FARM BUSINESS UPDATE



STRATEGIC STEPS – ENDURING PROFIT



Condobolin

Thursday 22nd March

9.00am to 1.00pm

Condobolin RSL Club,

20 McDonnell Street, Condobolin

#GRDCUpdates





Condobolin GRDC Farm Business Update convened by ORM Pty Ltd.

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Program

9.00 am	Announcements	ORM
9.05 am	GRDC welcome	GRDC
9.10 am	Taking a planned approach to investment in plant and equipment	David Smith, ORM Pty Ltd
9.55 am	Understanding farm finance	Brad Sewell, Robinson Sewell Partners
10.40 am	Morning tea	
11.10 am	Enterprise mix and inputs following a poor year	Eric Nankivell, Farmanco
11.55 am	How not to blink – developing emotional and mental fortitude for the road ahead	Dennis Hoiberg, Lessons Learnt Consulting
12.40 pm	Close and evaluation	
12.45 pm	Lunch	



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Central West Farming Systems Inc (CWFS)

Central West Farming Systems Inc (CWFS) was formed in 1998 as a farmer based research group with the motto of: "Farmers Advancing Research".

The principal aim of the organisation is:

"To be the leading regional group effectively demonstrating, extending and promoting farming innovation to assist farmers manage their businesses for long term economic, social and environmental viability"





The group is managed by an Executive Committee comprising of 9 farmers & 3 industry representatives. CWFS currently has over 350 members. These are predominately farmers, although we are also strongly supported by private advisers, agribusiness, research organisations and universities. Core funding for our activities derive from industry and Government funding programs. Our major funding partners currently include the Grains Research and Development Corporation (GRDC). CWFS works closely on a number of projects with universities, the newly formed Soil CRC (with CWFS having representation on the Board), the Low Rainfall Collaboration Group and other farming systems groups at a national and regional level.

Our current projects include:

- Maintaining profitable farming systems with retained stubble in Central West NSW
- Crop Sequencing
- Overdependence on Agrochemicals
- Soil Acidity and pH Management for Central West Farming Districts
- Women and Youth in Agriculture
- Irrigated canola and cereals
- Nitrogen use efficiency

Project funders include Farming Together, Landcare, Soil CRC, Local Land Services and GRDC. CWFS' Women & Youth in Agriculture Project has been established since 2009 and aims to engage and empower women and youth to participate more fully in agriculture and increase productivity through building opportunities.

This Project incorporates workshops, conferences, field days and mentoring groups to encourage women and young people to become decision makers within their farm businesses.

CWFS has developed an AgMarketing program which supports women (in its initial phase then open to all) in their substantial on-farm commodity marketing role.

The focus on marketing is embedded in a value chain approach and build participants' ability and confidence to better manage their whole farm enterprise.





Irrigation research

In 2014 CWFS officially commenced irrigation research via its Condobolin based irrigation site. This has provided CWFS with an unprecedented opportunity to expand its areas of research into irrigated crop varieties, irrigation technologies & techniques, and water use efficiencies within an irrigation system.

Members receive information via a wide variety of publications and extension activities.

CWFS, PO Box 171, Condobolin NSW 2877 Ph: 02 6895 1025 Fax: 02 6895 2688 Email: cwfs@dpi.nsw.gov.au www.cwfs.org.au





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The GRDC's **Farming the Business** manual is for farmers and advisers to improve their farm business management skills. It is segmented into three modules to address the following critical questions:

- Module 1: What do I need to know about business to manage my farm business successfully?
- Module 2: Where is my business now and where do I want it to be?
- Module 3: How do I take my business to the next level?

The **Farming the Business** manual is available as:

- Hard copy Freephone 1800 11 00 44 and quote Order Code: GRDC873 There is a postage and handling charge of \$10.00. Limited copies available.
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Choosing and justifying the right sprayer

Brett Symes.

ORM Pty Ltd.

Keywords

decision making, machinery, spray equipment, efficiency.

Take home messages

- There are many variables to consider when choosing a sprayer, and each will be weighted differently from business to business depending on the farming model utilised, (enterprise mix, farming system, typical rotation, spread of farming operations, etc.), the need or want to optimise efficiency, and availability of labour and lifestyle decisions. Make sure you get the right horse for your course regardless of what the neighbour has.
- Before upgrading the sprayer there may be options to increase overall efficiency of the existing sprayer.
- The capital invested can be similar between a self-propel (SP) and a tow-behind outfit when aiming to match field capacity.
- Alternative uses for the sprayer, and the likelihood of spraying where higher clearance is required, are key determinants in type of machine and cost-of- ownership.
- Tank size and boom width can sometimes be a trade-offs against spraying speed.

Introduction

Choosing the right sprayer and justifying its ownership cost can be a challenging task. There's a lot of variables and trade-offs to consider when making the decision, and the importance of each varies from business to business. The sprayer is often the most used implement on the farm, and therefore, it's important to get the decision right. Taking a structured decision making approach can help take the stress and uncertainty out of making this decision.

Structured decision making approach

Step 1. What spraying tasks and timelines do I need to achieve?

Spraying objectives, or targets around getting the spraying done on time, can vary considerably from business to business. While often not written down, each business usually has a number of 'spraying objectives' they aim for to ensure timeliness of operations. Examples of some spraying objectives include:

- Complete post-emergent grass selective herbicide application early (i.e. before tillering of weeds).
- The ability to spray the area of susceptible cereal crop varieties in three days should a stem rust incursion break out.
- The ability to get clethodim out within a 4hr/ day 'window of opportunity' during winter in the Western district to minimise the effect of frost on herbicide efficacy.
- The ability to apply herbicides during late stages of crop development (crop-top) to any crop type with minimal crop damage and good spray coverage.

Step 2. What will affect these timelines?

Besides physical limitations such as sprayer clearance height, the ability for your spraying outfit to meet your spraying objectives in a timely manner, will be influenced by the 'work rate' of your sprayer inside the paddock and efficiencies impacting on timeliness outside the paddock.



Inside the paddock

Work Rate (Effective field capacity)

The theoretical capacity (ha/hr) of a machine to perform its work whilst in the paddock is defined as:

'Theoretical width of boom (m)

Field = $\frac{x \text{ speed of travel (km/hr)}}{10}$

However, we know that there are factors that affect the ability for a machine to operate at its maximum width or speed at all times, while in the paddock. Hence the theoretical field capacity of a machine is adjusted down by a factor known as the Field Efficiency Percentage (FE %), which is the percentage of time the machine operates at its fully rated speed and width while in the paddock. The result is the Effective Field Capacity, or true 'Work Rate' that can be used to assess true productivity in the paddock.

So:

'Work Rate' width of boom (m) (Effective = $\frac{x \text{ speed of travel (km/hr)}}{10} \times \text{FE \%}$ field capacity)

An example is provided in Table 1.

Table 1. Calculation of Work Rate.					
	Units	Example			
Boom width	Metres	36m			
Spraying speed	Kilometres/hour	25km/hr			
Theoretical field capacity	Hectares/hour	90ha/hr			
Field efficiency	Percentage	80%			
Work Rate (Effective field capacity)	Hectares/hour	72ha/hr			

Examples of factors that affect the width or average speed of the spraying unit whilst in the paddock include:

- Water rate limitations (will this limit speed due to inadequate pump capacity, or nozzle size or number?).
- Spray efficacy limitations
 - o Wind
 - o Dust
 - o Technology to allow correct droplet size at increased speed (e.g. AIM Command®, Three Tier System (3TS)®).
- Paddock landform and topographic feature limitations
 - o Soil type and steepness can affect trafficability.

- Paddock shape, undulation, obstacles (trees, dams, channels, swamps, etc.) and terrain (rocks, corrugations) can all limit speed and width (overlap).
- Overall power, gearing, weight and balance
 - o an underpowered machine will restrict speed
 - o inadequate gearing range can affect speed
 - o is the machine too heavy for the rainfall zone and soil type, hence may sink?
 - o an unbalanced machine may have a restricted speed
- Downtime
 - o Breakdowns, blocked nozzles; could these be eliminated with better preventative maintenance?

Efficiencies impacting on timeliness outside the paddock

With a spraying outfit, there are significant factors outside the paddock that also impact on the overall timeliness of the spraying operation. These factors can often be improved for low cost regardless of which spraying outfit you use.

Examples of efficiencies outside the paddock, and what influences them, include:

- Fill time
 - o Pump and hose size (e.g. 1.5" connection to chemical shuttle =60L chemical/min; 4" water hose faster than 3" > 2", etc.).
 - o Induction technology.
 - o Batching plant (often requires additional labour).
 - o Mounted pump.
 - o Quick fill systems (for example, overhead water loading, nose connector)
- Travel time
 - o Spread of farming operations and/or distance between paddocks.
 - o Road speed (empty and loaded).
 - o Block cropping (less clean-outs).
 - Distance to fill points (versus a 'nurse tank' could be used to take water to the sprayer instead, however this may require extra labour which will be need to be accounted for).
- · Clean out time
 - o Flush technology.



- o Block-cropping.
- Tank size if tank size is matched to paddock size (subject to weight considerations) this can mean less time spent travelling and filling.
- Breakdowns (lack of preventative maintenance?).

Efficiency factors both inside and outside the paddock can be highly variable between farms. Growers should continually ask themselves what could I be doing differently to improve current efficiencies, and therefore, overall timeliness of the operation.

Step 3. What options do I have to achieve my timelines?

The main options as with most plant and machinery is self-ownership, use of contractors, or a combination of the two. The key questions to ask with respect to each include:-

Self ownership:

- 1. Do you need:
 - Alternative uses am I looking for a
 dedicated spraying outfit or do I also need a
 'third' tractor (for example, front end loader
 (FEL), spreader or chaser tractor), or selfpropel (SP) that can be used for windrowing
 also? An alternative use can effectively
 subsidise the cost of ownership of a machine.
 - Clearance height what's the likelihood of needing to spray where higher clearance is required (for example, taller crop types (e.g. canola, sorghum/corn) or late season applications (e.g. fungicides/insecticides/ desiccation/crop-topping, late season liquid N)). If likely, are contractors available if you haven't got the clearance?
- 2. What can I afford? (refer later section)

Contractor:

Contractors usually come with the latest and greatest machines, which can usually handle all applications and are modern, economically justified machines due to the area that they cover which increases the utilisation of the equipment. Are you confident you can get them in a timely manner and not compromise productivity? Is it cost effective to own your machine? (refer later section)

Combination:

For example, by owning a tow-behind you get the alternative use from the tow-tractor and you can engage a contractor for the high-clearance spraying. The consideration for operations, is can you get the contractor when needed?

Step 4. Ownership & costs – What can I justify?

Table 2 provides a comparison of different types of sprayers. In summary however a few features of each type of sprayer are listed. (Note: Less attention has been paid to truck mount sprayers given the limited number operating on Victorian farms):

- 1. Tow-behind
 - Handles most applications.
 - · Choice of larger tank sizes.
 - · Clearance issues late in season.
 - Multiple alternative uses for towing tractor.
- 2. Truck or tractor mount
 - Fastest road speed full or empty.
 - Choice of larger tank sizes.
 - Clearance issues late in season.
 - · Visuals sometimes compromised.
 - · Limited alternative use.

3. Self-propel

- Great clearance specifically designed for spraying hence suitable for all spray applications.
- · Great traction.
- Best comfort.
- Superior visuals.
- Good road speed.
- Modern technology (for example, AIM Command®).
- Higher fuel use (hydrostat).
- Limitations on tank size.
- · Limited alternative use.

Table 2. Comparison of different				
		Tow-behind (and front wheel assist (FWA))	Truck/tractor mount	Self-propel (SP)
Travel speed	Empty	40km (up to 70km)	80km	50km (up to 70km)
	Full	25-30km	80km	30-40km
Working spray speed	Mallee	20km		25km (25-30)
	Wimmera	18km		25km
	Western District	15-17km		20-22km (20-26)
		Rule of thumb: SP 6kph	faster	
Spray applications		Clearance issues late in season	Clearance issues late in season	All (incl. late season fungicides/insecticides/desiccants)
Indicative late season sprays		Depends on farming system, rotation and season. Apply your own probabilities (e.g. Mallee client 8% (insecticide/fungicide in field peas, lupins, canola; desiccate field peas, spray-topping canola and some cereals)		
Traction		Good (FWA)	Good (4WD)	Better (2WD)
Alternative uses		FEL, '3rd' tractor – chaser, spreader	Limited (liquid N)	Limited (liquid N, windrowing - front mount)
Fill time		40min (pers. comm.)		25min (pers. comm.)
Visuals		Good	Good (can be limited by tank and lower seating position)	Great (behind – same as tow-behind; front and down – superior)
Tank size		Most 7-9kL (Up to 10kL)		Most 5 — 6.2kL (Hardi Rubicon now 6,500L. Up to 8kL — Goldacres G8 Super Cruiser — less clearance)
Operator comfort (ride, control, OHS)		Good	Good	Superior
Agility (e.g. backing into corners)		Harder (articulation)	Medium	Easy
Fuel use		10-14L/hr		Hydrostat — 21-25L/hr Mechanical — 10-14L/hr
		Rule of thumb: Hydrosta	at SP 2 x fuel use	
Other				Cutting tracks – can widen wheels so back track different to front
				Proactive integrated weed managemen - got it so can do it, don't have to wait for contractors or cost their service

Justifying an investment in a machine is a balance of financial and non-financial considerations.

The primary financial consideration is cost of ownership, which will be influenced by:

- Capital cost (i.e. the loss in value of the machine each year, plus the appreciation in value of its replacement and an allowance for the opportunity cost of the money invested into purchasing the machine which could have been invested via another means). This 'changeover' cost can be 35-40% of the total cost, so keeping it to a minimum has a big influence on overall ownership cost. Factors that affect changeover cost include:
 - o Engine hours on trade.
 - o Age of trade

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- \square Access to parts.
- □ Poor condition.
- o New technology the sky's the limit so be critical on what you really need. For example, do I need auto-height, auto-greaser, etc.?
- o No-trade discount.
- o Factory incentives.
- o Exchange rate.
- o Poor reputation.
- o Poor dealer support.

Some growers have a defined policy around changeover time based on engine hours (for example, 2000 hours), age (for example, 5 years old)



Table 3. Some 'actual' variations in capital cost of SP sprayers sold within various regions of Victoria (Source: ORM Pty Ltd).					
Wimmera Western District North Central					
Age (years)	5	4	3.6		
Changeover price (\$)	205,000	192,000	142,000		
Engine hours	2,000	1,950	2,550		
Hours per year	400	488	676		
Changeover (depreciation)/year (\$)	42,000	48,000	39,628		
Changeover (depreciation)/Eng. hr (\$)	103	98	56		

or model (for example, within one model of current model). Whereas others will keep an active eye on the market and buy whenever the price is right (for example, Wimmera grower in Table 3 will upgrade whenever changeover is < \$100/eng.hr).

The full scale of financial benefits of ownership, needs to be evaluated as an offset to the costs, these benefits will be driven by the following factors:

- Field capacity and field and non-field efficiencies, as outlined in Step 1.
- Alternative uses for machine can 'subsidise' the sprayer costs.
- The percentage of spraying needed to be done by contractors.
- Other fixed costs (interest, rego/insurance) can be up to 25% of total costs which is a big contributor.
- Fuel usage hydrostat SP can use double the amount of a tow-behind, but overall fuel cost is influenced by field capacity and field efficiency.
- Labour cost dependent on machine hours.
- Scale spread of costs (particularly the fixed costs) over area sprayed per annum (\$/ha).

When assessing cost of ownership, it is advisable to compare it to the cost of using a contractor. Once this comparison has been made an informed assessment can be made as to whether ownership is cost-effective. The final decision will however also be impacted by non-financial considerations and the timing of the planned upgrade.

Non-financial considerations include:

 Job satisfaction – the sprayer is the most widely used implement on farm, operator comfort, health considerations (e.g. bad back) should be considered.

- Interest and/or expertise in machinery sometimes it's easier to let the contractor worry about ownership issues and access to labour, and get the latest and greatest technology turn up each year.
- Attracting and retaining employees varies between regions.
- No financial pressure.
- Family time.
- Stress being able to get the contractors when you want them.
- OHS

Non-financial considerations are harder to quantify than financial considerations. Each grower has to put their own weighting and dollars on these variables depending on their personal preferences.

In regards to timing, sometimes a decision to upgrade can be justified based on a simple cost: benefit analysis, but there may be other immediate priority uses for that capital or existing financial commitments that already limit cash flow. Some useful overall machinery investment benchmarks to consider include:

- Alternative/priority uses for capital i.e. what other 'big-ticket' items are coming due for an upgrade and will investing a certain amount of capital in improving your spraying capacity limit you from getting the balance and timeliness right in other areas?
- Overall capital invested in machinery ORM benchmarking show that the typical investment in machinery is \$1 for every \$1 of income generated, or a ratio of 1:1. Some businesses can maintain a 0.8:1 ratio without compromising timeliness, which means in a farm business generating \$1,000,000 income, \$200,000 of capital can be invested elsewhere.

- Total (horse) power, machinery and labour cost (TPML) – what is the total annual cost of machinery capital, machinery operating costs (fuel, repairs, contractors), and labour (including your own). A figure under 40% of income is good, under 35% is great
- Cash flow implications machinery is often financed over five years and too much spent on machinery upgrade all at once can run down cash flow, particularly in a poor income year.
 Machinery repayments (principal and interest) below 13% of income is generally OK if other key-cost areas in the business are balanced.

Conclusion

Choosing and justifying the right sprayer doesn't have to be a difficult process. Taking the time to fully evaluate what capability you need, and the options and costings associated with achieving that capability, will ensure that you get the right horse for your course.

Contact details

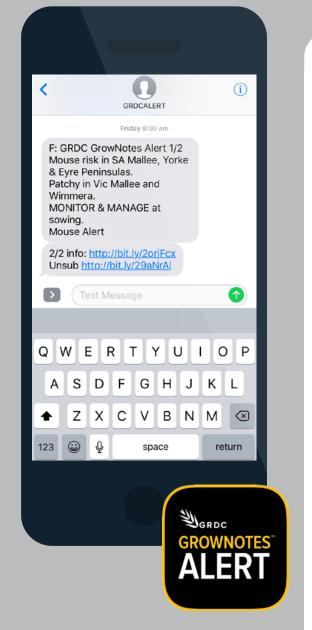
Brett Symes brett@orm.com.au



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Banking the farm – a financial confession

Brad Sewell.

Robinson Sewell Partners.

Keywords

banks, farm debt, borrowing, relationships.

Take home messages

- The borrower must not take a *laissez faire* approach to banking, they must undertake their own due diligence to determine where they sit in the value chain of banking.
- If you understand your credit rating you have the opportunity to negotiate the cost of debt.

Introduction

There is around \$67 billion currently lent to farmers around Australia. Every day our farmers are banking on the banks continued support. The banks conduct annual reviews to test the viability of each of their agribusinesses. If the client passes the credit performance check, it's business as usual. If they fail, then it's time to work out a solution or loan recall.

But how does a borrower determine if a bank's appetite for lending is changing?

The answer is that most agribusiness borrowers don't test the banks appetite. Their funding then becomes a blind spot for a financial grenade to explode without apparent warning. In these instances, the borrower has not created a mechanism within their business model to provide visibility as to the bank's willingness to lend to their business, and under what guidelines.

For farmers who borrow, it is almost a laissez faire playground where both parties are agreeing to terms, with one party having full visibility but the other doesn't.

Under these trading terms it is of no surprise that we continually get asked by farmers:

- Which is the best bank to bank with?
- Which banks are lending to agriculture?
- What is their appetite to lending?
- Is it getting tougher out there?

 Why are the banks taking so long to make decisions? Is there something wrong with our business?

The bank's internal review mechanisms are not communicated to the borrowers and are not designed for public knowledge. It is in the bank's best interest to keep a positive perception in the open market of their capability to lend, while behind the scenes they reconfigure their balance sheet lending to meet their own internal requirements and targets. This perception is called marketing, and they are very good at it.

What does this mean for the borrower?

The borrower must be accountable to undertake their own due diligence to determine where they sit in the value chain of banking. At face value, this would be deemed an improbable task due to both the time and skill required to obtain such an insight and understanding.

Understanding your credit rating removes the 'blind spot' of funding risk. Having knowledge of the bankability of your business and knowing what the borrowing thresholds are, allows you to make viable strategic decisions.

Understanding your credit rating also creates the opportunity to negotiate the cost of debt (i.e. interest rates and fees). With a lower cost of debt and with access to debt on more flexible terms, gross margins and net profit in the business improve.

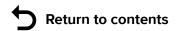
Timing

Seek advice if required, but timing is an essential characteristic. Layered with timing, is the 'art of presentation'. Knowing how to present an enterprise with so many unforeseen 'risk' variables inherent within agribusiness is critical to satisfying a bank's credit policy. Accidental or deliberate misrepresentation of any business to the financiers is at the peril of the business. However, by applying some true and tested principles of good corporate governance, the reward is profound for those that apply and adhere to the rules of engagement.

Banking is not static. Banking is not set and forget. The banks are continually evolving their exposure and appetite, and businesses by their very nature are forever evolving.

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Decisions in a tough year

Eric Nankivell.

Farmanco.

Keywords

planning, risk, opportunities, threats.

Take home messages

- Not everyone is in the same position.
- Processes: four step tight budget process.
- Strategies: rotation; fertiliser; machinery.
- Land values: opportunity or threat?

Overview

Thankyou to GRDC for providing the opportunity to present at the Condobolin GRDC Farm Business Update. Hopefully we can generate some challenges and discussion that will help clarify and inform some of the decisions you are making moving into seeding 2018.

We all think that we received 20mm of rainfall. Make no mistake, there was only 15mm in 'Windmill' paddock and more than 30mm at 'Grandads'! It is important to recognise that it is the same with all farming businesses. While from the outside, they all appear the same, there are always significant differences.

This is no more evident than in this community. Many of you had your best ever year in 2016 with record yields, followed by one of your worst in 2017. But spare a thought for those on the river who had their worst year in 2016 because it was too wet and a consecutive poor year this year.

Mix with this, the differences in stage of life, attitudes to risk, opportunities taken to expand, etc and you have a wide range of business strengths, concerns and attitudes. Hence today, my focus is on the key things that most people are trying to make decisions on – some of this might be directly

relevant to you in your business, but some of it might just not be a big priority.

Just how bad was it?

Figure 1 illustrates the rainfall during 2017 for an example farm in this area and that of the long term average.

Yes, this is correct. For this farming business, there was no rainfall recorded in July, August or September.

The great start to the season enabled most businesses to commit fully to their cropping programmes with a good measure of confidence. This confidence was still looking rewarded, despite dry winter conditions – up until the frosts (1 July (-6.8°C), 2 July (-5.5°C), 12 July (-4.0°C), 22 July (-5.1°C), 29 July (-4.1°C), 20 August (-4.5°C), 29 August (-5.3°C) and 1 September (-3.9°C).

Despite this, no matter how bad things are there are always ways you can have a positive impact on your business. Undertake a formal review, know where you stand and decide your course of action. The greatest risk you have is in shutting down and not being able to move forward. If you feel like you are in this position seek some counselling advice to help you focus on the task at hand.

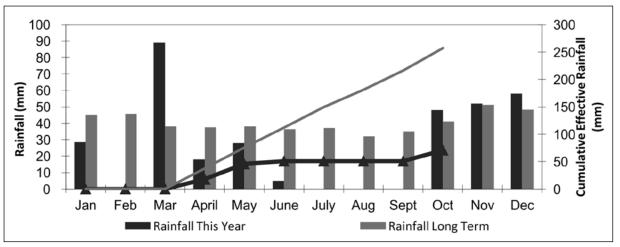


Figure 1. Rainfall during 2017 for an example farm in this area and the farm's long term average.

Strategies for tight budgets

I often use this simple process to help clarify the possibilities when it comes to tight budgets. The key things you can do are:

- · Increase income.
- · Reduce expenses.
- · Bring forward income.
- · Delay payment of expenses.

Sounds obvious? If you start with a brain-storming session around each of these items, you can manipulate cashflow overdraft expectations by as much as 50%. I have one very focussed client in a difficult position, who reduced the business's overdraft requirement by 100% starting with this process.

You discover that you can do things like defer payment of chemicals and fertiliser on terms. You can get an advance on grain sales if you are prepared to commit to a particular buyer. You can get a wool-advance six months before you require it. You can bring forward sheep or even wool sales. The important thing to realise is that there are many opportunities here.

It is however, important to recognise that there are nearly always costs associated with making these decisions. Taking an earlier wool advance comes at a higher cost than bank interest. However, sometimes the penalty is minimal or there is no penalty at all so it is worth investigating.

Once you have a list of the possibilities, you can rank them according to which ones are the last ones you might consider. For example, selling an item of machinery or selling the breeding ewes.

Operating cost caution

Don't cut costs aggressively without looking at the big picture. The aim is **not** to reduce income. We have all seen people go extreme and cut right back in the wrong areas and this often starts a spiral of continued poor performance.

Operating costs: wages, fuel, repairs, fertiliser, chemicals, any direct enterprise costs including levies and royalties, seed, shearing, selling costs, etc.

The operating cost: income ratio is the **measure** of the skill of farming. It is about getting the most income for the **least** expense.

Be sure when you are reviewing expenditure that you assess the likely impact on yield and price of each option.

The benchmark average for the operating cost : income ratio is 58% for our medium rainfall clients. The Top 25% is 53%.

Rotational choices

I suspect that rotational choices is the area that most of you have spent your time on.

Rotational choices are often choices between short-term and long-term profit.

If you are in a very tight cashflow position you will need to sacrifice some enterprises that have the risk of sending your business over the edge in the shortterm through poor performance.

You may have to cut back on legumes in favour of cereals. This might not be an easy choice but it may be a necessary one. Work out what the differences might be in profitability and make a rational short-term choice if you need to.

Some of the choices will be based on emotion and fear. The pain of such poor performance on canola last year has seen the canola area significantly reduced in favour of barley which had a reasonably good year given its slightly better frost tolerance over wheat. Look at your five-year average and be sure that you are not making a poor decision by reducing canola in the rotation too much. You still have to make a judgement on the risk – 2018 might be as bad as 2017.

Likely the strength of your overall business will be a factor in going against the trend for canola and barley. You might just not have the choice.

Be careful about swapping crop for increased pasture. There might be some good opportunities to reduce the area of crop on riskier soil types but if you are going to reduce crop and increase pasture, ensure that you have targeted your stocking rate on that pasture appropriately. Otherwise, you will not produce much more sheep income but this enterprise will be carrying more of the fixed overhead costs of the business. The end result could be worse, so just follow through and make sure it makes sense.

Consider the rotational weed aspects of your decisions with your agronomist. Make sure that you are making a sound rotational choice with the least compromises and then executing the choice appropriately to manage the rotational options for the following year—bearing in mind you might have to be pragmatic.

Fertiliser

Fertiliser is the largest variable cost for most farm businesses. Thinking through your fertiliser strategy can provide you with opportunities to improve yield with lower inputs.

The most obvious example of this is on farms with soil types where:

- Colwell P is > 30.
- Phosphorus buffering index (PBI) <100,
- pH > 4.7, and
- not a Red Ferrosol Soil.

On this type of soil (i.e. Colwell P > 30, PBI <100 and pH >4.7) which is quite typical through NSW, you can target replacement-only rates of phosphorus (P) on cereals., i.e. one tonne of wheat removes three units of P. If your average yield is for example; 2.3t/ha, then 2.3*3=6.9 units of P. To achieve this you only need apply 6.9/22 (units of P in monoammonium phosphate (MAP)), which

is equivalent to 31kg of MAP. Sounds low if you are using 60kg but it is adequate to maintain P levels.

Radio isotope work shows that only 20% of the MAP you apply ends up in the plant. Eighty per cent comes from the soil reserve, so even if you don't get it quite right, the actual impact of what you are applying is minimal. So, have confidence in going down this track. Speak to your agronomist and put in some test strips of double rate/half rate alongside and see if the difference shows up on a yield monitor, just to prove to yourself that this strategy is working for you.

Be aware that this is not a strategy for Red Ferrosol soils. These may have very high rates of P in soil tests, but this may still be unavailable to the plant. Most of you will be aware if you have any of these types of soils as they are generally well identified.

Improving pH also improves the availability of P. If you are cutting back P rates, this may free up some money for lime that will have a longer term positive impact on overall productivity. In some cases, this saving on P could give you the freedom to chase the season with nitrogen (N) if it looks like it is going to be a good year.

Machinery replacement

You need to develop some of your own rules of thumb with machinery replacement to help keep you focussed on a realistic replacement strategy.

My rules of thumb:

- 10% of your total plant value is the maximum level of repayments or expense per year.
- 8.5% client benchmark average to gross income (\$2M income = \$170k per annum).
- Maximum 30% of profit in a good year to play 'catch-up'.
- Prioritise according to productivity gain:
- 1. Better establishment
- 2. Spraying timeliness
- 3. Harvest efficiency

The cheapest depreciation on a machine is often the period after it has been paid off!

However, reliability and productivity are the biggest drivers of your business so if you can make a significant improvement to either of these, further investment is necessary. Maybe you can't do it all this year or maybe you can't do any of it this year? If you can't do any upgrading, then use your best

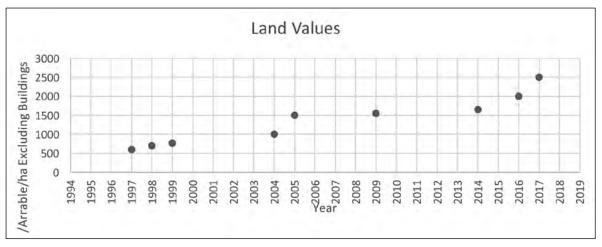


Figure 2. An example set of land values for the last 20 years.

asset – your timeliness to be right on the money, even if it requires additional seasonal labour.

You don't want to be the grower with the oldest machinery who is last to finish everything. But you don't need to be the grower with the newest machinery finishing first and not being profitable. As with most things in life, somewhere down the middle is likely the most rewarding.

Land values

We did this exercise the other day with clients. Very simply, we looked at all the sales within a 20km radius over the past 20 years to see if it could help give us perspective.

Similar amalgamated data comes from Rural Bank each year, but often it is better just to sit down and record your own info in your own area.

Figure 2 shows that land values in this locality jumped 50% in 2004/2005 which is very similar to the jump in other areas at the current time. However, be aware that there is a whole decade here where the land growth component was virtually zero.

The current rise in land values might bring on good properties that would not normally come onto the market, and this might present an opportunity for your business.

If you are not able to expand, then sit back and relax. You get all the benefits of rising land value without having to do anything!

Beware: expansion at the current time needs to be considered cautiously. Has the profitability of agriculture fundamentally improved in the cropping region? Was your bank asking you to reduce debt two years ago, but now seem keen to lend you more money to expand? Really sit down and pull apart the profitability of a potential expansion as historically businesses have got into trouble buying during a rural property bubble.

If you are expanding in the medium rainfall zone. Set your target equity after expansion at 75%. Be prepared to see no growth in land values for a decade (seems unlikely?) and test your assumptions to make sure that consecutive poor seasons don't start you on the way to be a statistic of the latest rural property bubble.

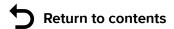
The land value does have other 'off-site' impacts. In succession planning, the expectations of off-farm members can be enhanced and many succession planners are focussed on the value of assets rather than what level of income these assets can support. With rising asset values, there is a greater risk that succession planning outcomes will lead to higher risks for on-farm families. Make sure you work through **how** it will **work** on paper. Don't just go with emotion.

Conclusion

Despite the risks, there are many opportunities for business. Work out whether they are good opportunities for you. Let's hope for the best for 2018.

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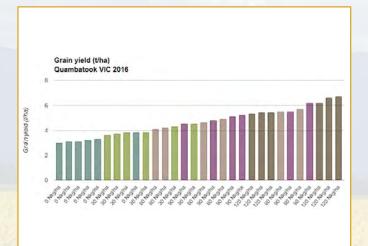








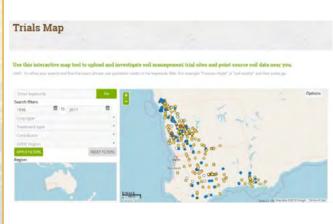
Looking for relevant and freely accessible information on issues such as crop nutrition, disease control or stubble management in your region? Online Farm Trials (OFT) contains over 4,700 on-farm trial projects from across Australia on a wide variety of crop management issues and methods. Use OFT to discover relevant trial research information and result data and to share your grains research online.



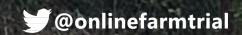
An embeddable version of the OFT Trial Explorer, or widget, has been designed for use on third-party websites. The widget provides the opportunity to display your trial project information on your own website and allows users to view other relevant trials from across Australia. Visit OFT for more information or to register an interest in managing your trial information with Online Farm Trials.



Grower and farming system groups, government researchers and industry are using OFT to manage and share their grains research online. Upload and publish your trial research data and reports to OFT to share information on solutions that address local or regional issues to increase profitability and sustainability of farming enterprises.



www.farmtrials.com.au/2018updates







How not to blink

Dennis Hoiberg.

Lessons Learnt Consulting.

Keywords

■ change, resilience, H.O.P.E., habits, optimism, planning, enacting.

Take home messages

- Key challenge is to look after yourself.
- Focus on what you can control, set realistic expectations, don't compare yourself with others and critically, don't overthink just do!
- Action creates energy, energy creates results and results create success.

Background

Lessons Learnt Consulting defines resilience as our ability to bounce forward and thrive through change and to make use of the lessons learnt and opportunities this world provides us.

The challenge of life is not achieving the bounce back — rather it's the effective learning of the lessons of life and building on them so that the same mistake is not repeated twice and critically, that we grow and thrive during the process.

We are all resilient — it's just at times when we are 'caught up in the moment', we forget this. We often confuse what resilience is and when we can use this competency.

One of the errors people often make in relation to resilience is to believe that it is only required in the big events of life — relationship breakdowns, health issues, financial issues and chaotic business and environmental circumstances. In effect, resilience is required in everyday life. I often think the major challenge of life is not change — but rather turning up every day and 'doing the do'.

So, how do we make sure resilience is a natural part of our everyday life, habits and rituals?

Through our research and practical experiences, Lessons Learnt Consulting has developed the HOPE model.

HOPE represents:

- H healthy habits,
- O optimistic thinking,
- P planning; and
- E enacting.

H — healthy habits

People must learn to look after themselves because, as I often say 'if you can't look out for yourself, you can't look after your family, your mates, your community and your industry'. Unfortunately, many people tend look after their businesses to the detriment of themselves.

Resilient people have healthy habits around routine, diet, sleep, connectivity and physical environment.

What are your habits and do they serve you in a positive manner?

O – optimistic thinking

We hear much about positive thinking. I encourage people not to be positive in their thinking but rather to be realistically optimistic. In reality, we don't have too much control over our outcomes and results. The only thing we control is what we do in order to achieve those outcomes. One characteristic of resilient people is that they focus on process. Follow the process and from that results will come.

P – planning

Part of what you can control is your thinking process. I believe the most effective thinking process for us to adopt is 'what are the things that I can do now to achieve the results I desire?' Be in the moment.

Planning is important as it translates our goals and aspirations. My observation is that many people are very good at planning — in fact in the agribusiness sector, planning is the skill that will make or break a season. One of my clients manages her business around the mantra 'Miss a week, miss a season'.

So planning is almost second nature in terms of the way businesses are conducted. It is important therefore that you use these same skills to run your life. Use the skills of setting objectives, establishing milestones, monitoring progress and taking corrective action in the running of your own life. Also in planning, remember to ask for help! Ask yourself the question, 'What help do I need to achieve the objectives I am trying to achieve?'

E – enacting

Finally we must do. We must enact. One of the most difficult thing people are faced with is actually doing and implementing the plans.

We must DO!

Conclusion

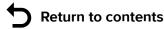
The HOPE model is a very powerful model for building an individual's resilience and skills.

In learning not to blink, the key challenge is to look after yourself. Focus on what you can control, set realistic expectations, don't compare yourself with others and critically, don't overthink — just do!

Action creates energy, energy creates results and results create success.

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THE 2017-2019 GRDC NORTHERN REGIONAL PANEL

GRDC

GRAINS RESEARCH & DEVELOPMENT CORPORATION

ERRUARY 2018

CHAIR - JOHN MINOGUE



■ John Minogue 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



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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ROGER BOLTE



Roger Bolte is a fourth-generation farmer from the West Wyalong area in NSW, operating a 6500 ha winter cropping program with his wife and

family focussing on cereals, legumes and hay. During his 35-years in the industry, Roger has been involved in R&D in various capacities and has had the opportunity to travel abroad and observe a variety of farming systems. He believes that R&D and education are the cornerstones of the industry and feels privileged to be afforded the opportunity to share his experiences.

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ROY HAMILTON



■ Roy Hamilton operates a 4400 ha mixed family farming enterprise near Rand in NSW's Riverina. He was an early adopter of minimum till practices

and direct drill and press wheel technology and is currently migrating to CTF. The majority of the property is cropped while the remainder runs ewes and trade lambs. He has held roles on the south east NSW Regional Advisory Committee, the GRDC's southern region Regional Cropping Solutions Network and was a founding committee member of the Riverine Plains farming systems group.

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PETER MCKENZIE



■ Peter operates a private agronomy consulting business based in Quirindi NSW. Prior to this he was facilitator/agronomist for

AgVance Farming group, a communications conduit between industry and growers. 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., 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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GRAHAM SPACKMAN



■ Graham has been Managing Director of a private agricultural consultancy at Emerald, Queensland, for the past 28 years, providing

advice on the agronomy and management of summer and winter, dryland and irrigated crops in grain and mixed farming systems. He has extensive involvement in RD&E having participated in two decades of GRDC and DPI-funded farming systems research, particularly in weed management, soil fertility and adaption of agronomic practices in CQ farming systems. Graham was a member of the CQ Research Advisory Committee for over 10 years and Chairman for five years.

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BRUCE WATSON



■ 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 is an active member of the grains industry and was awarded a Nuffield Scholarship in 2009.

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DR JO WHITE



■ Dr Jo White is an experienced researcher with over 15 years' experience in agricultural research programs based at the Department of

Agriculture and Fisheries in Queensland (DAFQ) and the University of Southern Queensland (USQ), including 10 years' experience in the field of plant pathology of broad acre summer crops. Jo has a keen interest in developing and delivering onground practical research solutions to growers which improve productivity and profitability of their farms and is now working as a private consultant based in Queensland.

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LUCY BROAD



■ Lucy Broad is the General Manager of the Grains Research and Development Corporation's (GRDC) Grower Communication and Extension

business group. Lucy holds a Bachelor of Science in Agriculture, majoring in agronomy, and prior to working at the GRDC spent the last 13 years as Director and then Managing Director of Cox Inall Communications and Cox Inall Change, Australia's largest and leading public relations agency working in the Agribusiness and Natural Resource Management arena. Her entire career has been in communications, first with the Australian Broadcasting Corporation and then overseeing communications and behaviour change strategies for clients across the agriculture, natural resource management, government and not-for-profit sectors.

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NORTHERN REGION GROWER SOLUTIONS GROUP AND REGIONAL CROPPING SOLUTIONS NETWORK

FERRUARY 2018

The Northern Region of the Grains Research and Development Corporation (GRDC) encompasses some of the most diverse cropping environments in Australia, ranging from temperate to tropical climates – it has the greatest diversity of crop and farming systems of the three GRDC regions.

Implemented, to provide structured grower engagement, the GRDC Grower Solutions Group projects and the RCSN project have become an important component of GRDC's investment process in the northern region. The Northern Region Grower Solutions Group and the RCSN have the function of identifying and, in the case of Grower Solutions Groups managing short-term projects that address ideas and opportunities raised at a local level which can be researched demonstrated and outcomes extended for immediate adoption by farmers in their own paddocks.

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Northern Grower Alliance (NGA) was established in 2005 to provide a regional capacity for industry-driven, applied agronomic grains research. NGA is currently working on a five year Grower Solutions project, fully funded by the GRDC, focussing on cropping areas from the Liverpool Plains to the Darling Downs and from Tamworth and Toowoomba in the east to Walgett, Mungindi and St George in the west. A network of six Local Research Groups, comprised of advisers and growers, raise and prioritise issues of local management concern to set the direction of research or extension activity. Areas of focus range from weed, disease and pest management through to nutrition and farming system issues.

GRAIN ORANA ALLIANCE (GOA)

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■ Grain Orana Alliance (GOA) is a not for profit organisation formed in 2009 to help meet growers research and extension needs in the Central West of NSW to support their enduring profitability. Currently operating under the GRDC Grower Solutions Group - Central NSW project, one of the key priorities is to identify and prioritise R,D and E needs within the region through engagement with local growers and advisers. This grower engagement helps direct both the GRDC investments in research projects and GOA's own successful research programs. GOA's research

covers a wide range of relevant topics such as crop nutrition, disease management and weed control. The structure of the project allows for a rapid turnaround in research objectives to return solutions to growers in a timely and cost effective manner whilst applying scientific rigour in the trial work it undertakes. Trials are designed to seek readily adoptable solutions for growers which in turn are extended back through GOA's extensive grower and adviser network.

CENTRAL QUEENSLAND GROWER SOLUTIONS GROUP

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The Central Queensland Grower Solutions project, is a GRDC and DAF Queensland investment in fast-tracking the adoption of relevant R,D & E outcomes to increase grower productivity and profitability across central Queensland. Covering approximately 550,000 ha and representing 450 grain producing businesses, the central Queensland region includes areas from Taroom and Theodore in the south to Mt McLaren and Kilcummin in the north, all of which are serviced by the project staff, located in Biloela and Emerald. Team leader Rod Collins is an experienced facilitator and extension officer with an extensive background in the central Queensland grains industry. He was part of the initial farming systems project team in the region throughout the late 90's and early 2000's which led the successful adoption of ley legumes to limit nutrient decline and wide row configurations in sorghum to improve yield reliability across central Queensland. He has more recently led the development and delivery of the Grains Best Management Practices program.

COASTAL HINTERLAND QUEENSLAND AND NORTH COAST NEW SOUTH WALES GROWER SOLUTIONS GROUP

The Coastal Hinterland Queensland and North Coast New South Wales Grower Solutions project was established to address the development and extension needs of grains in coastal and hinterland farming systems. This project has nodes in the Burdekin managed by Dr Steven Yeates from CSIRO; Grafton managed by Dr Natalie Moore from NSW DPI; Kingaroy managed by Nick Christodolou (QDAF) and Bundaberg managed by Neil Halpin.

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Neil Halpin is a principal farming systems agronomist with the Queensland Department of Agriculture and Fisheries. He has over 30 year's field trail experience in conservation cropping systems, particularly in the sugar-based farming systems of the coastal Burnett. His passion is for the integration of grain legume break crops, reduced tillage, controlled traffic and organic matter retention in coastal farming systems.

Maximising the productivity and profitability of grain legumes (peanuts, soybeans and mung beans) is a common theme throughout the various production areas and systems covered by this project.

KINGAROY QUEENSLAND:

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Nick Christodoulou is a principal agronomist with the Department of Agriculture & Fisheries (QDAF) on Qld's Darling Downs and brings over 25 years of field experience in grains, pastures & soil research, with skills in extension application specifically in supporting and implementing practice change. Nick has led the highly successful sustainable western farming systems project in Queensland. Nick was also project leader for Grain & Graze 1 Maranoa-Balonne and DAF leader for Grain & Graze 1 Border Rivers project, project leader for Grain and Graze 2 and was also Project leader for the Western QLD Grower Solutions project. Currently he is the coordinator for the Grower Solutions Southern Burnett program.

BURDEKIN QUEENSLAND:

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The Burdekin & tropical regional node of the Coastal and Hinterland Growers Solution Project is led by CSIRO research agronomist Dr Stephen Yeates and technical officer Paul McLennan, who are based at the Australian Tropical Science and Innovation Precinct at James Cook University, Townsville. The Burdekin & tropical Grower Solutions node has a committed and expanding advisory group of farmers and agribusiness professionals. Due to the rapid increase in farmers producing mungbean in the region an open door policy has been adopted to advisory group membership to ensure a balance in priorities between experienced and new growers. The node is focused on integrating grain crops into sugar farming systems in the lower Burdekin irrigation area in NQ and more recently contributing to other regions in the semi-arid tropics that are expanding or diversifying into grain cropping. Information and training requests for information and training from the Ord River WA, Gilbert River NQ, Mackay and Ingham areas necessitated this expansion. Recent work has focussed on the introduction of mungbeans in the northern Queensland farming systems in collaboration with the GRDC supported entomologists Liz Williams and Hugh Brier, Col Douglas from the mungbean breeding team, the Australian Mungbean Association and Pulse Australia. Both Stephen and Paul have many decades of experience with crop research and development in tropical Australia.

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The NSW North Coast regional node of the Coastal and Hinterland Grower Solutions Project is led by NSW DPI research agronomist Dr Natalie Moore and technical officer Mr Nathan Ensbey, who are based at the Grafton Primary Industries Institute. The NSW North Coast Grower Solutions node prioritises and addresses issues constraining grain production via an enthusiastic advisory group comprised of leading grain growers, commercial agronomists from across the region and NSW DPI technical staff. In this high rainfall production zone (800-1400mm pa), winter and summer grain production is an important component of farming systems that also includes sugar cane, beef and dairy grazing pastures, and rice. The region extends east of the Great Dividing Range from Taree in the south to the Tweed in the north. Both Natalie and Nathan have many years experience with research and development for coastal farming systems and are also currently involved with the Australian Soybean Breeding Program (GRDC/CSIRO/NSW DPI) and the Summer Pulse Agronomy Initiative (GRDC/NSW DPI).

REGIONAL CROPPING SYSTEMS NETWORK (RCSN) SOUTHERN NSW

CHRIS MINEHAN

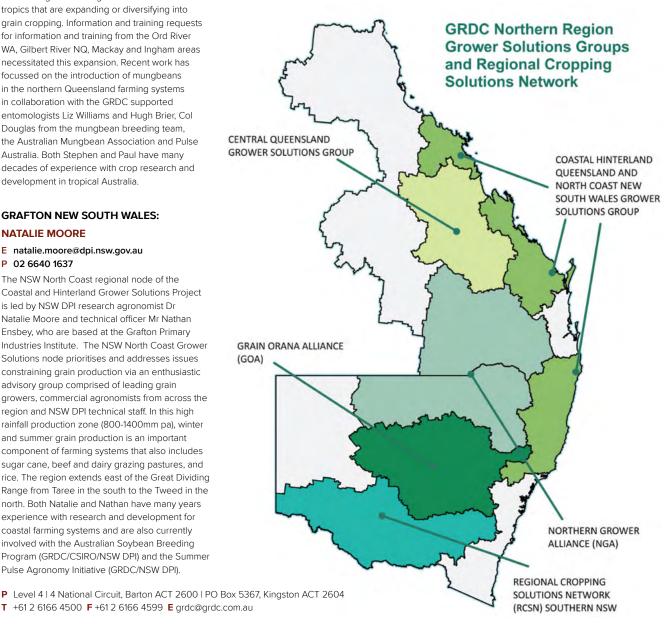
Regional Cropping Solutions Network Co-ordinator Southern New South Wales (Wagga Wagga)

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The Southern New South Wales Regional Cropping Solutions Network (RCSN) was established in 2017 to capture production ideas and opportunities identified by growers and advisers in the southern and western regions of New South Wales and ensure they translate into direct GRDC investments in local R, D & E priorities. The SNSW RCSN region covers a diverse area from the southern slopes and tablelands, through the Riverina and MIA, to the Mallee region of western NSW and the South

Australian border. The region is diverse in terms of rainfall and climatic zones, encompassing rangelands, low, medium and high rainfall zones, plus irrigation. The SNSW RCSN is facilitated by Chris Minehan. Chris is an experienced farm business consultant and a director of Rural Management Strategies Pty Limited, based in Wagga Wagga, NSW. The process involves a series of Open Forum meetings which provide an opportunity for those involved in the grains industry to bring forward ideas, constraints and opportunities affecting grain grower profitability in their area. These ideas are reviewed by an RCSN committee comprises 12 members, including grain growers, advisers and researchers from across the region that meet twice per year to assist GRDC in understanding and prioritising issues relevant to southern NSW.



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- The local GRDC Farm Business Update steering committee that includes both government and private consultants and GRDC representatives
- Partnering organisation: CWFS





You can now provide feedback electronically 'as you go'. An electronic evaluation form can be accessed by typing the URL address below into your internet browser.

To make the process as easy as possible, please follow these points:

- Complete the survey on one device (i.e. don't swap between your iPad and Smartphone devices. Information will be lost).
- One person per device (Once you start the survey, someone else cannot use your device to complete their survey).
- You can start and stop the survey whenever you choose, just click 'Next' to save responses
 before exiting the survey. For example, after a session you can complete the relevant
 questions and then re-access the survey following other sessions.

www.surveymonkey.com/r/Condobolin-FBU

2018 Condobolin GRDC Farm Business Updates Evaluation

2.	ORM has permisssion to follow r	me up in regards to post event outcome	PS.
2.	How would you describe your		
		main role? (choose one only)	
	☐ Grower	☐ Grain marketing	☐ Student
	☐ Agronomic adviser	☐ Farm input/service provider	☐ Other* (please specify)
	☐ Farm business adviser	☐ Banking	
	☐ Financial adviser	☐ Accountant	
	☐ Communications/extension	☐ Researcher	
You	ur feedback on the presentat	tions	
	·	I, please rate the content relevance and box (10 = totally satisfactory, 0 = total	
3.	Choosing and justifying the rig	ht sprayer: <i>David Smith</i>	
Coi	ntent relevance /10	Presentation quality /10	
Hav	ve you got any comments on the	e content or quality of the presentation?	?
4 .	Banking the farm – a financial	confession: Brad Sewell	
Coi	ntent relevance /10	Presentation quality /10	
Hav	ve you got any comments on the	e content or quality of the presentation?	?
 5.	Decisions in a tough year: <i>Eric</i>	Nankivell	
Coi	ntent relevance /10	Presentation quality /10	
Hav	ve you got any comments on the	e content or quality of the presentation	?

6.	How not to blink –	developing em	otional and mental fortit	tude for the road a	head: <i>Dennis Hoiberg</i>
Со	ntent relevance	/10	Presentation quality	/10	
Ha	ve you got any comr	_ nents on the co	ــ ntent or quality of the pre	esentation?	
	ur next steps	loast one now	atratagy vou will undort	aka aa a raayit of	attanding this
7.	Update event	least one new	strategy you will undert	ake as a result of	attending this
_					
8.		• •	ake? nter, consider a new resource:	, talk to my network, s	tart a trial in my business
		<u>·</u>		<u> </u>	,
Yo	ur feedback on the l	Update			
9.	This Update has in	creased my aw	areness and knowledge	of farm business	decision-making
	Strongly agree	Agree	Neither agree nor Disagree	Disagree	Strongly disagree
10.	Overall, how did th	ne Update even	t meet your expectation	s?	
Ve	ery much exceeded	Exceeded	Met	Partially met	Did not meet
Co	□ mments	U	U	u	Ц
11	Do you have any c	omments or su	ggestions to improve the	e CDDC Undate e	vents?
TI.	Do you have any c	omments or su	ggestions to improve the	e GRDC Opuate e	vents:
L					
12.	Are there any subj	ects you would	like covered in the next	Update?	

Thank you for your feedback.







SPRAY APPLICATION GROWNOTES™ MANUAL





SPRAY APPLICATION MANUAL FOR GRAIN GROWERS

The Spray Application GrowNotes™ Manual is a comprehensive digital publication containing all the information a spray operator needs to know when it comes to using spray application technology.

It explains how various spraying systems and components work, along with those factors that the operator should consider to ensure the sprayer is operating to its full potential.

This new manual focuses on issues that will assist in maintaining the accuracy of the sprayer output while improving the efficiency and safety of spraying operations. It contains many useful tips for growers and spray operators and includes practical information — backed by science — on sprayer set-up, including self-

propelled sprayers, new tools for determining sprayer outputs, advice for assessing spray coverage in the field, improving droplet capture by the target, drift-reducing equipment and techniques, the effects of adjuvant and nozzle type on drift potential, and surface temperature inversion research.

GRDC

It comprises 23 modules accompanied by a series of videos which deliver 'how-to' advice to growers and spray operators in a visual easy-to-digest manner. Lead author and editor is Bill Gordon and other contributors include key industry players from Australia and overseas.

Spray Application GrowNotes™ Manual – go to: https://grdc.com.au/Resources/GrowNotes-technical Also go to https://grdc.com.au/Resources/GrowNotes and check out the latest versions of the Regional Agronomy Crop GrowNotes™ titles.

