

WEST WYALONG, NSW
THURSDAY 18
AUGUST 2022

FARM TO PROFIT FARM BUSINESS UPDATE



FARM TO PROFIT FARM BUSINESS UPDATE



West Wyalong

Thursday 18th August, 2022
*Services and Citizens Club,
100 Monash Street, West Wyalong*

#GRDCUpdates



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GRDC Farm Business Update
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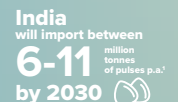
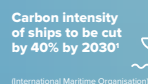
WHERE SHOULD GRDC FOCUS ITS INVESTMENT?

CONTRIBUTE NOW TO HELP SHAPE THE 2023-28 RD&E PLAN

We want to understand what is challenging you, what excites you, the issues facing the grain industry and where you believe grains research and development should be focused to deliver greatest impact.



WHAT WILL WE SEE TOWARDS 2040



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You are encouraged to contribute to shaping the Plan by visiting:

rdeplan.grdc.com.au/consultation

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f <https://www.facebook.com/theGRDC>

We encourage all stakeholders to contribute new ideas and opportunities for investment throughout the life of this Plan by contacting GRDC staff based in our regional offices or Canberra.

1. Kingwell, R. (2021). Grains industry supply/demand drivers and trends. Considerations for Australian grains RD&E. Report to GRDC by the Australian Export Grains Innovation Centre (AEGIC)
2. Deloitte (2020). Deloitte Insights: Electric vehicles. Setting a course for 2030. Deloitte University EMEA, CVBA, B-1831 Diegem, Berkenlaan 8b.

GRDC Farm Business Update WEST WYALONG



GRDC
GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

Program

- | | | |
|----------|--|--|
| 9.30 am | Announcements | |
| 9.35 am | GRDC welcome | |
| 9.40 am | Grain commodity outlook and global observations | <i>Tim Bickford,
Brahman Commodities</i> |
| 10.20 am | Evolution of family farms - from partnerships to corporate structures | <i>Carmen Quade,
Agrifocused</i> |
| 11.00 am | Morning tea | |
| 11.30 am | Increasing farm scale in the current market – economies of scale versus diminishing marginal return | <i>John Francis,
Agrista</i> |
| 12:10 pm | Tough fertiliser decisions – cost matters and profit matters more | <i>Wayne Pluske,
Equii</i> |
| 12.50 pm | Lunch | |
| 1.50 pm | Financial management reporting – the value of financial information | <i>Courtney McCauley,
Homestead Ag</i> |
| 2.30 pm | Machinery investment - measuring the return on precision spraying technologies and other data mapping options | <i>Adrian Roles,
AgTrak</i> |
| 3.10 pm | Wrap up and evaluation | |
| 3.15 pm | Event close | |



The WeedSmart Big 6

Weeding out herbicide resistance in winter & summer cropping systems.

The WeedSmart Big 6 provides practical ways for farmers to fight herbicide resistance.

How many of the Big 6 are you doing on your farm?

We've weeded out the science into 6 simple messages which will help arm you in the war against weeds. By farming with diverse tactics, you can keep your herbicides working.

Rotate Crops & Pastures

Crop and pasture rotation is the recipe for diversity

- Use break crops and double break crops, fallow & pasture phases to drive the weed seed bank down.
- In summer cropping systems use diverse rotations of crops including cereals, pulses, cotton, oilseed crops, millets & fallows.



Mix & Rotate Herbicides

Rotating buys you time, mixing buys you shots.

- Rotate between herbicide groups.
- Mix different modes of action within the same herbicide mix or in consecutive applications.
- Always use full rates.
- In cotton systems, aim to target both grasses & broadleaf weeds using 2 non-glyphosate tactics in crop & 2 non-glyphosate tactics during the summer fallow & always remove any survivors (2 + 2 & 0).

Increase Crop Competition

Stay ahead of the pack

Adopt at least one competitive strategy (but two is better), including reduced row spacing, higher seeding rates, east-west sowing, early sowing, improving soil fertility & structure, precision seed placement, and competitive varieties.



Double Knock

Preserve glyphosate and paraquat

- Incorporate multiple modes of action in the double knock, e.g. paraquat or glyphosate followed by paraquat + Group 14 (G) + pre-emergent herbicide
- Use two different weed control tactics (herbicide or non-herbicide) to control survivors.



Stop Weed Seed Set

Take no prisoners

- Aim for 100% control of weeds and diligently monitor for survivors in all post weed control inspections.
- Crop top or pre-harvest spray in crops to manage weedy paddocks.
- Consider hay or silage production, brown manure or long fallow in high-pressure situations.
- Spray top/spray fallow pasture prior to cropping phases to ensure a clean start to any seeding operation.
- Consider shielded spraying, optical spot spraying technology (OSST), targeted tillage, inter-row cultivation, chipping or spot spraying.
- Windrow (swath) to collect early shedding weed seed.



Implement Harvest Weed Seed Control

Capture weed seed survivors

Capture weed seed survivors at harvest using chaff lining, chaff tramlining/decking, chaff carts, narrow windrow burning, bale direct or weed seed impact mills.



WeedSmart Wisdom



Never cut the herbicide rate – always follow label directions
Spray well – choose correct nozzles, adjuvants, water rates and use reputable products.
Clean seed – don't seed resistant weeds.
Clean borders – avoid evolving resistance on fence lines.
Test – know your resistance levels.
'Come clean. Go clean' – don't let weeds hitch a ride with visitors & ensure good biosecurity.



Grain commodity outlook and global observations

Tim Bickford.

Brahman Commodities.

What is the outlook on the current grain's commodity book? Is it possible to budget on sustained higher commodity prices through to harvest and what is the longer-term view of the demand / supply dynamics for the base grain commodities?

Tim will look at global grain stocks and the events that will have an influence on grain prices through to harvest 2022.

Notes



More about Tim...

Tim Bickford is a senior trader and Director of Brahman Commodities, with 15 years of experience in the grain industry, including 10 years of trading experience. Prior to joining Lemarc Agromond, Tim worked in number of roles at GrainCorp including cash trading experience in the UK and EU markets. Throughout his career, Tim has developed a strong knowledge of the international grain markets and has been responsible for managing derivative positions, currency, and hedge books, along with vast experience in developing and executing export strategies.

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Evolution of family farms – from partnerships to corporate structures

Carmen Quade

AgriFocused

Key Messages:

- ◆ Farm businesses are growing in scale and complexity.
- ◆ Growth is not just about adding hectares, labour and machinery, it's about leadership, systems and strategy. We need to manage the growth of farming businesses as they move through the stages of business growth, from sole owner operators through to much larger scale businesses.
- ◆ We can reflect the best of corporate models of management and leadership whilst still maintaining all the great things about family farming operations. Solid systems and structures enhance family relationships.



Introduction

Managing a farming business is a complex task. Most farm businesses have grown in the past 20 years. There are more hectares under management, more people involved and possibly less labour available per hectare. As farm businesses grow, the complexity of managing the farm business increases and it might not be as simple as it once was. Greater levels of market and seasonal uncertainty force us to scan constantly for opportunities and threats and we need to allocate more time to decision making. Skills shortages mean that the importance of the business owner as a machine operator is higher than it should be, leaving less time and capacity for important managerial tasks. Given these challenges, replicating the best of what is used in the corporate world can give family operated business more flexibility, higher levels of success and less stress.



Taking your business to the next level – strategies to consider

Simplification – Simplification of systems is a deliberate choice. Some farm businesses address this by eliminating the number of variables in their business. Examples of this include removing enterprises, removing fences, planting blocks of paddocks and reducing the number of grain varieties. Business managers also choose to do this when they replicate machinery brands or models or repeat previously successful strategies and decisions. Eliminating off-farm work or off-farm contracting also simplifies our operations. What have you already simplified in your business? What can be simplified further? What are the advantage and disadvantages of simplification?

Delegation – Now more than ever farming businesses need brain power to make good decisions in an environment of ever-changing variables. We can make changes to how we structure responsibilities in our businesses to make the most of all the brains, and to spread the mental load. Does the business manager or farm owner have to make every business decision? Is it a realistic mental load to carry and does it make the best of everyone's intellect? Empowering staff and other family members to take on day to day responsibility for tasks and contribute to longer term strategy can work well. It improves outcomes, reduces errors and builds job satisfaction. It contributes to successful succession and skill development and reduces key person risk.

Outsourcing – Delegating is passing on responsibility to someone within the business, outsourcing is getting someone outside the business to take on a role or responsibility. As the business owner/manager you retain full decision-making responsibility, but others can take on the main function of some roles. Typical aspects of the business to outsource include grain marketing, repairs and maintenance, staff recruitment, machinery acquisition, bookkeeping, taxation planning and agronomy. Could a personal assistant (PA) or a virtual assistant (VA) be helpful? Trust is important, avoid the trap of outsourcing and also spending a lot of time monitoring. Don't have a dog and bark.

Allocating and articulating clear roles and responsibilities – In a sole operator business roles and responsibilities are simple, the one person does it all. In businesses with more family members or staff involved, there are often loose and poorly defined roles and responsibilities.

If your business has poorly defined roles you will find yourself saying things like "I thought she did it", "Why didn't he do it?", "Have you done it yet?", "We both forgot to do it" or "We did it twice." Communication can overcome this, to a degree, but it is essentially inefficient for low level decision making. For simplistic tasks it is more efficient to allocate one person as the 'boss' of some jobs and to be able to rely on them to just get it done. For higher level tasks, it works well allocating a person to a responsibility area - who does the research, analyses the options and presents a recommendation to the "board" or the boss. Good communication underpins the success of this and every business strategy.

Often responsibility transition is informal, but this leads to uncertainty for those inside and outside the business. Look at your business, write down what needs to be done each year and look for the links between activities and those that can stand alone.

Remember that allocation of roles and responsibilities does not have to be permanent, it is sometimes better if roles rotate after a few years.

Communication – Business growth leads to higher levels of complexity, requiring more planning and communication. What are your communication tools and rules? How do you receive information and relay information to others? Is it time to try something new? There is lots of technology available to assist in communicating minor details to ensure work flows smoothly. Meetings are important, but they serve different functions. Consider your meetings, are they operational, crisis or strategic in nature?

Planning – Short term goals in cropping businesses are pretty straightforward. We want to get the crop in, get it up and get it off. Medium to short term goals differ from business to business. What is it you want to achieve in the next 10 years? How old will you and other family members be in another decade. What do you want the farm to look like and how do you see yourself working in it? Moving your business plan from your head to a piece of paper allows you to share those ideas with the people around you, for them to make their own contribution and then work toward shared goals.



Management or Advisory boards – Could a formal corporate style management structure suit your business, dissolve tension and lead to more professional decision making? Meeting a few times a year with an independent advisor or board member can enhance planning and decision-making outcomes. Bringing the whole advisory team around the same table (agronomic, business, accounting and finance) can lead to a shared understanding of business constraints and vision.

My follow up questions for the speaker.

Why working on this could be great for your farming business

- With delegated responsibilities, plans in place and established methods of communication there will be less mistakes and less rework.
- Relationships between family members and staff are enhanced by clarity around roles and higher levels of empowerment.

Self-evaluation

Where on earth do you start? This simple exercise is a great place to assess where you are now and clarify your future direction.

What we need to start doing	What we need to stop doing	What we need to continue doing



We want to work on this in our business, what should we do next?

- Set time for formal face to face communication.
Consider having two to three strategy meetings a year with all business owners. 12 monthly catch ups with management and key staff and weekly operational meetings with on the ground management and operational staff. You can work your change management strategy into this framework.
- Consciously schedule some brain down time.
It's ok for this to be in working hours. Turn your phone off and the radio on. Schedule regular time off farm. See holidays as fuel for your brain and your body.
- Start or update an operational calendar outlining all that needs to be done each year on farm and in the office.
Use this as a starting point for clear and deliberate discussions with those around you regarding roles in the business.
- Start small. An easy quick win is the best way to commence any change management.

Our First Action _____

Our Second Action _____



Want to learn more, here are some suggestions;

- Burke, K. (2020). Crops, People, Money and You. Available in hardcopy, audio book or e-book at www.thinkagri.com.au
- Krause, M. (2015). Farming the Business Manual. GRDC. <https://grdc.com.au/resources-and-publications/all-publications/publications/2015/01/farming-the-business-manual>
Chapters on leadership as well as advisory boards.
- Farm Business Focus – a free email group by AgriFocused. Sign up at <https://agrifocused.com.au/farmbusiness/> for regular hints and tips.
- Farm Office Plus –online farm office course, coming soon from AgriFocused. <https://agrifocused.com.au/training/>
- Podcast: Growing Agri People, Sally Murfet. <https://podcasts.apple.com/au/podcast/growing-agri-people/id1529845594>
- Ag EDGE – Farm advisory boards www.agedge.com.au



More about Carmen...

Carmen enjoys working with people to improve their business skills, and in 2019 founded her agribusiness training company, AgriFocused, offering face to face and online training.

Carmen holds a Bachelor of Business (Agricultural Commerce), a Master of Professional Accounting and a Cert IV in Training Small Groups. Her extensive experience in Local Government includes economic and community development as well as corporate governance. Carmen has worked as a university lecturer in Accounting and Agribusiness.

Together with her husband and other family members, Carmen is a partner in a mixed farming business at Tallimba, in the Northern Riverina.

Carmen has a lived understanding of the complexities and challenges involved in farm business.

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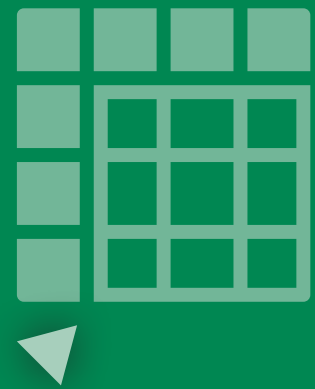
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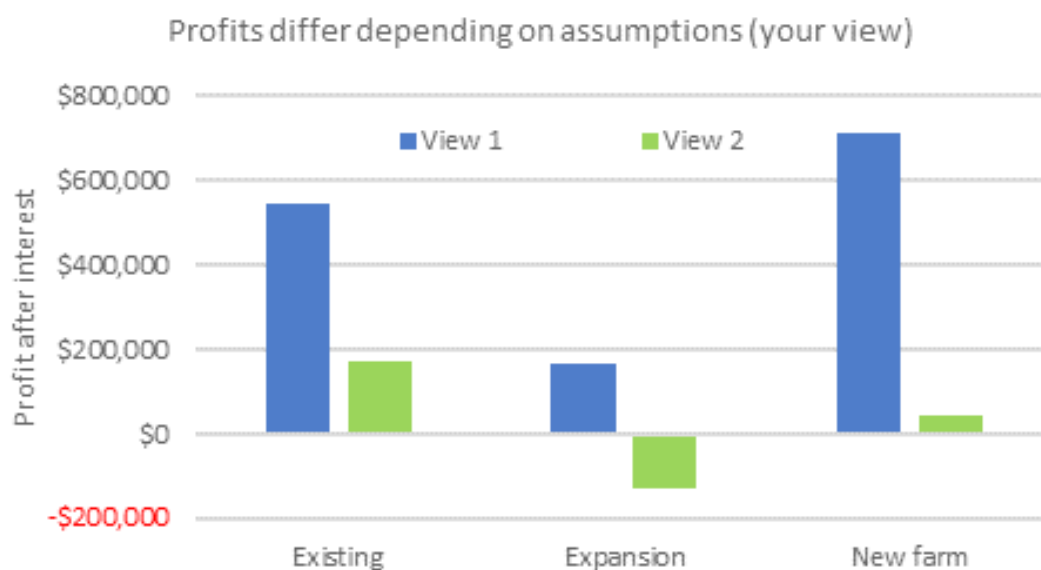
What is the impact of high asset values on expansion decisions?

John Francis

Agrista

Key Messages:

- ◆ The fundamentals for making a well-informed expansion decision have not changed.
- ◆ Economies of scale differ by business and by circumstance.
- ◆ Understand the business needs beyond interest costs.
- ◆ Form a rational view of the future.
- ◆ Develop an executable exit strategy and treat it as an insurance policy.



Introduction

While the factors influencing the outcomes of farm expansion investment analyses (interest rates, costs, commodity prices) are always changing, the principles for making a well-informed expansion decision have not.

Key considerations for expansion irrespective of whether land prices are considered extreme, follow.

- Economies of scale differ by business and by circumstance.
- Understand the business needs beyond interest costs.
- Form a rational view of the future.
- Develop an executable exit strategy and treat it as an insurance policy.



The aim of a well-informed decision about farm expansion is not to predict the future. Rather it is to consider all the possibilities (good and bad), weight them based on your views and to have a risk management plan that minimises the impact of disasters and allows for business continuity even in the most extreme of circumstances.

Expansion and intensity generate economies of scale – but not in every case

Economies of scale are the business efficiencies resulting from additional production generated at a lower marginal cost, when compared with the business in its existing state. To understand how economies of scale are achieved it helps to understand the concept of a partial budget. A partial budget is a decision framework that measures the change in business performance by comparing alternative business activities with existing activities. This change in performance is known as the “marginal benefit” and requires a marginal thinking, rather than an average thinking approach.

Consider the following situation. A crop-only business generates \$690 per hectare gross income, \$400 per hectare in enterprise costs and \$150 per hectare in overhead costs. The operating profit (before lease) of that business is \$140 per hectare. This was calculated by deducting enterprise and overhead costs from income. The output of this business performance is shown in figure 1a.

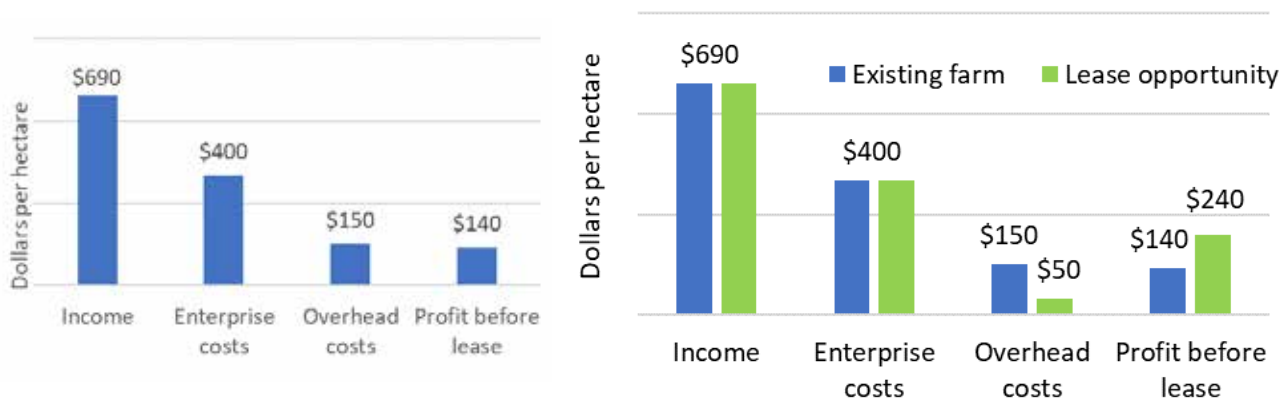


Figure 1a. Crop business performance example.

1b. Marginal thinking compares performance differently.

You are provided with an opportunity to lease 250 hectares next door at \$140 per hectare – should you take it? The immediate inclination is to decline the offer on the basis that your existing profit, replicated over the additional area would be sufficient only to cover the lease thus there would be no net benefit after lease payments are made. The issue with this line of thinking is that it is average thinking rather than marginal thinking.

Now, for context, consider that the existing business is not running labour and machinery optimally, so this opportunity requires no more machinery, labour or insurance costs and only results in slight increases in administration, motor vehicle and repairs and maintenance costs. These additional costs total \$12,500, equivalent to \$50 per additional hectare cropped.

Now reconsider the opportunity for expansion in the context of the change in overhead costs. The change in overhead costs delivers a cost saving on every additional, or marginal, hectare cropped. This cost saving of \$100 per hectare flows to the profit line - delivering a marginal profit of \$240 per hectare before lease on every additional hectare cropped, or \$100 per hectare after lease costs of \$140 per hectare, on every additional hectare cropped.

Table 1 shows the importance of taking a marginal thinking (or partial budgeting) approach when analysing investment opportunities, as returns are dependent on the methodology used in investment decision-making. The aim of this exercise is not to promote the virtues or otherwise of leasing, but rather to demonstrate the importance of understanding partial budgeting as an important first step in assessing business growth opportunities.



Table 1. Comparison of financial analysis of an investment using average and marginal thinking. Marginal thinking is required in investment analyses.

		Average thinking	Marginal thinking
Profit before lease	(\$/ha)	\$140	\$240
Lease cost	(\$/ha)	\$140	\$140
Profit after lease	(\$/ha)	\$0	\$100
Area	(ha)	250	250
Return on operating capital	(%)	0%	17%

Economies of scale – doing more with less

Economies of scale are efficiency gains achieved by producing more at a lower marginal cost. Economies of scale can be achieved by producing:

- more with the existing cost structure
- more with a slightly higher cost per production unit, but lower than in the business as it is
- the same, with less cost.

Economies of scale are typically achieved by spreading an overhead cost structure of the existing business, over more productive units. Overhead costs are the costs of doing business and include administration, depreciation, electricity and gas, insurance, general repairs and maintenance, motor vehicle expenses, rates and wages and on-costs. Labour and machinery costs are two areas that typically have the biggest influence on contribution of costs to economies of scale.

The value of the economies of scale that can be achieved when increasing production depend on:

1. The extent to which you are already optimising machinery and labour efficiency.
2. The change in scale between the existing business and the expansion.
3. The extent to which the additional production improves machinery and labour efficiency.
4. The efficiency gained by increasing production (proximity to existing, similarity to existing).
5. Assess the extent to which economies of scale will provide benefit in your business as follows;

Create a table with four columns.

1. First column - list broad expenditure categories into which you can group all of the individual overhead costs of the business.
2. Second column - sum the overhead costs in each category applying to the existing business.
3. Third column - sum the overhead costs expected for each category for the proposed expansion.
4. Fourth column - calculate the relative difference between costs by item, by dividing the proposed expansion overhead cost (column 3), by the existing business overhead cost (column 2).

The output of these steps is shown as Table 2.



Table 2. Categorising overhead costs helps to understand the extent of economies of scale that can be expected when expanding.

Area (ha)	2000	400	20%
Overhead line item	Existing farm overhead costs	Proposed expansion overhead costs	Relative difference
Administration	\$12,000	\$1,000	8%
Depreciation	\$70,000	\$5,000	7%
Electricity and gas	\$5,500	\$0	0%
Fuel & lubricants (non crop)	\$5,000	\$500	10%
Insurance	\$12,000	\$2,000	17%
Lime/gypsum	\$30,000	\$6,000	20%
Motor vehicles	\$5,000	\$200	4%
Rates & rents	\$12,000	\$2,400	20%
Repairs & maintenance (general)	\$28,000	\$5,000	18%
Wages	\$120,000	\$0	0%
Total overhead expenses	\$299,500	\$22,100	7%
Total overhead expenses (\$/ha)	\$150	\$55	37%
Marginal benefit of scale (\$/ha)		\$95	

Points to note;

The example shown in Table 2 shows the overhead costs for an existing farm of 2,000 hectares with a proposed acquisition representing 20% of area relative to the existing business. In this example, no additional labour and no additional machinery is required to manage the additional area. This is shown in the proposed overhead cost structure (column 3) as no additional wages and very little additional depreciation in the respective lines. Other line items increase but not necessarily in a pro rata alignment with the increase in scale.

The relative difference in overhead costs between the existing farm and the proposed acquisition are shown in column 4. In total, a 20 percent increase in scale resulted in a 7 percent increase in overhead costs, with both of these represented as a relativity when compared with the existing business.

At a productive unit (per hectare) level, the marginal, or additional, overhead costs incurred as a result of expansion equate to \$55 per hectare, compared with \$150 per hectare in the existing business. The benefit of scale therefore equates to the difference between these two – that is \$95 per hectare. This flows straight through to operating profit and represents the extent to which profits of the expansion will be superior to profits of the existing business, assuming no difference in production or enterprise cost structure between the two.

While economies of scale add considerable value to a business when expanding it is also possible for a business to achieve diseconomies of scale. This occurs where the marginal overhead costs are higher in the expansion than in the existing business. This leads to an operating cost inefficiency in operating the additional land.

Diseconomies of scale typically occur where:

- labour or machinery are not well matched to the scale of the business
- the expansion is located a considerable distance from the existing business
- there are operational inefficiencies in operating the additional area.

Consider a situation where the expansion required an additional labour unit costing \$60,000 per annum. In this case, the overhead cost structure in the expansion would increase to \$82,000, or \$205 per hectare. This would deliver a diseconomy of scale equating to \$55 per hectare. In other words, every additional hectare would deliver profit \$55 lower than in the existing business.



Leveraging equity

Over the last ten years the financial leveraging of equity has created a lot of wealth in agriculture. Those who used their increased equity from capital growth to further grow their businesses have been handsomely rewarded. Some farm asset owners have increased their net asset value by a magnitude of 10 times on the back of financial leverage. The key drivers of the extreme rates of wealth creation over the ten years from 2012 to 2022 are:

- extremely low interest rates
- reasonable operating returns
- exceptional capital growth on land.

A physical lever, such as a pair of fencing strainers, or a spanner, is a tool that magnifies force. The magnification of force delivers value by making the job easier. Financial leverage, put simply, is the use of existing equity to secure debt and magnify wealth.

Financial leverage achieves the goal of magnifying wealth where the returns from the debt exceed the cost of the debt (interest). The greater the positive disparity between return on the investment and the interest cost on the debt, the greater the rate of wealth creation.

The cautionary tale of using debt when leveraging equity is that just as financial leverage can magnify wealth creation, it can also magnify wealth destruction. Where investment returns on debt accumulated exceed the costs of that debt, then wealth is destroyed at a greater rate than in an unleveraged investment scenario.

This is why the use of debt requires a very good business case and a solid understanding of the risks presented to the business if things don't go according to plan.

Business and personal needs - asking the right questions

One of the questions that should be asked prior to expanding is: "What are the annual financial demands on the business after interest is paid?" This is important because it ensures that additional interest costs of debt funded expansion don't consume all of the business surpluses. The business should have adequate funds after all interest payments to:

- repay the principal in a timely manner
- pay for annual capital costs such as machinery
- fund future liabilities such as retirement and succession plans.

Take a view

It is important to clarify and quantify your view prior to expanding, because this view will form the assumptions in an analysis. Your view is unique to you and your circumstances, but should be weighted on evidence, or formed based on some sort of rationale. Given that a decision about expansion is about the future, there is no way of guaranteeing an outcome - however the aim of forming a view based on evidence, is to weight the probability of the outcome in your favour. The view, or opinion, of individuals in the market varies widely and this often explains the wide range in perceived value of land.

When forming your opinion, or view, of the future, consideration needs to be given to the following factors:

- rate of capital gain
- Interest rate
- commodity prices
- cost structure
- changes in production.



Irrespective of your view, it is important to run sensitivity analyses to ensure that you have valued the upside and costed the downside. Exit strategies are developed to assist in isolating losses to the expansion investment and prevent impacts over the whole asset portfolio.

Table 3 shows two different views (1 & 2), while Figures 2 and 3 show the extent of the difference in financial projections based on the views formed for an investment in 33 percent more land. The scale (2,500 hectares), debt (15% asset value), and asset values of the existing business (\$3,825/ha) and proposed expansion do not change between views.

Table 3. Assessment of two different future views. View 1 and view 2 differ widely.

	View 1	View 2
Rate of capital gain	10%	1%
Interest rate	2%	8%
Commodity prices	High	Low
Cost structure	Low	High
Changes in production	Low	Low
Profitability	6%	3%

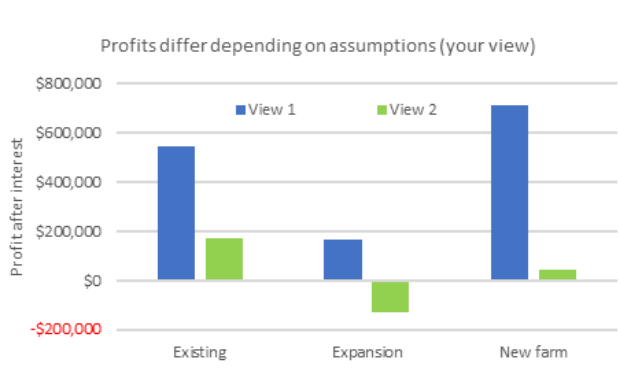


Figure 2. Profit after interest for Views 1 and 2.

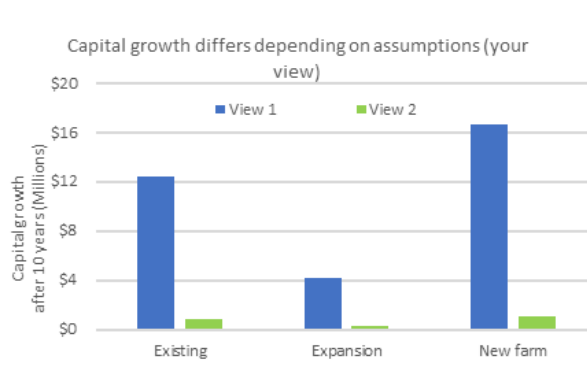


Figure 3. Capital growth for Views 1 & 2.

View 1 projects post-expansion profits after interest of \$700,000, with capital growth of over \$16 million while View 2 projects post expansion profits after interest of \$40,000 and capital gain of only \$1.1 million. It is easy to see how the manager with View 1 may offer more for the land. It is important to note that if more is offered for the land then the projections in this analysis also change.

Exit strategies

One of the keys to a solid expansion plan is the exit strategy. In other words - don't get in without considering how to get out. The cost of execution of the exit strategy is typically the transaction costs incurred at purchase and again on liquidation of the assets, plus any loss of capital value which occurs between purchase and disposal of the assets. It can help to think of these costs as an insurance policy. It is undesirable to have to execute the policy, but execution prevents a financial loss of a far greater magnitude than the cost of the policy itself.

Consideration could also be given to alternatives such as leasing the assets if this delivers a more desirable outcome.

Conclusion

The aim of a well-informed decision about farm expansion is not to predict the future. Rather, it is to give consideration to all of the possibilities (good and bad), weight them based on your views and to have a risk management plan that minimises the impact of disasters and allows for business continuity even in the most extreme of circumstances.



My follow up questions for the speaker.

Why working on this could be great for your farming business

- This process can assist in decision making.
- Provides a process that can be followed for success.
- Assists in managing expectations and risk.

Self-evaluation

- Do you have a historical record of your key financial ratios? Y / N
- How would an expansion of varying scale impact economies of scale in your business?

- What is your view on interest rates, capital gain, commodity prices and costs?

We want to work on this in our business, what should we do next?

- Run an expansion analysis for a fictitious expansion so you are prepared when the time is right.
- Consider the extent to which you will achieve economies of scale when expanding.
- Start forming your view on interest rates, commodity prices, production and costs.



Our First Action _____

Our Second Action _____

Want to learn more, here are some suggestions;

- GRDC Farm Business Management resource and publication links. <https://grdc.com.au/resources-and-publications/all-publications/farm-business-management-manuals>
- Krause, M. (2015). Farming the Business Manual. GRDC Publication. <https://grdc.com.au/resources-and-publications/all-publications/publications/2015/01/farming-the-business-manual>
- ORM. (2013). Making effective business decisions. GRDC Fact Sheet. <https://grdc.com.au/resources-and-publications/all-publications/factsheets/2013/07/orm-fbm-making-effective-business-decisions>
- Hudson, T. (2013). Key financial ratios. GRDC Fact Sheet. <https://grdc.com.au/~media/documents/resources/publications/fact-sheets/8116-key-financial-ratios-fs-pdf.pdf>
- Nicholson, C. et.al. (2020). Farm decision making. GRDC Publication. <https://grdc.com.au/resources-and-publications/all-publications/publications/2020/farm-decision-making>





More about John...

John Francis is farm business management consultant with over fifteen years' experience in agricultural consultancy and a further fifteen years' experience in production agriculture (agronomy). John holds a Bachelor of Applied Science (Agriculture) and a Certificate IV in workplace training and assessment.

John is the owner of Agrista, an agricultural consultancy business based in Wagga Wagga in southern NSW. Agrista provides farm business management advice to farm asset owners and managers, the finance sector, government, industry and the agricultural services sector. John's expertise generates value for clients by identifying opportunities to improve productivity and profitability.

John is passionate about improving financial literacy in farm managers as he sees this as key to improving business performance. His detail-oriented personality type and ability to think critically, rationally, and objectively underpin John's development and delivery of courses designed to improve business skill and identify the factors influencing farm growth investment outcomes.

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Tough fertiliser decisions – cost matters and profit matters more

Wayne Pluske

Equii

Key Messages:

- ◆ Fertiliser rate has the most impact on fertiliser profitability, so it's worth investigating.
- ◆ Assumptions about past profitability of fertiliser rates are often wrong.
- ◆ More robust fiscal analysis of rate response data helps improve future rate decisions.
- ◆ Fertiliser rate response curves are critical for good analysis and improving fertiliser profitability.

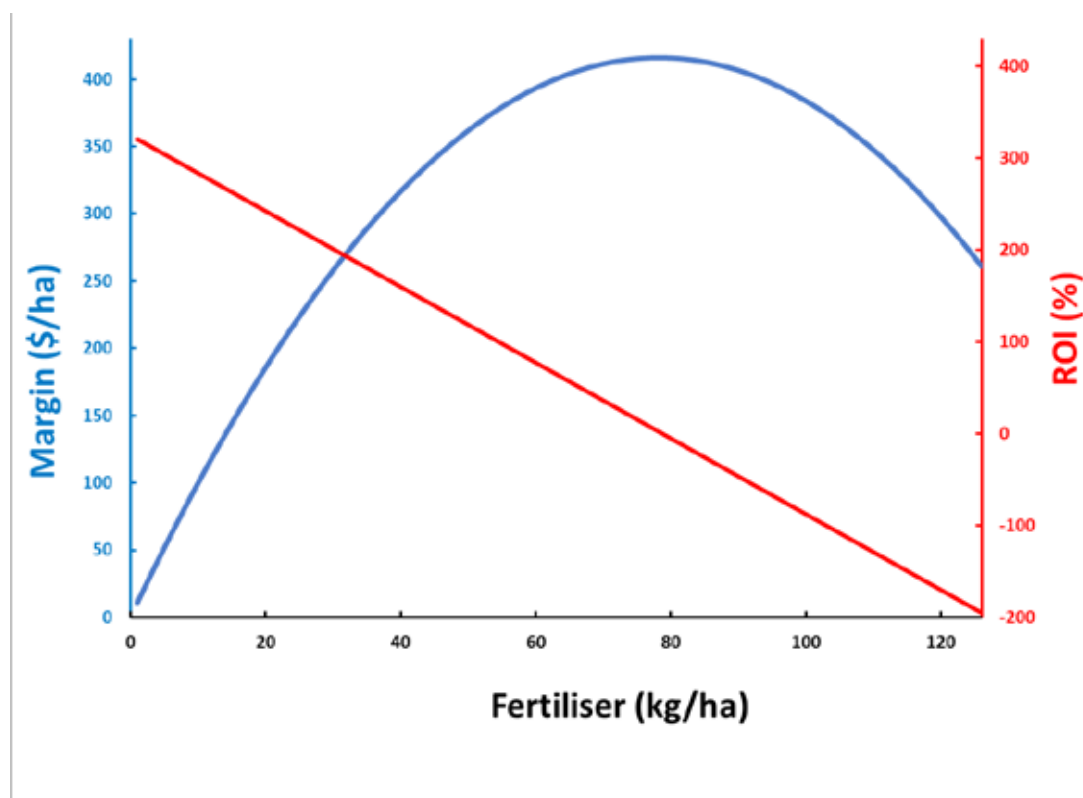


Figure 1. Fertiliser rate response curve (kg/ha) illustrating the relationship to gross margin (\$/ha) and diminishing rate of return on investment (%).

Introduction

Because fertilisers will always be a large variable input cost, there is much to gain from continually assessing their profitability. Better fertiliser use has more potential to improve profitability than changing other variable costs because there is clear cause and effect when fertiliser rates are tweaked. For growers already optimising their fertiliser types, placement and timing, better rate decisions are their biggest opportunity.



Analysing fertiliser rate decisions for profitability and risk management

Good measurement and tough analysis of fertiliser responsiveness considers return on investment (ROI) and:

- helps determine profitable rates, even when fertiliser costs, grain prices and seasons fluctuate
- questions long held assumptions that we are using cost-effective rates
- starts to quantify risks of investing in fertiliser
- increases our confidence to change rates.

ROI on fertiliser is rarely determined. It is more commonly gauged and surmised through partial yield measurements and incomplete fiscal analyses. When a crop is responsive to fertiliser, there are diminishing marginal returns on fertiliser as rate increases - the first unit (kg/ha) of fertiliser gives the biggest ROI and ROI gradually diminishes until there is not enough justification to invest more.

Robust measurement of fertiliser profitability means focussing on how cost-effective each marginal unit of fertiliser is. This requires yield response data for each incremental unit of fertiliser which only comes from a fertiliser response curve, which in turn only comes from yield measurements from at least four fertiliser rates.

A serious fiscal analysis of the fertiliser response curve calculates the ROI on every incremental unit of fertiliser to determine which units deliver acceptable returns, which ones don't, and where to stop applying fertiliser. This analysis methodology can deal with variable yield and rate responses, consider fluctuating fertiliser and grain prices, and highlight the riskiness of investing across a range of fertiliser rates.

My follow up questions for the speaker.

Why working on this could be great for your farming business

- More profitable fertiliser use increases business profitability.
- Reviewing past fertiliser profitability is a good way to improve future fertiliser profitability.
- Fertiliser costs, grain prices and yield responses affect fertiliser profitability; having a method to assess their impacts can improve rate decisions.



Self-evaluation

- Do you alter fertiliser rates when fertiliser prices double or triple? Y / N

If yes, what are the reasons for altering your rates?

How do you go about working out your new rates?

- Do these changes make, or cost you money? Y / N / Not sure
- How much money do you typically leave on the table from using too little, or too much fertiliser?
\$_____/ha OR Some / Not sure / A lot
- How comfortable are you with your process of working out, or adjusting fertiliser rates?

Not at all Completely

We want to work on this in our business, what should we do next?

- Start measuring yield responses to fertiliser in your paddocks, utilising VRT and yield mapping capabilities.
- Strongly scrutinise all yield responses; results of your analyses will be enlightening.
- Seek help on how to measure and analyse fertiliser responsiveness.

Our First Action _____

Our Second Action _____



References

Bryce, A. and Pluske, W. Fertiliser profitability. GRDC GroundCover. Feb 2022.
<https://groundcover.grdc.com.au/agronomy/soil-and-nutrition/fertiliser-profitability>

Want to learn more, here are some suggestions;

Hagan, J. and Bell, L. (2022) Making nutrition decisions in high-cost environments. GRDC Update Paper. <https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2022/03/making-nutrition-decisions-in-high-cost-environments>



More about Wayne...

Equii's Wayne Pluske is a WA-based independent consultant, specialising in soils and fertilisers. Combining his ability to explain complex technical information in an easily-understood manner and tackling problems with new ways of thinking, Wayne is always looking for innovative solutions.

Wayne's core service is the collation, interpretation and mapping of new and old soil tests - delivering it to clients as maps minus any proprietary software or data ownership concerns.

Having worked in public and private organizations, in various roles including Research Officer, Agronomist and Managing Director. Wayne developed many of the decision support models Fertiliser companies and others use to make fertiliser recommendations.

Wayne chairs GRDC's Soil Constraints – West Steering Committee which monitors the western region's investments into solutions for soil constraints - including soil compaction, acidity, water repellence and sodicity.

Wayne likes working with good farmers to make a difference.

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Financial management reporting - the value of financial information

Court McCauley

Homestead Ag

Key Messages:

- ◆ You need to have a good accounting system and tailored chart of accounts.
- ◆ Automate and stay up to date.
- ◆ Budget!
- ◆ Management report – don't forget the commentary!
- ◆ Repeat, repeat, repeat.



Introduction

Management accounting provides business owners and managers with the information they need to make informed decisions, understand and control their business, implement strategic planning, and gain efficiency for continuous improvement.



It is essential in any business but is often overlooked in farming businesses.

Management reporting is one key component of management accounting that can be implemented in any farming business by utilising actual-to-budget reporting. To be effective, management reporting needs to be accurate, timely and meaningful to you.

Collect meaningful data

There is a tendency to jump straight into management reporting or benchmarking with whatever data you currently have available. This can result in a frustrating, inefficient process that doesn't provide the same benefits as laying the groundwork before hooking in.

To create accurate, timely and meaningful accounting data you need neat and up-to-date books. The starting point is to review your chart of accounts and accounting system (what program you are using as your cashbook, how it is setup and how you are entering the information). Best practice will have;

- A short chart of accounts that is tailored to you and what you want to see in your business, and makes the job of coding transactions easier.
- Accounting software with as much automation as possible, including bank rules, automatic coding, linked invoices, etc.
- Accessible accounting software to help you keep on top of transactions.
- The habit of keeping bookwork up to date (weekly is good, every couple of days is better).
- Complete data in all coded transactions, including descriptions, quantities, and enterprises.

Ticking off these points will give you good quality data from your business.

Budget

For any business, but particularly farming, having a budget is crucial – at the very least an annual budget. Not just for the bank, not only done if you have a funding requirement - budgeting is more importantly an essential tool for business owners and managers. Budgets set out what you plan to achieve in your business and your road map for getting there. And doing it in your head DOES NOT COUNT!

Once you have a budget, don't just close it and forget about it. The real value in management reporting comes from comparing the actuals for a period to your budget for the same period, and analysing the differences, or 'budget variance'.

For every material variance you want to understand:

- Whether it is a permanent or a timing difference?
- What caused the variance? - Was it external factors? Did you get something wrong? Was it a combination of both?
- What is the impact on your plan of the variance?
- What, if anything, do you need to do because of the variance?

In answering these questions, the assumptions you made about your operations will be challenged or confirmed – both are great! You will learn where you were wrong about what is happening in practice and what you can do differently next time. You will be able to react to changes from external factors earlier than you would previously have been able to.

“What gets measured, gets managed” – Peter Drucker



My follow up questions for the speaker.

Why working on this could be great for your farming business

- Management reporting helps you understand your farm business.
- Having the right systems and processes in place saves you time and avoids frustration with your compliance bookkeeping.
- Mastering budgeting and management reporting gives you tools to grow your business and to keep learning.

Self-evaluation

- Are your cashbooks neat, tidy, and up to date? Y / N / Don't know
- How would you describe your bookwork process?

Straightforward / Relatively quick _____ Complex / Time consuming

- How would you describe the information output from your bookwork?
Useful / meaningful _____ Limited value
- How would you rate your business in the following areas of cashbook management?

Chart of accounts is simple and tells me what I need to know	0	1	2	3	4	5	6	7	8	9	10
Accounting software has useful automation shortcuts set up	0	1	2	3	4	5	6	7	8	9	10
Software is accessible	0	1	2	3	4	5	6	7	8	9	10
Bookwork is up to date	0	1	2	3	4	5	6	7	8	9	10
Transaction notes are detailed - description, quantity, enterprises	0	1	2	3	4	5	6	7	8	9	10

- Do you have a current budget for your farm? Y / N
- If yes, do you compare your actual results to budget on a regular basis and examine the variances? Y / N



We want to work on this in our business, what should we do next?

- Review your chart of accounts and accounting software – are they right for you, and do they make your life easier?
- Create a habit of keeping your accounting system up to date.
- Prepare a budget for the 2023 financial year if you don't already have one. If you're not sure where to start, have a chat to your accountant, they should be able to help you get started.
- Commit to comparing your actuals-to-budget at regular intervals and to understanding the variances.

Our First Action _____

Our Second Action _____

Want to learn more? Here are some suggestions:

Speak to your accountant for more information, or a qualified accountant that specialises in management accounting for farm businesses.

I do not recommend making any changes, particularly to your chart of accounts, without first speaking with your accountant.

Further reading from GRDC

Krause, M. (2013). Farm financial tool – Cash flow budget. GRDC Fact Sheet. <https://groundcover.grdc.com.au/agronomy/soil-and-nutrition/fertiliser-profitability>





More about Court...

Court was raised on a beef cattle and cropping farm 10km out of Cowra on the Lachlan River. Her love of agriculture started from a very young age, always out helping her dad on the farm. Even when things weren't going to plan, the process of problem solving, learning, collaborating, failing, pivoting, and, eventually, winning was exciting and still drives Court.

After completing a Bachelor of Business, majoring in accounting, and Bachelor of Laws at the University of New England in Armidale, Court knew she wanted to live and work in regional NSW. Courtney worked as an accountant in Dubbo for nearly 10 years, working nearly exclusively with farming clients whilst qualifying to become a chartered accountant. She valued learning from clients about their farms and farming practices, as well as the information top tier of farmers wanted to know before making decisions.

Following further work with farming clients in Moree, Court and her husband Brett decided to move their young family back closer to home. Currently living on a property near Canowindra and raising three very strong-willed children, Court has completed additional training. She now holds a Certificate of Public Practice, is a Registered Tax Agent and has opened her own firm, Homestead Ag, specialising in advisory and accounting for farmers.

Court now enjoys using her agricultural background and accounting expertise to bring management accounting to farmers - to strengthen and grow farming businesses.

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Machinery investment – measuring the return on precision spraying technologies and other data mapping options

Adrian Roles.

AgTrak.

Key Messages:

- ◆ When making an investment in spraying technology it is important that an analysis of investment be made. This analysis is best done in a whole-farm context as you would with any other agricultural investment.
- ◆ Analysis of spray technology investments should include the following considerations: environmental, professional satisfaction, social, obsolescence time frame, compatibility to existing and future machinery, productivity, efficiency gains and economic gains.
- ◆ You should also consider investment in spray technology as a potential risk management tool in your farming business.
- ◆ It is important to conduct your own research and analysis of spraying tech products and services, as information from spray tech providers tends to be inflated due to the use of generic and simplified economic analysis.



Introduction

Farmers are frequently challenged by being able to make informed decisions on when and what to invest in, which is no different when it comes to spray tech. This is because the profitability of spraying technology will vary, not only from farmer to farmer but also from paddock to paddock. The interoperability of a new spraying technology purchase and the future obsolescence of any spraying technology investment can also be difficult to determine. This can make assessing spraying technology investments difficult, but with a little thought and work a farmer can determine the return and risk of investing in spraying technology.



Assessing ag tech investment decisions

Due to the difficulty in determining an accurate return on investment, it is important that farmers go through a proper decision-making process when considering investing in any new tech for their farming businesses, such as spray technology.

The first question a farmer should ask themselves before investing in spraying technology is, have I achieved a suitable level of return from my existing investments? This could be, have I maximised my returns on what I am already doing? Or could I improve on my current level of return, for example can I improve my agronomy? Is my operational timing good? Is my existing equipment and technology being used to its full capability? If the answer to any of these questions is yes, then a farmer may wish to look at further investments, possibly in spraying technology.

When considering investing in spray technology a farmer also needs to ask themselves, does this investment support my goals and objectives for my business? It is important to ensure that you have thought about and outlined what you are wanting to achieve in your business. Examples could be, I have the goal of land stewardship through sustainable land practices to ensure future profitability for my farm business, or I want to reduce summer weed escapes and increase spraying efficiencies. Whatever your goals or objectives are, if you think an investment has the potential to support your goals it is important to follow a logical decision-making process.

The key to making the most informed investment decision in ag tech is to use a logical process such as the seven-step process outlined below.

1. Identify the problem or opportunity.
2. Identify the alternative solutions.
3. Collect all data and information.
4. Analyse the alternatives and determine a decision.
5. Implement the decision.
6. Monitor the results.
7. Accept the responsibility for making the decision.

It is important to note that when evaluating spraying technology for possible investment, steps 3 and 4 in the decision-making process can be the most challenging due to lack of independent and trustworthy sources of information and data. It is important to understand that most return-on-investment information on any ag tech, not just spraying technology, from agricultural tech providers is derived from generic, simplified economic modelling.

Below are some other non-economic considerations that a farmer may want to consider as part of steps 3 and 4.

- **Interoperability:** It is important to consider how any new spraying technology investment will fit into existing machinery operations, hardware, and software.
- **Obsolescence:** Most farmers realise that technology is changing at a rapid pace. It is important to understand and plan for any spray technology investment becoming obsolete. By not planning for this, a farmer may risk losing valuable time, data and encounter unforeseen expenses.
- **Risk management:** Spray technology has the potential to be used for risk management. The main five risks that farmers face from spray operations are: production risk, price/market risk, legal risk, personal risk, and financial risk.
- **People:** Is it an investment that will be professionally satisfying and rewarding to the investee? What is the learning curve with the new technology? A farmer's time is valuable, it can be costly to learn new spraying technology and implement successfully.



- **Automated vs data intensive technology:**

- a. Automated spray technologies, like auto section control, brown on green and green on green camera, and use of artificial intelligence for weed identification. If it meets a need, can potentially have immediate ROI and can be readily used by most farmers.
- b. Data intensive spray technologies, such as drones and remote sensing, require additional skills to be used effectively. This can result in increased difficulty in determining the ROI.

- **Environmental and social:** Spraying technology may also have environmental and social benefits that are hard to quantify, but worth considering.

When assessing spray technology investment, wide variations in outcomes are possible. This is due to many farmers and their farm businesses having different goals and objectives. The resulting return on a spray technology investment by its nature are farmer specific, farm specific and paddock specific. For example, a spray technology investment may be economically profitable, but may not align with business goals or be feasible to the farmer, due to any of the above-mentioned considerations. Therefore, investment in spray technology may require thinking deeper than a direct economic analysis of the investment to maximise the full benefits that a spray technology investment may offer.

My follow up questions for the speaker.

Why working on this could be great for your farming business

- Potential increase in profitability.
- Improved management decisions.
- Professional satisfaction.
- Potential increased ability to manage risk.

Self-evaluation

Before investing in spray technology, have I fully utilised existing production and ag tech opportunities?
Y / N

List existing production and ag tech opportunities you could get more out of in your business.

List any spray technology opportunities you would like to investigate further.



Do you have clearly defined goals you want to achieve by investing in spray technology? What are they?

How do you rate your ability to manage and implement your spray technology investments?

Skills low high

Knowledge low high

If necessary, are you willing to invest in employ someone with, skills and knowledge to manage and implement your spray technology investments? Y / N

We want to work on this in our business, what should we do next?

- Review existing machinery and tech investments, align any new investment to your goals.
- Conduct an appropriate decision-making framework and analyse the spray technology for each unique circumstance and farm attribute.
- Use correct analysis techniques for spray technology investing such as net present value, internal rate of return, partial budgeting, or whole farm planning.

Our First Action _____



Our Second Action _____

Want to learn more, here are some suggestions.

- extensionAUS, Precision Ag community of practice. <https://extensionaus.com.au/precisionag/home>
- Jourdain, G. 2019. Green on green camera spraying - a game changer on our doorstep? GRDC Update paper, link: <https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2019/02/green-on-green-camera-spraying-a-game-changer-on-our-doorstep2>
- Sprayers 101 website, link: <https://sprayers101.com/>

References

- Kay, R., Edwards, W. and Duffy, P. (2004). Farm Management 5th ed. McGraw Hill publishing.
- Collins, C. (2017). Microsoft excel: 3 ways to calculate a rate of return in Excel. <https://www.journalofaccountancy.com/issues/2017/feb/calculate-internal-rate-of-return-in-excel.html>
- Griffin, TW. et.al. (2004). Adoption, profitability and making better use of precision farm data. Dept of Agricultural economics, Purdue University, West Lafayette, IN.
- Sprayers 101 website, link: <https://sprayers101.com/>



More about Adrian...

Adrian is a mixed farmer from Young NSW, growing canola, winter cereals, pasture production and merino sheep. Adrian has implemented precision agriculture on his own farm, while also assisting other farmers, agriculture supply industry and agriculture technology providers. In his involvement with the supply and fitment of precision agriculture related hardware and sensors, Adrian endeavours to ensure there is practical use of precision agriculture equipment resulting in a financial or agronomic gain to the farmer.

Adrian has written and delivered training course in precision agriculture for government, agriculture colleges and private industry. He is actively involved in learning about new technology and techniques of precision agriculture - with the goal of developing inventive training programs that will result in adoption of precision agriculture by farmers.

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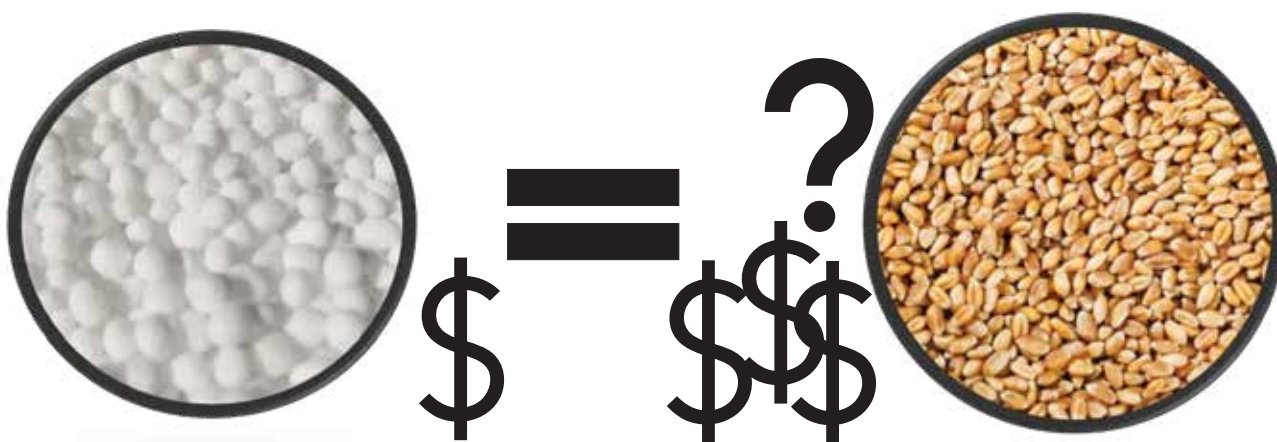
Topping up Nitrogen using an N demand driven strategy – how much will it cost to increase yield now and is the return-on-investment worth it?

Jana Dixon.

Pinion Advisory.

Key Messages:

- ◆ There is a moderate-to-strong return-on-investment for applying Nitrogen fertiliser to increase yield up to a realistic and achievable target, despite this season's high fertiliser prices.
- ◆ Understanding a crop's 'Fed-To' yield potential throughout the growing season, based on crop nitrogen supply, is **critical** for N fertiliser decision making.
- ◆ Predicting N fertiliser requirements needs to be done early and then revisited as the season progresses to ensure timely supply to crops.
- ◆ Focus on yield first, then weigh up the return on increasing protein at early booting stage based on grade spreads. Currently APW1 is the most economic grade to target for wheat (Jun 2022).



Introduction

The return-on-investment of high-priced N fertiliser is held up by strong grain prices this year. Based on a range of assumptions outlined below, the current Benefit:Cost of applying N fertiliser to bread wheat in a responsive N situation is \$3.70:1.

It is recommended that all growers understand how to complete simple N calculations to determine: (1) what yield potential a crop is currently fertilised to achieve ie. the “Fed-To Yield” based on N supply, and (2), how much more nitrogen is required to reach the crop’s non-nitrogen-limited yield potential “Target Yield.” This information is critical to understand the likely economic response to further N fertiliser applications.

The economics of N applications to explicitly target protein in wheat need to be assessed at the time of the decision. If the price spread to a higher protein grade exceeds the cost of the nitrogen application, then the decision to apply additional N to achieve higher protein targets can be justified. At current price spreads (Jun 2022), APW1 is the most economic grade to target for wheat.



Nitrogen fertiliser principles

Nitrogen is a critical nutrient for plant growth and is required in relatively large quantities by cereal and canola crops. Recent research has shown that N continues to be a key driver of the yield gap for wheat in the Southern Region, along with spring frost and heat stress. There are still significant profitability gains to be made by farm businesses, by assessing crop supply and demand to improve N fertiliser management and increase understanding of fertiliser economic responses.

How much will it cost to increase yield with expensive urea?

To estimate the cost to increase yield of a N responsive crop, “rules of thumb” regarding how much N is required to increase grain yield by 1t/ha can be applied (row #1, in Table 1 below). The “rules of thumb” are built around:

- Protein assumptions of; wheat at 11%, durum at 13.5% and barley at 10% protein.
- A 50% uptake efficiency of the total N supply.
- Industry best-practice knowledge, supported by literature summarised in the GRDC publication: A Nitrogen Reference Manual for the Southern Cropping Region, 2020.

From Table 1 below:

- Row #2 indicates the equivalent rate of urea (46% N) to increase grain yield by 1t/ha, for a nitrogen responsive crop.
- Rows #3, #4 and #5 indicate the cost per ha to increase the yield of each crop type by 1t/ha, based on urea prices of \$1500, \$1250 and \$1000 per tonne respectively.

Table 1: Crop nitrogen requirements and fertiliser costs to increase grain yield by 1t/ha					
		Canola	Durum	Wheat	Barley
#1	Crop N requirement per 1t/ha grain (kg N/ha)	80	50	40	35
#2	Equivalent urea rate	175kg/ha	110kg/ha	90kg/ha	80kg/ha
#3	Cost per ha*, urea @ \$1500/tonne	\$272	\$175	\$145	\$130
#4	Cost per ha* urea @ \$1250/tonne	\$229	\$148	\$123	\$110
#5	Cost per ha*, urea @ \$1000/tonne	\$185	\$120	\$100	\$90

* also includes a \$10/ha spreading cost.

Is the return-on-investment worth it?

The return-on-investment is simply defined by the **Benefit:Cost** of a stand-alone fertiliser decision.

The **Benefit is the income gain (\$/ha)**, based on yield increase (t/ha) achieved from the fertiliser input, multiplied by grain price (\$/tonne). Note that for a yield increase to be achieved the crop needs to be in an N responsive situation.

The **Cost is the expenditure required (\$/ha) to achieve the yield benefit**, which in this case is simply the fertiliser cost (\$/ha) plus spreading cost (\$/ha). These costs are outlined in Table 1 above for a 1t/ha yield increase across a range of urea prices and crop types.

The **Benefit:Cost represents the return-on-investment per dollar spent**. A \$1:1 ratio represents a ‘break-even’ decision (i.e. \$1 return per \$1 invested). A \$2:1 ratio indicates a \$2 return per \$1 invested. The higher the ratio, the stronger business case for the decision, and lower the risk.

Assuming a urea price of \$1250/tonne, a \$10/ha spreading cost, and crop/paddock scenarios which are responsive to applied nitrogen fertiliser, the benefit:cost estimates for applied N fertiliser are illustrated in Table 2 below.



Table 2: Estimated Benefit:Cost ratios from urea applications, to increase yield by 1t/ha in a range of crops in 2022.

	Canola	Durum	Wheat	Barley
Estimated yield increase (t/ha)	1	1	1	1
Grain price \$/tonne	\$1000	\$600	\$450	\$380
Benefit	\$1000/ha	\$600/ha	\$450/ha	\$380/ha
Urea rate to increase yield by 1t/ha	175kg/ha	110kg/ha	90kg/ha	80kg/ha
Urea price (\$/tonne)	\$1250	\$1250	\$1250	\$1250
Cost of application (includes \$10 spreading cost).	\$229	\$148	\$123	\$110
Benefit: Cost	\$4.40 : 1	\$4.10 : 1	\$3.70 : 1	\$3.50 : 1

How much nitrogen do I feed my crop?

A useful way to track N requirements during the growing season is to monitor the yield your crop is fertilised to (the “Fed-To Yield”), compared to the yield you are targeting (the “Target Yield”) at different stages of the growing season.

Fed-To vs Target Yield

The “Fed-To Yield” looks at the total N supplied to a crop to-date, divided by the crop N requirements needed for 1t/ha of grain (see Row #1, Table 1). This represents possible grain yield achievable (at a designated protein percentage) given the N supplied so far. Critical information for determining the N supplied to a crop includes: Deep soil N results and total N applications to date (including; pre-seeding inputs, seeding fertiliser and any topdress applications).

The “Target Yield” needs to be a **realistic** estimate of crop yield potential. This is based on all information we have on hand, and any modelling tools we have used. It should account for any production risks which might impact yield in spring. Examples of tools and information include:

- Potential yield calculations using stored soil moisture, current growing season rainfall and forecast rainfall for winter / spring. For example: Sadras & Angus or the French & Shultz yield potential equations.
- Past paddock performance / farm yield data.
- Modelling programs such as APSIM or Yield Prophet®.

If the ‘**Fed-To Yield**’ is **less than** the **realistic Target Yield**, there is potentially a case for applying additional nitrogen fertiliser.

What about targeting protein?

The question that often arises is “I’ve fed my crop to its realistic target yield - is it worthwhile applying extra N to increase protein and achieve a higher quality grade?” To look at the business case for targeting protein in wheat, the following “rule of thumb” can be applied:

5kg N/ha (or 11kg/ha urea) is required per 1t/ha grain yield to increase grain protein by 1% in wheat¹.

This can be used to work out the cost per 1t/ha of grain to increase grain protein.



Table 3: Cost to increase grain protein per 1t/ha of wheat, across a range of urea prices.

Protein increase	Urea rate req'd per 1t/ha grain	Urea Price (\$/tonne)				
		\$500	\$750	\$1000	\$1250	\$1500
1%	11kg/ha	\$5.50	\$8.25	\$11	\$13.75	\$16
2%	22kg/ha	\$11	\$16.50	\$22	\$27.50	\$32

With urea at \$1250/tonne it will cost \$13.75 to increase protein by 1% per 1t/ha of grain (i.e. move a grade from APW1 to H2 or ASW1 to APW1).

At the time of writing, 2022/23 APW MG Wheat contracts have a spread of +\$5/tonne for H2 and -\$15/tonne for ASW1 at Outer Harbour. This means currently it is justified to spend \$13.75 per 1t/ha to increase protein from ASW1 to APW1. However, it is not the case for increasing grades from APW1 to H2 at this stage.

My follow up questions for the speaker.

Why working on this could be great for your farming business

- Urea is at record high prices in 2022. Making sound decisions on which paddocks and crops to target for topdressing is essential to achieve a good return-on-investment for fertiliser inputs.
- A clear understanding of crop nitrogen requirements will assist you to make proactive, rather than reactive, fertiliser procurement decisions.

Self-evaluation

How well do you understand the yield you're feeding crops to, based on nitrogen fertiliser inputs?

Not at all Not at all

When making calculated fertiliser decisions during the growing season, do you

- conduct deep soil nitrogen tests? Y / N
- and calculate 'Fed-To' vs 'Target Yield' for crops? Y / N

Are you proactively managing in-season fertiliser supply by reviewing a Nitrogen budget at (at least) one critical stage during the growing season (i.e. tillering)? Y / N

We want to work on this in our business, what should we do next?

- Construct a simple nitrogen budget for this season to define Fed-to vs Target yield for crops. Contact your agronomist to help with any assumptions.
- Assess the Benefit:Cost of for further N applications this season, and implement your decision.
- Plan to conduct deep soil nitrogen sampling in Autumn 2023 to assist with future N decisions.



Our First Action _____

Our Second Action _____

Want to learn more, here are some suggestions;

- Theory around nitrogen budgeting assumptions: www.grdc.com.au/a-nitrogen-reference-manual-for-the-southern-cropping-region.
- Determining “Target Yield” see: A guide to consistent and meaningful benchmarking of yield and reporting of water-use efficiency, <https://publications.csiro.au/rpr/download?pid=csiro:EP156113&dsid=DS2>
- Strategies for long management of nitrogen, the ‘N Bank approach’: www.grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2021/02/strategies-for-long-term-management-of-n-across-farming-systems

References;

¹This rule of thumb has been derived by the grain %N to grain protein % conversion of 5.75, from the GRDC publication: A Nitrogen Reference Manual for the Southern Cropping Region, 2020 (<https://grdc.com.au/a-nitrogen-reference-manual-for-the-southern-cropping-region>)





More about Jana...

Jana Dixon is an Agribusiness Consultant with Pinion Advisory and provides agronomic advice to clients in the Lower North, and wider regions of South Australia. Jana delivers agronomy advice with a business focus and aims to achieve gross margin optimisation for her clients through sound input decisions. She is also a part of Pinion Advisory's Farm Business team, delivering business benchmarking services using Pinion Advisory's SnapShot benchmarking program.

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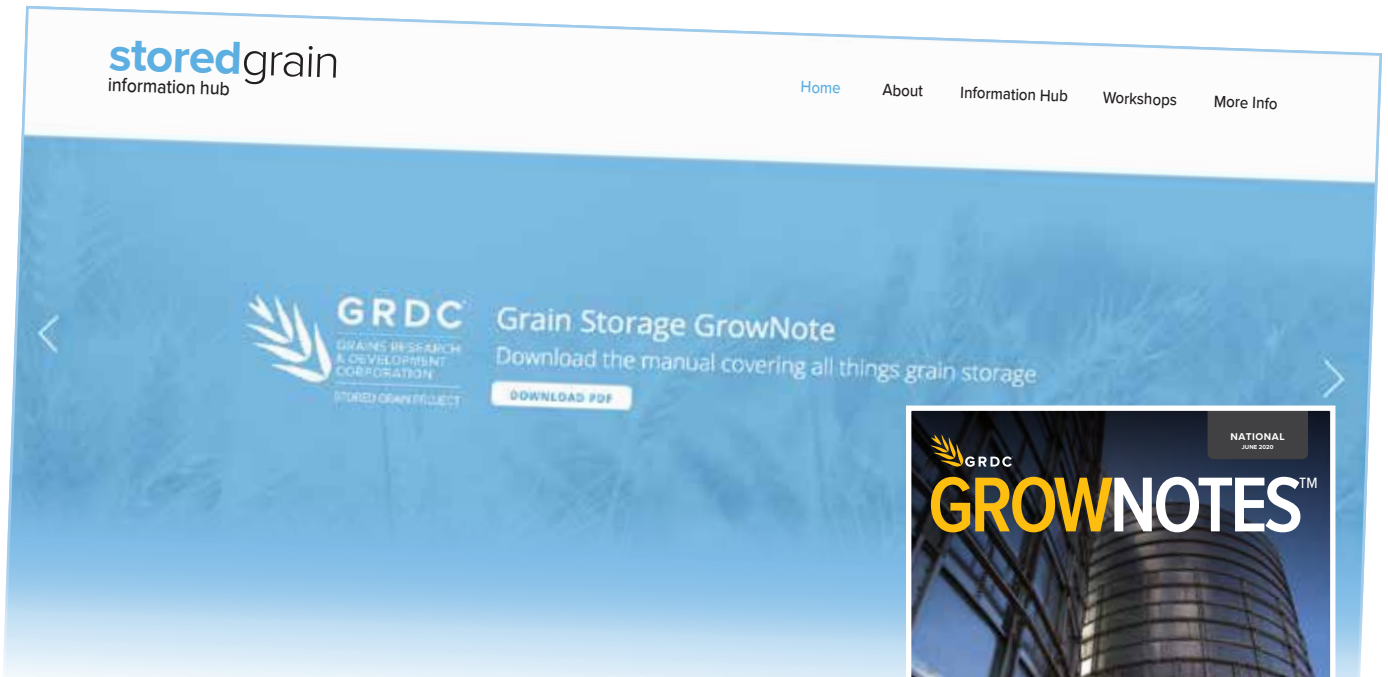
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November 2021

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Barmedman, NSW



John runs a mixed broadacre farming business and an agricultural consultancy, Agriculture and General Consulting, at Barmedman in south-west NSW. John is chair of the district council of the NSW Farmers' Association, sits on the grains committee of NSW Farmers' Assn and is a winner of the Central West Conservation Farmer of the Year award. His vast agricultural experience in central west NSW has given him a valuable insight into the long-term grains industry challenges.

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DEPUTY CHAIR - ARTHUR GEARON

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Arthur is a grain, cotton and beef producer near Chinchilla, Queensland. He has a business degree from the Queensland University of Technology in international business and management and has completed the Australian Institute of Company Directors course. He is a previous vice-president of AgForce Grains and has an extensive industry network throughout Queensland. Arthur believes technology and the ability to apply it across industry will be the key driver for economic growth in the grains industry.

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Bruce and his family operate a 3400 ha family grain growing business near Parkes NSW, which produces a mixture of dryland winter cereals, pulses and oilseeds as well as summer dryland cereals, pulses and cotton grown on a 12m zero till CTF platform with full stubble retention. Bruce holds a Bachelor of Agricultural Economics from the University of Sydney and previously worked with PricewaterhouseCoopers in its Transfer Pricing practice. He was awarded a Nuffield Scholarship in 2009. Bruce is interested in both transformational or blue sky research and ensuring that existing research delivers profitability to grower's businesses.

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Since 2017 Jo has been based in the Wide Bay Burnett Region and is a private consultant while also running her own protected cropping horticultural operation. Previously Jo was a researcher for over 15 years working for the Queensland Government and university institutions. She holds a PhD in sorghum plant pathology and has extensive experience in delivering research for the broadacre summer crops plant pathology program based in Toowoomba. Jo has a keen interest in developing and delivering on-ground practical research solutions to growers which improve productivity and profitability of their farms.

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ROY HAMILTON

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Roy runs a 4400ha mixed family farming enterprise near Rand in NSW's Riverina with his wife Leanne and family. He was an early adopter of minimum till practices and direct drill and press wheel technology. His farming system comprises 80 per cent wheat, canola, barley, triticale, faba beans, while the remainder is under pasture running 1400 ewes and trade lambs. He has held roles on the south east NSW Regional Advisory Committee, the GRDC's southern region RCSN (now GRDC National Grower Network) and was a founding committee member of the Riverine Plains farming systems group.

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Peter operates a private agronomy consulting business based in Quirindi NSW. His main focus is supporting growers to achieve high economic returns via best practice production management. He is a passionate supporter of research and has been active in extending weed management research information to industry, particularly in central west NSW, is a former director of Conservation Farmers Inc. He is a former member of the north east Regional Advisory Committee and a participant in Northern Growers Alliance local research group on the Liverpool Plains.

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Formerly Emerald, QLD



Graham has been managing director of a private agricultural consultancy in Emerald, Queensland, for the past 30 years providing agronomic and farm business management advice in summer and winter crops in dryland and irrigated systems ranging from broadacre to mixed grain and grazing. For two decades he participated in GRDC and Department of Primary Industries-funded farming systems projects, particularly in the areas of weed management, soil fertility and adaption of agronomic practices for Central Queensland conditions. Graham is a chartered member of Ag Institute Australia and an Aust. Institute of Company Directors graduate. He has recently retired but remains actively interested in RD&E particularly in Central Queensland.

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Chris is a grain grower, who farms a broadacre property east of Moree, in northern NSW. His farming system rotation includes wheat, barley, chickpeas and sorghum. He has a Bachelor of Commerce and a Bachelor of Laws from the University of Sydney and worked as an investment banker in derivative structuring in Sydney and Hong Kong before returning home to Australia. Chris believes in the potential to increase farm profitability through data-based decision-making and is a supporter of investigating and developing higher value grain markets to provide profitable alternatives to traditional crops. Chris is an advocate of understanding and improving seasonal climate forecasting models and tools to effectively guide on-farm decisions.

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Originally from Tasmania Georgina was involved in her family's 8500ha irrigated and dryland mixed farming enterprise. Before moving to NSW in 2018 Georgina was Leader of Grains Research and Strategy and Senior Industry Development with the Tasmanian Institute of Agriculture. Today, she is a research leader with NSW DPI based in Tamworth. With a PhD in growing canola in low rainfall environments, Georgina currently oversees the department's investment in chickpea and durum wheat breeding, pulse and cereal quality and post-entry quarantine programs.

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ADAM TOMLINSON

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Raised on a grain property near Moree in north western NSW, Adam has a Bachelor in Applied Science Crops and Rangelands and postgraduate qualifications in agribusiness. Over the last 20 years he has held senior positions in banking, agricultural research and advisory roles within Australia and internationally. He works in the finance sector in Orange and has a small-scale farming operation. Adam's expertise lies in providing strategic guidance to support the profitability and sustainable growth of a broad range of agribusinesses.

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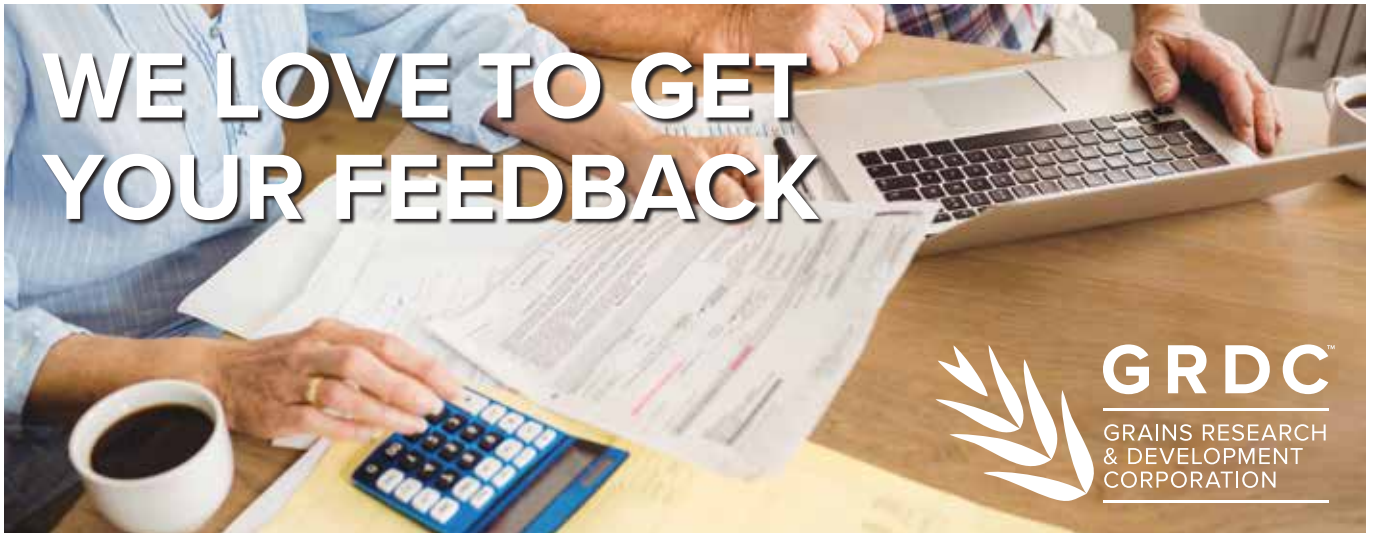


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- The local GRDC Farm Business Update planning contributors.





Prefer to provide your feedback electronically or 'as you go'?

Use your phone camera to scan the QR code below. Start and stop the survey whenever you choose, just click 'NEXT' to save responses before exiting the survey.



2022 West Wyalong Farm Business Updates feedback

1. How would you describe your main role? (choose one only)

- | | | |
|---|--|--|
| <input type="checkbox"/> Grower | <input type="checkbox"/> Grain marketing | <input type="checkbox"/> Student |
| <input type="checkbox"/> Agronomic adviser | <input type="checkbox"/> Farm input/service provider | <input type="checkbox"/> Other* (please specify) |
| <input type="checkbox"/> Farm business adviser | <input type="checkbox"/> Banking | |
| <input type="checkbox"/> Financial adviser | <input type="checkbox"/> Accountant | |
| <input type="checkbox"/> Communications/extension | <input type="checkbox"/> Researcher | |

Your feedback

Please rate each presentation you attended in terms of relevance and quality
(10 = totally satisfactory, 0 = totally unsatisfactory).

2. Grain commodity outlook and global observations: *Tim Bickford*

Content relevance /10 Presentation quality /10

Have you got any comments on the content or quality of the presentation?

3. Evolution of family farms - from partnerships to corporate structures: *Carmen Quade*

Content relevance /10 Presentation quality /10

Have you got any comments on the content or quality of the presentation?

4. Increasing farm scale in the current market: *John Francis*

Content relevance /10 Presentation quality /10

Have you got any comments on the content or quality of the presentation?

5. Tough fertiliser decisions: *Wayne Pluske*

Content relevance /10 Presentation quality /10

Have you got any comments on the content or quality of the presentation?

6. Financial management reporting: *Courtney McCauley*

Content relevance /10 Presentation quality /10

Have you got any comments on the content or quality of the presentation?



7. Machinery investment- measuring the return on precision spraying technologies: Adrian Roles

Content relevance /10

Presentation quality /10

Have you got any comments on the content or quality of the presentation?

Your next steps

8. Please describe at least one new strategy you will undertake as a result of attending this Update event

8. What are the first steps you will take?

e.g. seek further information from a presenter, consider a new resource, talk to my network, start a trial in my business

Your feedback on the Update

10. This Update has increased my awareness and knowledge of farm business decision-making

Strongly agree

Agree

Neither agree
nor Disagree

Disagree

Strongly disagree

11. Do you have any comments or suggestions to improve the GRDC Update events?



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