It is important to know what makes a price profitable, and to be able to accurately make this decision, you must know your break-even price.

So the \$320/t target is generally a good guide, but the importance of doing your own cost calculations and setting the margin you wish to achieve should not be overlooked.

Unpacking a rule of thumb

Understanding how a rule of thumb was created allows for better adaption of it to different situations. Whether it is the first or fiftieth time someone has faced a particular decision, it is still valuable to understand the reasoning behind the decision.

Discussing the origins of rules of thumb and how they are used helps create a framework for future learning. A few simple questions can help to 'unpack' a rule that is being used (See side story – *Questions to ask in unpacking rules of thumb*).

Questions to ask in unpacking rules of thumb

1. **Origin:** where do you remember first hearing the ROT?
2. **Experience:** what has been your experience with the rule? Have you found it to be (un)reliable?
3. **Research:** what research verifies the rule?
4. **Blind spots:** what areas may the rule cause you to neglect?
5. **Adaptive management:** how have you used this rule in different ways in your management?
6. **Evolution:** what factors are required for change in your ROT?

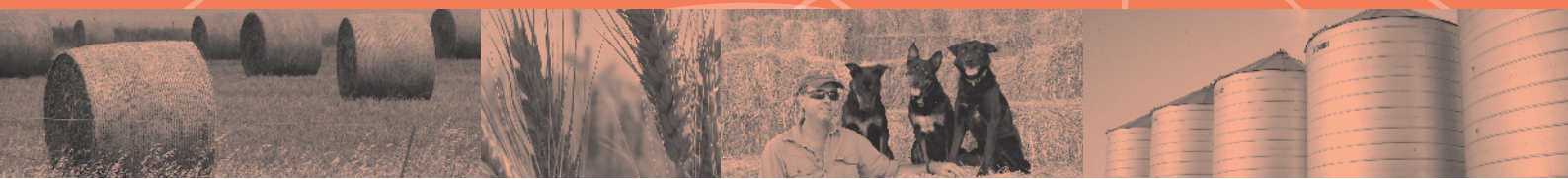
Understanding the origin and validity of rules of thumb is important in sound decision making for three reasons:

1. It can validate a rule as being helpful.
2. It can provide the transparency required for adaptive use of the rule.
3. It can highlight the need to discard the rule.



It's best to be transparent and discuss rules of thumb used in decision making.

Examples of rules of thumb that highlight these three possible results are provided in Appendix 1, where workshop discussion and analysis have been used to unpack them.



Approaches to enhance decision making

The appropriate approach to make a decision can be informed by recognising the type of decision that needs to be made and therefore the relative influence of the head, the heart and the gut. A series of approaches are provided on different ways to assist in decision making, especially with complex decisions (Appendix 2). They range from structured questioning processes, to operating farm advisory boards, through to getting farmers to make sense of difficult decisions through relaying personal experiences and discussion.

Advisors and decision making

Farmers are increasingly using advisors with specialised knowledge to help inform their decisions. The main areas advisors are used for include:

- To bring technical expertise and the latest technologies to the business.
- To improve efficiency, by allowing someone else do the 'filtering' of information.
- As a sounding board to run ideas past.
- By bringing a range of experiences (intuition) gained from other properties that could be applied to their situation.
- When a more logical, rational analysis is required that the farmer is unable or unwilling to do (the head).
- For decisions that the individual finds particularly difficult because of the strong heart influence.

Choosing people to take advice from is a decision in itself and can have a big influence on how a business performs. It takes a lot of trust to accept someone's advice. Some farmers use an advisor as a self-preservation strategy in deferring the responsibility of the decision. They will say things like "I sprayed at that time because my agronomist said to" or "I bought that tractor because my accountant said I wouldn't have to pay as much tax if I invested in capital". Listening to advisors is a valid decision making strategy and can often lead to good decisions. However farmers should be aware that they are the ones accepting the risk so it is important for them to have thought through the decision and have ownership over it.



Other farmers will not follow the suggestions given by their advisors. A consultant in one of the Rules of Thumb workshops commented that “advisors get upset when farmers stray”. Reasons why farmers may not carry through with recommendations is discussed in depth by Lane (1992), but largely come down to:

- A lack of understanding and ownership of the reasoning behind the recommendation.
- A failure to appreciate the values, goals and motivations of the farmer, so the advice doesn’t fit the aspirations of the people and the business.
- The emotional and financial risk the farmer factors into the decision.



Ultimately it is the farmer who has to be happy with the decision.

Advisors also use intuition and rules of thumb, whether they like to admit it or not. A consultant at one of the ROT workshops was adamant that he didn’t use rules of thumb, however a farmer he consults for was also sitting on his table and remarked that some of his rules come from this consultant! One consultant mentioned having a set of rules of thumb with certain thresholds that can be adapted based on how they know their client operates.

Consultants in the workshops expressed a need to better communicate the reasoning behind their rules of thumb to farmers. This would help farmers approach their decision making more critically and adaptively rather than making blanket rules. It may also increase the adoption of consultant advice as there is more transparency as to its logic, and enables farmers to have greater ownership over the decision.

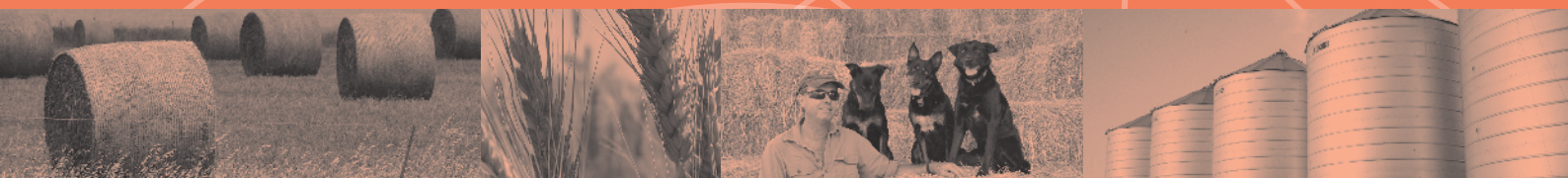


Consultants can bring new ideas, rules of thumb and information to a decision.

Stress and decision making

Stress is commonly encountered in farming. This can be during periods of heavy work load e.g. seeding, shearing, harvest, because of poor seasons, when under financial pressure or if encountering relationship challenges. When we think of stress we commonly associate it as being bad. This is only part of the story. Some types of stress can be good and lead to favourable outcomes because it sharpens your alertness and your performance.

The body produces the hormone cortisol when we are stressed. In short bursts, called acute stress, it primes the brain for improved function. However if stress continues over a long period of time, called chronic stress, it will eventually impair the decision making process, sometimes to the point of inaction. When people are affected by chronic stress, their ability to think and rationalise is reduced (i.e. the head part of



decision making). What is diminished are reasoning, anticipation and the ability to plan and organise.

Recognising the signs of chronic stress and what to do about it is discussed in the People Chapter.

The characteristics of a good farm decision maker

Northern Victorian dairy consultant, Ian Gibb, believes farm managers who appear to have a mysterious capacity to make 'best bet' decisions and implement them actually follow rules to achieve their success. These rules re-inforce many of the issues already discussed. Some of these rules are:

- When faced with a decision, they identify the critical variables (there are usually only two or three) and aren't distracted by non-critical variables. Experience, observation and a comprehensive 'world view' contribute to identifying the key items quickly.
- Smart farmers listen to 'experts' but don't follow them blindly because they know that experts only ever see part of the big picture.
- Act quickly and decisively. More often than not, the good options disappear quickly.
- It is usually better to make a near-ideal decision than to analyse a situation to death and as a result miss an opportunity that depended on getting the timing right. The principle of diminishing marginal response applies to analysis too.
- Doing nothing is a decision and sometimes is the right one.
- Be prepared. Don't leave everything until the last minute.
- Don't beat yourself up for decisions that turn out to be less than ideal when viewed with the wisdom of hindsight.





Chapter 2 People

People

Farming is more than a business. While profits drive business, life is not all about profit. This is especially so for the majority of people involved in Australian agriculture. Farming defines who we are.

Agriculture is an industry based around people, with farms traditionally being family affairs, commonly inter-generational and set in a context of a close community. As such the emotional and social connection tends to be strong, with decisions that protect or enhance the people aspects of farming often over-riding technological advances that may be available. These connections extend to a range of people, whether it be family members on the same farm, relationships with neighbours, banks or business suppliers.

This chapter explores the human factors in decision making that will not only help to understand the reasons behind our own decisions, but also some of the decisions that are made by neighbours and others that may contradict our own. Failure to appreciate the people aspects greatly diminishes our ability to influence others. Remember, we are all different!

Beliefs and values

How we behave and make decisions is a reflection of our beliefs and our values.



Beliefs

Beliefs are ideas that a person holds to be true and are willing to defend. They can be based on 'facts' or faith and are acquired from a range of sources including formal education, experience, peers and cultural surroundings (e.g. religion, upbringing).

Some beliefs enable us to advance our lives and others hold us back from achieving our dreams and goals. Once they are brought from the subconscious, a decision can be made if they are supporting or hindering us and a choice made to retain or change them.

Consider the example of two farmers interested in purchasing a neighbouring property. One may believe that the neighbouring property is worth more because it's right next door and that debt is a necessary aspect of running a business. These beliefs may lead



to a higher price being offered than the other neighbour who believes equity must be kept above 90%. Different beliefs can lead to very different outcomes.

Farming families often hold common beliefs that have been passed down from one generation to the next. They could be referred to as the unwritten rules of how the family operates e.g. the eldest son gets the homestead or “we are a cropping family so don’t entertain the idea of having livestock”. For these rules to have become beliefs they generally have served the family well over a period of time. This means they are often hard to change.

Beliefs are commonly not questioned but are taken as a ‘given’ by the family members. It is often new partners coming into a family business who identify these and question them, sometimes leading to friction. This is also a common problem encountered in succession planning where family members will have different beliefs about what is fair and equitable in relation to how the assets should be divided amongst family members.

However good decision making requires beliefs to be surfaced and questioned and not avoided, so they support the family business in its decision making rather than hindering it.

Values

Values are things that are important to you and are shaped from our beliefs. They are developed early in our lives, they influence our outlook on the world (our attitude) and the decisions we make.

Some of the common values we could expect to encounter amongst farming populations are around:

- Family
- Community
- Loyalty
- Independence
- Working outdoors
- Growing products that feed and clothe people.

Values are usually subconscious and we don’t know what our values are unless we spend time thinking about them and how they may influence our decision making. It is possible to examine your values, to tease out what they mean, how they play out in your life and how they influence the decisions you make (See the exercise – *My core values are...*).



It is not only important to understand your values, but to understand that values are shaped by our beliefs and underpin our attitudes and behaviours.

Values will have different meanings for different people. For example, *Family* is a common value held by many people, but for women their belief around *Family* is commonly “I must *be there* for, and *nurture* my family”. For men it often means “I must *provide* for my family.” The couple in this example share the value of family, they just interpret the meaning of value differently which results in a different set of actions.

Corporate businesses identify the values they want to underpin their business decisions and culture. Where this is working well you will see people ‘walk the talk’, making business decisions based on the clearly identified values. As farming businesses, we often don’t share our values, they remain assumed. This can create serious problems and lasting resentment.

If our values and beliefs are challenged or questioned we often feel uncomfortable and sometimes threatened. It can make us ‘switch off’ and not listen properly because we don’t want to hear what is being said. When questioning values and beliefs, it is important to provide time to allow people to work through any differences.

EXERCISE: My core values are.....

From the words listed, choose 10 that you believe are the most important values to you. Then reduce this to the top 5.

Step 1: Ask yourself ‘I value

Affection	Money	Expertise	Professionalism	Learning
Community	Pleasure	Independence	Polite	Confidence
Creativity	Religion	Recognition	Equality	Peace
Growth	Security	Reputation	Wisdom	Happiness
Family	Advancement	Knowledge	Courage	Reliability
Helping others	Achievement	Wealth	Caring	Compassion
People	Adventure	Democracy	Integrity	Creativity
Involvement	Change	Effectiveness	Loyalty	Imagination
Respect	Challenge	Honesty	Balance	Capable
Relationships	Co-operation	Influencing others	Competition	Broadminded
Self-respect	Competance	Empathy	Stability	Logical
Being in control	Decisiveness	Efficiency	Winning	Freedom

Then take each of the 5 values you identified and write down what that value means to you.



Personal goals

We all have personal aspirations and dreams, the thing we would like to achieve or do in our lifetime. These are our goals. Goals are simply the things that can be described as “I want to ...”. They often float around in our heads and we don’t articulate them to the other members of our farming family, business associates or financiers. Sometimes our beliefs will even stop us from admitting them to ourselves.

The culture of many farming businesses has been one of not setting and sharing goals. We often blame the uncertainty of farming for this, “It’s too hard to plan because I don’t know what the season will be like.” But it will also depend on your family of origin, how you communicate as a family and whether there is a culture listening with an open mind.

When goals are not shared or achieved, people can become resentful and depressed. If the other members of the business don’t know what’s important to the individuals in a business, how can they assist and support you in achieving your dreams?

Knowing what people want and working towards achieving this makes for a happier workplace. Good businesses ensure the goals of all members of the family business are understood and shared.

Think about your own goals and dreams. What is it that you would like to do in the remainder of your life? Believe it or not the chances of achieving your goals increases by writing them down and by sharing them with other people (see exercise – *My goals are...*).

EXERCISE: My goals are...

In my lifetime I aim to...

In the next 3 years I want to...

In the next 6 months I will...

Once having identified some of your dreams and aspirations, it is important to develop some realistic actions to increase the chances of them being achieved. The steps to do this are in Appendix 3.



Emotion

We are all emotional beings. Our memories are linked to emotion and so are our past experiences. The decisions we make are influenced by our emotions at the time. Given the same information, we will make different decisions when we are angry or stressed compared to when we are relaxed and calm.

Research has shown we often seek a logical explanation to justify why we have made a decision driven by emotion. That spur of the moment emotional decision is justified by 'good' reason at some later date.

Negative emotions can result in a limited search for new alternatives and a less vigilant use of information. Daniel Kahnemann, a social researcher from Princeton University, says the pain of loss is twice as great as the pleasure of an equivalent gain. This means we will go out of our way to avoid the loss or negative results because of the way it makes us feel. Considering this premise, are past emotional losses holding the business back because of the fear of another loss?

On the other hand, positive emotions can increase problem solving abilities and result in a better extraction and use of information.



People use emotions as well as rational and intuitive processes in making decisions.

Failure to recognise emotions in decision making will result in poor decisions or decisions being made while in the 'wrong frame of mind'. The outcomes of such decisions can be profound, long lasting and lead to regret.

To reduce the risk of making emotional decisions when in the wrong frame of mind, try one or more of these tricks:

Use the 10/10/10 rule (taken from Heath & Heath, 2013).

Think about the decision in terms of:

- How will you feel 10 minutes from now?
- How will you feel 10 months from now
- How will you feel 10 years from now?

Buy some time

When faced with a big decision sleep on it. Things often become clearer over time.



Distance yourself

With distance we can see more clearly the important components of the issue we are facing.

- Ask yourself “What advice would I give my best friend in this situation?”

Use experience to picture the outcome

- Name the emotion you are feeling, express it aloud.
- Consider what has caused that particular emotional response.
- Ask yourself:
 - » When have you experienced a similar decision and what was the outcome? or;
 - » When have you experienced this emotion when making a decision, what links are there to this situation? What was the outcome of that decision?
- Then you can consider the value of this emotion to the current situation, give yourself some space to work through the emotions and then come back to the decision.

Managing change

Change is hard. We naturally resist change and whether we like it or not, change brings with it an emotional cycle, the grief cycle. Sometimes we can move through this very quickly and not even be aware that it is happening. At other times we will get stuck in the process somewhere along the way.

Everyone has some degree of difficulty in facing change. It is often associated with a period of mourning — be it loss, negotiations in a given situation, or the need to adapt or accept a new situation.

The first reaction is usually emotional; “I don’t want to do that!”. If you’re the one making the change, this emotional cycle is much simpler because you have already accepted the decision. We are often excited by the opportunity and wonder why others don’t jump on board and get excited too.

If you’re the object of a change, the one destined to receive the ‘benefits’ of change, then your immediate reaction is commonly resistance because you don’t expect it or want it.

Depending on the type of change, the following reactions are common:

- Distortions of perception: “Did he say what I think he said?”
- Recalling previous experience: “Do you remember the last time they did this?”
- Fear of the unknown: “How will this affect me?”
- Need for knowledge: “Must I relearn everything again?”



It can take time to adapt or accept a new situation or circumstance. When we present people with new data, new information and new ways of doing things we are asking them to undergo change.

Change won't be accepted until a good deal of effort has been expended on working through the emotional aspects of the change and not just the logical reasons. What's worse is that until these efforts have been made, people who resist change will expend effort strengthening their own resistance. Involving people from the outset in change processes is the best way to create lasting change.

Stress

As mentioned in the Decision Making Chapter, stress is commonly encountered in farming. Stress in small bursts can be beneficial, sharpening the mind and our decisions. However long periods of stress can have serious consequences.

When we are stressed the head part of decision making reduces and the heart and gut takes over. Emotions and intuition guide our decisions. We tend to do things the way we have always done them, relying on pre-planning, past experiences and knowledge as well as gut feel. Importantly when in this frame of mind, we tend not to want to take on board new information, or to think deeply about a topic or problem.

Recovering from stress

Recovery time from stress is critical. It's not healthy to stay in a stress state for a long period of time. The long term impacts on our bodies can lead to more serious conditions such as heart attacks, strokes, high blood pressure and ulcers. The emotional impacts include depression, low self-esteem and relationship problems.

Don't make any life changing decisions during times of stress as they will probably be made entirely on gut feel and emotion, with very little analysis. Step away and provide some space before making big decisions (see side story – *Some simple ways to manage stress*).

What are some signs of chronic stress?

These signals vary between individuals and can include:

- withdrawal
- anxiety or tension
- poor concentration
- headaches, backaches
- grinding or clenching teeth
- fatigue
- over or under eating
- increased alcohol consumption
- emotional outbursts
- stomach pain
- indecisiveness
- sleeping problems
- inability to focus and get on with normal activities.

Sometimes those closest to you will know when you are stressed, even if we don't recognise it ourselves.



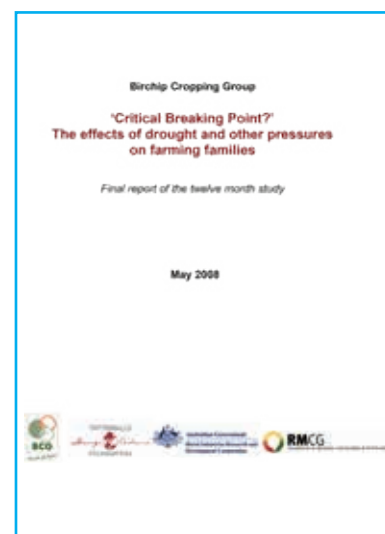
Some simple ways to manage stress

- Keeping some green grass around the house, even in the dry times.
- Organise a corner BBQ – get together with the neighbours.
- Get off the farm – have a break away or even better a holiday.
- Having a boat in the shed or caravan on the coast, something that you enjoy that gets you away.
- Talking to someone removed from the situation.
- Exercise – take up some type of sport, walk on the beach with the dog, join a sporting team.
- Get involved in the local community, join a club or group that is of interest to you, even if it's the last thing you feel like doing.
- Keep telling yourself that this is the nature of farming is cyclical – there will be bumps along the way.

The legacy of long term stress on decision making

Long periods of stress can also alter our personal goals, beliefs and values. The Birchip Cropping Group undertook a large study to understand the impact of the drought on farming families in Victoria's Wimmera - Mallee.

The Critical Breaking Point study aimed to gain a better understanding of the pressures and experiences of farming families in a time of drought. They interviewed 60 farming families over three years (2006 to 2008) to track the experiences during the drought and, it was expected and hoped, a period of drought recovery.



Their key findings were:

1. Farming families ate into their physical, financial and personal/emotional reserves.
2. The effects of drought remained with them for years after the drought ended.
3. The majority persevered and had not been pushed to leave farming (although most have had to alter their personal and professional plans).
4. There were strong differences between the circumstances and outlooks of each farming family.



5. Farming families' awareness of, and sensitivity to, the risks involved in farming was escalated.
6. Many adopted a permanently more conservative approach to production, marketing and income protection.
7. The default position for a minority of farmers is optimism.
8. People remained committed to their sector and communities.

The implications for appreciating the impact of long term stress on decision making are important. After these stressful periods pass, it is not business as usual. The majority of farmers adopt a more conservative and less risky approach (see side story – *Grain marketing after a loss*).

Grain marketing after a loss

The dry seasons in Southern Australia and around the world during the 2000's resulted in unprecedented volatility in grain prices. In a newly deregulated market, farmers moved away from their traditional pool systems of grain marketing to embrace a new world of market opportunities with multiple buyers offering a myriad of market tools and products.

Many farmers took the advice of grain analysts and took forward sales positions on grain production, which as a result of the drought, they either couldn't fill or were nevertheless impacted on financially by selling at a price that was well below the price on offer at harvest. The accumulated stress associated with the loss of potential income in a low income year, of not being able to fill contracts signed up for earlier in the year as the drought unfolded combined with a lack of previous experience in dealing with unprecedented market volatility, meant stress levels became higher and higher as the combination of factors turned against them.

Wheat futures hit all-time highs. Traders on the stock market with experience made fortunes with such volatility while farmer's stress levels rose. Arbitrage opportunities abounded but few took the position to trade out of losses, they 'froze' and watched the arbitrage opportunities disappear before their eyes.

Many farmers who experienced these losses have changed their marketing approaches – and are now more wary about engaging in forward grain sales as a result of the experience.





Personality type

Our personality type influences the way we learn, make decisions, organise our lives and communicate with others.

Understanding personality types helps to understand our own behavioural patterns and that of other family members and our staff, so we can modify how we interact with individuals in our businesses.

There is often debate about personality types, however there is agreement that a significant part of our personality is genetic. While the percentages vary, roughly 40% of personality is genetic, 40% is formed during our formative years (up to about the age of 14) and 20% is through socialisation.

Think about the significance of this in farming businesses! Personality is being passed from one generation to the next and then we influence the values, beliefs and attitudes of our children growing up in that family business.

It is important to recognise that while we have these innate personality preferences, it doesn't mean we can't learn to behave differently. By creating awareness of our preferences and how we automatically react we can train ourselves to respond in a different way when it would be advantageous to do so.



There are useful frameworks to help us identify our personality type, the one used in this document is a modified version of the Myers Briggs Type Indicator (MBTI). This framework provides a useful way to anticipate how people may respond to a certain situation, make decisions, communicate and learn (see exercise – *What is my personality type?*).



EXERCISE: What's my personality type?

There are four different categories in the exercise related to:

- 1. Where do I get my energy from?
- 2. How do I learn?
- 3. How do I make decisions?
- 4. How do I organise my world?

Each of these categories are labelled with a letter, for example in 'Where do I get my energy from?', an Introvert is an 'I' and an extrovert is an 'E'.

At the end of the exercise you have four letters which give a guide to your personality type.

I am a...

Extrovert (E) or Introvert (I)	
Big Picture (N) or Practical (S)	
Thinking (T) or Feeling (F)	
Judging (J) or Perceiving (P)	

Note: If you score equally on each side then read the further insights for each type and decide which is more like you. If you can't decide, ask someone who knows!

Further descriptions of the Myers Briggs Type Indicator (MBTI) provided in Appendix 4.

In using this type of framework it is important to understand:

- There is no good or bad type or personality, it's about acknowledging the differences and recognizing how this can impact on our behaviour and decisions.
- Teams, families and businesses work well with a mix of personality types and can function extremely well when these differences are valued for what each can bring to the table.



Where do I get my energy?

Column A		Column B	
Attuned to external environment		Reserved – drawn to inner world	
Need people for energy		Learn through reflection	
Social and expressive		Build energy by being alone	
Learn through doing and talking		Private and contained	
Broad interests		Work out ideas by reflecting	
Speak think speak		Think speak think	

Mostly column A – **Extrovert** (E)

Mostly column B – **Introvert** (I)

Further insights

There are two main differences between extroverts and introverts. An extrovert will think and speak at the same time whereas an introvert will think and then speak. Both types are processing information – just in a different way, one aloud and the other internally.

Secondly an extrovert gets their energy from other people. They will start to wind down and feel drained if they are alone for too long. In contrast the introvert becomes tired and drained if they are with people for too long. They get their energy from having time out and being alone.

Extroverted farmers will often belong to committees so they have the opportunity to work with others and keep their energy levels up. In contrast an introverted farmer is often happy with his/her own company and is harder to attract to events away from the farm.

How does this impact on decision making?

From a business perspective, the introvert will need time to think through decisions and potential changes to the business largely by themselves, whereas the extrovert will look for a sounding board to talk things through with.



The majority of the farming population is introvert (I) because they like to think things through before acting.



How do I learn?

Column C		Column D	
Focus on future possibilities		Focus on what's real and actual	
Look for patterns and meaning		Factual and concrete	
Big picture, outcome focused		Like guidelines and precedents	
Trust inspiration		Observant, remember specifics	
Want to clarify ideas and theories		Understand ideas through practical application	

Mostly column C – Big Picture, **Intuitive** (N)

Mostly column D – Detail focused, **Sensing** (S)

Further insights

Detail people are practical and down to earth and like to learn using their five senses. They like to start at the beginning and work their way through a process in a logical sequential way. Once they have gone through the steps they will then see the outcome and the bigger picture. They focus on the present and what is real and concrete when learning.

Big Picture people tend to learn the opposite way, they need to start with the outcome and they like to work out the process themselves i.e. they jump in the deep end and figure it out as they go. They love theories, possibilities and learn by connecting patterns or bits of the jigsaw. They are future focused and think about what could be.

How does this impact on decision making?

When strategic planning, Big Picture people love to design the visions, mission and strategic goals while the practical people have great strengths in designing the action plans and what will be done. Big picture people love variety and change while detail people like structure and routine.



Approximately 75% of the farming population are detailed focused (S) because it is hands on and practical.



How do I make decisions?

Column E		Column F	
Analytical		Empathetic	
Problem solving with logic		Guided by personal values	
Can be tough minded		Strive for harmony	
Use cause and effect reasoning		Access impacts of decision on people	
Objective		Fair – want to treat as individuals	
Reasonable		Agreeable	

Mostly column E – **Thinking** (T)

Mostly column F – **Feeling** (F)

Further insights

Thinking people value the logic and analysis in decision making, they see the importance of collecting some information and thinking through a logical process. Feeling types value people in their decision making, they take into account people’s feelings and values when making decisions.

Thinking types can be seen as ‘hard and cold’ compared to feeling types and feeling types can be seen as ‘warm and fuzzy’ compared to thinking types. Thinking types like to come up with logical solutions to problems, they can appear to be negative, the ‘black hat’ in the discussion. They like to critically analyse situations and problems.

Feeling types are great hosts and ‘people people’. They look after the emotional wellbeing of the team and remember important events. They care deeply about what’s important to them. In agriculture, we often see them choosing careers which involve people or caring for the environment.

How does this impact on decision making?

We have already talked about the role of the head, heart and gut in the Decision Making Chapter. The Thinking types rely more on the head and gut, the Feeling types more on the heart.

60% of women are Feeling types (F) and 60% of men are Thinking (T) types.





How do I organize my world?

Column G		Column H	
Organise their lives		Adaptable, like to change course	
Like to have things decided		Spontaneous and flexible	
Avoid last minute stresses		Energised by last minute pressure	
Systematic, methodical		Adapt in a moment	
Make short and long term plan		Open ended	

Mostly column G – Organised, **Judging** (J)

Mostly column H – Flexible, **Perceiving** (P)

Further insights

Organised people like to create order in their world. They like to make plans and follow them. They will make lists and like to make a decision with ‘enough’ information and get onto the next thing on the agenda. They handle time-limits well, planning their life towards a looming deadline. They are more likely to follow the rules.

In contrast Flexible people like to live in a spontaneous and adaptable way. They are more likely to have lots of balls in the air at one time, find it hard to say no and are more likely to procrastinate. They plan backwards from a deadline and often get things finished at the last second. A Flexible person will like to challenge the rules.

For example, imagine you are driving in the country and it’s raining when you come across a sign Dry Weather Road Only. An Organised person would read the sign recognise it has been raining and choose another route. A Flexible person is more likely to want to test the boundaries and will take on the challenge of the dry weather road.

How does this impact on decision making?

This characteristic influences a person’s approach to risk. The Flexible type will be more likely to analyse the risk so as to exploit an opportunity than an Organized person, who will be more risk averse. Organised types like to decide quickly and move on with the plan whereas Flexible types like to postpone the final decision to maintain ongoing flexibility within the plan.



How personality influences temperament

Temperament is the combination of the mental, physical, and emotional traits of a person, which influences what we do. Part of the MBTI results can be used to predict the temperament and therefore behaviour of a person (and by inference, the decisions they are more likely to make).

The temperament testing is most commonly known as the Keirsey model. For this analysis you only need to know if you are one of four MBTI types; an NT, NF, SJ or SP (see exercise – *What's my temperament?*)

EXERCISE: What's my temperament?

Revisit the MBTI exercise above.

1. From the **how do I learn** part determine if you are an intuitive (N) or sensing (S) person.
2. If you are an intuitive person (N), then go to the **how do I make decisions** part and determine if you are a thinking (T) or feeling (F) person. You will have a result of NT or NF.
3. If you are a sensing person (S), then go to the **how do I organise my world** part and determine if you are a Judging (J) or perceiving (P) person. You will have a result of SJ or SP.
4. Then read the descriptions for the chosen category (below) bumps along the way.

My Temperament

While there is nothing black and white about personality types, the four temperament groups do have distinct characteristics that help describe differences in the farming population. In this booklet each category has been given a name to align more with farming and agriculture. The proportion of farmers in each of these four categories can be compared to the broader Australian population (taken from Strachan, 2011).

NT – Pioneers

Pioneers will try almost anything and will often be the first in the district to try something new. While they love getting their teeth into the start up, they have to concentrate to sustain interest once the project is past the design phase.

Pioneers are consistently good at generating new ideas. Their strengths include problem solving, strategic planning and understanding complex systems. They see patterns in



complexity and are the innovators of new technology. Their potential weakness is failing to focus on the needs of other people because they are too wrapped up in the next thing.

Approximately 15% of Australian farmers are this temperament, compared to nearly twice this number in the general population.

NF – Team builders

Team builders are genuine people with integrity. They always trying to reach their goals without compromising their personal code of ethics. They speak mostly of what they hope for and imaging what might be possible.

They tend to focus on the people needs of a business or community and make great community leaders. They support inclusive decision making and firmly believe the strength of the business lies in the people. Their strengths include developing a vision and empowering others to join them. They often avoid conflict, strive for harmony and may ignore problems in the hope that they will go away. Team builders are more likely to recognise the sometimes difficult role women can experience in farming businesses and where conflict can arise. They recognize the differences between genders and work to accommodate these (see side story – *A few considerations about gender*).

Only 5% of farmers are team builders, compared to nearly four times this in the general population.

SJ – Dependables

These people are careful and reliable. They seek social stability, order, security and loyalty. They value the industry they are in and like the sense of belonging (I'm a farmer, I work in agriculture).

Their skills include attention to detail, reliability, dependability and a capacity to work to a deadline. They are practically orientated and need to see results for their work. They like solid facts and are good at developing policies and procedures. They dislike change for change sake.

Dependables will take on new innovation once it has been tried and tested and a process or guideline has been developed, usually by the pioneers. They are stressed by rejection and others not following the rules or/ and ignoring deadlines.

More than half the farming population are dependables, a much greater proportion than the general population (42%).



A few considerations about gender

Consider these possible gender differences on farms and what they may mean to decision making.

1. Men and women are hardwired differently. Men have 10 times the testosterone than women and this impacts on decision making particularly in relation to risk. The higher levels of testosterone increase risk taking behaviour, particularly after a run of wins – the winner effect. Women are more likely to take smaller risks.
2. Many women carry out the bookkeeping on farm and complete the BAS and these tasks keep them focused on the important cash position of the business. Their 'filter' in decision making may be clearly focused on the cash while the male partner's 'filter' may be one of profit or gross income. Conflict may arise when the women are not included in the bigger picture planning and the need for unplanned cash expenditure.
3. Some young women are embraced into the family farming business while others are treated with suspicion and caution. In some businesses there is an underlying fear that marriages will break down and the farm will be lost. It is important to consider the position of these young women – they fall in love with a man and find themselves married not only to him, but his family and family business as well, and often requires leaving their career and own family many miles behind.

Compounding this is they live in someone else's home, often live on a tight budget and work very hard. Isolation and poor succession planning often alienates them further. The impact of this can be far reaching and not only in terms of divorce. While partners are working long hours out on the property, these young mothers are a key influencer of their children during their formative years, passing many subtle messages about farming and the business on to their children, often unaware of the impact of their words and deeds. If we want the next generation to consider farming as a career, we should consider carefully the subconscious messages that are being passed on.

4. The grumpy grandma syndrome, where the female partner becomes disgruntled around the time of retirement. She has often given up many of her goals and aspirations so the farming business can come first. With retirement looming she may become resentful and believe it should be her turn now. Clarifying business and personal goals as part of regular business planning lifetime as well as retirement dreams should be an integral part of any business and help avoid the grumpy grandma syndrome.



SP – Doers

Doers value the here and now and get things done. They are at their best in a crisis, have a good sense of timing and don't mind taking risks. They will do whatever works for a quick and effective payoff even if they have to ignore convention and rules.

They are good with detail, realistic, open minded and fairly tolerant but are impatient with theories and abstractions. Doers are often tempted to do it now and fix the details later.

There are twice as many doers in Australian farming (~25%) compared to the general population.

Implications of personality type and temperament on farm decision making

A range of skills are required in a farming to optimise business performance. A farm operation needs the capacity to implement a production systems to grow grain, meat, wool and milk within the capacity of the natural resources and variability in climate. But the farm business also need to plan, to innovate, to sell the commodities produced, to meet compliance requirements and manage people, commonly family members.



Farmers are often 'jacks of all trades' but often are only 'masters of some'.

Different temperaments and personalities bring different motivations, attitudes and skills to various tasks. They will be attracted to certain tasks, enjoy doing them but will also be less well equipped to do other jobs.

A few key areas that are important in the effective functioning of a farm business are discussed.

Allocation of jobs

Different personality types will have a preference for different jobs within the business and it is important to recognise where the strengths are and where the weaknesses may be.

Dependables, which are the majority of farmers, need to be given tasks and complete them. This personality suits many farm jobs that are practical but may appear repetitive to other types e.g. seeding, shearing, harvest, hay making and marking. They are also good with machinery maintenance. On the administration front, they can make good bookkeepers and Work Health and Safety officers, where guidelines of how to do things are provided. Get dependables to 'do' farming.

Doers are also task oriented, but relish finding ways to make it happen even if it involves cutting corners a bit and taking a punt that it's 'about right'. They are good at times of



crisis, rising to the challenges and finding ways to keep going. They work well under the pressure of the busy times in farming. Put doers on the tasks that are time critical.

It is not surprising that dependables and doers make up more than 75% of farmers, because farming is seen by many as a 'doing' occupation, a production industry.



Pioneers love to develop plans, both long term and seasonal. They need to be learning new things and working out things for themselves. New technology appeals to them as does implementing new techniques and designing new ways of doing things. They hate to be given instructions and told to follow them. Once something new is mastered they like to hand it onto someone else so they can get onto the next thing. Only 1 in 7 farmers have a personality type that likes to plan and find new ways to do things! Get pioneers to do the planning and innovate for the business.

Team builders are great people managers but only 5% of farmers have this personality type. They are great human resource managers, ensuring the staff and family members are happy working within the business. They will often also be the environmental manager of the business and strongly value passing the property on in a better state to the next generation. Like the pioneers new technology and systems appeal to them, particularly if it relates to making the workplace more harmonious. Get team builders to manage who does what.

In addition to these temperaments consider the MBTI section on *Where do I get my energy?* Extroverts are better when working with people than alone for long periods of time. If you send an extroverted young worker off fencing for long periods on their own you may find their work rate deteriorates. Instead send them off in pairs with someone to interact with and they will happily do the task for much longer.

Communication of tasks

Communication is critical in operations that involve more than one person in the business.

Dependables and **doers** need clear instructions and a process to follow. Their strengths are attention to detail and ensuring tasks are carried out correctly. Their preference is to be taken through the steps and then have the task linked to the bigger goal or farm outcome so there is clarity in the purpose of the activity.

Pioneers and **team builders** need to see the bigger goals or outcomes first and then be provided with the task. They need to see the links to the purpose of the task (why are we doing this?) before being having the task explained to them. Both of these types prefer to be involved in designing how they would do the activity rather than being told what to do. Their strength is in designing and developing the process.



Adoption of technology and practices

Adoption of new technology and practices is a feature of agriculture and the pathway to improved productivity. However not every temperament is excited by the prospects of something new.

Pioneers will get excited about the possibility of new technology (e.g. a yield monitor on the headers or auto steer machinery). They can see how the information could be used and what the benefits may be. They are often lead the way with adoption of something new as they are happy to 'work it out' as they go along.

Doers, with their larger appetite for risk, will jump on board with a new technology after watching over the fence and seeing it work for the pioneers. They are prepared to take it on without all of the processes in place as long as they can clearly see a practical concrete benefit to their business.

The **dependables**, with attention to detail, are more likely to wait until the **pioneers** and **doers** have 'ironed out the bugs' in the innovation before adopting. They like to have the guidelines or framework to follow which has few gaps and few risks.

Team builders will adopt a technology at any time as long as they believe it will make the life of their workers or family easier and more satisfying. They are happy to pioneer new innovation and technology if it's in line with their personal values, interests and goals.

Making decisions

Personality and temperament affects how people make decisions. Appreciating the personality type can help to explain why people make the decisions they do.

The majority of farmers, the **dependables**, like to make decisions in a timely way and then move on. They don't like to be provided with masses of information just the concrete practical facts in a logical sequential way that is essential for the decision. They take into account what their neighbours and peers might think before acting. However they are less likely than other types to dwell on decisions; once made they move onto the next thing at hand.

Doers, like the **dependables**, prefer concrete practical facts in a logical way without masses of information. They are more likely to either jump onto the decision, to act so things get done.



Pioneers like to explore the possibilities and options in a logical way before they make a decision. They will not be concerned what the neighbours or peers think about what they are doing as long as it's right for them. They enjoy brainstorming, researching and testing theories before making a decision.

Team Builders will consider people first in their decision making, they like to know people's feelings and values (including their own) have been taken into account. They also like to see how the decision connects to the overall outcome or vision of the business.







Chapter 3 Farm business basics

The bottom line in agriculture

Many people (and most farmers) in Australia would agree that agriculture can be a great industry to be involved in. Yet history shows that many people have opted out of the industry seeking better fortunes in other areas.

This chapter explores some fundamental concepts around what makes a farm business tick from a financial perspective. A more comprehensive discussion around farm businesses management is provided in two excellent publications, *Farming the Business – sowing for your future* (Krause, 2014) and *Financing your Farm – A practical guide to financial growth* (Blackburn and Ashby, 2007).



It is important to appreciate that people farm for more than just money, they do it for social and environmental reasons or values as well. Everybody will have a different perspective on what they are seeking from being involved in the agricultural industry.

Economists have come up with a name for the value people seek from farming, a thing called utility (See side story – *The concept of utility, the triple bottom line*).

The concept of utility, the triple bottom line

If you talk to a farmer about utility, most will think it is an invaluable piece of machinery, with four wheels and available in many colours (but usually white). Speak to an economist and utility refers to the financial, social and environmental values, the triple bottom line.

Few farmers are in agriculture for financial gain alone. While profitability is clearly an important element, and many advisors think it is the primary motivation, other components of the triple bottom line like job satisfaction, family and environmental aspects will always play an important part in decision making. Farmers will often accept poorer financial returns as a trade-off for some of these other perceived benefits. See if you recognise some of these statements that reflect the utility of farming.

"My role as a land manager is to hand my farm onto the next generation in a better condition than I inherited it – if I have to forego some profits to achieve this then so be it"

"I love the aspect that all the family are involved at harvest- it is great working together"

"It's a lot easier to be green when you are not in the red!"



The importance of cash flow, profit and wealth management

A fundamental requirement for a sustainable business is to be profitable and financially viable. To achieve this requires a clear understanding of how profit and wealth is created in a farming business and how important it is to manage costs and cash flow.

Cash flow

Cash flow or liquidity refers to the money received into the business during the year and can affect the short term viability of a business. Sufficient access to funds (cash flow) is critical because this money is used to pay for inputs required in the production system. These can be direct input costs such as fertiliser, supplementary feed, herbicides and fuel as well as overhead costs such as electricity, living expenses and insurance. It can also be required to pay for other commitments such as tax liabilities, GST and capital expenditure.

Restrictions on cash flow can prevent important and time sensitive decisions from being implemented, resulting in less than optimum production (see side story – *The value of having a short term credit facility*). It can also mean products may have to be sold immediately they become available, rather than at a timing that increases potential income.

The value of having a short term credit facility

Short term credit can be expensive, depending on the facility offered, but so can not having credit available at critical times.

Consider the example of expenditure on an input such as urea on a crop. We estimate the additional fertiliser (\$50,000 of urea) will grow more significantly more grain, but we don't have the cash in our account. Is it worth using a credit facility?

Expected additional income	\$100,000
Additional variable costs	\$50,000
Additional overdraft interest on \$50,000 for 6 months @ 7% PA	\$1,750
	\$51,750
Expected net return from applying urea	\$48,250
Return on investment in urea (\$48,250/\$50,000)	96%

So the return is 96% on the money borrowed.



The nature of primary production means that income tends to be received in fewer, but generally larger amounts, while expenses tend to be in smaller amounts but more frequent. This usually results in the business having a peak debt which tends to fall at a similar time each year e.g. prior to sale of spring lambs in October or receipt of grain income in December.

Most farm businesses use some sort of short term trading account from a financial institution to cover short term requirements. The traditional facility is the overdraft. The expectation is that this type of facility would be cleared (i.e. move into credit) at least once each year (see side story – *Is my cash flow good, bad or ugly?*).

Is my cash flow position good, bad or ugly?

A few simple questions to examine the working account of the business and the cash flow budget can be quite informative. Consider these:

- Does the overdraft account move into credit at least once during the year? If so, by how much and how has this changed over time?
- In which month does the overdraft account peak? Has this changed over time with changing strategies e.g. enterprise mix?
- Are any surplus funds (i.e. when the overdraft is in credit) being used effectively either within or outside the farm business?
- How has the peak debt of the business increased over a number of years? If it has, is there an obvious reason (e.g. land purchase) or is it a symptom of annual expenditure consistently greater than income?
- Are major capital items being purchased out of cash flow or are these being financed in another way?
- Is profitability being compromised by the need to achieve income flows to meet expenses? Can the timing of major expenditure items be altered to better fit with cash incomes?
- Is there usually some margin between peak debt and the overdraft limit available for contingencies or unforeseen circumstances?

Where an overdraft is provided, it is common to also have additional facilities such as term loans or equipment finance to service longer term funding requirements (e.g. for capital purchases such as land or machinery). In more recent years, demand has moved more towards provision of Lines of Credit (LOC) where short and longer term funding needs are rolled into one facility.



Funds to cover cash flow requirements can also be obtained from commercial sources such as input suppliers (seed, fertiliser, chemicals) and possibly grain buyers through advance purchase options. Credit cards with substantial limits may also be used. Some of these options can be expensive so it is necessary to look at the underlying interest or holding costs.

Businesses which operate in credit can take a different approach. Such businesses need to decide where they will invest their surplus funds. It is possible and often likely that investment in other areas, either on or off farm, will result in better returns than using these surplus funds to meet on-going cash flow needs (for further discussion in this area, refer section on opportunity cost and spending the marginal dollar).

There are a number of software packages available to help create a cash flow budget. A simple computer based spreadsheet is commonly used. The GRDC also has some very useful tools to help www.grdc.com.au/GRDC-FS-FFT-CashFlowBudget.

Profit

For any business to be sustainable, it must be profitable over a run of seasons. Profit provides income for the business proprietors, by providing funds for both consumption in the short term and the building of wealth in the long term.

In simple terms farm profit is the annual gross income less annual costs. Due to the seasonal nature of agriculture, farm profit is normally accounted for annually, compared to some other business that report quarterly or every six months.

Farming is similar to any production business, to grow enough products at prices to exceed all production and overhead costs. The surplus remaining is the profit. However there can be different definitions of profit, depending on what costs are included and excluded and whether the figures are being used for taxation or management purposes. The levels of income, inclusion of different types of costs and the resulting profit used in this booklet are shown in Figure 3.

Be aware that high productivity does not always equate to high profitability. A business can operate profitably at quite low production levels per hectare if appropriate control of costs and natural resources are maintained.

The GRDC has produced an excellent factsheet to help prepare farm profit budget (www.grdc.com.au/GRDC-FS-FFT-ProfitLossBudget).



Gross margin

Many external factors influence the gross margin obtained (i.e. the gross income less production costs). Weather and markets are obvious external factors, but the decisions of the farm manager also has considerable impact. These include things like:

- Production skills in agronomy and animal husbandry.
- Choice of enterprise selection, in particular taking into account risk and return.
- Choosing to produce a bulk commodity or a differentiated product.
- Choosing the desired allocation of labour and capital.



While variable costs are different across farming regions and industries, these expenses are typically less than 40% of total costs.

It is uncommon for production businesses in agriculture to report negative gross margins, except when production failures occur due to severe climatic conditions e.g. drought, severe frost, pests etc. Usually the value of production meets or exceeds the direct input costs to produce the commodity. The main challenge to profitability then becomes the ability of the gross margin to meet all overhead costs with a surplus to cover the operator's needs, including growth.

Overhead costs

Overheads are the costs that we have to pay even if we sat on the farm and did nothing for the year. In this booklet overheads include the direct farm wide cash costs such as rates, administration, insurance, electricity etc. Overhead costs also include depreciation, owner / operator allowances, interest and lease payments. Other types of analysis often separate the different types of overheads, but for our purposes they all have to be serviced from the gross margin if we are to make a profit. The critical number is knowing if the business has made a profit before tax.

Unlike enterprise costs which are assigned to a particular commodity, overhead costs are spread across the entire business. They can be difficult to reduce directly because of the types of expenses incurred e.g. council rates, finance costs, insurance etc. Influencing overhead costs is primarily through scale and efficiency of operation. It is not always achieved by increasing size.

Overhead costs are typically 40% to 60% of gross income so are an obvious area to look for savings.





Figure 3: Components that make up net profit

Gross income (price x quantity produced)

Enterprise costs

Gross margin

Farm wide costs

Operator costs

Finance

Lease costs

Depreciation

Overhead costs

Net profit

Tax costs

Money for additional consumption and/or growth (wealth creation)



Gross income. This is the multiplication of quantity produced (yield) by the price received.

Enterprise costs. These are sometimes called **direct** or **variable** costs and include items such as seed, fertiliser, herbicides, supplementary feeding, fuel, shearing, transport, casual wages etc. They vary depending on the level of production.

Gross margin. It is the gross income less the enterprise costs and is commonly used to quickly compare between different enterprises (e.g. sheep to cropping) or within an enterprise eg wheat to barley.

Farm wide costs. These are sometimes called **fixed** costs and include items such as rates, insurance, electricity, accountant costs, office expenses, general repairs and maintenance etc. They do not vary greatly as levels of production vary.

Operator costs. These are the costs for owner / operator wages and drawings.

Finance and lease costs. This refers to the money required to meet financing arrangements with a lender. Lease costs are included here because it is considered similar to purchasing land and paying the interest and principal costs.

Depreciation. This is the calculated loss in value of items, usually machinery, as they are used and/or get older. It is the implied costs that needs to be put aside to replace the same item with something new. It may be poorly accounted for during periods of poor profitability.

Tax costs. This is the money owing based on the net profit (after all legitimate business costs are removed).



Scale

Increasing scale to reduce overhead costs makes sense when there is capacity to do more with what we already have. Farming more land with existing equipment and available labour dilutes overhead costs because it is spread over more area. As economist Tim Hatching says “scale is not size, scale is about margin”. If increasing size, say by buying land, leasing or the purchase of larger capacity machinery increases repayment and depreciation costs more than the gross margin generated, then overheads will rise, not reduce.



Scale is not size, scale is about increasing margin.

Increasing farm size has been a feature of Australian agriculture for many decades. However downsizing to consolidate overhead costs, commonly by using contractors, can be a more sensible way of reducing overhead costs. The challenge for any farm business, in a competitive environment, is to be able to access the efficiencies associated with scale irrespective of the businesses current size. Using the competitive advantages of a business is critical in achieving this (see section on competitive advantage).

There are numerous benchmarks to examine efficiencies of scale, such as DSE per labour unit, dollars invested in machinery per tonne of grain produced, gross income per labour unit etc. These can be useful to appreciate efficiencies in a farming business.

Cost of Production and its link to profitability

As mentioned previously a profit will occur when a business is able to sell its products for more than it costs to produce them (providing all costs are allocated correctly). Therefore it makes sense to know the cost of production (COP).

It is important to recognise that the unit costs of production (i.e. the cost per tonne of grain or per head of livestock) is driven by productivity. Low productivity such as that occurring in drought years can see costs per unit output at very high levels and generally at much higher levels than the returns that the commodities will bring in the market place. The opposite of course occurs in high production years, where good profits can be achieved by low unit cost prices and fair market value.

While some may question the ‘value’ of the COP number (see side story – *The pros and cons for calculating cost of production*), it can help to identify the components that make up the COP figure and what strategies could be employed to lower them. The five major cost centres are:

- **Enterprise costs:** These will typically comprise less than half of the total costs of production. The focus here is production economics and scale should not have a significant bearing on the result.



- *Overhead costs:* These tend to be relatively constant from year to year and are influenced by scale.
- *Machinery Costs:* Gaining operational efficiency through work rate and scale are the major driver for reducing COP.
- *Labour:* As with machinery, operational efficiency with labour input has a major influence on COP.
- *Capital:* This is the area which is often overlooked when assessing COP. Capital tied up in land needs to be accounted for, usually by allocating a lease value. Scale will generally not have a significant influence here, however productivity tends to have a good relationship with capital values.

The pros and cons for calculating cost of production

It is a commonly held belief that knowledge of the COP for individual enterprises is a valuable measure of the level of prices required from the market place to achieve a profitable outcome.

However there is an academic view that COP as a measurement is irrelevant for a price taking, export driven, commodity production system which typifies much of broad acre agriculture in Australia. The argument against the COP calculation is twofold:

1. It is almost impossible to calculate COP with a high level of accuracy given that many of the parameters involved in the calculation are subject to individual interpretation and allocation across enterprises.
2. In the final wash up, COP has no influence on the price actually received in the market place given that commodity prices are set by supply / demand factors. Producer's margins will not drive market sentiment in any way and may well be forced to accept a price lower than the COP because of other circumstances e.g. cash flow requirements.



Notable differences between cash flow and profit calculations

A cash flow budget will include most income and expenditure items which are relevant to assessing the profit performance of a farm business. However there are important differences in the treatment of some items:

- *Timing:* Cash flow is all about the timing of the income or expenditure item, whereas profitability can relate to inventory changes e.g. changing from full lamb sales to a self-replacing ewe flock could significantly adversely affect cash flow within the year but annual profit may be similar.
- *GST:* Cash flow budgets should include GST payments with offset (contra) payments as Business Activity Statements (BAS) are completed by the business. Profit and Loss statements are completed net of GST.
- *Machinery expenditure:* Should be included in cash flow budgets, whether these are purchases or lease, hire purchase or loan repayments on major machinery items. In a profitability assessment machinery is depreciated i.e. the cost of machinery to the business is the difference in value between the start and the end of the profit reporting period. Any interest on loans used to purchase machinery is regarded as a separate cost.
- *Taxation:* Include in the cash flow budgets any known or expected income tax liability. Profit statements are initially calculated prior to any tax liability being assessed.
- *Owner's drawings:* A cash flow budget should show the actual level and timing of drawings being taken by the owner / manager. On the other hand, a profit statement should include a managers allowance which reflects the true value of their input to the business (often this could be the opportunity cost of their labour and management input if put to an alternative use).

Assessing profit performance

Business profitability can be assessed both historically and into the future. Sadly farmers have been notoriously bad at doing either. Any historical assessment of profitability is usually limited to compliance requirements for income tax purposes. Similarly, it is rare that farmers will complete strategic assessments of future profitability. These tend to only occur when forced by the prospect of a significant capital acquisition or pressure from a financial institution.

Although agriculture is fundamentally a biological system and profitability can be compromised by factors beyond operator's control, it does not diminish the value of actively monitoring profitability as an input into business management.



As mentioned several times in this booklet, profit in agriculture is a means to an end, not the end in itself. What is sufficient profit for one person, family or business will be different to another. Therefore to decide if the profit your farming business is adequate, you first need to know what profit you need to achieve. Try the exercise – *Yes, I reckon I can live quite well on that!*

EXERCISE – Yes, I reckon I can live quite well on that!

What constitutes acceptable profit is clearly an individual judgement. Desirable outcomes will vary between operators. An elderly couple nearing retirement may be happy to forego monetary profit for extra time spent on adventures away from the farm. A young operator in expansion mode may be prepared to work long hours for little income if it increases his capacity to fund future property purchases.

How much profit do you need?

- Consumption

- » Living expenses _____
- » Holidays _____
- » Vehicle replacement _____
- » Kids' education _____
- » House renovations _____
- » Presents for the partner _____
- » Income tax _____
- » Other _____

- Building of Wealth (Growth)

- » Debt reduction _____
- » Capital expansion _____
- » Superannuation (retirement saving) _____
- » Off-farm investments _____

TOTAL _____



Another consideration is to realise that as inflation and disposable incomes increase in other sector of the economy, more profit is required just to maintain current standards and make agriculture attractive to new entrants.

Sociologist, Neil Barr, points out that household disposable income in Australia increased in real terms (accounting for inflation) by about 50% between 1994/95 and 2008/09, with a widening gap between the highest 10% of people and the lowest 10% (Figure 4). However in more recent time household disposable income has plateaued. From a farming perspective. It is reasonable to expect that farm profits needs to keep pace with this.

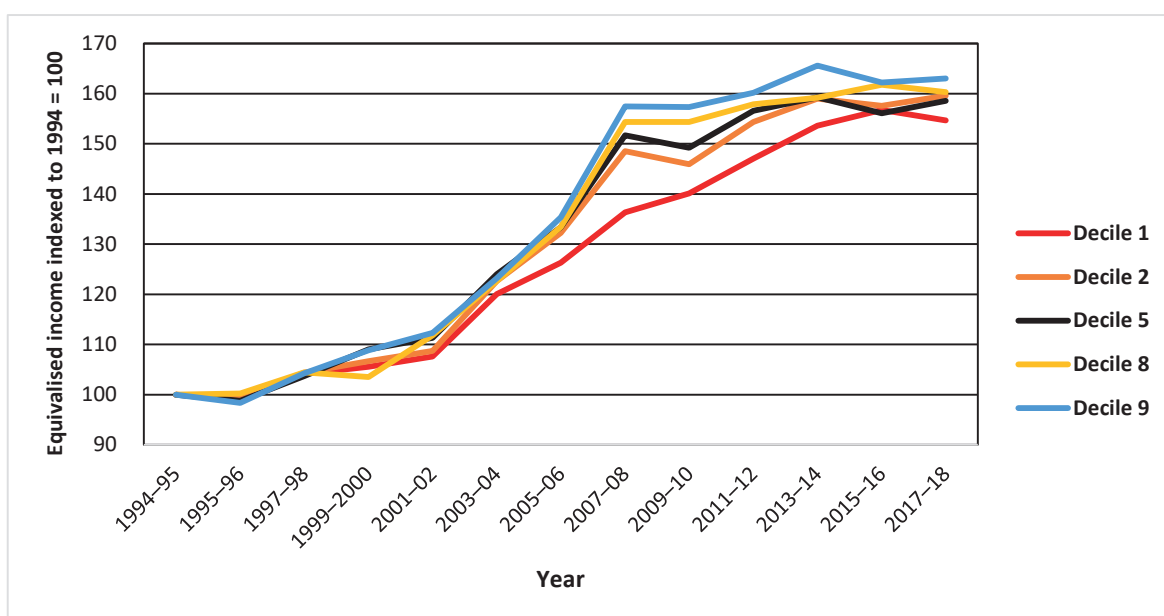


Figure 4: Change in Australian real disposable household income 1994-95 to 2017-18

(Source: ABS, from Barr, 2014)

Business Profit vs Taxable Profit

There is a clear distinction between the profit which needs to be reported to the Australian Taxation Office (ATO) and any profit assessment which is meaningful for business management. Given tax records must be completed by law and management records are discretionary, the information provided to the ATO is a good starting point providing the different treatments of income, expenditure and capital items are understood.

Tax returns are generally prepared from an accurate set of financial records (invoices, reconciled bank statements) and therefore contain very good information on income and expenditure levels along with potentially useful data on some asset and liabilities.



The biggest downside is that the time frames are usually different i.e. financial year (July to June) for the ATO vs a seasonal production year for most management (often calendar year). Expenditure and income reported in the taxation statements will tend to cross over to two different seasons.

An excellent fact sheet on how much your tax return tells you about your business is available from the GRDC (www.grdc.com.au/GRDC-FS-TaxReturn).

Profit and Taxation – getting the balance right

Profit is required for both consumption and growth and the majority of this occurs after tax has been paid. While income tax minimisation is a reasonable and legitimate goal of a business, it should be balanced against other priorities. There are many effective ways of managing taxable profits and agriculture has very good taxation accountants whose role is to advise in this area. But be prepared to accept that paying income tax is a necessary evil and a sign that the business is producing profitable outcomes.



If you are paying tax, then you must be making a profit.

Businesses should always make a point of reviewing their profit performance prior to the end of the financial year, to allow the opportunity for effective taxation management if required.

The effect of profit averaging (marginal tax rate)

Primary producers can elect to average their incomes over a five year period in calculating the income tax rate which will apply in the current year. This means one good profit year, which on the surface may suggest a lot of tax is payable, will be reduced because of the offset from other lower profit (or loss) years. It is the five year average income that should inform the decisions to reduce tax. Your accountants will be able to advise on the effective marginal rate which applies to the averaged taxable income.

Average taxable income is an important number because a farmer can quantify the tax saving benefit if they chose to spend money before the end of the financial year on tax deductible items such as inputs or machinery.





The potential benefit of expenditure to reduce a tax liability varies depending on the size of the taxable income. For example, following a series of high income years, the marginal tax rate could be quite high (approaching 50%) and any tax deductible expenditure effectively receives a very large discount. Bringing forward necessary expenditure from future years makes a lot of sense in these situations. On the other hand, if faced with an already low marginal tax rate, reducing this further through expenditure has less effect. In these instances, decisions around purchases should not include any significant value considerations from taxation savings.

Farm Management Deposits (FMD)

These are term deposits made by individual producers (with compliant financial institutions) which receive interest at commercial rates but removes this income from the taxable profit, thereby allowing the deferral of taxation liability until some future time. These FMDs can be an effective way to manage taxation liabilities by moving taxable income from high profit years to poorer profit years. They can therefore form part of an effective risk management strategy in helping to cope with the high variability of agricultural production and prices. There are important rules which need to be followed when using FMD's so seek advice.

Wealth

Wealth refers to the accumulation of money and assets (capital) after all liabilities have been accounted for. The largest assets in most farming businesses are land, machinery, livestock and other infrastructure. The greatest liabilities are usually in loans and other financing.

Equity is a calculation used to assess wealth. It is the amount of assets that are actually owned, after taking into account all external liabilities. It is commonly expressed as a percentage. Gearing or leverage are other terms used and refers to how much of the business is funded by the owners compared to borrowed funds.

High levels of equity are generally seen as an advantage because:

- Financial costs are lower (lower interest charges) which should have a positive impact on profit.
- It allows lenders a greater level of security which will generally result in better terms available for borrowings.
- Gives more 'breathing space' in the face of adverse circumstances. Access to additional funds should still be available if seasons or prices are poor.
- Gives room to move if opportunities present e.g. additional land purchase.



On the other hand, high equities may not be the best policy if wealth accumulation is the major goal. Most advisors would suggest that some level of debt and gearing is advisable over the longer term. Using other people's funds to grow a larger business can be a desirable outcome if this is your goal (see exercise – *Is the debt I'm carrying good or bad?*).

In capital-intensive industries such as agriculture, the following are often cited as guidelines for assessing owner equity:

- Greater than 90%: Strong – Assess investment opportunities (on and off-farm).
- 70-90%: Satisfactory, consider consolidation and on-going development of the asset base.
- Less than 70%: Potentially weak with poor resilience to adverse circumstances.

But these are general and should be adjusted for:

- Lower rainfall and more climatically variable regions because they often need a higher equity as a safe margin. However they generally have the ability, under favourable conditions, to recover quicker from more extended positions.
- More intensive industries (e.g. dairying, pigs, poultry) with reliable cash flow means they can usually handle lower levels of equity.
- More diversified businesses (e.g. those with a mix of livestock and cropping) are more likely to be able to recover from lower equity positions than more specialised farms.

Additional information on understand equity and the balance sheet is provided in a GRDC fact sheet (www.grdc.com.au/GRDC-FS-FFT-BalanceSheet).



EXERCISE: Is the debt I'm carrying good or bad?

There are two measures that can help understand if the debt in a business is assisting or hampering growth. These are the return on total capital (ROC) and return on owner equity (ROE).

1. Return on Total Capital (ROC)

Return on Total Capital indicates the % pre-tax money made by having assets of a certain value tied up in farming. It allows consideration of other possible returns for the capital e.g. compared to the % return in a term deposit with a bank. It is measured by comparing Profit before interest and tax with total assets used to make the profit.

[Calculation = ((Earning before interest and tax)/Farm Assets)]

So a business that has \$2M in assets (land, machinery, livestock and infrastructure) that made a net profit of \$100,000 has a ROC of 5%.

2. Return on Owners Equity (ROE)

This indicator measures the return on investment of the owner's capital in the farm business. It is measured by comparing net profit after interest with owners' equity.

[Calculation = ((Net Profit)/Farm Equity)]

So a business that has equity of \$1.5M (but \$2M in assets) that made a pre-tax profit of \$50,000 (because \$50,000 was paid in interest) has a ROE of 3.3%.

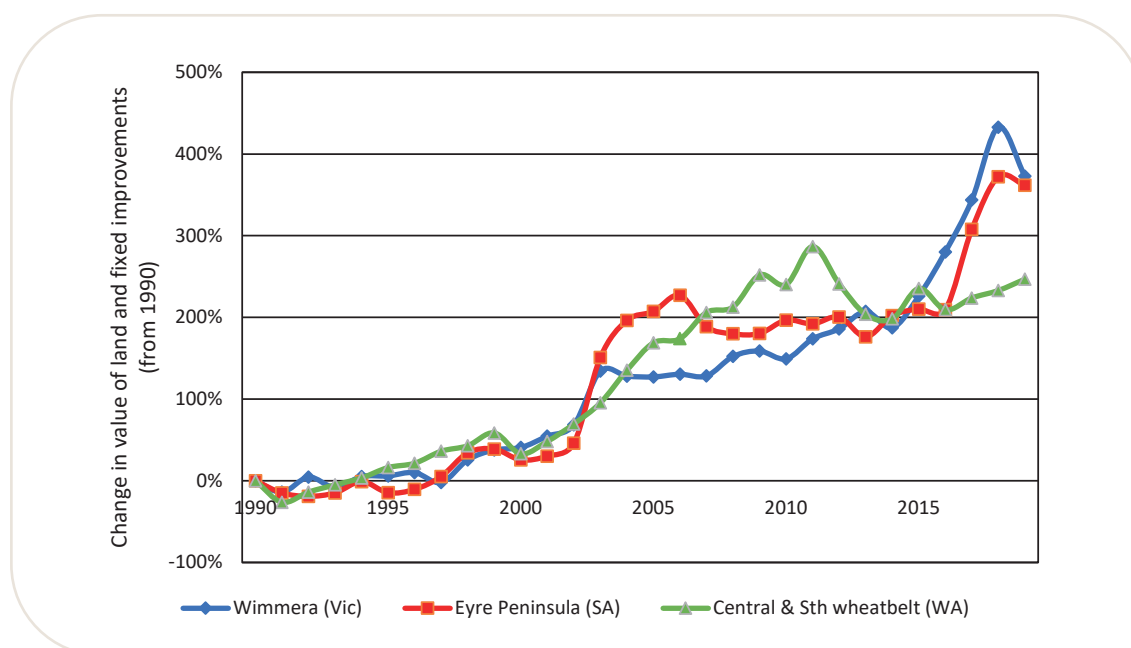
Consider the two following capital analysis ratios. If:

- **ROE > ROC:** Debt is adding value to the wealth of the business. That is, the debt finance expense is less than the return from the assets it is financing.
- **ROE < ROC:** The cost of debt is greater than the return delivered from the assets purchased via that debt. This is the case in the above example where the ROE = 3.3% and the ROC is 5%.

Note: The above calculation of both ROA and ROE is cash only and does not include capital appreciation. In many cases, while it might be the situation that from a cash perspective the cost of debt is greater than the cash return, once capital appreciation is included, the total return being derived from the asset is often greater than the cost of debt.



Wealth will fluctuate in most farming businesses. This is caused by a combination of the annual profit (or loss) generated in the business and the value of the major assets. For some assets like land and capital improvements, this value will tend to increase over time (Figure 5), for others like machinery it will decrease. Therefore the wealth of a business will change annually, although the trend in equity over a number of years is generally a more meaningful measure than annual fluctuations.



» **Figure 5:** Change in value of land and fixed improvements from 1990 to 2019 for three mixed farming regions in Australia. (source <http://apps.daff.gov.au/AGSURF/agsurf.asp>)

Production and assets can both create wealth

Most farm business managers are running two businesses, one a rural production business while the other business is effectively an investor, making a return from the land asset.

Wealth from land ownership is created from changes in land value over time, along with some sort of market return for the use of the land. However market rental is usually only imputed and rarely charged to the farm business, so the wealth is just from increased land value. Yet the imputed cost is an important expense which needs to be considered (refer to section on opportunity costs).

Historically there has been a perceived link between the productivity of the land and the wealth that can be created from owning it. The feeling now in some regions in Australia



is that there is a disconnect between land values and productivity gains that are currently being made. That is, land prices are going up but no more productivity is being generated from the land. This has implications for a farmer's equity position, by increasing equity while prices rise, but could be reversed quickly if land values were to decline.

The rural production business usually involves the provision of labour, inputs and management along with machinery and livestock to produce agricultural commodities such as grain, meat and wool. Commonly the production business is often on land also owned by the same business. This can sometime blur the understanding of which business is contributing to the wealth of the business. For example solid increases in land values can mask the poor performance from the production side of the business.

Other Important Business Concepts

Benchmarking

Benchmarking is an analytical way of understanding efficiencies in a business. It is simply the comparison of select components of business performance compared to a set of standards or best practice (often derived from what the best comparable 10% or 20% are doing). The measures are usually a ratio of limiting resource inputs such as area of land (per ha), rainfall (per 100 mm growing season rainfall), labour (DSE/labour unit) or money (% of assets managed).

Many farmers are sceptical of the value of benchmarking, commonly saying "my farm is different" and "we are not comparing apples with apples". While some resources will vary between and within farms e.g. soil type, topography and rainfall at critical times of the growing season, others will not.

There is wide disparity between business performances across Australian agriculture. Assessment of profit performance consistently shows the top performers substantially out competing the majority. This doesn't necessarily relate to what the businesses do, it is more about how well it is done. At the same time all businesses are not created equal and this particularly relates to the size of the business.

This is where some good benchmarking can be useful in identifying potential weaknesses (for example, machinery or labour inefficiencies) which may be impacting on business profitability. Refer to the GRDC fact sheet on benchmarking for more information (www.grdc.com.au/FBM-Benchmarking).



Opportunity cost

There are usually a number of ways in which we can choose to use goods and services. Each of these choices will give an expected outcome (or *utility* as discussed earlier). Opportunity cost refers to the value of the good or service if it was to be used for something else. Understanding opportunity cost (and correctly identifying the value) is important to avoid bias in decision making.

As an example, a farmer decides to conserve some fodder by making hay. There are three broad alternatives or opportunities to use this fodder; store it for a 'rainy day', sell it or use it soon after making it. If the fodder is stored then there is a cost in the form of unrealised income. If it is sold, then the opportunity cost is the purchase of other fodder (if needed) or potentially the lower animal performance because the livestock are underfed. If it is used to feed the animals, the opportunity cost is the extra value added to the livestock by feeding.

Opportunity cost of farm inputs and outputs are often quite easy to identify in monetary terms. However the concept also applies more broadly, where the value may be difficult to identify. The value will be an individual's choice, influenced by past experiences and preference. Consider the opportunity cost of inadequate occupational health and safety in the event of a serious farm accident, or possibly forgetting your partners' birthday! (see side story – *Examples of opportunity costs in your business*)





Examples of opportunity costs in your business

Examples of actions which have opportunity costs. How would you value them? (Consider what the alternatives are and it's not just about the money!)

Decision	Alternative	Opportunity cost of the action
Using farmer retained seed	Purchase seed	Cost of purchased seed
Using surplus funds to buy new harvester	Use surplus funds for some other purpose	Return from alternative use of surplus funds
Retaining ewe lambs for breeding purposes	Buying in replacements	Cost of purchasing replacements
Growing own fodder	Purchasing fodder	Cost of purchasing fodder
Removing stock when soil surface vegetable cover reaches critical levels	Not removing stock leading to potential for soil erosion due to lack of cover	Environmental cost of loss of topsoil
Contributing your labour and management to your farm business	Working off farm	Off farm earning capacity
Programming time for training and development	Ignoring training and development needs	Potential income loss from poor decision making
Running a grain and livestock production business on your property	Leasing property to another farmer	Value of lease
Annual family holiday	Working 12 months each year	Potential income loss from poor decision making due to work fatigue
Working rather than attending kids sport day	Attend sport day	Value of family bonding

Opportunity costs reside in all the decisions we make. Consider the following statements and try to identify the opportunity cost.



"I decided to invest my money in the share market and use contractors rather than buy a new harvester."

"I did the sums and I was better off to lease the farm out and concentrate on off-farm work rather than run the farm ourselves."



"I choose to run an advisory board for my farm business – it costs a bit but I reckon we are making a lot better decisions now."



Spending the marginal dollar

Everyone has limited resources (time, money, expertise). Good farm managers are able to identify where effort should be focused to get the best return for the investment of these limited resources. This may be through increased inputs into a certain enterprise such as extra fertiliser, investing in a different enterprise, making a capital purchase of machinery to improve efficiency or to invest in your own well-being to ensure you are thinking straight. The best investment may even be off the farm.

There is a skill in being able to conduct this analysis. The challenge for a farmer or advisor is being able to estimate the response that is possible for each decision, how this changes with each extra input and how this response compares to other possible responses.

We commonly think of investments and responses in monetary terms, but often the most limiting resource may be something else such as time or expertise. Further the response may be intangible, such as a happy partner or family or improved long term health.

Successful farm businesses also seem to have the ability not to get caught up in the 'hype' of the latest technology, investing in products and technologies that have potential in the farming system. While acknowledging the important role innovators and pioneers play in advancing agricultural practices, studies have shown that being an early adopter is a much more comfortable and profitable position to take than always being the innovator (although your personality has a strong bearing on whether you are an innovator or not – see the People Chapter for more details).

Law of diminishing returns

The most common type of production response in agriculture diminishes as inputs are increased (Figure 6). If starting from a low point, each additional input provides a return much greater than the cost of the input (in this example, if starting from 0 investment, the first unit gives a 60% response). As inputs increase further, a positive response still occurs but it becomes less than the response from the previous input, it is diminishing (in this example, the investment from 1 to 2 only gives an additional response of 25%). If investment continues, there is a point where an additional investment becomes small (for example, by investing one unit from 3 to 4).

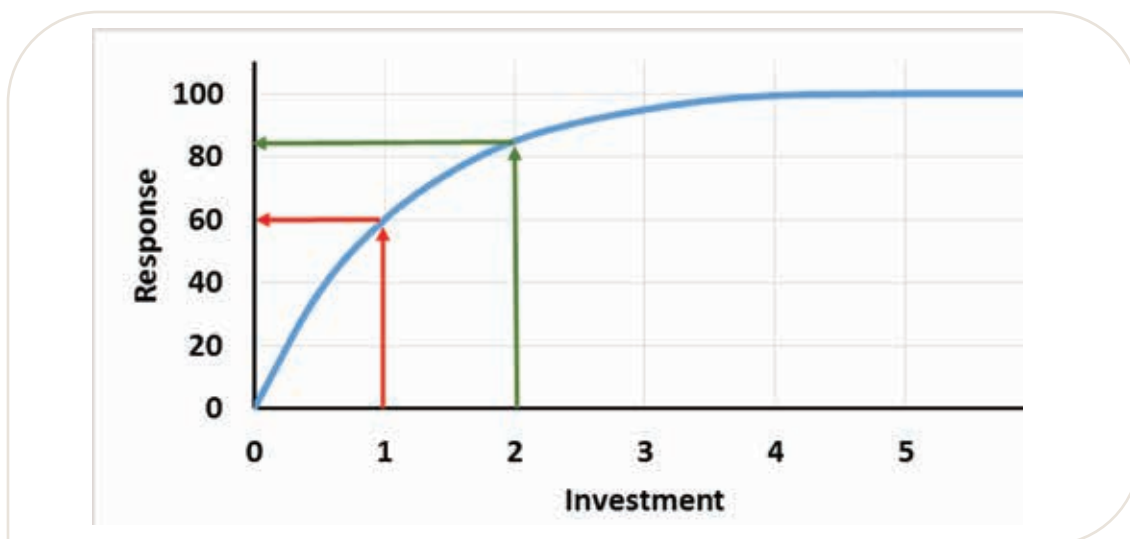


Figure 6: Stylised graph of the law of diminishing returns.

Because each investment has a cost (which may or may not be easy to think of in monetary terms), there comes a point where the cost of the next investment may exceed the return from that investment.

This thinking can apply to non-production issues as well. The decision to invest should be influenced by where you think you are on the graph representing the law of diminishing returns.

Unfortunately, the production responses in agriculture are usually not this neat. They can sometimes be quite variable because of other complicating factors and events e.g. a different response to fertiliser from one year to the next because of seasonal rainfall. To compensate for this uncertainty, conservative decisions are often made i.e. decisions to apply additional inputs are made when potential gains are higher (investment from 0 to 1) compared to when they are more marginal (investment 3 to 4). Decision making with uncertainty is discussed in the Risk Chapter.

The analysis required to create these production responses is challenging, which makes the comparison of different investments difficult. However, intuitively, we will have some idea of the shape of the curve and where we are currently located on the curve. Are we right down the bottom where any investment shows the likelihood of very good return or have we already got the area well covered? With this knowledge we can at least start to make some rationale assessment of investment priorities.

To test this try the following exercise (see exercise – *Where should I invest my next effort?*).



***What gets done on the farm on Sunday often gets undone on Monday
– you need to have a break.***



EXERCISE: Where should I invest my next effort?

Imagine the law of diminishing returns graph represented in Figure 6. Then consider where you believe you are on the graph in relation to the following:

- applying fertiliser
- purchasing new seed
- spending money on new machinery
- investing in training and development
- investing in personal health e.g. visiting your doctor and dentist
- holiday breaks away from the farm
- farmhouse renovations as an aid to domestic relationships

Spending on short term and long term decisions

There is a useful distinction in applying the law of diminishing returns to different types of farm decisions. Farm decisions occur at both a strategic and tactical level. The diminishing returns approach is most appropriate for short term or tactical decisions, where there is a desire to maximise return for a given set of conditions.

Strategic decisions commonly require a longer term view, where the consideration is to improve the average performance of the business. While the same principle applies, the decision requires accepting that some short term returns may be less than optimal, but these are compensated for by larger gains at other times (see side story – *Getting the tactics right for the strategy*).





Getting the tactics right for the strategy – Long term management of ryegrass in cropping rotations

The adoption of a no-weed-set strategy to manage ryegrass populations on cropping land will often involve short term costs which are substantially greater than short term marginal gains. Examples include:

- Only growing break crops which are capable of being crop topped even though other more profitable crops exist.
- Slowing down and making harvest more expensive by using harvest seed capture techniques.
- Rotating to more expensive herbicide options to limit herbicide resistance.
- Rotating to hay crops as a means of reducing seed set.

The value of the strategy can only be assessed over the longer term, hopefully by achieving the goal of sustainable crop production in the presence/absence of ryegrass.

There are traps to avoid when deciding where to allocate limited resources. These include:

- Focusing too heavily on short term gains. For example, agronomists will agree that on many soil types, the non-addition of phosphorous fertiliser in any one year is unlikely to cause a calamitous drop in productivity. However beware of the longer term impacts of such a move. Phosphorous will still need to be replaced at some stage in the future.
- Focusing too heavily on past results. What has worked in the past might not necessarily work in the future e.g. due to changing markets
- Believing the highest price will give the best profit. Holding stock or grain for future sale has a cost and that cost may be higher than the price increases being achieved by holding.

Here are some suggested questions to ask yourself when thinking about spending the next dollar (see exercise – *Some questions around spending the next dollar*). This is further explored in the Decision Making Chapter.



EXERCISE: Some questions around spending the next dollar

Available resources will always be limited, so we need to question our choices to help compare the alternative uses. Some of the questions we need to ask include:

1. Is the possible investment area in your sphere of control i.e. will spending a dollar actually make a difference?
2. Have we got an open mind on alternative uses of resources? Is our thinking constrained by bias e.g. towards using funds for technical inputs (fertiliser, machinery etc.) only?
3. How confident are we in our knowledge of the response functions for each alternative use of resources?
4. Can we reasonably identify upside / downside risks of investing / not investing?
5. Do we have the option of waiting for further information or do we need to move now?

And some rules of thumb which may be appropriate, depending on circumstances:

- Only spend a dollar if you think it will return \$2 – allows a margin for risk.
- New kitchens are cheaper than a divorce.
- Base target soil fertility levels, (P, K, S) on achieving a 95% response.
- With problem weeds aim for nothing less than 100% prevention of seed set.
- During busy periods, plan to have at least one day off each week.
- Take an annual break of at least 3 weeks away from the farm.
- Use your birthday as a reminder to book in with your doctor for a check-up.

Controlling costs as a way of improving returns

Good businesses constantly watch their costs. It is a fundamental part of good business management. They review what they spend and determine if the expenditure is giving the return they want. Often decisions are made to spend less in an area (cut costs) because the returns are considered marginal or those funds would give a better return elsewhere.

The trap is to cut cost in areas that are still providing a sound return on investment because they are an 'easy' decision to make (i.e. it is a large upfront cost) or the impact of reduced



investment is hard to see. For example, a decision to reduce or avoid using fertiliser for a year or two may be sound if cash flow is critical or there is a large reserve of nutrients in the soil, but if not it may have long term consequences to pasture survival and productivity.



Margins make you money, not price.

Competitive advantage

Competitive advantage is simply the capacity of a farming business to produce something at lower cost or at greater production (for the same inputs) than someone else. This implies an efficiency advantage, possibly due to the land available, climatic conditions or proximity to markets. It may also relate to the skills of the business manager to capture opportunities others cannot.

Some comparative advantages are stable because of geographic location and soil type. However other advantages can change through improvements in technology and practices. For example, the recent expansion of cropping into more reliable higher rainfall areas that were traditionally livestock have largely been brought about through the adoption of improved cropping technologies.

I do really well at things that I like doing.



Knowing your competitive advantage is important, it is your potential edge in staying either in, or hopefully ahead of, the pack (see exercise – What's my competitive advantage?). While many aspects of production are largely set by location and climate, managers have some discretion on how they set up their business to maximise their competitive advantage. Accessing efficiencies of scale is a key area.

EXERCISE: What's my competitive advantage?

Consider some of these things about your farming business:

- Climate – rainfall, length of growing season, temperatures
- Frost incidence
- Soil characteristics
- What is the property well suited to?
- What are you well suited to?
- Proximity to markets
- Scale
- Marketing – commodity vs differentiated product
- Managing people.



Chapter 4 Risk

Risk

Anyone associated with farming knows it is a risky business. It is one of the few industries where the main driver of production, namely climate can be highly variable and unpredictable. Combine production variability with volatility in prices and some input costs and it creates a very challenging business environment. Recent analysis by the Australian Farm Institute shows the value of output from Australia agriculture is the most volatile in the world and the most volatile sector of the Australian economy (Keogh, 2013).

We worry about risk in agriculture because it can make or break our livelihood. A decision that increases risk can have dramatic effects on short term cash flow, annual profit and asset value if the downside happens. Conversely, a decision that increases risk but pays off, can set a farming business up for a long time.

Most farmers have developed long term strategies and operational tactics to cope with this volatility. It is testament to their adaptability and resilience that they continue to operate in such a challenging set of circumstances. Most of the times the managerial skills keep the business profitable. Occasionally there are big wins, occasionally big losses.

This chapter aims to provide some information around risk. It explores some key concepts, provides recent price and production data and describes how this variability can be incorporated into farm decision making.

What is risk?

The most common way to define risk is by combining how often an event occurs with the value if it does occur. An event that happens often but has very little impact or value would be considered low risk. However if the event happens rarely but when it does the impact is significant, then it would be considered higher risk.



Risk combines likelihood and consequence.

When we talk about risk most of us immediately think about the negative consequences if an action goes bad. This is only one aspect of risk. The other side is the opportunities that taking a risk offers.



The word risk is derived from Italian word *risicare*, which means 'to dare'. This implies there is opportunity. It also implies a choice. As individuals we decide how much risk we expose ourselves to by making choices.

A decision that increases risk will either increase the likelihood of an event happening and/or increased the consequence if it does occur. This increased consequence may be a greater return, not just a greater loss.



Understanding risk is not about the middle or the average, it is the opposite – it's what happens at the extremes, both the good and poor results, that has the biggest impact on our farm business.

Reward and risk

There is a constant tension between risk and reward. In farming, like most endeavours, risk is a necessary part of making returns. Managing risk is about making decisions that trade some level of acceptable risk for some level of acceptable return. Decisions can be made to reduce risk, but it usually comes at a cost, namely lower returns. The challenge is that human beings usually want both; high returns and low risk. This is not easy to achieve.

Risk is personal

Everyone has a different position on risk. Financial security, stage of life, health, family circumstances, business and personal goals can influence the amount of risk an individual is willing to take on. This position can change rapidly, sometimes triggered by sudden events. The right level of risk is when the head, heart and gut are comfortable.



No risk position is right or wrong, it is what you are comfortable living with.

Averages and risk

Average values are commonly used to calculate potential returns and costs. This approach is a good method of calculating potential returns but not for calculating risk, because in agriculture we rarely get the average (see side story – How often do we get the average?)



How often do we get the average?

The following chart shows how often the average price has been reached for some common commodities (+/- 2.5% of the average)

Commodity	Times the price is at the average
APW wheat ^a (\$/t)	9.7%
Canola ^a (\$/t)	12.5%
Wool (19 um) (c/kg cln)	8.0%
Trade lambs ^b (18-22kg) (\$/kg cwt)	6.8%
Feeder steers ^c (300-400kg) (\$/kg lwt)	9.0%

a = Delivered Adelaide port

b = Victorian saleyards

c= NSW saleyards

The key drivers in agriculture, namely yield, prices and some costs have a range of values over time. Therefore we need to include this variability in any analysis if we wish to represent risk.



Average values tell us nothing about risk.

The average, middle and most frequent value

The average value is not always the middle value or the most frequent value in a set of numbers. This is because a small number of very extreme high or low values can have a noticeable influence on the average. This is common for prices, where the most common value, called the mode, is usually less than the average value because of a few very high prices (see side story – Why average prices are higher than the most frequent price). It also results in the middle value, called the median, often being less than the average.



Why average prices are commonly higher than the most frequent price

Market forces influence the highs and lows in prices. When commodities are in short supply, there is usually a buyer who is willing to pay 'whatever it takes' to purchase the product making prices rise until there is no further competition.

In contrast when there is an oversupply and prices fall, there are eventually speculators who will purchase the commodity on the assumption that prices will rise in the future and they can resell it at a profit. This puts a 'floor' in the market. It results in the highest price above the average usually being greater than the lowest price below the average (Figure 7).

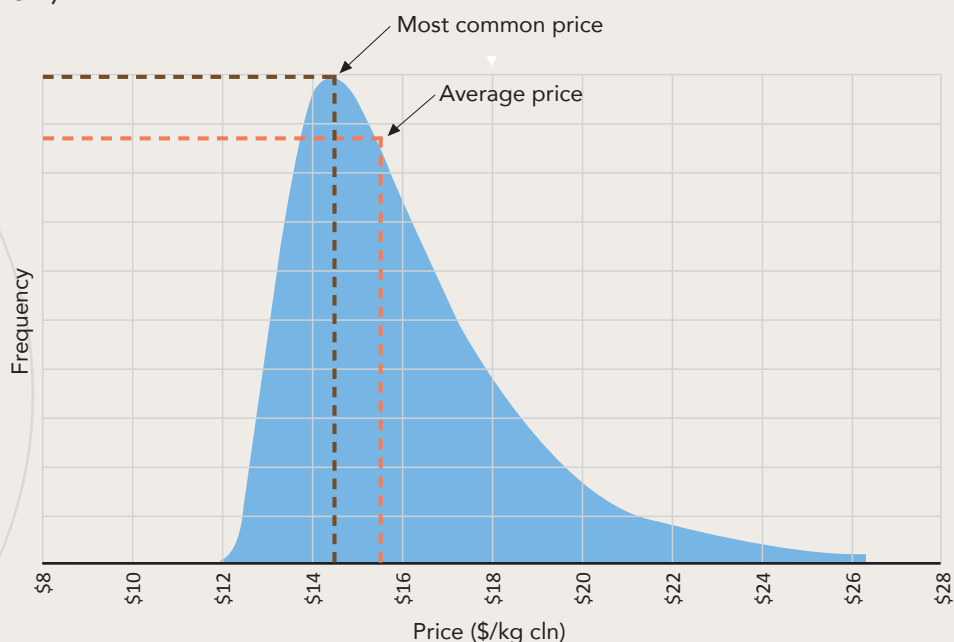


Figure 7: Continuous fitted distribution representing weekly prices for 19 micron wool from July 2003 to June 2019 (inflated to 2019 dollar values).

If you feel the price you get for your commodities is less than the reported average, then you're probably right!

In Figure 7 the average price for 19 micron wool over the past decade has been \$15.46/kg clean whereas the most frequent price is \$13.36/kg clean. The price distribution is 'skewed' because of a few very high wool prices in early 2003, February to August 2011 and more recently from 2017 to 2019. Sixty per cent of the time the price is less than the average. Further examples of this for other commodities are provided (Table 1).



Table 1: Average price and range from July 2003 to December 2019 for some major commodities.

Commodity	Average price	Most common price
APW wheat ^a (\$/t)	\$310	\$267
Canola ^a (\$/t)	\$580	\$533
Wool (19 u) (c/kg cIn)	1546 ^c	1336 ^c
Trade lambs ^b (18-22kg (\$/kg cwt)	\$5.39	\$5.38
Feeder steers ^c (320-400kg) (\$/kg lwt)	\$2.59	\$2.31

a = Delivered Adelaide port

b = Victorian saleyards

c = NSW saleyards

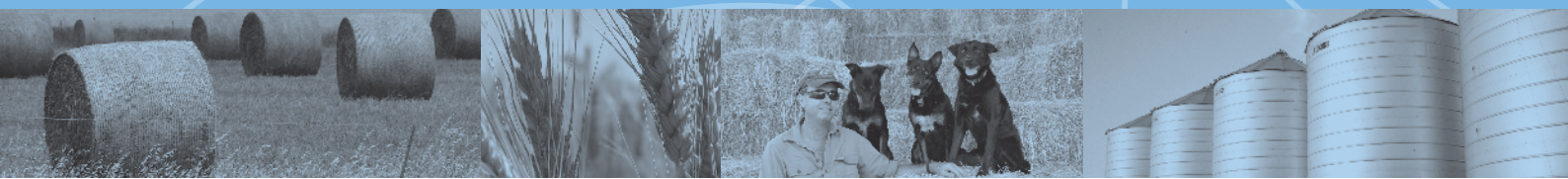
The average price and range for other commodities is presented in Appendix 5.

How does this inform the decisions I make? Knowing the most commonly occurring price and the middle price as well as the average price can be useful in preparing farm budgets and other calculations. Using the most frequent prices are likely to make the calculations more conservative than the average, but reflect what is likely to happen more often.

Ranges to indicate risk

To include risk in our calculations requires an understanding of the possible range in values we may encounter and how often they may occur. An understanding of the range can be determined from the variability in numbers that make up the average. An understanding of how often we encounter values within a range comes from the volatility.

It is possible for two results to have the same average, but with different levels of variability (refer to side story – Two farms, same average yield but different variability).



Two farms, same average yields but different variability

Consider two farms:

The wheat yields off six paddocks on farm A were 2, 2, 3, 4, 5 and 8 t/ha. The average wheat yield across the farm A was 4 t/ha ($2+2+3+4+5+8 = 24/6 = 4$).

The wheat yields off six paddocks on farm B were 3, 3, 3, 4, 5 and 6 t/ha. The average wheat yield across the farm B was also 4 t/ha ($3+3+3+4+5+6 = 24/6 = 4$).

Despite the average yield of both farms being the same, farm A has greater variability because yields range from 2t/ha to 8 t/ha, whereas yields on farm B only range from 3t/ha to 6 t/ha. Also the most common yields for both farms were below the average yield, at 2 t/ha for farm A and 3 t/ha for farm B.

Volatility also represents fluctuations in values, but includes a frequency component. A common mathematical way of showing volatility is using a calculation called standard deviation which shows how spread out the numbers are that make up the average (refer to Appendix 6 for more on how to calculate and use standard deviation).

What does this mean for my decision making? By knowing the variability we can start to consider best and worst case results and ask why we are getting the extremes in values and if there is anything we could do about it. By adding the dimension around volatility we can start to appreciate how often these extremes happen. Are they very infrequent, which might mean we just accept them the odd time they happen, or do they occur quite often?

Assigning risk – framing the odds

Anyone with a fleeting interest in horse racing would recognise that each starter is given a number that suggests the chance of winning (or placing) in the event compared to the other horses. These numbers are commonly called the odds, and they let us compare the likelihood of the horse winning. The framing occurs (our comparison of the likelihood) when all the horses in the event are given chances relative to each other. The odds are simply ratios comparing a certain result occurring to the number of other possible results. So a horse with winning odds of 3:1 is considered to have more chance of winning than a horse in the same race assigned odds of 100:1.



To understand and talk about risk in farming, and to use this to inform our decisions, we need to frame the odds around various events occurring. The events to consider are those that are highly variable and cannot be easily predicted when on-farm decisions have to be made. The variation in prices, yields and some costs¹ in agriculture are 'events' that are highly variable, but have a big impact on our final return.

Consider the example of an expected yield of a wheat crop. Across a run of years you may expect to get an average yield of 4 t/ha. However you know the yield is not going to be 4 t/ha every year, some years will be higher, some will be lower. The yield is variable. So to determine your yield risk you estimate some lower and higher yields and assigns the chances of those yields occurring (Table 2).

» **Table 2:** Expected yields in poor, typical and excellent seasons and the chances of those yields occurring.

Season	Chances of getting that season	Expected yield (t/ha)
Poor	20% or 0.2 or 1 in 5 years	2.5
Typical	60% or 0.6 or 3 in every 5 years	4.0
Excellent	20% or 0.2 or 1 in 5 years	6.0

This simple exercise of assigning chances to a range of expected yields has framed the odds. In the 'long run', say over 100 seasons, the average yield would be similar because we these results occurred would have:

20% chance of 2.5 t/ha, so 20 years of 2.5 t/ha = 50 tonnes

60% chance of 4.0 t/ha, so 60 years of 4.0 t/ha = 240 tonnes

20% chance of 6.0 t/ha, so 20 years of 6.0 t/ha = 120 tonnes

Total of 100 year = 410 tonnes or 4.1 t/ha/yr

If all these results occurred with these chances, the long run yield would be 4.1 t/ha, close to the average of 4 t/ha.

Some may be uncomfortable about framing odds based on opinion or judgement because they are our personal convictions about the occurrence of an uncertain event. While this is understandable, it is also unavoidable. Nobody can predict the future

¹ Some input costs in agriculture are variable e.g. predicting supplementary feeding at the start of the season whereas others are reasonably stable e.g. seed prices (although some relatively stable costs may increase annually).



with certainty, so it is essential we use our own knowledge, the knowledge of others, intuition and convictions to make these judgements. In reality when we are framing the odds we operate on a continuum, from those results we are able to make confident estimates about, to those framed on intuition and gut feel.



The level of risk we are prepared to accept is our decision, so it's our responsibility to frame the odds so we are comfortable with our decision.

It is also important to realise that by framing the odds, it doesn't guarantee the result will occur precisely in that sequence. There may be periods when the result occurs more frequently than the odds suggest, followed by periods of lesser frequency (although in the 'long run' the ratio is thought to be correct).

Rarely can the odds or chances be divided as cleanly or easily as suggested in Table 2. More often there are many possible yields all with slightly different chances of occurring. We will have a continuous range, from the very lowest values (but with very low chances of occurring, through to more common values (which happen more frequently) to very high values (that also happen very rarely). The range in value and frequency are referred to as continuous distributions.

Developments in mathematics and computer programs enable a few simple odds to be expressed as a continuous distribution. So instead of the 3 values and odds presented in Table 1, the same information can be turned into a range of values and odds (Figure 8).

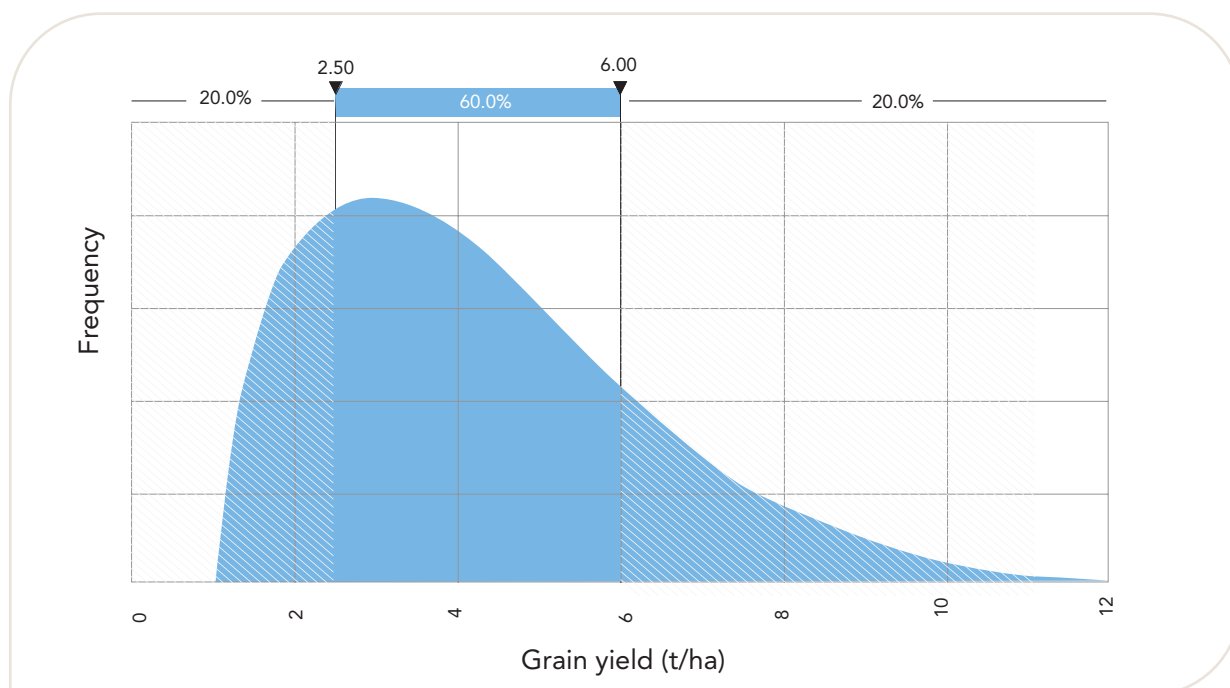


Figure 8: Continuous distribution representing the three probabilities expressed in Table 2.



Figure 8 also illustrates a common occurrence with continuous distributions that they are not even around the mean or middle. They are 'skewed', in this case suggesting the chances of getting 1.2 t/ha yield is the same as getting a yield of 9.5 t/ha, even though the average is 4.1 t/ha.

Using historic data (form guides) to frame the odds

Historic information can provide a useful guide to help frame the odds as it provides a link to what has already happened. How well this predicts the future depends on how closely you believe the future will behave like the past. While this may be debatable, history can be a useful form guide to provide help to inform the odds you choose, especially if we know something about why these events occurred.

Framing the odds for commodity prices

Historic prices can be grouped and presented in a variety of ways. Readers may be familiar with terms like deciles, percentiles or quartiles. These are simply ways of grouping a series of numbers to enable a probability to be assigned to those values (see side story – Percentiles or P values).

Percentiles or P values

A percentile is simply the values below which a percentage or proportion of values fall. The values are arranged from lowest to highest and divided into the specified number of groups.

- **Quartiles** (or quarters) clusters the values into 25% groups, so quartile 1 is the lowest 25% of values, Quartile 3 the lowest 75% of values.
- **Deciles** (or tenths) clusters the values into 10% groups, so decile 1 is the lowest 10% of values, decile 9 is the lowest 90% of values
- **Percentiles** cluster values into any % group specified. So the 5% percentile or P5 clusters the lowest 5% of values, the P95 the lowest 95% of values etc.

In this booklet the 10, 50 and 90 percentile are commonly used to present ranges in values. These three percentile bands were chosen as they suggest the 'best' (P90 or 90%) and 'worst' (P10 or 10%) of results. When thinking about creating yield type distributions, such as grain yield, lambing %, turn off weight of livestock or the amount



of supplementary feeding, the P10 roughly equates to the worst one year in 10 and the P90 the best one year in 10. The P50 is the middle or mid-range result.

An example of a simple price guide for some common commodities is listed in Table 3. A list of price percentile values for common grains, meat and wool is provided in Appendix 5, with an interactive web based tool also available (see side story – Web based tool to frame the odds around common commodities).

» **Table 3:** Price percentile values for some select commodities from June 2003 to December 2019 (inflated to 2019 dollars).

Commodity	P10	P50	P90
APW wheat ^a (\$/t)	\$228	\$296	\$409
Canola ^a (\$/tZ	\$476	\$557	\$702
Wool (19 u) (c/kg cIn)	1221c	1468c	1968c
Trade lambs ^b (18-22) (\$/kg cwt)	\$3.91	\$5.39	\$6.87
Feeder steers ^c (320 – 400 kg) (\$/kg lwt)	\$2.02	\$2.56	\$3.28

a = Delivered Adelaide port

b = Victorian saleyards

c = NSW saleyards

Web based tool to frame the odds around common commodity prices

An interactive web based tool is available to create your own form guides and explore price volatility. The price form guide allows you to choose commodities, locations and timeframes to generate graphs and comparisons within and between commodities. It also has some commentary explaining why certain peaks and troughs may have occurred.



It is accessible through <http://agprice.grainandgraze3.com.au/>



The information gained from the historic price guides can be used in a number of ways to inform our decision making. This includes:

- Putting today's prices into context with past prices.
- Understanding how closely prices of different commodities follow each other.
- Doing budgets with say worst 10% or 20% prices rather than the average.
- Testing how the business would survive with a run of say worst 20% prices.

Framing the odds for yields

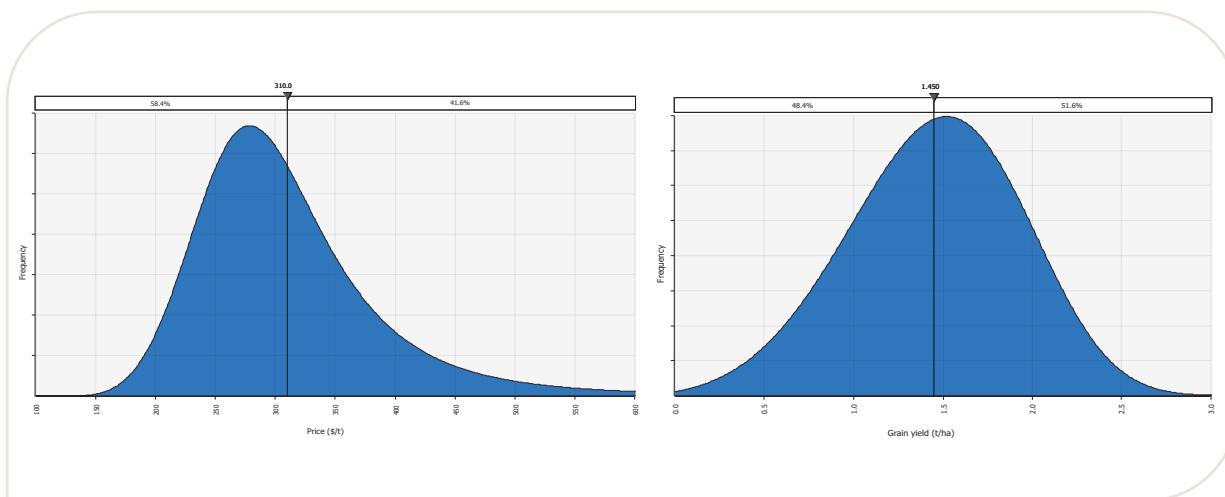
Framing the odds for yields is much more difficult than prices. Weather, soil type and management all combine to produce an infinite array of interactions that result in a final yield, especially at the farm scale.

Unlike prices there are no organisations that collect national yield data except on a very broad basis. The Australian Bureau of Agriculture and Resource Economics (ABARES) AGSURF database enables broad regional differences to be inferred for a range of commodity types (<http://apps.daff.gov.au/AGSURF>). An example from the database is provided for wheat (Table 4).

» **Table 4:** ABARES regional yield percentile values for select agro ecological zones from 1990 to 2019 for wheat.

Locality	P10 (t/ha)	P50 (t/ha)	P90 (t/ha)
WA - Central and Southern wheat belt	1.44	1.96	2.25
SA - Eyre Peninsula	0.80	1.49	2.07
Vic – Wimmera	1.29	2.63	3.20
NSW – Central west	0.59	1.84	2.75

The results in Tables 3 and 4 highlight the un-evenness or 'skew' in the extremes around the average. Prices tend to have more frequent lower than average results with less frequent high values that occasionally go very high. Yields are often the opposite, with the most common yields higher than the average because of the years where no yield is produced. Examples of these common differences are presented (Figure 9).



» **Figure 9:** Continuous distribution for APW wheat (from Table 3) and wheat yields from the Eyre Peninsula (from Table 4). Average price is \$310/t, average yield is 1.45 t/ha.

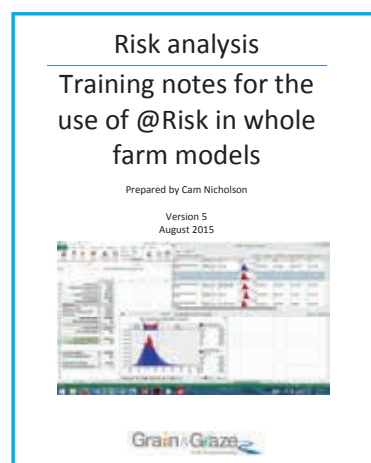
An alternative approach is to use computer models to calculate annual pasture growth or crop yields. While many assumptions need to be made in running these models, they do provide some insights into the potential annual and seasonal variability.

Arguably the best information will come from the farm records and experience. Farm data reflects the uniqueness of each farming situation (soils, climate and management) and places the responsibility of framing the odds with the individual rather than with a modelled result.

A method of using historic farm information to frame the odds is outlined in the Grain and Graze risk analysis training notes. In a nutshell the framing involves arranging the information in order from lowest to highest and then looking for 'clusters' in the results that will represent 'best', mid-point and 'worst' groups of values.

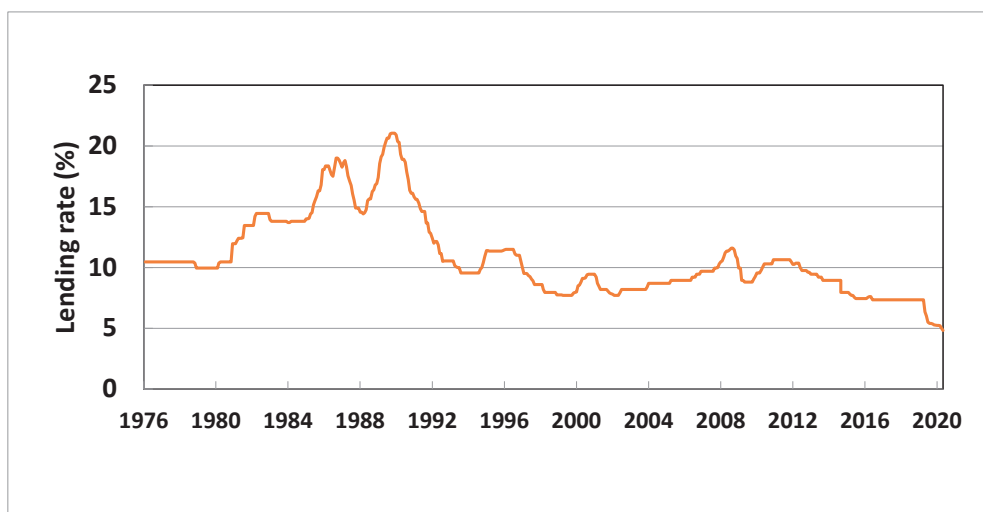
Framing the odds for lending costs

Most farm business operate with some level of debt, borrowed from a bank or other facility. Gaining access to this money comes at a cost, commonly referred to as the lending rate (or interest rate). The lending rate will vary depending on the wholesale cost of money, the margin the lender builds in to cover costs and a profit and commonly a margin added by the lender to include a level of risk.





The lending rate can be a significant expense to the business. While very high interest rates of the late '80s and early 1990s are etched into many farmers' minds, the last three decades have seen relatively stable lending rates for small business (Figure 10).



» **Figure 10:** Small business lending rates (source RBA).

More on using historic information (form guides) to help frame the odds

As mentioned historic information can provide a useful guide to help frame the odds as it provides a link to what has already happened. How well this predicts the future depends on how closely you believe the future will behave like the past.

There are a few key considerations when using historic information to frame the odds.

Inflation

Inflation can make comparisons of current and historic prices difficult. While some of us can remember prices from the past, not many are good at factoring in inflation. Not including inflation prevents being able to compare today with the past (Table 5). The average annual inflation in the past two decade has been approximately 2.1%.



» **Table 5:** Annual inflation as measured by the Consumer Price Index from 2003 to 2018.

Year	Annual inflation	Multiplication factor to covert to 2019 dollars
2003	1.8%	1.46
2004	2.0%	1.42
2005	2.0%	1.39
2006	3.3%	1.34
2007	1.8%	1.31
2008	3.9%	1.25
2009	1.3%	1.24
2010	2.9%	1.20
2011	3.4%	1.16
2012	1.2%	1.14
2013	2.4%	1.12
2014	3.1%	1.08
2015	1.6%	1.07
2016	1.1%	1.06
2017	2.1%	1.04
2018	2.3%	1.02

» *The price of APW wheat at Geelong in December 2003 was \$178/tonne, the equivalent of \$260/tonne in 2019 dollars.*

Major events

Major events can have a significant influence on yields, prices and lending rates and it is important to understand the events that formed the peaks (and troughs). In other words are these events rare and inflating the typical price range or yields? Or are they common within the period we are considering and therefore should be included when framing the odds?

Take drought for example. Australia has experienced many major droughts since the start of the 19th century. In the typical mixed farming area of Western Australia, South Australia, Victoria and Southern New South Wales there have been at least 12 events where annual rainfall across large areas has been very much below average or lowest on record (Figure 11). This averages about one drought every 10 years, although they are not spaced precisely every 10 years. Therefore the inclusion of the price spike due to the 2006 drought is probably acceptable when analysing the 2003 to 2019 figures.



On the other hand, the high yields of the 2013 harvest in the West Australian wheat belt were a once in a lifetime event (thought to be about once every 50 years), and will probably positively influence average grain yield records. So it may not be acceptable to include these, or if they are included, be aware of their influence.

Another example is the volatility in the variable lending rate for small business. In the late '70s and early '80s there was an extended period of rapid inflation, followed by deregulation in the mid '80s and then a recession in the late '80s and early '90s (refer back to Figure 10). This caused lending rates to fluctuate widely. In contrast the lending rates in the past 20 years have been relatively stable. While volatility is still possible, the increased level of debt many businesses are carrying compared to 20 years ago means it is unlikely interest rates would need to reach the heights of the late 1980s to result in a market correction. Therefore the volatility in the past two decades may be a more appropriate than including the longer term data.





	WA	SA	VIC	NSW
1900				
1910				
1920				
1930				
1940				
1950				
1960				
1970				
1980				
1990				
2000				
2010				


Figure 11: Years of decile 1 or below annual rainfall across the mixed farming zones of Western Australia, South Australia, Victoria and New South Wales. (Source BOM).



Connections between commodity prices and production

Market prices are determined by supply and demand. As discussed in the side story Why average prices are commonly higher than the most frequent price, when a product is in short supply, then prices usually rise as buyers compete to acquire it. When there is an oversupply of the product prices fall.

The price movement of various commodities can be compared to determine how closely they follow or diverge from each other over time. This is referred to as a correlation (co- meaning 'together' + relation) and can be calculated mathematically (see side story; Correlations and the 'r' value). The 'strength' of the correlation can be broadly classified as strong, medium, weak or non-existent.

Correlations and the 'r' value

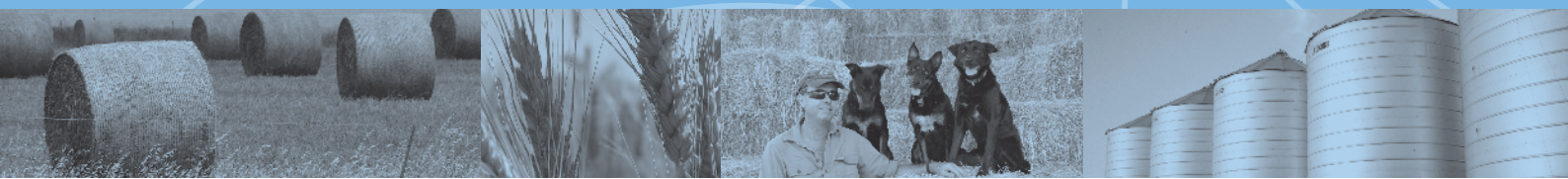
The numeric scale used for correlations is 0 to ± 1 and is commonly referred to as the 'r' value (or correlation co-efficient).

If there is no connection or dependence between two variables then it is considered a zero (0) correlation. If one variable exactly follows the size and direction of the fluctuations of the other it is positively correlated and given a value of one (+1). Conversely if one variable exactly follows the size and direction of the fluctuations of the other, but in opposite direction, it is negatively correlated and given a value of one (-1).

The r value can be broadly classified into 'strengths'.

- **Strong** with r greater than ± 0.8
- **Medium** with an r value between ± 0.5 and ± 0.8
- **Weak** with an r value less than ± 0.5
- **None** with an r value of 0

Knowing a weak r value can be just as useful as knowing a strong r value because the weakness implies there is no connection between the two variables, so they should be considered independent of each other.



While correlations can be useful when framing the odds, there is also a need to be mindful that:

- Correlations can be co-incidence. If the link doesn't make sense then it may just be luck.
- Correlations do not prove which variable influences the other, although our intuition may suggest otherwise e.g. If feed grain prices are really high it makes sense that feedlot buyer may not be able to pay high prices for livestock.
- Seemingly unrelated commodities may show a correlation because they are both affected to larger variables such as the exchange rate.

Strong correlations do exist within broad commodity types such as between grains, between wool microns and livestock. Examples of the 'strength' in prices between common commodities is provided (Appendix 7).

Because correlations exist in agriculture, they are important to consider when framing the odds. For example the historic information shows that if feed grain prices are high, there is a likelihood (but not a guarantee) that feeder cattle prices will be lower. So if we think feed grain prices are going to be high in the future, then we probably should factor in a lower feeder cattle price.

The correlations also can provide useful information to understand how different enterprises complement each other in a mixed farming system. For example, if there is a negative correlation between commodities, it infers that one price will be higher when another commodity price is lower. To manage income volatility, having a mix of enterprises that hedge against the fall in the other commodity may be very useful.



References

- BARR, N. 2014. New entrants to Australian agricultural industries - where are the young farmers? 14/003. RIRDC Canberra.
- BLACKBURN, A & ASHBY, R. 2007. Financing Your Farm - A practical guide to financial growth. 4th edition. Australian Bankers Association, NSW.
- HEATH C & HEATH D. 2013. Decisive: How to Make Better Choices in Life and Work. Random House. New York.
- KAHNEMAN, D. 2011. Thinking, Fast and Slow. Penguin Books, London.
- KAHNEMAN, D. & TVERSKY, A. 1979. Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, 47, 263-292.
- KEOGH, M. 2013. Global and commercial realities facing Australian grain growers. GRDC Update Papers. Australian Farm Institute.
- KRAUSE, M. 2014. Farming the Business - Sowing for your future. GRDC. Canberra.
- LAND and WATER AUSTRALIA. 2008. Managing Complex Systems - Preliminary Findings of the Grain and Graze Program. LWA, Canberra.
- LANE, D. C. 1992. Modelling as learning: A consultancy methodology for enhancing learning in management teams. *European Journal of Operational Research*, 59, 64-84.
- MURRAY-PRIOR, R. B. & WRIGHT, V. E. 2001. Influence of strategies and heuristics on farmers' response to change under uncertainty. *The Australian Journal of Agricultural and Resource Economics*, 45, 573-598.
- POOK, M., LISSON, S., RISBEY, J., UMMENHOFER, C. C., MCINTOSH, P. & REBBECK, M. 2009. The autumn break for cropping in southeast Australia: trends, synoptic influences and impacts on wheat yield. *International Journal of Climatology*, 29, 2012-2026.





Appendices

Appendix 1: Some discussion and analysis around different rules of thumb

Start sowing around Anzac day – Rule of thumb validated by analysis

1. **Origin:** where do you remember first hearing the ROT?

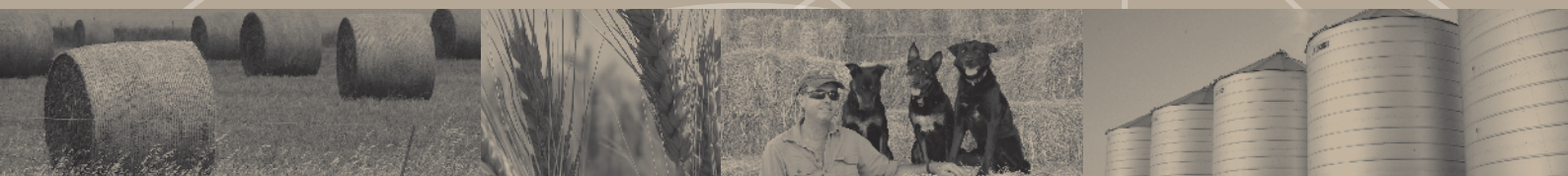
This was the most common rule of thumb, being raised at all three workshops. No one could remember where they heard it for the first time but it was a long held belief. At the Victorian workshop, it was thought the rule may have been brought in with advisors coming from other regions, as cropping is relatively new to south-west Victoria.

2. **Experience:** what has been your experience with the rule? Have you found it to be (un)reliable?

Experience has validated the rule, with sowing being linked to the season break which generally falls around Anzac day. Sowing around Anzac day suits standard length varieties and means sowing is finished before the ground is too wet.

3. **Research:** have you done any research to verify the rule?

There is quite a lot of research around optimum sowing time in lower rainfall areas and in recent years Southern Farming Systems has been running time of sowing trials in the high rainfall zone. Much of this research has focused around selecting a sowing date that optimises flowering date so that it occurs after the worst frosts but before the risk of heat stress increases. In southern Victoria this is around late April to May, depending on the season.



4. Blind spots: can you think of any areas the rule may cause you to neglect?

Organisation in sowing is pivotal to crop success. An early break coupled with disorganisation can result in missing the opportunity to sow at the optimal time. The rule of sowing after Anzac day can mean farmers are not prepared for an early break and miss the opportunity to sow on time. The variability in the timing of the break in south-west Victoria is graphed in Figure 12, with there being a reasonable chance of getting rain before Anzac day (day 115).

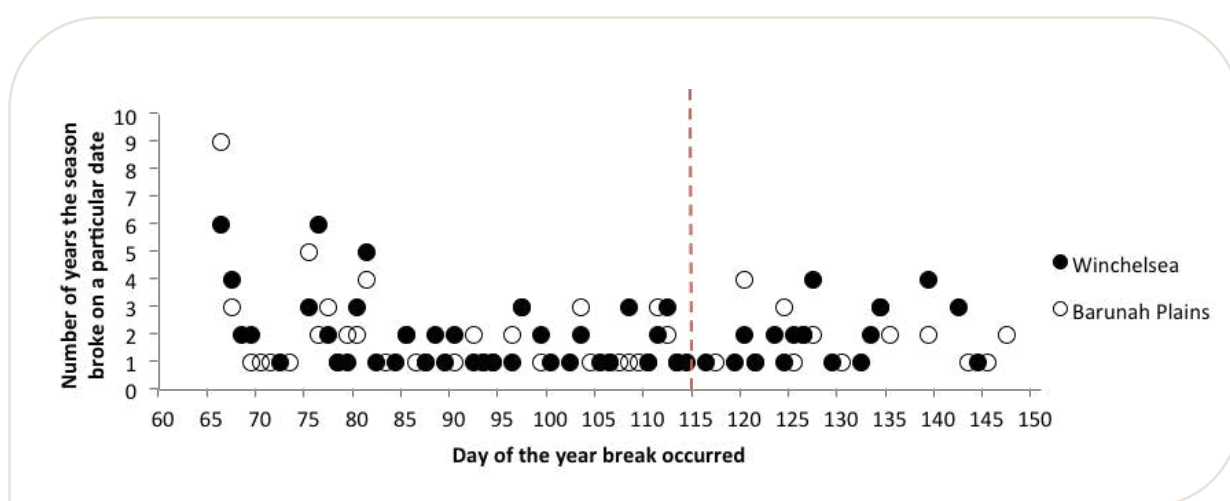


Figure 12. Timing of the autumn-break at Barunah Plains and Winchelsea from 1889-2012, with the red line marking Anzac day (in non-leap years). An ideal break is defined as either $\geq 25\text{mm}$ over 3 consecutive days, or $\geq 30\text{mm}$ over 7 consecutive days (Pook et al., 2009). NB: in a non-leap year, the period represented is the 1st March to the 30th May

5. Adaptive management: have you used this rule in different ways in your management, if so, how?

There is no silver bullet to selecting a sowing date. This rule is helpful in providing a start point for thinking about sowing however variability in the break timing means the potential for an early break should not be neglected.

6. Evolution: what factors are required for change in your ROT?

This is quite a good rule of thumb, however farmers should be careful to not let it constrain their thinking in sowing early in years when the season permits. Further research and witnessing successful early sowings may help shift thinking around sowing date.



The $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ rule – Rule of thumb requiring adaptive use

1. **Origin:** where do you remember first hearing the ROT?

This rule guides that 33% predicted grain yield be sold at sowing, 33% later in the season and 33% at harvest. Participants were unsure where they first heard the rule.

2. **Experience:** what has been your experience with the rule? Have you found it to be (un)reliable?

One of the facilitators relayed a conversation she had had with a woman who keeps the books and markets grain on her husband's family farm. This woman held to the ' $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ rule', despite being able to see it may not always be the most profitable. Her reasoning was that using this rule is a form of self-preservation whereby she can almost absolve any negative outcomes as she 'just followed the rule'. She found this deferral of responsibility to be a great help when she has to take the books before the family at the end of the year. For this woman at least it is more valuable to maintain peace within the family than to take responsibility for risky decisions. Her experience socially validated the rule, if not financially.

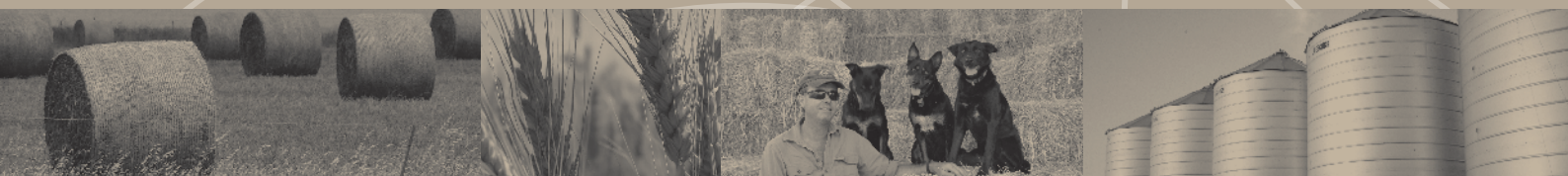
3. **Research:** have you done any research to verify the rule?

This rule originates from basic hedging strategies but ignores both production and price risk. Workshop participants did not know of any research supporting or refuting the rule, but they were sceptical of its efficiency and effectiveness.

4. **Blind spots:** can you think of any areas the rule may cause you to neglect?

It is helpful in creating price certainty; however the season can change drastically with the potential for significant loss if it does. In taking prices at set times, there is the risk that these may not actually be 'good' prices for your business. Some questions that may help identify blind spots include:

- Is this price actually 'good'?
- Should I consider delaying selling if the price is below a certain amount?
- Can I accept this level of risk, or should I consider more conservative thresholds, maybe locking in no more than 20% before plant establishment and no more than 50% by the end of August?



5. Adaptive management: have you used this rule in different ways in your management, if so, how?

The same rule but with different values can be used. At the Perth workshop it came up on two separate tables to lock in no more than 20% before it is established and one group added no more than 50% by end of August. This maintains the framework to guide decision making but is more conservative.

It is important to look at the price given. Speculations based on historical values and market forecasts help better inform grain marketing decisions.

6. Evolution: what factors are required for change in your ROT?

This differs between people. For some it may be crunching numbers to analyse the probability of getting a better price than the one on offer. For people such as the woman previously mentioned, having someone like a consultant or family member suggest a change may give her the freedom to evolve her rule whilst still deferring responsibility.





Don't want to lose the potential of a paddock by leaving it fallow – Rule of thumb rejected by analysis

1. Origin: where do you remember first hearing the ROT?

Participants thought it may have come from higher rainfall areas where production is more intense and there can be a grazing mentality of using the whole farm. Spring sowing is often guided by this principle, where a missed opportunity to sow in autumn is carried over to spring.

2. Experience: what has been your experience with the rule? Have you found it to be (un)reliable?

The consultants at the workshop were quite sceptical about the profitability of just sowing for the sake of having something in the ground.

3. Research: have you done any research to verify the rule?

There is relatively little research around spring sowing, with it generally being an opportunistic venture. Southern Farming Systems representatives mentioned their move to more systems research to address such issues.

4. Blind spots: can you think of any areas the rule may cause you to neglect?

Cropping is often assumed to be more productive than pasture, which is a rule of thumb in and of itself. The fear of missed potential behind this assumption could lead to missed opportunities in pasture production or loss in the incidence of poor yields.

5. Adaptive management: have you used this rule in different ways in your management, if so, how?

Holding crop and livestock production in tension is at the heart of this rule. Changing mentalities around crop and livestock productions may lead to more integrated management decisions, such using livestock to graze weeds and volunteer plants in the fallow paddock to decrease seed burden.

6. Evolution: what factors are required for change in your ROT?

Farmers want a reasonable return for the risk and effort involved in production. What is considered 'reasonable' differs between individuals. It is important to understand the likelihood of breaking-even, as sowing for the sake of having a crop in may actually be a higher risk and require more effort than it is worth.



Insights from facilitating a workshop identifying and unpacking rules of thumb

The information in this section comes from our experiences and learnings from three workshops discussing rules of thumb. Over all there was a genuine interest on the behalf of both farmers and consultants in discussing their rules of thumb and trying to understand the theory behind them.

The workshop program was refined as we went, from the beginning where it was a very broad discussion of general rules of thumb, to the end where we focused on rules around time of sowing. We found both had similar outcomes in the learning around identifying components of the decision making process, but having a more specific topic acted as a start point in helping participants identify their rules rather than beginning with a blank canvas in unfamiliar territory.

Each workshop involved a short presentation and discussion around decision making processes in which the decision making paradigm in Figure 1 was presented. Initially this was at the beginning of the program, however we found discussion to be more robust when we began with a brainstorm of different rules of thumb used before having the decision making discussion. Doing so opened the floor to participant contributions and experiences so when the theory around decision making was introduced there was an understanding that their opinions and experiences were valued and they were ready to critically engage with the topic.

Keeping discussion on track was a challenge at times, making it valuable to have a facilitator on each table of 4-6 participants. Having a specific topic for the workshop also assisted in keeping discussion focused. The topics became more focused as the workshops progressed, from the first which considered general rules of thumb, to the second where different tables focused on separate topics (agronomy, sheep and business), and the third looking at time of sowing. In each workshop, every table selected two rules of thumb to unpack, using the key questions in unpacking a rule of thumb.

Participant responses overall were positive, with most recognising a need to think more critically about their decision making and rules of thumb as an area they had previously given little conscious thought. Questions that prompt this critical thought and test assumptions are essential, however they can be uncomfortable for the participants if their beliefs are challenged.

A farmer at the Adelaide workshop commented that “rules of thumb are there to be broken”, noting that they are in no way a precise and infallible formula for production. This willingness to break the rules is not characteristic of everyone, with many having rules of thumb so ingrained that they become beliefs and accepted as truth.



Appendix 2: Approaches to help with decision making

There are many approaches or processes that can be used to help facilitate the decision making process. Three broad approaches are described here. These are:

- Structured questioning processes
- Farm advisory boards
- Making sense through personal experience (storytelling)

Structured questioning

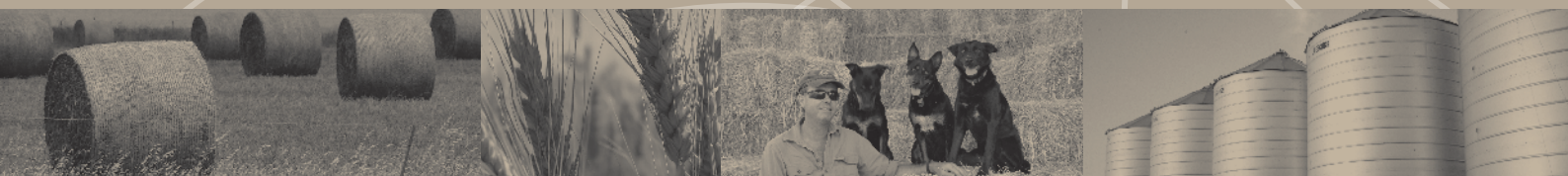
Three processes are described, that can be used to help in working through a decision. These help by providing a 'structure' to work with. The processes appeal to the more logical, step by step type of people or can help those who are not analytical in their decision making.

1. Decision Analysis Matrix

A decision analysis matrix is a useful tool to use when there are a number of good alternatives to choose from and many different factors to take into account. It can be used in almost any important decision where there isn't a clear and obvious preferred option.

How to use the tool

List your options as rows on a table and the objectives of the decisions or factors you need consider as columns. Then score each option/factor combination, weight this score by the relative importance of the factor, and add these scores up to give an overall score for each option. The option that scores the highest is preferred.



Example: A good harvest means you have money to invest. What is your decision?

	Objectives or Factors	1	2	3	4	5	
Options		Business cost saving	Farm productivity	Future income stream	Capital appreciation	Meets family & personal goals	Total value points
Weighting		/10	/10	/10	/10	/10	
1 Pay off farm debt		10	6	4	2	9	31
2 New tractor		6	10	2	2	6	26
3 Unit in the city		4	2	7	10	6	29
4 Liming		4	10	4	5	7	30

In this example paying off some farm debt would be a good decision

Tips

If your intuition tells you that the top scoring option isn't the best one, then reflect on the scores and weightings that you've applied. This may be a sign that certain factors are more important to you than you initially thought. Also, if an option scores very poorly for a factor, decide whether this rules it out altogether.

A production focused example (the Mudge Index) is presented for making decisions about cropping in a low rainfall environment. The matrix and weighting approach for opportunity cropping was developed in the mid-2000's by SA Upper North farmer Barry Mudge to help inform him of the chances of a successful cropping season in a marginal and highly variable cropping environment. Instead of making the same decision each year, Barry identified a number of factors critical for a successful outcome and weighted them accordingly.

The critical success factors of crop performance were:

- Level of stored soil moisture
- Seeding opportunity (timing and amount of seeding rains)
- Agronomic considerations
- Seasonal outlook forecast

These critical success factors were then divided further and assigned a value (see table).

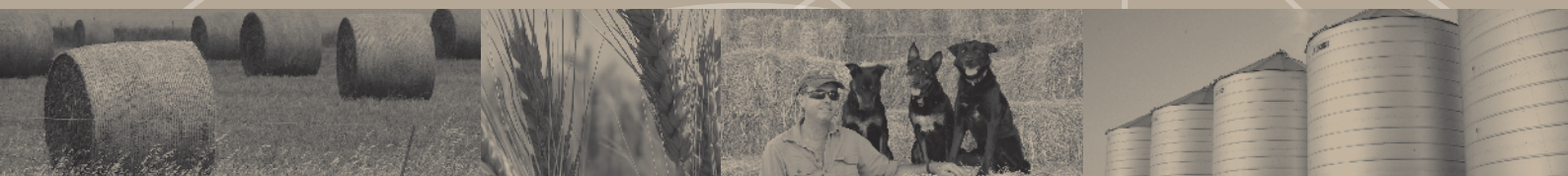


Table: Decision matrix and weightings for cropping in a low rainfall environment

Critical success factors	Condition	Points Allocated	Maximum Points
Stored soil moisture	80 mm 60 mm 40 mm 20 mm < 10 mm	4 3 2 1 0	4
Timing of seeding rains	- Optimum - Within 2 wks - Within 4 wks - Within 6 wks	3 2 1 0	3
Amount of seeding rains	- More than 30 mm 15-30 mm < 15 mm	2 1 0	2
Agronomic considerations (nutrition, weeds, disease)	- No constraints - Limited constraints - Significant constraints - Poor	3 2 1 0	3
Seasonal Outlook Forecast	Decile ranking minus 1	Up to 8	8
			20

A decision support rating was then developed to help inform the decision

- >15 Points** Sow maximum crop area with increased fertiliser inputs
- 10-15 Points** Sow with normal inputs but possibly drop off poorer performing paddocks
- 7-11 Points** Sow better performing paddocks only, then reassess
- < 7 Points** Significantly reduce crop area.



2. Making decisions more robust

We make many decisions in farming without fully knowing the odds, either because we are not well informed (i.e., the information is about but we don't use it) or we simply can't or haven't defined the odds. This uncertainty means we will be making decisions where probabilities are very difficult to define or are unknown.

In this situation we can seek to develop options that are more 'robust'. A robust decision or solution (as defined by Rod Marsh of NetBalance¹) is one that (amongst other things):

- Remains viable under the widest range of possible solutions. That is we could do A or B or C and it would still be OK.
- Is insensitive to broken assumptions. If our assumption is wrong, it still will work out.
- Builds in redundancy.
- Maximises value when planned as part of a portfolio of actions.

How to use the approach:

Think of a significant issue requiring a decision, such as bringing livestock back into a cropping system or expanding the farming business by buying more land.

- List the **major risks** associated with making this change (these are aspects we could put odds on).
- List what is **uncertain** about the change (these are aspects we would find difficult to put odds on).
- What **strategies or actions** could be employed to make the decision more robust? (See above for what makes a robust decision.)

1 Net Balance is an Australian sustainability advisory service (www.netbalance.com.au)



3. Making a 'hard' decision 'easier'

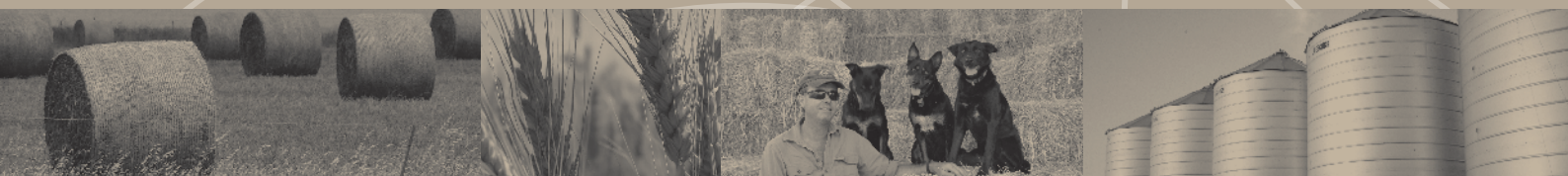
Many decisions in farming have flow on effects and the information we get only 'starts the ball rolling'. There are many consequences that flow from considering a change and these have to be dealt with as well. This complexity makes it a hard decision. For example, you are shown profit figures that suggest a mixed farming system is more profitable and resilient than cropping only. But to re-introduce sheep will require a decision on breed, consideration of infrastructure, where to get the finance to buy the sheep, possible new skills in feeding and grazing management, establishing new pastures and if there is enough personal interest to have livestock again. It is a complex decision and it is a hard decision.

According to Ben Newell, a psychology with the University of NSW, a hard decision has three basic characteristics:

- There is a serious potential loss if things go wrong.
- The steps to get to a conclusion are long and difficult (onerous). In other words it takes a lot of processing to come to a conclusion.
- After processing, there appears to be no clear winner, no obviously superior decisions.

How to use the approach:

- Talk about and calculate the size of the potential loss.
- Consider strategies that may minimise the size of the potential loss.
- Use tools such as the decision analysis matrix and making more robust decisions to provide structure to the decision making processes.
- Endeavour to make clear distinctions between various options so the conclusions are clear and stand out. Considering all things as being about the same does not help.



Farm advisory boards

Adapted from Farm Boards lead to better decision making by Mike Roberts and Bill Long.
www.grdc.com.au/Media-Centre/Ground-Cover-Supplements/GCS113/Farm-advisory-boards-make-better-decisions

Less than 1% of family farms use a regular, formal meeting process to assist in strategic business management and development. What is more common is for different members of the farming business to engage in separate discussions with specialist such as agronomists, accountants and financiers. Meetings are only held when there is a crisis (succession, financial pressure, considering to buy the farm next door).

A Farm Advisory Board is simply an extension of the process that farmers are already using with advisors. It only differs by getting everyone whose advice has an influence on the performance of the business to the table at one time and on a regular basis.

People who are being included and acknowledged for their contribution find it easier to pull in the same direction instead of pulling apart. When people are aligned, their thinking becomes focused and business direction becomes much clearer.

Farming families don't necessarily want to be corporatized, but there are some benefits in a more regular, structured approach. Farm Advisory Boards are a platform for discussion and decision-making, by providing a regular and disciplined way to deal with farm decisions. Also farming businesses set up as companies are obliged by Law to have a formalised approach.

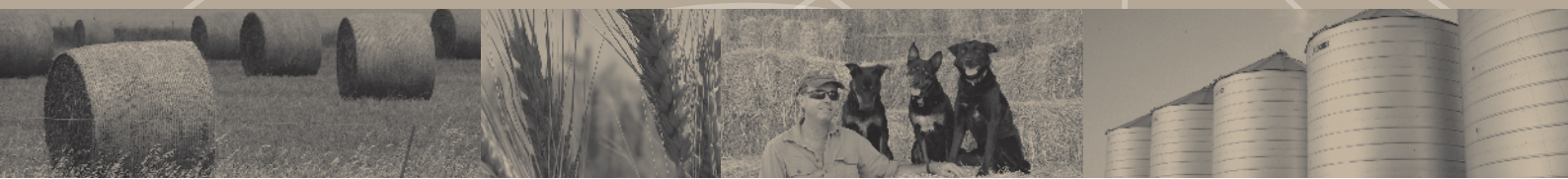
Tips

- Membership of your board should include people you take advice from and who influence your business decisions. Start by including bankers, the accountant, agronomists and the business management advisor.
- Appoint an independent chairs with the skills to facilitate discussion in a way that includes all parties (good understanding of decision-making processes, allows everyone to have their say, be able to recognise bias and prejudice, cope with different personalities, reach consensus etc). Talk to your accountant or other advisors. If they don't think they have the skills, they might know someone who has.
- Consider an independent note taker, so everyone can participate rather than taking notes themselves.



- Set an agenda that suits you. It will likely reflect such things as a seasonal outlook, marketing, a machinery inventory and replacement policy, policies around who is doing what in the business, where individuals want to be in five or ten years and so on. Explore major scenarios such as the financial impact of a run of dry seasons without the stress.
- Be prepared to allow emotions to be expressed. Decisions are linked to values, beliefs, who people are and how they view their role in the farming business. Allow time for people to 'go away and think about things'.
- Remember profits drive business but life is not all about profit. Many decisions are motivated by personal stage of life issues. It is important for the board to consider how to achieve family goals and make money along the way.
- Don't be put off by the perceived costs of running a farm advisory board. Like any good investment, those extra costs are soon recovered.





Making sense through personal experience (storytelling)

Farming systems are some of the most complex systems in business. There is not one correct answer because there are so many issues to deal with.

Complex decisions are very often difficult and confusing. Many factors need to be considered and some considerations are hard to define, measure or identify. Often a number of people are involved or have to be considered.

It has been found **storytelling** is a great way of helping us make complex decisions. Farming families have passed down, through generations, the stories of important events that have helped to shape their lives. Through many seasons, a story of how the farm works has been developed which needs to be taken into account.

Stories help us to make sense of complex situations. In farming storytelling helps work out interactions between enterprises, livestock, crops, climate and soils; it determines the potential opportunities and consequences; the risks and our approach to risk; and gives the opportunity to consider things as we make a decision.

We like to learn by talking with each other. The experiences of other farmers and/or advisors, and their different 'world view' helps us to formulate a decision as we talk with them about the different aspects of a decision.

Reading stories helps farmers make complex decisions. The best stories provide an understanding of how the decisions were made, the financial implications of the decision, the risks which the farmer considered, some of the mistakes made along the way and what was learnt.

Everyone's farm is different. A decision which was right for one farmer won't necessarily be right for another, however by hearing another farmer's story, farmers can understand their complex decisions better and be more confident in their decision making.

To make difficult decisions, people need to tell others involved in the decision what worries them, what risk they are prepared to take, how a decision will affect other parts of their life, and how committed they are to the decision.

Individuals telling their story

People making complex decisions need a person or group of people to share their story with and listen to other people's stories. Big farming decisions are too important to make on your own. Sharing stories can reduce the stress involved in difficult decisions.



Having someone to share stories with is important. People share their story in a different ways. For example:

- Talking through at a social event such as the football match, the pub or a BBQ
- Employing a consultant, advisor or mentor
- Joining a discussion group
- Getting together with a close friend or just talking “over the fence”

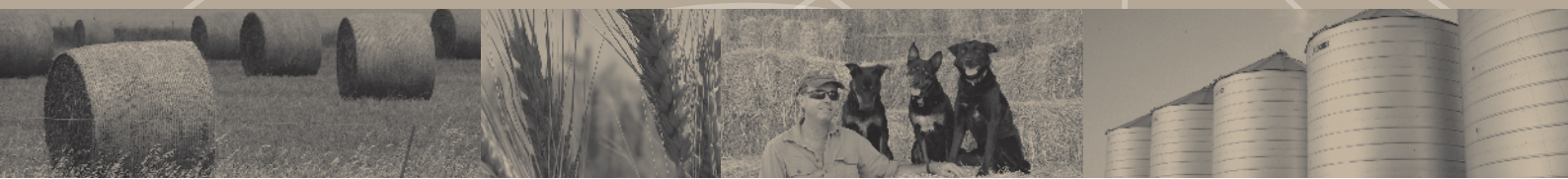
Running family meetings (or a farmer board) where open, honest discussions are had about difficult decisions where everyone is encouraged to share how they feel about decisions.

Discussion groups for storytelling

Farmer discussion groups have been running for many years throughout Australia in all agricultural industries. They come in many forms and there is no recipe for a successful discussion group, but successful groups encourage farmers to tell each other their stories. Discussion groups tell the story of how a decision was made, and people can show each other the results of good and bad decisions.

A few tips for a successful discussion group:

- Start with setting “ground rules” – How do you want to work together in this group?
- Encourage everyone to be open and honest by making confidentiality an important ground rule. Ask people to tell their stories in the group not in the ute on the way home.
- Encourage group members to share financial performance and talk about the financial implications of decisions.
- Make it clear it is OK to say “I would rather not talk about that”.
- Ask people questions that encourage storytelling from everyone. (See below)
- A group facilitator helps the group by listening and asking questions which guide discussion towards the difficult, strategic and complex decisions. This ensures the group members get the most out of their discussion group. The role of facilitator is very important because they have the responsibility to ensure the group tackles the big, hard decisions.



Advisors using storytelling

Advisors can assist farmers make decisions by using storytelling. Some ways, which advisors can help, are:

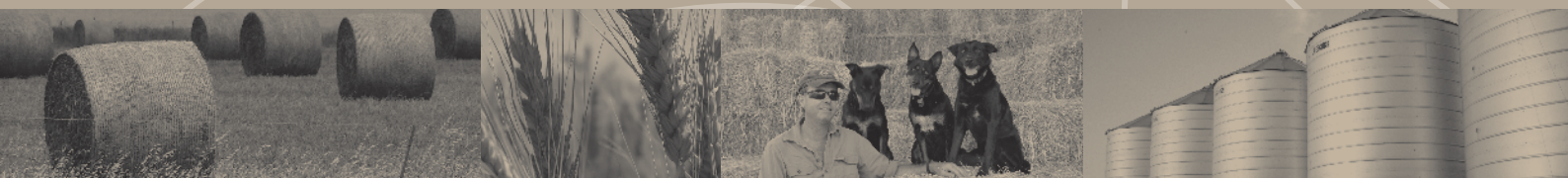
- When advising a farming family, accept there is no one right answer and all family members need the opportunity to talk through the decision. Ask open questions, listen carefully and encourage family members to listen to each other.
- Help clients understand decisions are complex, and that telling the story is an important part of working out decisions.
- Asking open questions, which encourage farmers to talk openly and honestly about their decisions. For example – What worries you about this decision? Who will be affected by the decision? Who has had a similar experience?
- Encouraging other farmers to share their experiences, which may be relevant or similar? A farmer telling their story will help other farmers to make sense of their decision.
- Ask farmers to talk about a decision they are pleased about, one they found difficult, one they regret.



Appendix 3: Action plan to achieve your goals

Take one of the goals you have written above and work through the goal setting table. Definitions around each heading in the table is presented below.

Area of your life	Date:	
The goal (well formed outcome)		
What is the current reality in relation to this goal?		
Motivation: why is this goal important		
Barriers	Solutions	
Action steps	Date started	completed
Learning (review, conclude, apply)		
How I will know the goal is achieved ?		



Definitions

Area of your life – does it apply to:

- The business
- Family
- Personal development
- Recreation
- Community
- Other

The goal – Is it described in a SMART way. i.e.

- **Specific** – do I know exactly what the goal means?
- **Measurable** – can I measure the success? Will I know when I have completed it?
- **Achievable** – can I really achieve it?
- **Realistic** – have I made the goal realistic? Is the timeframe realistic?
- **Timebound** – does the goal have a timeframe attached to it?
When will it be achieved?

Current reality – Where are you right now in relation to the goal? This is a very helpful step when reflecting and thinking about your achievements.

Motivation – Why is this goal important to you? If it's not important enough it will not happen!

Barriers and solutions – What might get in the way of you achieving this goal and what are some of the things you can put in place to ensure the barriers are overcome.

Action steps – Break the goal down into small achievable steps, something that is easy to measure and give you a sense of progress towards your goal.

Learning/review – We often set goals, complete them and move on without reviewing, thinking about what worked well? What would I do differently next time? This step also provides an important opportunity to celebrate successes. There has been much research that shows the people who stop and celebrate success are happier with their lives.

How will I know the goal has been **achieved**? - What will we see as a result of the goal? Sometimes this is easy to state – "I will have returned from my successful trip to the Caribbean" and sometimes it is a difficult to measure. If your goal is to increase your confidence, be specific about what you are increasing confidence in and how you will know this has been achieved. "I will have increased my confidence in having difficult conversations with my boss because I will have successfully negotiated my package."



Appendix 4: The sixteen Myers Briggs Type Indicators (MBTI) at a glance

ISTJ

For ISTJ's the dominant quality in their lives is an abiding sense of responsibility for doing what needs to be done in the here-and-now. Their realism, organising abilities and command of the facts leads to their completing tasks thoroughly and with great attention to detail.

Logical pragmatists at heart, ISTJ's make decisions based on their experience and with an eye to efficiency in all things. ISTJ's are intensely committed to people and to the organisations of which they are a part; they take their work seriously and believe others should as well.

ISTP

For ISTP's the driving force in their lives is to understand how things and phenomena in the real world so they can make the best and most efficient use of them. They are logical and realistic people, and they are natural trouble-shooters.

When not actively solving a problem, ISTP's are quiet and analytical observers of their environment, and they naturally look for the underlying sense to any facts they have gathered. ISTP's often pursue variety and even excitement in their hands-on experiences. Although they do have a spontaneous, even playful side, what people often first encounter with them is their detached pragmatism.

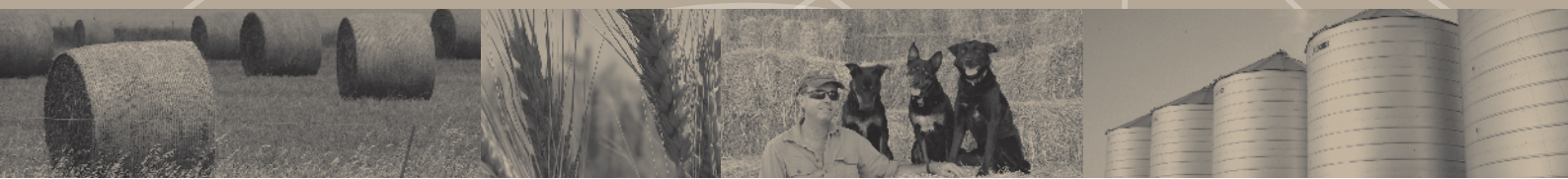
ESTP

For ESTP's the dominant quality in their lives is their enthusiastic attention to the outer world of hands-on and real-life experiences. ESTP's are excited by continuous involvement in new activities and in the pursuit of new challenges.

They tend to be logical and analytical in their approach to life, and they have an acute sense of how objects, events, and people in the world work. ESTP's are typically energetic and adaptable realists, who prefer to experience and accept life rather than to judge and organise it.

ESTJ

For ESTJ's the driving force in their lives is their need to analyse and bring into logical order the outer world of events, people and things. ESTJ's like to organise anything that comes in their domain, and they will work energetically to complete tasks so they can quickly move from one to the next.



Sensing orients their thinking to current facts and realities, and thus gives their thinking a pragmatic quality. ESTJ's take their responsibilities seriously and believe others should do the same.

ISFJ

For ISTJ's the dominant quality in their lives is an abiding respect and sense of personal responsibility for doing what needs to be done in the here-and-now. Actions that are of practical help to others are of particular importance to ISFJ's their realism, organisational abilities, and command of the facts lead to their thorough attention in completing tasks. ISFJ's bring an aura of quiet warmth, caring, and dependability to all they do; they take their work seriously and believe others should too.

ISFP

For ISTP's the dominant quality in their lives is a deep-felt caring for living things, combined with a quietly playful and sometimes adventurous approach to life and all its experiences.

ISFJ's typically show their caring in a very practical ways, since they prefer actions to words. Their warmth and concern are generally not expressed openly, and what people often first encounter with ISFP's is their quiet adaptability, realism and "free spirit" spontaneity.

ESFP

For ESFP's the dominant quality in their lives is their enthusiastic attention to the outer world of hands-on real-life experiences. ESFP's are excited by continuous involvement in new activities and relationships.

They also have a deep concern for people, and they show their caring in warm and pragmatic gestures of helping. ESTP's are typically energetic and adaptable realists, who prefer to experience and accept life rather than judge and organise it.

ESFJ

For ESFJ's the dominant quality in their lives is an active and intense caring about people and a strong desire to bring harmony into their relationships. ESFJ's bring an aura of warmth to all that they do, and they naturally move into action to help others, to organise the world around them, and to get things done.

Sensing orients their feeling to current facts and realities, and thus gives their feelings a hands-on pragmatic quality. ESFJ's take their work seriously and believe others should do so as well.



INFJ

For INFJ's the dominant quality in their lives is their attention to the inner world of possibilities, ideas and symbols. Knowing by way of insight is paramount to them, and they often manifest a deep concern for people and relationships as well.

INFJ's often have deep interests in creative expression as well as issues of spirituality and human development. While their energy and attention are naturally drawn to the inner works of ideas and insights, what people often first encounter with INFJ's is their drive for closure and for the application of their ideas to people's concerns.

INFP

For INFP's the dominant quality in their lives is a deep-felt caring and idealism about people. They experience this intense caring most often in their relationships with others, but they may also experience it around ideas, projects, or any involvement they see as important.

INFP's are often skilled communicators, and they are naturally drawn to ideas that embody a concern for human potential. INFP's live in the inner world of values and ideals, but what people often first encounter with them in the outer world is their adaptability and concern for possibilities.

ENFP

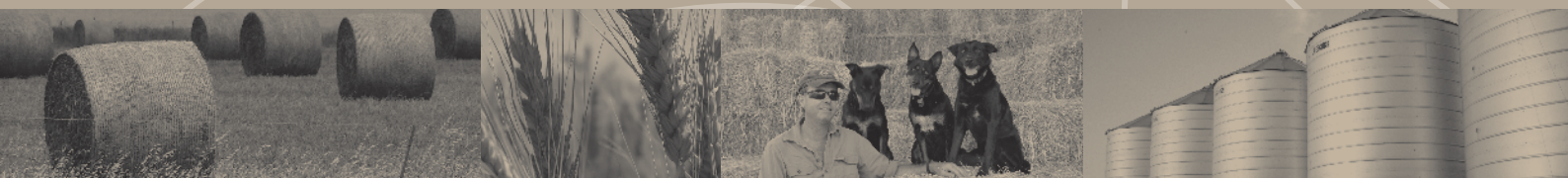
For ENFP's the dominant quality in their lives is their attention to the outer world of possibilities; they are excited by continuous involvement in anything new, whether it's new ideas, new activities, or new people.

Though ENFP's thrive on what is possible and what is new, they also experience a deep concern for people as well. Thus, they are especially interested in possibilities for people. ENFP's are typically energetic, enthusiastic people who lead spontaneously and adaptable lives.

ENFJ

For ENFJ's the dominant quality in their lives is an active and intense caring about people and a strong desire to bring harmony into their relationships. ENFJ's are openly expressive and empathic people who bring an aura of warmth to all that they do.

Intuition orients their feeling to the new and to the possible, thus they often enjoy working to manifest a humanitarian vision, or helping others to develop their potential. ENFJ's naturally and conscientiously move.



INTJ

For INTJ's the dominant force in their lives is their attention to the inner world of possibilities, symbols, abstractions, images and thoughts. Insight into conjunction with logical analysis is the essence of their approach to the world; they think systematically.

Ideas are the substance of life for INTJ's and they have a driving need to understand, to know, and to demonstrate competence in their area of interest. INTJ's inherently trust their insights, and with their task-orientation will work intensely to make their visions into realities.

INTP

For INTP's the driving force in their lives is to understand whatever phenomenon is the focus of their attention. They want to make sense of the world as a concept and they often enjoy opportunities to be creative.

INTP's are logical, analytical, and detached in their approach to the world; they naturally question and critique ideas and events as they strive for understanding. INTP's usually have little need to control the outer world, or to bring order to it, and they often appear very flexible and adaptable in their lifestyle.

ENTP

For ENTP's the dominant quality in their lives is their attention to the outer world of possibilities; they are excited by continuous involvement in anything new, whether it's new ideas, new people and new activities.

They look for patterns and meaning in the world, and they often have a deep need to analyse to understand, and to know the nature of things. ENTP's are typically energetic, enthusiastic people who lead spontaneous and adaptable lives.

ENTJ

For ENTJ's the driving force in their lives is their need to analyse and bring into logical order the outer world of events, people and things. ENTJ's are natural leaders who bring conceptual models that serve as plans for strategic action.

Intuition orients their thinking to the future and gives their thinking an abstract quality. ENTJ's will actively pursue and direct others in the pursuit of goals they have set, and they prefer a world that is structured and organised.



Appendix 5: Price percentile values for a range of commodities (June 2003 to December 2019, inflated to 2019 prices)

Grain (\$/t)	State	P Values				
		10	25	50	75	90
Canola	SA	\$486	\$524	\$568	\$626	\$703
	VIC	\$480	\$512	\$556	\$624	\$694
	WA	\$502	\$541	\$583	\$640	\$695
APW wheat	SA	\$228	\$256	\$298	\$343	\$400
	VIC	\$224	\$249	\$286	\$326	\$381
	WA	\$252	\$274	\$304	\$358	\$401
Malt barley	SA	\$222	\$248	\$284	\$330	\$425
	VIC	\$218	\$241	\$276	\$320	\$386
	WA	\$241	\$261	\$294	\$326	\$381
Feed barley	SA	\$191	\$220	\$252	\$293	\$389
	VIC	\$183	\$212	\$241	\$283	\$331
	WA	\$202	\$219	\$258	\$302	\$326
Lentils	SA	\$249	\$276	\$332	\$369	\$397
Lupins	WA	\$485	\$579	\$678	\$920	\$1218

Wool (c/ kg cln)	Micron	P Values				
		10	25	50	75	90
	17	1467	1558	1688	1963	2603
	18	1349	1410	1547	1794	2359
	19	1237	1296	1432	1641	2040
	20	108	1169	1322	1532	1809
	21	100	110	1277	1493	1741
	22	964	107	1243	1457	1698
	23	935	1027	1208	1413	1558
	24	885	957	1118	1226	1397
	25	800	849	963	1114	1258
	26	722	773	880	1020	1168
	28	565	629	715	798	925
	30	482	551	621	703	839



		P Values				
c/kg cwt	State	10	25	50	75	90
Trade lamb	SA	375	415	459	518	571
	Vic	387	424	468	536	586
	WA	328	367	416	495	574
Heavy lamb	SA	373	413	456	519	571
	Vic	380	416	459	527	587
	WA	323	357	409	487	574
Mutton	SA	153	193	240	311	393
	Vic	169	210	250	337	459
	WA	128	157	211	299	384

		P Values				
c/kg cwt	State	10	25	50	75	90
Feeder steers (c/kg lwt)	SA	168	185	204	224	248
	Vic	171	188	204	226	246
	WA	172	188	204	224	237
Trade steers (c/kg cwt)	SA	321	346	377	420	465
	Vic	343	369	400	438	471
	WA	336	363	391	419	441
Jap Ox (c/kg cwt)	SA	320	344	369	405	430
	Vic	333	351	370	403	430
	WA	284	315	345	365	381
Cows (c/kg cwt)	SA	251	286	319	347	373
	Vic	266	292	319	345	369
	WA	211	238	268	295	318



Appendix 6: Calculating standard deviation

One standard deviation represents the upper and lower value of about two thirds (68%) of all the values in a data set. In the two farm example provided in the main text, the standard deviation of yields on farm A was 2.3 t/ha whereas the standard deviation on farm B was only 1.3 t/ha. The larger the standard deviation the greater the volatility (because we also know how frequently it happens, in this case expect that range 68% of the time).

How to calculate the standard deviation (and co-efficient of variation)

Follow the following steps:

1. Work out the average.
2. Subtract the average from each number (some will be negative).
3. Multiply each remainder number by itself (so the negatives cancel out).
4. Add all these numbers together and divide by the number of occurrences.
5. Take the square root of the added numbers.

Example Farm A

Average is 4 t/ha ($2+2+3+4+5+8 = 24/6 = 4$)

Subtract average from each value (-2, -2, -1, 0, +1, +4)

Multiply by itself (4, 4, 1, 0, 1, 16)

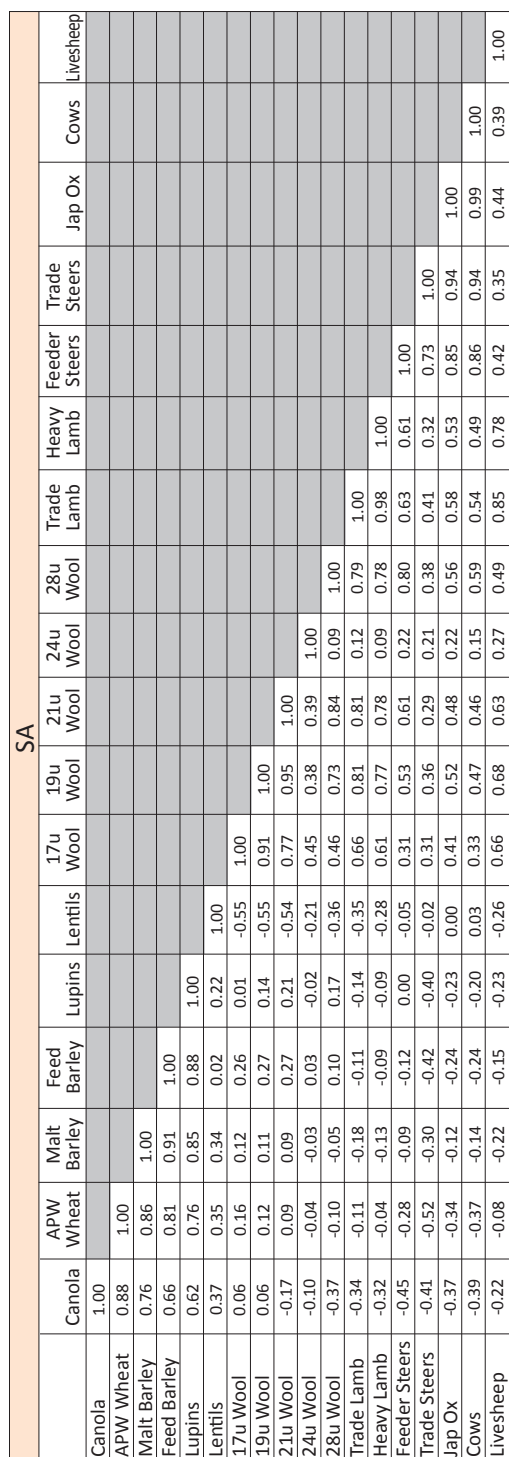
Add together and divide by the number of occurrences ($4+4+1+0+1+16=26/5 = 5.2$)

Take square root ($\sqrt{5.2} = 2.3$).

The co-efficient of variation or CV is simply the standard deviation divided by the average and expressed as a %. So for farm A the CV is $2.3/4 = 58\%$.



	Canola	APW Wheat	Malt Barley	Feed Barley	Lupins	Lentils	17u Wool	19u Wool	21u Wool	24u Wool	28u Wool	Trade Lamb	Heavy Lamb	Feeder Steers	Trade Steers	Jap Ox	Cows	Livsheep
	1.00																	
	Canola																	
	APW Wheat	1.00																
	Malt Barley	0.81	1.00															
	Feed Barley	0.67	0.88	1.00														
	Lupins	0.67	0.85	0.82	1.00													
	Lentils	0.38	0.33	0.27	0.05	1.00												
	17u Wool	0.08	0.14	0.14	0.21	0.01	1.00											
	19u Wool	0.08	0.14	0.08	0.24	0.14	-0.55	0.91	1.00									
	21u Wool	-0.12	0.03	0.24	0.24	0.21	-0.54	0.77	0.95	1.00								
	24u Wool	-0.11	-0.08	-0.12	-0.02	-0.02	-0.21	0.45	0.38	0.39	1.00							
	28u Wool	-0.31	-0.05	-0.11	0.09	0.17	-0.36	0.46	0.73	0.84	0.09	1.00						
	Trade Lamb	-0.27	-0.10	-0.19	-0.16	-0.15	-0.25	0.65	0.78	0.76	0.15	0.74						
	Heavy Lamb	-0.24	-0.02	-0.13	-0.08	-0.05	-0.23	0.62	0.78	0.80	0.13	0.79						
	Feeder Steers	-0.36	-0.27	-0.28	-0.16	-0.11	0.01	0.31	0.52	0.56	0.16	0.71	1.00					
	Trade Steers	-0.40	-0.46	-0.42	-0.33	-0.38	-0.07	0.36	0.44	0.37	0.22	0.44	0.49	0.43	0.90			
	Jap Ox	-0.32	-0.32	-0.30	-0.24	-0.21	0.10	0.29	0.42	0.39	0.13	0.54	0.57	0.53	0.95	1.00		
	Cows	-0.39	-0.33	-0.32	-0.18	-0.19	-0.08	0.37	0.54	0.54	0.21	0.65	0.59	0.98	0.95	0.96	1.00	
	Livsheep	-0.21	-0.16	-0.25	-0.23	-0.26	0.66	0.68	0.63	0.27	0.49	0.83	0.78	0.42	0.40	0.42	0.40	1.00









This image shows a single sheet of white paper with horizontal green ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

