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President's Report

Farming can be a tough gig at times. While automation is rapidly changing the way we operate, no amount of technology can take away the emotional strain that comes from being dependent on the seasons.

Mental health advocate Micheal Hancock presented an important message at our recent conference about the need for farmers to look after their mental health. It is a message SANTFA is very proud to support and one that is worth repeating here.

Last year's dry season took a toll on many. With no significant rainfall on the horizon, even those of us who escaped relatively unscathed are starting to feel the bite as we near seeding time. The need to look after our emotional wellbeing, and that of our families, workers and fellow landholders, must be a priority.

If you are struggling to remember why you're in the farming game, please reach out and talk to someone. As Micheal says, we need to protect our mental health so we can make good farming decisions. We need to be emotionally strong to maintain our 'fighting attitude' and our will to succeed. If you share your worries with others you will soon realise you are not alone. Farming certainly can be tough but, if we all join together, we have a better chance of reducing the emotional burden.

You can find a link to a podcast of Micheal's conference presentation at https://bit.ly/2Uf3HqM for part one and https://bit.ly/2WzumuU for part two, or listen to more RADIO SANTFA episodes at https://www.spreaker.com/show/1702662/episodes/feed.

Meanwhile, as we turn our attention to the season ahead it's important to remember that preparation is vital. As we've seen time and again, it is very difficult to accurately predict the season break, so while many are forecasting little or no rain until June, that doesn't mean we can put our feet up. Getting seed in at the right time is vital if we are to maximise profits, and to achieve this we need to be ready for whenever the break occurs.

We may not be able to control the weather but we can make sure we are ready to pull into the paddock as soon as the rain hits, even if it's earlier than the so-called experts predict.

Callum March

Mother [Nature] knows best

SARAH JOHNSON

The future of agriculture depends on farmers working with natural ecosystems, according US researcher Dr Dwayne Beck, who shares his model for creating profitable and sustainable cropping systems that rebuild the soil and ensure a sustainable supply of food for generations to come.

Growers meeting US no-till advocate and researcher Dwayne Beck for the first time can be a little surprised by his initial request.

"I always ask to look at the native vegetation," said Professor Beck, research manager at Dakota Lakes Research Farm and keynote speaker at SANTFA's 2019 conference. "I want to see what Mother Nature is doing with your ecosystem. Then I can compare that to what you're doing with the ecosystem."

Dwayne, who has more than 35 years' experience in his field and is recognised globally as an advocate for diverse no-till cropping systems, believes farmers can ensure a profitable and sustainable future in agriculture by replicating Mother Nature's model for local natural ecosystems. Consequently, it is critical for him to understand how native vegetation exists in harmony with the region's climate and geographic conditions, he said.

In many places including Dwayne's home State of South Dakota, where he has seen first-hand the impact of European colonisation, establishing a farming system that replicates a region's original ecosystem means reversing decades of damage and soil degradation caused by deforestation and tillage.

DWAYNE BECK HAS MANAGED RESEARCH PROGRAM FOR ALMOST 30 YEARS.

FARMING SYSTEMS ON DAKOTA LAKES RESEARCH FARM AT LEAST PARTLY MIMIC THE LOCAL ECOSYSTEM; A KEY REASON IT CONTINUES TO BE FINANCIALLY VIABLE WHILE HOSTING INNOVATIVE NO-TILL AND BIOLOGICAL RESEARCH.

South Dakota was settled in 1743 by French fur traders, who claimed the area for France and set about harvesting the native beaver population to make fur hats for export to Europe. Removing beavers from the environment was the start of a damaging sequence of events, Dwayne says.

"Before the Europeans arrived the beaver dams held water up in a network of drainage ways across the landscape.

"When my ancestors came in they killed all the beaver then brought in settlers who immediately started to plough and over-graze the prairie.

"When the beavers were killed the dams disappeared so when it rained or the snow melted the water drained out of the landscape straight into the Missouri River, causing erosion and a lot of big floods.

"This was going on from the 1860s until about the 1930s and all of a sudden we had massive flooding. The white man's response to that was not to put the beaver back, but to build large reservoirs in the river to hold the water.

"Once they had the reservoirs farmers started to irrigate and found they had to use high-pressure irrigation to spread the water out because it wouldn't go into the soils. They had to do tillage in order to grow good irrigated crops because they didn't have the infiltration rate needed to get the water into the soil, but even with tillage the water still ran off.

"Then there was the Arab oil embargo and the price of energy went up. The price of land went down and the growers were paying lots of interest on it. This is where we [Dakota Lakes Research Farm] entered the system. The farmers got together and said 'we need to do something different'."

The research farm, in Pierre, mid-way between Minneapolis and Denver, was established in 1990 by a group of farmers to research ways to create resilient and

profitable farming systems that would rebuild and protect the landscape.

Today the research enterprise is run by South Dakota State University (SDSU), with the production side of the business managed by a farmer-led corporation that owns the facilities, most of the equipment and the 324ha of land, about a third of which is irrigated.

Dwayne has been the research manager at Dakota Lakes Research Farm, which has a 'nothing but no-till' mission statement, since its inception and has been instrumental in devising diverse no-till cropping systems that have been widely adopted across much of central South Dakota.

Crop production results calculated during almost three decades show the financial benefits of adopting these systems.

"In 1990 when we started the east was all spring wheat and barley, all continuous cereals with tillage. In the west it was tillage-based dryland spring and winter wheat with summer fallow and irrigated corn. You didn't grow corn unless you had irrigation and it was all with tillage," he said.

"Now there's dryland corn, soy beans and wheat in the east. Dryland spring wheat, winter wheat, oil seeds and pulse crops in the west are very diverse and there's no fallow or tillage. And irrigated acreage has predominantly gone away because the guys are producing up to 12t/ha of corn without irrigation."

Comparing corn, soya bean, spring wheat, winter wheat and sunflower production in the central, north central and south central districts of South Dakota showed an increase of $1.6billion in the annual value of crop production from 1986 to 2014, he said.

"It's huge. But we didn't achieve this because we set out to improve yields or look at what fungicide to use. We set out to better manage our ecosystem.

"How do we capture the water and the sunlight and turn it into products we can sell? We looked at the natural grassland ecosystem because that had to be our model.

"We call this transformational change or a holistic approach. The light bulb did not result from incrementally making candles better.

"Almost all agricultural research is incremental. We need incremental research to do a better job of understanding wheat but we also need to take a look at the big picture."

For Dwayne, the 'big picture' is about understanding the four key processes of the ecosystem: water cycle, energy flow, mineral cycle and community dynamics.

Water cycle

When it comes to the water cycle, Dwayne asks: "Does the rain feed plants and deep percolate to recharge groundwater or does it run off and cause erosion and water quality degradation?"

He believes no-till techniques are critical to improving water use efficiency. "Simply from being no-till we can now put on 50mm of water in nine minutes with no run-off. When people visit us we walk them behind the irrigator when we're putting on 50mm of water and they don't get muddy shoes because the water goes in the soil like it's supposed to."

Residue, or what Dwayne calls 'soil armour', together with 'macro pores' – large holes in the soil created by termites, earthworms and crop roots – increase water infiltration. "The water goes in the big holes and it gets away from the

DAKOTA LAKES RESEARCH FARM STILL HAS LAND UNDER IRRIGATION BUT MANY LONG-TERM NO-TILL SOUTH DAKOTA GROWERS HAVE MOVED AWAY FROM IRRIGATION BECAUSE THEIR IMPROVED RAINFALL INFILTRATION MEANS THEY NO LONGER NEED TO WATER.

DAKOTA LAKES RESEARCH FARM IS EXPLORING THE POTENTIAL OF A LUCERNE-CORN COMBINATION. THE LUCERNE IS ESTABLISHED BY SOWING BETWEEN ROWS OF CORN STUBBLE THEN, IN SUBSEQUENT YEARS, CORN IS SOWN BETWEEN THE ESTABLISHED LUCERNE THAT CYCLES NUTRIENTS FROM THE SUB-SOIL BACK UP TO THE SURFACE, PROVIDES SHELTER FOR THE EMERGING CORN, FIXES NITROGEN THAT IS ULTIMATELY ACCESSED BY THE ANNUAL CROP AND ENCOURAGES PREDATORS THAT HELP KEEP CORN PEST POPULATIONS AT BAY.

surface into the soil where it's not prone to evaporation. I leave a lot of pens in the field because I stick them in the macro pores to show people and then I get all excited and leave them in the field."

His motto for water cycling is: take the E out of ET (evapotranspiration), which is a combination of evaporation and transpiration. With evaporation, water moves from the land into the atmosphere. Transpiration is the process of water movement within a plant and eventually from the leaves as vapour.

"Water goes out of your soil either by transpiration or evaporation. You make no money if it evaporates.

"Taking the E out of ET should be your focus here in Australia where it's dry.

> **The 'big picture' is about understanding the four key processes of the ecosystem: water cycle, energy flow, mineral cycle and community dynamics.**

"Maximise water holding capacity. As you add organic matter you increase the water holding capacity of the soil and this is where you can use some cover crops at times.

"The most dramatic difference you'll see in time, if you do this right, is all of a sudden you'll hold way more water and if you're using the mycorrhizae, you can extract more water and produce crops where it wouldn't be possible with conventional techniques."

Energy flow

Dwayne's message on energy flow is to harness the power of the sun, once again replicating the natural ecosystem.

"Focus on being the best sunlight harvester; not the best wheat grower but the best sunlight harvester that you can be," he said. "Ecosystems harvest sunlight energy to drive all of their processes."

For Dwayne, sunlight meets the key criteria for an effective energy source: it's constant, benign and internal.

"Sunlight is constant, the sun is going to come up tomorrow, whereas fossil energy is finite; we can't count on it always being there. Sunlight can be damaging from a

COVER CROPPING A TOOL, NOT A FAD

Cover cropping might be considered the latest agricultural fad by some farmers, but US researcher Dr Dwayne Beck says covers are a tool he has used for the past 40 years.

"It seems like all of a sudden cover crops are the big thing everybody has to do it now to be successful," said Dwayne, keynote speaker at SANTFA's 2019 conference and research manager at US-based Dakota Lakes Research Farm.

"Cover and forage crops are a way to improve rotational diversity and intensity while providing competition for weeds but they are a tool, not an end. You don't use them all the time. They should be used to fine-tune or tweak crop rotations.

"We seldom use cover crops in our dryland situation unless I'm planning to do something with forage, but if I have a wet harvest and my soil's nearly full of water it doesn't make any sense to let that go to waste."

Covers are also a way of building carbon in the soil, he said. "In sub-humid, semi-arid and arid environments, cover crops can be used to increase organic matter and biological activity."

Despite his long experience with cover crops in the US, Dwayne says getting them right is largely guesswork. "Managing cover crops is really more of an art.

It's more guesswork and instinct than science at this point."

Dwayne's 10 top tips for covers are:

1. **Decide on your goal before trying to choose your cover crop or cover crop mixture.**
2. **Think of the cover crop as just another component of your crop rotation.**
3. **Use a mixture of species to meet several goals simultaneously. Mixed stands add more diversity, compete better with weeds and optimise nutrient cycling.**
4. **Create conditions beneficial to the next crop. This should be one of the primary goals of a cover crop. If you're not getting equal or better yields after the cover crop, you're doing something wrong.**
5. **Consider water and nutrient management. Water used by a cover crop between cash crops can be regained during the growing season because of better infiltration, reduced run-off and improved water relations, provided cover is maintained.**
6. **Understand local rainfall patterns and the water-holding characteristics of your soils to fully benefit from cover and forage crop programs.**
7. **Cover crop seed must be cheap in terms of cost/hectare. Small seeds mean less volume/hectare, which reduces the number of stops to refill the seed box.**
8. **Small seeds grow better on the surface than larger seeds while large seeds usually emerge better through a mat of residue.**
9. **Using harrows to improve germination of surface broadcast seed also improves the stand of weeds, but having weeds in a cover isn't necessarily a problem as long as they don't go to seed.**
10. **Think of soil organisms as tiny cows or sheep and use cover crops to balance their diet. In paddocks with high-carbon (low protein) residue like wheat and corn stubble, sow high-protein cover crops like peas. Where residue levels are low or it is high in protein (nitrogen), sow high-residue, high-carbon cover species to increase the level of cover and provide carbon for the soil microbes.**

cancer standpoint but other than that it's pretty benign, whereas fossil fuels are not so benign. Sunlight energy is internal – it's coming from biological processes driven by sunlight – rather than external where you have to purchase it."

He is also quick to point out that farmers need to maintain the soil's energy by ensuring the microorganisms living underground have the food they need to thrive. "When we take off grain plus straw or hay in the same season there's no energy out there for the microbes to eat. Everybody says, 'I want to increase my microbes.' Well you can't starve them, you have to feed them. It's like any other livestock you have."

Mineral cycle

Removing residue from a paddock also impacts the mineral cycle because it depletes the system of energy and nutrients.

"Nutrients are lost by burning straw but cutting hay or straw takes everything off," he said. "With a 5t/ha hectare wheat crop, if you burn the straw you lose 82% of the nitrogen present, a bit of phosphorous, 40% of the potassium and 80% of the carbon. Everybody says, 'Burning is really bad, we don't do that any more', but if I take the stubble off and sell it as hay I don't lose percentages, I lose the whole thing; all the nutrients are gone."

Nutrients can also be lost through leaching or erosion, which is where cover crops come into consideration, he said. Cover crops can be used to catch nutrients and re-release them slowly into the system rather than having them leach into the sub-soil and seep out of the side of hills.

"Ecosystems that leak nutrients turn into deserts. When you come into a native system and start extracting the nutrients you waste the carbon, the organic matter goes down and that's the start of desertification."

Community dynamics

Dwayne sees weeds and diseases as efforts by the natural ecosystem to add more species to monocultures and single-species crops.

"How many species have a fairly stable population in your paddocks? Not very many, so Mother Nature tries to help you.

"Weeds and diseases are nature's way of adding diversity to your system. So when you start running into weed and disease or insect problems, don't go looking for something to kill them. First, look to understand that species.

"If you start putting chemicals on you're going to knock out beneficials and get resistance.

"If your consultant says 'let's go out and put a herbicide on your wheat and we'll throw a little insecticide or fungicide in at the same time because it's only a dollar', what have they just done? They've ensured there are no predators there."

Dakota Lakes Research Farm has not applied broad-scale insecticides for more than 16 years, instead ensuring there are good populations of predators like ladybird beetles and pirate bugs to keep pest populations low.

PEAK OIL? GROW YOUR OWN

"Never in the history of all of mankind have we knowingly faced the kind of issue we have now with climate change and population," Dakota Lakes Research Farm research manager Dr Dwayne Beck told the 2019 SANTFA conference.

"We're using oil that's getting more expensive to produce food that's getting less expensive and we're degrading the soils in the process. It makes no sense if you start looking long term."

In the past 100 years agriculture has become largely reliant on fossil fuels to power its operations, he said, with 80% of the total input costs in modern agriculture able to be traced directly to fossil fuels.

"Fossil fuel input in agriculture 120 years ago was zero and fossil fuel input in agriculture will have to be zero again in another 120 years."

Dakota Lakes Research Farm, which operates a cropping and livestock operation on 324ha, will be fossil fuel neutral by 2026. "We're going to produce as much oil as we use," said Dwayne. "We press our own oil seeds and use that oil. We sometimes sell the oil, but the income offset the cost of oils we buy in.

"Doing the right thing environmentally is almost always the correct economic approach in the long run.

"We don't need to change our habits to save nature or the planet; nature and the planet will go on without us. We need to do these things so our descendants have a planet suited to them."

Building drought tolerance through regenerative farming

SARAH JOHNSON

Drought conditions in NSW have put Michael Inwood's focus on sustainable and regenerative agriculture to the test but he is seeing promising signs that a combination of plant diversity, pasture cropping and rotational grazing will carry his farm through the dry spells.

Engaging nature is a motto Michael Inwood aims to live and work by on Toulon, his mixed enterprise farm north east of Bathurst in central-west NSW.

It is also the term name he has coined for the natural resource management plan he is implementing on the family property. "It's all about trying to use natural solutions or management decisions that tip the balance in nature's favour to see if we can reduce the cost of production by using nature to the fullest," said Michael.

Third-generation farmers Michael and wife Therese have worked hard to implement sustainable practices on their property, from rock weirs that slow water in creek beds to an electric-powered ute, pumps and electric fencing, all charged by solar energy.

To further his learning about sustainability Michael embarked on a Nuffield Scholarship funded by the Sidney Myer Fund in 2011. His report, 'Sustainable and Regenerative Agriculture: Farming in a world of finite resources', focused on two main issues: how to avoid depleting resources and how to actively build soil organic matter and soil carbon.

"Most people understand what it means to be sustainable but the word I prefer to use is regenerative," Michael said in his 2012 Nuffield presentation at Armidale. "When it comes to being sustainable you might be treading water; things might not be any getting worse but they're not getting better. I think what we need to be doing to be sustainable is to actually build the system; build in some buffer and insurance so in the good times we build and in the bad times we don't necessarily go backwards."

The severe drought experienced across NSW means the past two years are likely to fall into the 'bad times' category for the Inwoods, who run an 800ha superfine Merino grazing and opportunity cropping enterprise. The drought has taken a toll on their energy and financial resources, and since they exhausted their 300 tonne reserve of grain the business has been

MICHAEL INWOOD USES SOLAR ENERGY TO POWER A UTILITY, PUMPS AND ELECTRIC FENCING.

buying in feed, with prices for barley increasing by $200/t in that time. They have also reduced sheep numbers to just fewer than 5,000, scaling down to their core breeders and some replacement ewes.

Despite these constraints, the Inwoods have seen promising signs that their sustainable initiatives are working. In a district that is a sea of gold and brown, a patch of green on the Inwoods' property shows there is hope for the future.

> **Whatever biomass you have above the ground is replicated underground.**

The green is an 8ha paddock in which Michael is experimenting with multi-species pasture cropping, which he defines as sowing a grain crop into an existing multi-species pasture. "It's about retaining the biological function and the value of the pasture but you want the benefit of the increased dry matter and stimulation that having an extra plant species in the system can provide," he said.

The pasture was planted with 16 different species, including radish, turnip, plantain, chicory, lablab, seradella, red clover, vetch, millet, sun hemp and annual ryegrass, with oats sown in after the pasture stand was established.

"I've been trying year on year to foster this type of cropping regime in this particular paddock," said Michael. "Even though last year was an extremely tight year I kept the sheep off that paddock until the pasture species got going.

"I had massive root systems on the turnip and the radish and this year I've got a mat of residue. I grazed it right out at the end with lambs that we ended up selling into the meat trade.

"Driving a motorbike around on it now, one thing I've noticed is that it's so soft.

OATS SOWN INTO THE MIXED-SPECIES PASTURE PADDOCK ON MICHAEL INWOOD'S PROPERTY HAD NO PROBLEMS HANDLING THE COMPETITION.

Part of that is the residue on top, but I've noticed while hoeing Bathurst burrs that the soil structure seems to be very good. It's very protected and it looks dark. If that paddock had been ploughed like we used to it would be quite tight and fairly hard on the surface.

"I just think things are really starting to happen there. The oats we sowed into the pasture is almost to above the tank on the motorbike. Basically, we had feed there when other people in the district were full drought feeding, and with the rest of the district brown it was just phenomenal to have a patch of green up on the hill on my property.

"Plus, when you do get rain, you get much greater water infiltration. It goes in and not away."

Michael is aiming for high levels of biomass above ground, which in turn means a strong root system below ground. "Biomass is a really good indicator for the system," he said. "Whatever biomass you have above the ground is replicated underground and that would be the most amazing amount of soil carbon which becomes humus in the soil.

"When you terminate a crop its roots become soil carbon and recycled nutrients. You then sow your next species and that crop takes advantage of the higher nutrient availability and enhanced soil characteristics.

"You've really got a composting system in your paddock and that's the ideal for me. Can we start to turn some of our soil quality issues, like compaction, around with some of these massive-rooted plants like tillage radish? They call it that because it busts up the plough pan and it can go a metre down into the soil.

"It's about using a wide variety of plant species to do what we might be doing if we deep rip and then bring compost in. Maybe we can do it in the one operation, just with cover crops."

MICHAEL HAS BEGUN USING A CRIMP ROLLER TO CONDITION HIGH VEGETATION LOADS AHEAD OF SEEDING WITH A DISC.

What excites Michael about plant diversity is the increased nutrient efficiency that can be achieved. With single-species cropping a large proportion of nutrients are locked up in the soil. Increasing plant species stimulates biological activity, leading to nutrient benefits for subsequent crops and for animals.

"In our cropping systems only about 25% of the fertiliser we put out is actually used by the crop. So what's going on? Where has the other 75% gone? It's become unavailable, but the bacteria and fungi can get in there and make it plant available again. They can break the complexes open and make the nutrients available for the next crop that's coming through.

"The more humus you build in the soil,

the more soil carbon there is and the more nutrients are absorbed into the system. The bugs, bacteria and the fungi are living and dying and re-releasing the nutrients and at the same time improving the moisture-holding capacity of the soil, which also helps nutrient availability."

The Inwoods use their livestock to manage pastures and keep on top of weeds.

"Some of the storms we've had recently have provided good opportunities to shut up a paddock like the one with our multi-species pasture and let it do what it wants to, although I'm pretty big on trying to control weeds," Michael said.

"There are a lot of different plants in the mix that people might consider weed species but our animals graze them happily. They're not toxic; they're just not plants you would usually sow.

"It's much harder for croppers. They've got to stop everything growing to try and get another completely different species in there. It's much easier if you can utilise pastures and livestock."

Michael and Therese crop about 120ha a year, with about half that area pasture cropped and the balance just cropping, which includes use of spray fallow to keep on top of weeds.

"I'm pragmatic about how we control weeds, particularly this season when we've had summer storms come through that are generating significant weed growth in some of the paddocks I've set aside for cropping," Michael said.

"I've spray fallowed those paddocks twice, just a typical chemical fallow. There are people who say I shouldn't be doing that, but if I want to be sure that I get some grain for winter feed I need to have clean paddocks.

"The good weed growth means they have a really good residue on top, so I've got a great mulch layer, but I have to control the weeds because they're in the paddocks we'll harvest for grain.

I crimp roll to shut the large plants down before the stand becomes too thick and unmanageable,

"The pasture cropping is mainly about trying to increase our dry matter for winter, not grain.

"Instead of cropping 80 or 120ha we tick all the boxes on 60ha, then if the season works out for us we'll take a punt on the other 60ha with pasture cropping, which when it works, works very well.

"If it stays dry, crops in paddocks that are pasture cropped have an uphill battle because the cereal has been sown into a living pasture, but we haven't destroyed the pasture. At some point when it rains we'll get the benefit of that. We might not be able to harvest grain, but we've still got a pasture."

Oats are Michael's go-to crop for planting into pasture.

"I have sown dual-purpose wheat but I don't think it's aggressive enough to compete," he said. "That's why we've gone with oats. Oats is conducive to mycorrhizal fungi and is an aggressive plant. I go for older varieties of oats because they were bred at a time when a plant had to be more competitive against weeds. I think some of the newer varieties require more herbicides to take the competition out.

"And if all the ducks line up, if the stars align, if you crossed your fingers and toes, then you can double your winter dry matter in those paddocks, which is great. If I've got 1,500kg/ha of dry matter and an oat crop sown into that paddock gives me another 1,500kg/ha, then I double my dry matter levels, which means I can double my stocking rate."

Michael grazes his pastures judiciously and tries to ensure dry matter levels don't drop below 1,500kg/ha. "That means I know I've got 100% ground cover. Once you get below 70% ground cover – so you can see 30% dirt – you start to see an exponential increase in run-off when you get rain. I've seen paddocks, particularly those suffering from livestock compaction, where at least half and sometimes more of the rain runs off."

When necessary he establishes a 'sacrifice paddock' to maintain livestock while reducing grazing pressure on his other pastures so they can regenerate or to allow them to run to head and set seed.

"The temptation is always to get in and graze, to utilise all the feed that's there. Not using what's there is a really hard thing to do, especially when you're tight on feed, but if you can let those pastures run to seed and preserve some sort of productive capacity, then when the rain does come you're very quickly back in a situation to graze," said Michael.

"That's one lesson I've learnt; maintain ground cover, get out of those paddocks and pull the stock back to a sacrifice paddock."

Michael's sacrifice paddocks have good access to water and easy access to and from multiple other paddocks so the stock don't have to walk long distances, which is good for the animals and

WITH GOOD SOIL STRUCTURE THE DISC SEEDER HANDLES HEAVY SURFACE COVER WITHOUT ANY PROBLEMS.

MICHAEL'S 'EXPERIMENTAL' MULTI-SPECIES PASTURE PADDOCK WAS PROVIDING GOOD GRAZING WHEN OTHER FARMERS IN THE DISTRICT WERE HAND FEEDING THEIR STOCK.

minimises compaction, and can be easily run into nearby paddocks to graze for short periods when that is appropriate.

"Being able to graze nearby paddocks for a while is one way to provide a little bit of roughage for the livestock without having to feed hay, which is expensive. Having a cropping paddock next to a sacrifice paddock is great because you can run the sheep in and out of the stubble, which is better than just putting them in and leaving them because they'll eat it out pretty quickly if they're left there full time. They can also go into a nearby pasture paddock that isn't ready for extended grazing just for an hour or two to give them some green feed to add a bit more diversity in their diet."

The Inwoods use electric fencing to quickly and cost-effectively divide larger paddocks into smaller grazing zones. "We haven't done much strip grazing where we move fences but we very easily split some of our bigger paddocks into three or four stock paddocks," said Michael.

They have about 50 grazing paddocks that are grazed rotationally to ensure good pasture recovery, with the sheep moved to fresh pasture every one to three days depending on pasture quantity, quality and growth rate. Grazing pressure, tracked using Dry Sheep Equivalent (DSE) grazing days per hectare, is logged in grazing charts Michael has set up in spreadsheet format.

"The way it works is that if I have 50 paddocks and get a couple of days grazing out of each paddock, then with a half-decent autumn that's 100 days of feed, and that's my winter grazing. That way I know exactly where the stock are going. Generally the paddocks have been grazed in sequence before so they're all at a different stage of recovery, which I also take into account when deciding the grazing sequence and how long to leave the stock on each paddock.

I go for older varieties of oats because they were bred at a time when a plant had to be more competitive.

"The idea is to never take a paddock below a certain level because you impact on the recovery rate. If a paddock isn't ready for grazing I'll know that 30, 40 or even 100 days ahead of time so I know I'm going to need to feed, adjust my numbers or start getting a sacrifice paddock ready with feed on hand."

Michael's experimentation with pasture cropping into multi-species pastures, especially those with species like sun hemp and tillage radish in the mix, has recently included use of a crimp roller.

"I crimp roll to shut the large plants down before the stand becomes too thick and unmanageable, then sow the cereal in with discs, because you'll never get through that sort of residue with tines," he said.

The Inwoods' roller is a self-built trailed unit Michael says requires modification. "It's at the workable prototype stage at the moment. It looks pretty rough, but it's working.

"The aim is to shut down whatever you've grown. In a strict cropping sense, where a cash crop is planned, people will sow a mixed stand simply to stimulate biological activity in the soil to get things really humming and bust out those nutrients that are unavailable to the plants.

"The first thing people say is that you're going to have a nitrogen-deficient paddock, or the biology will compete with your crop while it's trying to break that stuff down.

"The thing is, if you're doing it every year, you're building a composting layer then a residue layer and it's a system. It's like Permaculture; it will keep rolling on and that's what I think I'm starting to get in this one paddock that I'm experimenting with."

Benchmarking groups, for performance and fellowship

SARAH JOHNSON

Being part of a benchmarking group has helped the Tilley family achieve a decade of steady growth by improving their decision-making capabilities, ensuring best practice and, importantly, providing a supportive network of peers they can count on for impartial advice and mentoring.

Benchmarking groups are more than crunching numbers, adopting best practice and improving performance, asserts Kapunda farmer Jarred Tilley, who considers the camaraderie to be the best part of the tight-knit group his family has been part of for the past eight years.

"You can go to companies and get your numbers put together so you can effectively look at your business, but the camaraderie that we've built within our group is worth mentioning," Jarred said.

"Our group has talked about how you see a cycling peloton in the Tour de France and it's this massive wave of cyclists moving flat out down the bitumen and maybe that's a good way of describing farming.

"We're all flying down a road in the same direction, but you don't want to be the one cycling out there on your own because when you've got the wind behind you, you think you're Stuart O'Grady but when you're going into the wind, it feels like someone has let the air out of your tyres."

The Tilley family, who run a 2,850ha mixed enterprise business at Kapunda and Booborowie, helped form the Rural Directions-facilitated benchmarking group they are part of a year after Jarred returned to Kapunda to join his father Robert on the farm, having spent the previous decade in corporate agriculture and as a construction project manager in the UK.

"I probably didn't handle not having a boss in some ways, or not having someone to report to," Jarred said of the family's reason for adopting benchmarking as a business tool.

"Dad and I were talking about how to do things after I came home and there didn't seem to be a good framework for decision-making.

"The way a lot of farmers work is that if the bank manager says you should do it, then you do it, and I didn't handle that approach. I wanted more control over what we did and why we did it."

GROWING THEIR CROPS – LIKE THIS CANOLA, IN THE PROCESS OF BEING WINDROWED FOR HARVEST – IN BLOCKS HAS SIMPLIFIED AND INCREASED THE EFFICIENCY OF THE TILLEYS' CROPPING ENTERPRISE.

The benchmarking group, which is facilitated by Rural Directions agribusiness consultant Simon Vogt, comprises five farming businesses located in the Kapunda and Booborowie areas. Many of the participants are neighbours or friends of the Tilleys.

Each year the group members submit their business figures to Simon, who uses the SnapShot™ benchmarking system to provide an overview of each farm's performance. The group then spends a day reviewing the results, analysing trends and planning for the coming season.

"We all have an open book," said Jarred. "We all look at each other's results and give objective feedback, but more to the point, we're all looking at our own results and trying to improve them year in, year out."

The open-book approach isn't for everyone, as Jarred discovered during the recruitment phase of the group.

"Some of my neighbours said, 'farming isn't like that, it's a competition at every turn'.

"I suppose there's a bit of a mentality within agriculture that it's 'us versus them', but as it's turned out, we're a very close group. It's only been positive.

"Typically, each member follows their own numbers more than anyone else's and it's not competitive amongst us, we're competitive together."

The group has a good mix of farmers across generations, with four out of the five farms involved represented by two generations. This has allowed for an informal system of mentorship, with Robert Tilley, for example, mentoring younger farmers in the group.

"You gain new ideas from one another," said Jarred. "Typically we talk on the phone a lot individually; it's like a network. If there's something you're worried about and you know someone in the group who knows more about that thing you can talk to them. I wouldn't say it's a secret handshake, but you can talk about anything with members of the group and it's confidential.

"Some people didn't want to join our group because they were worried about what happens when there's land for sale, but if anything there is potential to work

JARRED TILLEY SEES MANY BUSINESS AND PERSONAL BENEFITS FROM HIS INVOLVEMENT IN A BENCHMARKING GROUP.

together. Joining this group is one of the best things we've done."

Within the Tilleys' business, which includes Jarred and Alice, Robert and Dianne and older brother Leith and wife Kirsty, benchmarking has ensured that all the partners are aware of the key profit drivers for their enterprises, have access to the same information and are taking the same approach to the farm's operation and future.

"The main thing with benchmarking is that it keeps us all on the same page; my father, my brother and me," said Jarred. "The goal posts are there and we can see what we need to improve. The strengths and weaknesses of the business are more obvious and being able to see these allows us to take on opportunities and minimise threats; that old cliché."

Simon Vogt also helps the group identify key nation-wide agricultural trends.

"There are common trends that the top 20% of growers nail every year," Jarred said. "Simon often talks to us about those things and they're definitely front of mind.

"One of our business's strengths is that our machinery ownership is quite low for our income. We've got our machinery investment down so we are generating $1million in income for every $700,000 worth of machinery assets. Back in the day you'd think you were winning if you owned a new header, but now we're winning if we've got that ratio down low.

"I think that's what has come out of benchmarking for us. You stop worrying about whether you've got the flashiest header. With benchmarking it's like someone is looking over your shoulder and saying what you should be aiming for. It's working out what levels and ratios make it achievable to service your debt.

"At the moment, with our assets in mind, we're focussed on trying to hit a certain amount of income per year. If we weren't benchmarking we wouldn't understand that if we can hit those targets with our current level of assets we'll be retaining so much more profit."

PROFITABLE GRAIN PRODUCTION IS A KEY ELEMENT OF THE TILLEYS' MIXED FARMING BUSINESS, AND AT HARVEST THEY USE ALL THE OPTIONS AVAILABLE TO GET THEIR GRAIN OFF AND SAFELY INTO STORAGE WHILE CONDITIONS ARE RIGHT.

The discipline of benchmarking has also ensured the Tilleys look at the bigger picture, taking into consideration the peaks and troughs over many years.

"Because we've done benchmarking for eight years the trends are quite obvious. The problem with farming is that fluctuation of the seasons makes it hard to gauge a result based on one year," said Jarred. "That's one of the keys for us. Now we're following these indicators we can go to the bank and show that we're on top of it and understand the trends. It might have been a bad year but look at what's happening across the board."

Managing growth

A solid set of business systems and benchmarks has been critical to managing the strong growth of the Tilleys' cropping and livestock operations.

Through leasing and ownership the family has increased their holdings from 970ha a decade ago to today's total of 2,850ha. Over the same period they have almost quadrupled ewe numbers from 800 in 2010 to 3,000 today and their business has increased from one to three families.

"In the past decade or so our area has increased significantly and the cropping and livestock enterprises have also grown significantly, but the main part is that we've gone from one family to three," Jarred said. "It's worth mentioning that was always my father's dream. He always talked about how he had a farm and my uncle had a farm and even though they were in one business, they had their own roles and responsibilities. I thought he was a bit mad. The way farming is it's very hard to expand, but we have and we all have significant roles and responsibilities within the business."

Prior to returning to the family business Jarred and Leith each spent some years working away from the farm in what the family describes as a 'warm-up period'. Encouraging the boys to leave home and work with and for others was a strategic move by Robert and Dianne, who wanted their sons to experience life and develop skills outside of the family farm.

Jarred, after completing a Bachelor of Agriculture, worked in corporate agriculture as an assistant manager on a NSW cropping farm and then as a project manager in London, where he oversaw construction of supermarkets.

Leith gained a Bachelor of Agriculture and Economics and returned to the farm later than Jarred, at age 34, after working for Meat & Livestock Australia and Thomas Foods International in a meat sales role.

"Dad would say, 'don't come home and get all my bad habits. Go out there and have a go'," said Jarred.

The family leased land at Booborowie a year after Jarred's return and in 2014, after Leith joined the business, purchased 'Anama', also at Booborowie, a property they bought whole then sold down.

"I came home in '09 and in 2010 we started leasing," said Jarred. "We tried to lease locally but ended up expanding 100km north. It was 70% growth. I've heard people say that 10% growth per year is sustainable, and that's accurate. I think 70% was too much, but anyway that's what we did.

"I did extensive modelling and I wish everyone did a lot of modelling when they lease farms.

"It wasn't that I wanted to lease land to grow scale, I wanted to lease for profitability. We did a lot of modelling on that. We didn't watch the bumpers; we watched the poor seasons and we watched the average seasons. We played around with it and it was very obvious that the sheep numbers had to follow our growth in area."

Increasing sheep numbers was also about managing frost risk, with benchmarking helping the Tilleys identify losses from frost as something they needed to address.

SHEEP ARE A PROFITABLE PART OF THE TILLEYS' BUSINESS AND HAVE AN IMPORTANT ROLE IN FROST RISK MANAGEMENT.

"Benchmarking showed us quite quickly that our cropping business is not tolerant of frost. It's just devastating to our whole business and the point of the livestock is that it's the best way to manage frost risk," said Jarred. "Where we are in our business cycle we can't tolerate frosts; we need every paddock to make money.

"There are a lot of 100% croppers in the industry and I guess when I came home, that's how I thought our business would evolve, but it hasn't been like that at all. The sheep have become more and more a part of the business and now, the way current markets are, it's a profitable section of the business too, not just a risk management tool."

Most of the sheep are on the family's Booborowie properties, with Leith primarily in charge of the livestock operation.

The Tilleys have divided their Booborowie land into three categories – lower and higher frost-risk areas and non-arable country – as part of their frost management strategy. On the arable areas identified as having lower frost risk they are using a four-year rotation of pasture, canola, wheat and barley. The land more likely to be hit by frost is on a two-year rotation of pasture and hay, with the non-arable land on the tops of hills used only for grazing.

They grow multi-species pastures, generally vetch, barley and clover, with the dual aims of providing nutrient-rich grazing for their livestock and promoting biological activity in their soils.

"Three species probably doesn't count as multi-species compared to what some people grow, but we need to get better at growing pastures for the soil as much as for the livestock. They need to be good for grazing sheep and good for activity underground," said Jarred.

Livestock also have a role in the Tilleys' weed management regime, with the sheep used to graze chaff lines dropped in the paddock during harvest.

The family first used chaff lining – which involves fitting a chute to the header so the chaff and the weed seeds it contains are dropped in concentrated lines across

MACHINERY HAS TO BE RELIABLE, BUT BEYOND THAT, THE CRITICAL BUSINESS ISSUE IS THE RATIO OF RETURN TO INVESTMENT, NOT HOW NICE IT LOOKS.

the paddock – two years ago as a measure to help control brome grass and ryegrass. In that first year they experimented with burning the chaff lines but found that to be time-consuming and laborious and have opted to use the sheep to graze the weed seeds out of the concentrated rows of chaff.

They experienced some blockages in the first year and last year didn't use lining at all due to an increase in their hay-cutting program, but this season plan to chaff line in all their cropping paddocks.

Chaff lining has a lot of potential in a mixed farming operation, said Jarred, who points to the use of sheep to eat seed out of chaff lines as an example of the complementary nature of cropping and livestock, as is their decision to wean lambs on bean stubbles at Kapunda.

"Beans are good feed, so when we grow beans at Kapunda we can wean lambs on the bean stubble and they have good growth rates. It's about trying to find win-win situations where the sheep complement the cropping and vice versa."

At Booborowie the Tilleys use sheep to graze their barley crops, which provides valuable winter feed for the stock and helps spread the risk of frost damaging the barley.

"For our operation we need to sow all of our barley in one hit," said Jarred, "but that means all our crops mature at the same time, so if we have a bad frost at flowering or early grain fill the risk of significant damage across the area of crop is quite high."

Grazing the crops early in the growing season changes the equation, because it shifts flowering and maturity times of the barley enough to spread the risk of serious damage from a single frost.

The methodology they have developed for this maturity management grazing system involves running a large mob of sheep into each paddock in turn for a short time. This means grazing is staggered across the area of crop so each paddock is grazed at a slightly different growth stage, which has the flow-on effect of staggering flowering and grain set across the different paddocks, which increases the chance of at least some areas avoiding damage by frost.

Using a high stocking rate helps ensure even grazing and leaving the sheep in each paddock for only a short time minimises the risk of damage to the crop or soil. Paddocks are grazed only once the barley plants are well-enough established that the sheep can't pull them out while grazing and grazing is often followed up with an application of urea to provide a nutrition boost for the crop.

However, not all cropping paddocks are well suited to growing-season grazing, Jarred cautions. "You have to be careful with dirty paddocks because grazing the barley takes some of its competitive advantage away."

Depending on the season the Tilleys sometimes graze their barley twice, but they are careful to allow time for the crops to recover and set grain.

"Very occasionally we'll get a yield benefit from grazing but sometimes there's a yield penalty and last year was a shocker. We just didn't get the spring moisture we needed and the crops never recovered. But it helped the livestock part of the business in a year when livestock margins were good."

MANAGEMENT INSIGHTS

Block farming

Cropping became a complex operation for the Tilley family after they leased land at Booborowie in 2012,

To simplify their system they adopted 'block farming', which involves sowing crops of the same species in blocks.

This didn't change what they were growing, but having crops of the same species localised improved harvest efficiency.

Their program now includes four blocks; export hay, canola/beans, wheat and barley.

Purchasing Anama

After leasing land in Booborowie the Tilleys decided to buy the 1,740ha property known as Anama in 2014.

"Anama's owner didn't want to carve up the land, so we came up with the idea to buy it whole and sell it down," said Jarred. "And you can't do that unless you can back it up with numbers.

"I've always had the theory that opportunities don't just come your way, you've got to be smart, you've got to create them, and you've got to have the courage to do it.

"Maybe benchmarking gave us just enough courage that year to do that."

Advisory board

Forming an advisory board in 2014 helped the Tilleys prioritise important operational arrangements and strategic decisions for their farm.

"Advisory boards are expensive, but ours was invaluable to us that year," said Jarred. "We achieved a lot. We were buying and selling land, setting up trusts, business policies, roles and responsibilities, health and safety, wills and life insurance. A lot of that was done in the first 18 months.

"But maybe the best part was that it took a lot of weight off my father's shoulders. In some ways he was one of the boys again."

Machinery policy

Each year the Tilleys allocate funds to a machinery budget with the dual goals of ensuring there are funds available to upgrade machinery and preventing overspending.

"With such growth and money spent on land there was a risk that in poor years we wouldn't spend money on machinery," said Jarred. "For me it was about putting a floor in the spending. I didn't want us to not spend money on machinery. It's basically an amount per year and it's the same amount every year. What that allows you to do is start forecasting your machinery purchases and it means we have to justify a machinery purchase within that amount of money per year."

Exploring the pros and cons of farm diversification

GRAEME JENNINGS

Diversification of rural enterprises can pay significant dividends but is not an automatic solution to poor profitability and is not for everyone, according to Rural Directions agribusiness consultant Simon Vogt.

Integrating cropping and livestock enterprises can have management and financial benefits in the right circumstances, Simon told growers at the SANTFA annual conference, but developing and managing a good mixed enterprise business involves considerably more than running a few sheep or cows 'on the side'.

Well-managed diverse businesses can generate better returns than single enterprises but diversification carries a range of risks. These include stress and resource conflict between enterprises that can potentially erode margins in one or more of them, division and dilution of management focus and attention and reduced efficiency due to increased operational complexity.

Diversification can also reduce the benefits of scale within a business by dividing resources including capital between multiple enterprises – expenditure on fences and watering points as well as cropping machinery, for example.

Conversely, adding stock to a cropping enterprise can provide significant benefits in the right circumstances, particularly when livestock gross margins are higher than those achievable from alternative crops and where grazing is the highest value and best use of land such as rangeland, paddocks with low arability and crop production potential and areas impacted by waterlogging, soil sodicity or frost.

Running livestock also opens the way to broaden a cropping sequence to include a pasture phase to help manage herbicide-resistant weed populations and can provide a means of generating a return from cropping by-products such as bean stubbles.

Mixed farming – integration of cropping and livestock – is common in southern Australia and often promoted on the basis that diversification is of itself beneficial, Simon said, but effective integration of cropping and livestock requires a high level of implementation skill and specialist

RURAL DIRECTIONS AGRIBUSINESS CONSULTANT SIMON VOGT SPENDS MORE TIME IN OFFICES AND BOARDROOMS THAN PADDOCKS BUT STILL KNOWS HIS WAY AROUND AROUND A FARM AND HAS INSIGHTS THAT CAN HELP PRODUCERS IMPROVE THEIR MANAGEMENT AND PROFITABILITY.

producers should diversify only if there are good reasons and a solid business case to do so.

"Many highly productive and profitable specialist producers are very good at what they do and should pursue diversification only if there is a sound management or business case to pursue that course."

It is also important to realise that mixed farming offers a better fit in some regions than others, he said, with 75% of the high performing SA businesses in the Mallee and Upper Eyre Peninsula operating combined cropping and livestock enterprises while only 40% of the high performing businesses in the Mid North of SA were mixed farms.

Diversification will provide the greatest benefits when the multiple enterprises are able to be integrated effectively, so a key question for anyone thinking of adding a new enterprise is whether or not they can access the skill sets needed to maximise the performance of their cropping and livestock programs.

Simon was part of a national MLA-funded benchmarking project exploring 'the profitable integration of cropping and livestock' that drew on data from 100 farm businesses across south-eastern Australia over three years, from 2014 to 2016, and on findings from a GRDC study that ran from 2009 to 2013.

The MLA study identified the profit drivers in each agro-ecological zone, examined the impact of integrating cropping and livestock enterprises and ranked the relevant performance of the participating businesses by two criteria, Return on Equity (ROE) and Return on Assets Managed (ROAM).

The project team found that a business is most likely to benefit from diversification when broadening the enterprise base opens the way to win:win opportunities such as a livestock enterprise making it profitable to include a legume or other break crop in a crop rotation, increasing the profitability of a grain legume crop by finishing lambs on the pulse stubble, which also improves returns from the lamb enterprise, or enabling spring lambing where that would otherwise not be possible.

Other potential win:win situations include integration of hay and livestock where frost risk is high, which Simon identified as a good reason to consider adding livestock to a cropping enterprise, integration of lucerne and livestock, use of stock for non-selective grass control in cereal/medic systems, using a pasture phase to improve organic carbon levels and soil health, mice control benefits from running breeding stock on cereal stubble and canopy management benefits from grazing early-sown cereal crops.

Enterprise interactions can also reduce efficiency and profitability if a business is not well managed. For example, allowing volunteer cereals and weeds to establish in cropping paddocks as summer and autumn grazing for livestock disadvantages the cropping program through use of moisture and nutrients by the weeds and increasing the risk of disease and Russian wheat aphid incursions, he said.

There can also be a temptation to accept grasses in legume pastures and delay removing them because of their grazing value or run stock into stubble paddocks set up for windrow burning; both of which carry the risk of negative impacts on crop productivity from increased weed populations.

Similarly, sowing feed or fodder in late April, May or June when seeding crops needs to have priority can result in loss of productivity in one or both enterprises. From a pasture perspective, sowing feed or fodder in May or June compromises the ability of these stands to accumulate adequate dry matter before winter sets in and growth rates are reduced by fewer daylight hours, lower temperatures and frost that slow leaf emergence and reduce dry matter production.

With sheep and cropping it is also important to time shearing and lambing so these stock-related activities do not impact on seeding timeliness because being late with even 10% of the seeding program can reduce total farm profit by 20%.

Paddock size is another less obvious but still significant area of potential conflict between cropping and stock, with large paddocks good for cropping but smaller better for livestock and pasture management.

The project team found that the top 20% of businesses in the study generated 8% return on equity, compared with the group average of 3%. This level of performance made those top-performing businesses considerably more resilient and able to withstand seasonal and other setbacks than the other participants in the study.

According to data from the MLA 'profitable integration of cropping and livestock' project, the top 20% of mixed crop-stock enterprises are low risk, high margin businesses, retaining 30% of turnover as net profit – $300,000 in net profit before tax for every $1 million in turnover, Simon said.

Achieving this required 'best practice' management integration characterised by, in a sheep-cereal system:

- Ideally having all fodder crops sown by the end of March.
- Having seeding completed by mid May.
- Including a legume-based pasture phase in the cropping program.
- Achieving an adult fleece value of more than $60 and an average sheep turn-off live weight of more 52kg.
- Keeping variable costs to less than 40% of turnover.
- Aiming to keep Total Plant Machinery and Labour (TPML) costs at 25% of turnover.
- A lambing percentage of near 120%

The study showed that the gap between the best performers and the rest was due more to management and business acumen than any difference in resources, location or enterprise type, Simon said.

"They have essentially the same resources but achieve different outcomes. It's the jockey not the horse that makes the difference."

The project team identified interaction between four key profit drivers – gross margin, business costs, people management and risk management – as the key to the different profit outcomes achieved by the 100 participant businesses. "If any one of these four drivers is overlooked it will compromise profit potential and long term financial performance."

It's the jockey not the horse that makes the difference.

Based on the findings from the benchmarking study and previous similar exercises, managers looking to improve the profitability of mixed-enterprise businesses need to aim for superior gross margin performance in their cropping and livestock enterprises simultaneously by working to optimise crop yield and livestock income in a cost effective manner, Simon said.

The achievements of the top 20% of businesses in the study suggest that, for the cropping side of a mixed farming business, that means working towards a low-cost production model generating more than $600,000 turnover per labour unit with a machinery investment to income ratio of 0.8 : 1 and just 25% of turnover spent on plant, machinery and labour.

In livestock enterprises profitability is directly influenced by factors including turn-off weight, reproduction rate, fleece value, stocking rate, grazing management and feed costs and the price received for the end product.

Achieving a high level of productivity requires simple, scalable systems and efficient work patterns that minimise duplication, with labour efficiency enhanced by good handling systems and quality infrastructure including fencing, water infrastructure, laneways and yards, Simon said. Replacing labour with technology can also improve operating efficiency and profitability provided the economics (cost:benefit) are right.

LESS CAN BE MORE

Simplifying farming enterprises can lead to significant financial and personal benefits, according to Rural Directions agribusiness consultant Simon Vogt.

These benefits include greater focus and optimal timing of key activities such as seeding and lambing, improved labour productivity, enhanced mind set and wellbeing and less enterprise conflict.

We may need to integrate livestock and cropping enterprises, Simon said, but do we need four different wheat varieties, three different grain legume crop types, four different livestock enterprises each with different calving and lambing times and multiple shearing times each year?

Mental health, make it a household name

SARAH JOHNSON

SA farmer and counsellor Micheal Hancock is passionate about equipping rural people with the tools to revive relationships, build strong businesses and save lives.

Micheal Hancock is in a unique position to shine a light on rural mental health issues.

A West Coast farmer for the past 20 years, he has an advanced diploma in family therapy and has worked at the mental health 'coalface' as a counsellor.

Micheal, who wants to make mental health a 'household name' in rural communities and a priority for governments, believes relationships underpin the viability of farms and are the main source of mental health-related issues including stress, depression and suicide.

"The relationships within a farm are a lot stronger than a farmer's relationship to his farm," said Micheal, who runs a mixed enterprise farm at Lock with his wife Mardi and two school-aged sons. "They say blokes are married to the land but it's their partners they are married to.

"The major triggers for mental health problems that I've found are relationship issues between father and son and husband and wife. They can really tip blokes over the edge."

In a traditional farm structure, where the son succeeds his father in running a family-operated farm, the combination of family and business adds a layer of complexity to these relationships that can be further complicated by succession issues, he said.

"The guy on the farm is often acting as the son as well as the husband, so there's a three-way relationship going on and that's challenging.

"Sometimes that involves the father making demands of the son, leaving the son to feel that he needs to prioritise the father, which can make the son's wife feel secondary in the relationship because her husband hasn't stopped being a son.

"It's often a subconscious thing. In many instances a son who has issues trying to prove himself to his father can base his whole farming career on trying to gain his father's approval. It means many people farm out of expectation or because they have something to prove.

THIS IMAGE OF A CROP ON MICHEAL HANCOCK'S EP PROPERTY MAY BE IDYLLIC BUT THE CROPS, AND THE YEARS, ARE NOT ALWAYS GOOD AND THERE ARE MANY STRESSORS FOR FARMERS AND THEIR FAMILIES.

"There's a time in a farmer's life when he needs to stand up and choose his own path. He needs to get his father's blessing and from that point forget what his father says and show everybody he can do it."

Micheal came to this point with his own father when ongoing conflict forced him to confront the issue.

> **Every generation's situation is unique and it's important to try to see things from the other generation's perspective.**

"I had the same scenario where I was getting so much criticism and so much expectation from my father and I basically said over the bonnet of the ute, as you do, that I can go and make a life wherever, but if I'm going to make a life here it's going to be one that I control. You're not going to be able to control me for the rest of my life, so we've got to make this change now.'

"At the time I had another job I could go to so I could say, 'if you want me to run the farm, I'll run the farm, but if not, I'm going.'

"That didn't stop my father being a father and wanting to force his opinions, but it gave me a point of reference to go back to every time it happened. I'd say 'you wanted me to stay here, so here I am and I'm running the show'."

From 2004, Micheal spent three years working as a counsellor across Eyre Peninsula, providing one-on-one counselling and running community programs as an employee of Country Health SA. At that time he was one of eight counsellors across SA employed to help rural communities cope with drought. He also facilitated a program initiated by Dr John Ashfield, an author, educator and psychotherapist with extensive experience in the prevention of mental health issues, that included discussion groups on the stresses affecting men in rural areas.

One of Micheal's objectives in these sessions was to help participants figuratively walk in another person's shoes.

FARMER COUNSELLOR MICHEAL HANCOCK.

"I really encourage people to see a conflict situation from the other person's perspective," he said.

He has found this to be crucial during negotiations around succession, a process notorious for causing conflict in rural families. "In one sense succession is about handing the farm over to the son so he can hand it on to the next generation, but if you look at it from the father's perspective, he has worked all his life to build something up and it's not an easy thing to handball your life's work on to the next person. It's important to not underestimate the sacrifice.

"Plus, we're not many generations away from the people who walked into dense scrub and tried to go farming and the generations who followed those pioneers and had to do a lot with nothing during the war and Depression. Every generation's situation is unique and it's important to try to see things from the other generation's perspective."

It is also important that all siblings involved in a succession plan be considered and treated equally, he said. "The thing that determines whether a succession will be good or bad is whether or not anyone feels undervalued. Often, siblings who are no longer part of the farm feel like they don't count because it seems to be all about the sibling who is taking over management. Or if there are two or more siblings involved in the farm, issues can arise around who gets the home place.

"Once again, it's crucial to work out everybody's perspective and treat everyone as an equal. I've found that it's important to establish a common goal as a first step before you start working out how many sheep a farmer gets or who lives in which house."

Impact

Micheal has seen first-hand the impact mental health has on farming businesses and is passionate about making the issue a priority in communities and for government leaders.

"Mental health needs to be a household name because everything we do, every decision we make is affected by a person's mental health," he said. "When a farmer is mentally healthy they're in a good position to expand their business, follow their dreams and passions, improve their relationship with their spouse and appreciate things in their life.

List-writing is an effective way to break the negative cycle – whenever you're stressed, write stuff down.

"But poor mental health restricts us more than we recognise. I like to describe it as a photocopier or a printer. Have you ever pressed print and it doesn't work? You go to the printer and lift the lid and there are five pages jammed. That's what decision making looks like if you don't have good mental health. You try and jam all these decisions in at once.

"You get stuck in your own mind and negative thoughts can spiral until you get worse and worse. 'I've got no money, it's a drought, the crops aren't growing, what's going to happen next year? It's not going to rain next year.' And it goes on and on."

Micheal recommends list-writing as an effective way to break the negative cycle.

"I love lists. With just about every client I counselled, I got them to tell me all their problems and I would list them down, one after the other and then I'd help break them down," he said.

"We went through things one by one and once we got half way through the other three pages of problems just went away, because once you solve one thing, often much of the rest falls away. So that's a brilliant tool to take home. Whenever you're stressed, write stuff down. Whenever you've got relationship issues, write it down."

Tough questions

Micheal has encountered many farmers considering taking their own lives.

"I have had a lot of people come up to me after they planned their suicide but couldn't carry it out," he said. "They were able to reflect on what they went through, convey why they were doing it and what led up to it.

"The best advice I can give people who have a friend struggling mentally is to listen and be a friend. When blokes talk, a lot of the time it's not about solving their problems because often they don't even hear what you're saying, but by listening you give them an opportunity to

MICHEAL HAS BEEN TRUCKING HAY INTERSTATE AS PART OF THE BUY A BALE INITIATIVE FOR DROUGHT-HIT FARMERS.

unpack their own brain. Just listening saves more suicides than you'd realise.

"If I said to a farmer, 'you really need to listen to your friend', they'd think, 'I've got to turn into a counsellor and I'm not really much of a counsellor, so I don't know what to do. I don't know how to face this and I really need the right person there.'

"But listening is nothing more than being able to spend time with a person and allowing them to talk. People call me up and tell me their friend is struggling and they don't know what to do and I just say, 'talk to them like you normally do'. And if you want to raise a subject you think they might not want to talk about, just tell them, 'you look crap, what's going on?'."

Just listening saves more suicides than you'd realise.

Micheal recommends that anyone worried that a friend might be contemplating suicide take a direct approach, even though it might seem abrupt. "What we recommend is that people approach their friend and say, 'you don't look very good, what's going on?' then follow it with, 'I hope you're not planning on killing yourself.'

MENTAL HEALTH SUPPORT SERVICES

The following is a list of support organisations and people and the services they offer.

- Life Line, 131 114 – Crisis support, suicide prevention
- Mental Health Services, 131 465 – Comprehensive range of mental health services
- Regional Access, 1300 032 186 – Online and phone counselling service
- Beyond Blue, 1300 224 636 – Mental health information and support
- Suicide Callback Service, 1300 659 467 – Free professional counselling
- Mensline Australia, 1300 789 978 – Online and phone counselling service for men with family and relationship concerns
- Rural Business Support, 1800 836 211 – Farmers' financial counselling
- Centrelink Farmers' Line, 132 316 – Farmers' financial counselling
- Rural Aid – Buy a Bale, 1300 327 624 – Request or donate fodder
- Micheal Hancock, 0427 891 030 – Call for a chat

"It seems very forward, but someone who is considering suicide might say 'well, yes' and someone who isn't will say, 'of course not'. Some people will get offended, but asking the question is a whole lot better than not doing anything.

"If your friend says they have been considering suicide, the next question to ask is, 'well, how were you going to do it?'.

RELATIONSHIPS ARE IMPORTANT. MICHEAL AND MARDI HANCOCK AND THEIR SONS JONATHAN AND CALEB [RIGHT].

Again, it seems very forward, but a person who has said yes to suicide and has a plan is moving towards acting on the idea.

"Suicide contemplation is quite a normal thing, but actually planning it out is getting to the final stages and that's when you need to get some help. You need to make sure they have someone with them until you can get help or take them to help.

"This approach might seem shocking, but it saves lives."

He advises that it's particularly important to look out for each other in the aftermath of a tragedy or natural disaster. It is human nature to deal with the immediate problem, but mental health issues can arise later.

Micheal has been involved in Rural Aid's Buy a Bale initiative, transporting hay bales interstate. "I see so many resilient people battling. Those people up in Queensland, they were in crisis mode and they were working hard. It was inspirational to see, but once it's all over it's going to get very hard for them.

"The Pinery fire would have been the same; just get it all fixed. After that is when the counselling is needed."

Although no longer working officially as a counsellor, Micheal is available to talk by telephone to rural people who need help. "I'm more than happy to take phone calls to help people on their way to finding help or to help them unjam their photocopier."

More ground cover equals more moisture

SARAH JOHNSON

Moisture retention has become an even higher priority for NSW continuous croppers David and Peter Ricardo since they added dryland cotton, a summer crop, to their cropping program.

Conserving soil moisture is always front of mind for northern NSW growers David and Peter Ricardo.

The brothers run a 9,000ha continuous cropping enterprise between Walgett and Collarenebri, where low growing-season rainfall and the full gamut of extreme weather conditions make moisture efficiency a game changer.

"Between November and February we get most of our rainfall from summer storm events. This is when we fill up the soil profile and take advantage of the tremendous water-holding capacity of our black soil," said David Ricardo.

The lowest period of rainfall on the Ricardos' farm is in August and September. While conditions in these two months are crucial for grain fill in winter crops, the property receives only about 12% of the 475mm annual rainfall in that period, which means maturing winter crops rely on soil moisture stored from previous seasons or years, said David.

While the brothers are currently experiencing a run of very dry conditions, when the region does get good rain their floodplain country is inundated, which fills the soil profile with moisture. "Every hectare goes under water. It's not very good if you've got a crop to harvest, but if it's during summer it's fantastic. The main thing is that it dries out just enough to get a crop sown," said David.

DAVID RICARDO RUNS RICARDO FARMS WITH HIS BROTHER PETER.

USING A STRIPPER FRONT TO HARVEST CEREALS HAS INCREASED THE AMOUNT OF STUBBLE LEFT STANDING IN THE PADDOCKS TO PROTECT THE SOIL BETWEEN CROPS AND IMPROVED RICARDO FARMS' HARVEST EFFICIENCY.

"The big thing of course is that it fills the profile. With a full profile we've got 250mm of soil moisture to use for the next crop, and with good management, and depending on the timing, we can sometimes get almost two years' moisture from a flood."

Zero-till croppers for the past 30 years, the Ricardos' two key strategies for moisture retention are crop rotation and ground cover preservation. In a program that includes wheat, barley, chickpeas, faba beans, some canola and more recently cotton, strategically-planned winter cereals provide protective stubble loads that have become even more important since they began experimenting with dryland cotton, which is a summer crop. These early efforts have been quite successful and cotton is now part of their plans going forward, although its future in their program depends on their ability to retain enough soil moisture.

"We like our cotton so we've got to get better at conserving moisture and we believe the best way to do that is to plan ahead and look closely at our crop rotations," David said. "We'd like to grow cotton on up to 30% of our country every year. To do that we need to set up the paddocks where we want to plant cotton by growing cereal crops generating plenty of stubble in the year before the cotton and keeping that coverage on the soil for a long fallow period ahead of planting the cotton," said David.

With this in mind they have begun using a Shelbourne stripper front to harvest their cereals because it leaves tall standing stubble. "The stripper front is just so much better at keeping stubble taller and leaving more cover for longer, which is the only way we can lift our moisture efficiency from around 25%, which is the average for no-till crop around Walgett, to around 30%, which is what we are aiming to achieve."

The stripper front has also improved their harvest efficiency. "Pushing the harvest efficiency of our header was something we

were quite unprepared for," said David. "When everyone using draper fronts has to knock off at midnight because of tough straw we just keep going. The bottleneck is the cleaning capacity of the header and leaving the straw in the paddock instead of cutting it and putting it through the header means the machine can continue handling the grain. It has also improved our fuel efficiency by 30%."

Ground cover is also the Ricardos' main line of defence against extreme weather conditions. "Ground cover is ultra-important because our greatest asset is our soil."

Drought, heat, frost and sandblasting wind are all part of the farming experience on the north western plains of NSW, which are currently experiencing drought conditions, with rainfall at an all-time low according to records dating back to 1900. "It's very dry at the moment," said David. "We've had a series of drought years and most guys in the Walgett district would have lost five out of the past six or seven seasons. A lot of country is blowing away,"

The Ricardos are early adopters who were also among the earliest in the Walgett district to grow chickpeas, which they planted for the first time in 1990.

Our key strategies for moisture retention are crop rotation and ground cover preservation.

Introducing chickpeas was part of an initiative to broaden their crop rotation and reduce their reliance on wheat and they now haven't planted wheat on wheat for 30 years, said David. "I think we've been lucky. As young blokes my brother and I were open to all sorts of suggestions and we had an agronomist who said, 'you can't grow wheat on wheat because of disease and crown rot and all these different issues', so I think we picked up on that early.

"Initially we didn't know how to handle chickpeas, it was a hands-on learning experience as we went. It was difficult for a few years but we've really fine-tuned our chickpea management now."

However, there are always hits and misses, with their experiences in 2015 and 2016 providing a ready example of the highs and lows experienced with the crop.

"Our chickpeas in 2015 averaged 1.5t/ha or a bit less. It was a tough year and we had to literally shave the ground with a flex front to get the crop off.

Most guys in the Walgett district would have lost five out of the past six or seven seasons.

"In contrast, 2016 was about as good as it gets for us. We harvested about 3t/ha that brought about $800 a tonne. It doesn't get any better than that.

"The interesting thing about that crop was that it didn't flower until later. It was the end of August and the crop was about knee-high before we even saw a flower. It was just doing it so easily with the conditions and the moisture in the system."

The 2016 chickpea crop was also instrumental in enabling the brothers to produce a bumper wheat yield in conditions in which the rest of the district failed to produce a crop. "The chickpeas didn't use all the moisture and we had a little bit of a storm during summer so we were able to deep sow our wheat and get it established when nobody else was able to."

As was the case with chickpeas, growing cotton has been a 'learn-on-the-job' experience for David and Peter, who in

ADDING DRYLAND COTTON [ABOVE AND BELOW] HAS TURNED RICARDO FARMS' CROPPING SYSTEM 'ON ITS HEAD' AND MADE RETENTION OF CEREAL STUBBLES TO PROTECT THE SOIL AND PRESERVE MOISTURE EVEN MORE IMPORTANT THAN IT WAS BEFORE THE SUMMER CROP WAS ADDED TO THE PROGRAM. COTTON WILL GROW WELL ON THE RICARDOS' FLOODPLAIN COUNTRY WHEN THERE IS SUFFICIENT SOIL MOISTURE, BUT WITH NO IRRIGATION AVAILABLE TO HELP REDUCE TEMPERATURES, EXCESS HEAT AT FLOWERING CAN REDUCE YIELDS.

late October 2016 decided to plant 3,000ha of dryland cotton when they received 100mm of rain after three successive years of drought.

"It was an exciting time because we'd never grown cotton before. We'd seen it on our doorstep on a couple of neighbours' irrigation places but it was one of those things where we hit the ground running, just learning as we went," said David.

"We had the agronomist out every week looking at problems, looking at bugs. We lost some of it to sandblasting, some of it to chemical damage. It was a real learning experience but overall it was a successful crop."

In 2017, after good falls of rain late in 2016 that refilled the soil profile they followed the cotton with a chickpea crop that yielded 2.5t/ha.

"In 2017 we had the only wheat crop in the district and the chickpeas did two and a half tonnes a hectare. I attribute that to cotton having changed our management strategy. Having a summer crop in the system has turned our system on its head, in a good way. We want to get to the point where we're growing cotton every year. That's the goal."

However, the brothers still have plenty to learn about growing the crop.

Despite having plenty of soil moisture at planting their 2017 cotton crop suffered due to the heat, providing another learning experience.

"Ultimately the 2017 cotton crop had a number of problems but the biggest issue was the summer heat," said David. "The crop was never able to cool down because temperatures at night during February were mostly warmer than 35°C, so flowers on top of the canopy suffered."

SEEDING TIME ON RICARDO FARMS IN 2015 AFTER TWO YEARS OF DROUGHT WHICH SAW THE FLOODPLAIN SOIL LEFT WITHOUT ANY RESIDUE TO PROTECT THE SOIL.

Not one to sit idle, during recent drought periods when there has not been enough moisture to grow chickpeas or cotton, David has used his 'spare' time to develop an app – Farm Service Manager – to manage the brothers' machinery maintenance program.

Farm Service Manager, which is now available commercially, enables growers to maintain comprehensive service records on all agricultural machinery and can be used for service scheduling. More information is available at www.farmservicemanager.com and a free demo version is available through Google Play or the Apple App Store.

David is offering SANTFA members a 20% discount!

Grain versus hay: assessing the issues

KATHERINE MAITLAND

Driven by frost, low rainfall and strong market demand for hay, many farmers made the decision last season to cut cereal crops for hay. They are now being urged to be mindful of soil nutrient levels ahead of seeding in the paddocks that were cut for hay.

Faced with one of the driest January to August periods since 1965 and extensive frost damage, many SA growers had to decide whether to leave struggling 2018 crops for grain production, graze them or turn them into hay.

With the demand for hay, and the prices on offer, many of them chose the hay option.

According to Chris Davey, Agriservices Agronomist for YP AG, who describes hay as a 'handy commodity', the decision to divert 2018 crops planted for grain to hay or silage may have nutrition implications for this year's crops, with hay typically removing significantly more nitrogen, potassium and sulphur from a paddock than a grain crop does.

The grain versus hay decision is usually faced only in drier years, when grain and hay prices, predominantly driven by the domestic consumption in the eastern states, tend to be higher because of the seasonal conditions, Chris said.

"The decision to cut a grain crop for hay is never an easy one and is generally driven by market and environmental factors of the current year rather than agronomic reasons.

"It involves thinking through whether the grain yield would make more money for the grower than hay and consideration of things like crop stage and growth, when the frost struck, if frost is the issue, subsoil moisture and the likelihood of the crop recovering and, obviously, what the current market price is for hay.

"Estimating dry matter production and hay yield can be difficult because there are so many variables and some growers may not have the biomass needed to make hay."

In 2018, 40% of Chris's farming clients cut at least some crop for hay due to frost damage. One cut a grain paddock for hay because of the amount of ryegrass in the crop.

"Most of the crops cut in my area were wheat, but further down the Peninsula there were barley and canola crops cut, and even cases of lentils being baled for hay on the Adelaide Plains."

JOB DONE, OR IS IT? HAY NEEDS TO MEET DETAILED QUALITY AND NUTRITIONAL STANDARDS THAT, PARTICULARLY IN EXPORT MARKETS, INCLUDE STRICT MINIMUM RESIDUE LIMITS FOR CHEMICALS.

Many YP growers cut crops for hay after a multitude of frosts between August 20 and September 29, Chris said, with the decision whether or not to cut a crop down made on the basis of the severity of the frost and how likely the crop was to fill grain in light of the growth stage when it was hit.

"In many other districts across the State, growers decided to cut crops for hay because the dry conditions meant it was unlikely their crops would make it through to harvest due to moisture stress."

Cutting hay can reduce levels of nitrogen, potassium, and sulphur in the paddock but nutrient loss can be addressed, Chris said.

"Once the hay has been processed thought needs to go into replacing nutrients for the following year, controlling re-growth and any weeds, and maintaining ground cover throughout summer to prevent erosion.

"Removing hay from a paddock exports all above-ground nutrients from that particular paddock. Potassium is the main one farmers are aware of, because there is more of it in the stem and leaves of a cereal plant than in the grain, but other nutrients like nitrogen, phosphorus and sulphur are also removed, so there needs to be a plan to replace them in coming years.

"Cutting frosted crops for hay can influence the rotation in the paddock and the planned nutrient program for the following year so it is important to know what nutrients are available, and in what quantity, for the following crop.

"Where grain crops were cut for hay last year it will be important to address the nutrient removal, which is an active decision to remove nutrients from a

AGRONOMIST CHRIS DAVEY, PICTURED HERE IN A LENTIL CROP ALMOST READY FOR HARVEST, CAUTIONS THAT GROWERS WHO MADE HAY FROM 2018 CROPS PLANTED FOR GRAIN NEED TO PAY CLOSE ATTENTION TO PRE-SEEDING NUTRIENT LEVELS IN THOSE PADDOCKS THIS SEASON.

paddock, as opposed to nutrient loss, which in my opinion is mostly out of our control."

However, replacing nutrients removed from the soil by hay doesn't have to be all done in the year following hay, he said.

"My initial recommendation would be to ground truth (soil test) the paddock and establish the nutritional status and soil constraints."

Replacement of nutrients found to be marginal or deficient can be targeted through application of chicken litter or similar, use of soil ameliorants such as gypsum, or application of granular fertilizer, he suggests. This is particularly important for nutrients like the trace elements and phosphorus that are relatively immobile in the soil.

Nitrogen, sulphur and to a lesser extent potassium are relatively mobile in the soil and need to be applied annually at rates based on soil moisture and the yield potential of the crop.

He considers tissue testing in crop to be the most reliable way of identifying trace element deficiencies in growing crops.

Chris and his team conduct a soil testing program each year and hay paddocks are always tested for nutrients. The results of these tests suggest that nutrient removal and the amount of moisture remaining in the soil after hay has been cut will be slightly different in a paddock sown for hay – oaten hay is the main hay grown on YP – and one sown for grain but subsequently cut for hay.

He sees replacing the organic carbon component of hay as the hardest thing for growers to address.

"Removing so much biomass, stubble and carbon from a paddock can increase erosion risk and soil moisture loss because there is little left to protect the soil surface.

"Exporting the carbon instead of leaving it in the paddock to return to the soil, and higher soil temperatures due to not having stubble mulch on the soil surface, can also adversely impact the soil biology and microbial activity.

"Growers are aware of the flow-on effect of a hay crop but that generally doesn't influence the decision whether or not to cut for hay. The main agronomy factors come into play after the hay is cut."

Chris is hoping for a better season in 2019, with less crops needing to be cut for hay at the last minute.

"I hope that in 2019 the weather will be more favourable for all farmers, with more growing season rain and less frosts, so we don't need to make those decisions again. However, if the environmental circumstances in 2019 are similar to those of last year I would encourage farmers to be aware of when frosts occur, assess their crops 7-10 days after any significant frost, do dry matter measurements when needed and weigh up the financial and agronomic factors of grain versus hay.

"In terms of moisture-stressed crops, using soil moisture probes to measure subsoil moisture availability, coupled with seasonal weather forecasts, should provide an accurate indication of whether or not a crop will make it to maturity," he said.

Grower perspective

After assessing likely grain yield and quality, available markets and the human resources available, the Jaeschke family, who farm in the Hill River district near Clare, made a considered decision to cut many of their 2018 grain crops for hay.

Craig Jaeschke, owner and operator of Hill River Hay, said the process involved estimating grain and hay yields and establishing potential prices to calculate possible returns and gross margins for grain and hay.

"With a dry spring, we felt the hay had more upside than a reducing grain crop," Craig said. "And the chances of getting rain-damaged hay in a drought is fairly low.

"The bottom line is that we had large areas of frost-affected crop with low grain yield potential but with a reasonable amount of biomass to produce hay in a year when hay stocks were very low and there were drought conditions throughout Australia.

"We also locked up some lucerne paddocks for a second cut of hay instead of a seed crop because the demand for hay was and still is strong.

"The potential grain crops cut for hay in 2018 were canola and wheat. We established there were markets for this hay and that we had the human resources and machinery to handle the extra work load, with contractors available if it became too much for us."

The opportunities cutting hay in 2018 would open up in this year's cropping program were also a consideration.

"The decision to cut extra hay last year has given us more flexibility coming into 2019 cropping season to swing certain paddocks into different crops depending on seasonal conditions.

HAY BUYER ROB DIEKMAN SAYS WELL-MADE CANOLA HAY CAN BE A VALUABLE OPTION WHEN A CROP IS SERIOUSLY AFFECTED BY LACK OF RAIN OR FROST.

"We intend to plant about the same area of oaten hay as we grew last year and to sow frost-prone paddocks to crops that can be cut for hay if needed.

"It was never the intention to cut the area we did last year, but when planning we always factor in a level of grain crop to be cut mainly due to the risk of frost."

Craig says the question of whether to cut crops for hay or leave them for grain was at the back of his mind throughout the

HAY MAKING REQUIRES SPECIALIST MACHINERY AND A LEVEL OF EXPERTISE, SO ONE OF THE ISSUES FOR GROWERS CONSIDERING WHETHER OR NOT TO CUT GRAIN CROPS FOR HAY IS WHETHER THEY CAN GET A CONTRACTOR OR A NEIGHBOUR SET UP FOR HAY MAKING TO PROCESS THEIR CROP WHEN IT IS READY.

QUALITY KEY FOR CANOLA HAY

Canola growers who decided to cut their 2018 crops for hay are now reaping the benefits of that controversial decision.

Feed tests show that canola hay is a good source of fibre, especially for cattle, has high energy levels and can contain up to 16% protein.

Some farmers have been warned against feeding canola hay due to fears of toxin problems and that it could contain sharp stalks able to pierce animal intestines, but provided the stiff stalks are cut properly and the hay has been cured, canola hay can provide a palatable source of feed for livestock.

Rob Diekman, National Purchasing Manager for JT Johnson and Sons, said making hay can be a valuable alternative when a canola crop is seriously affected by lack of rain or is frosted, provided the grower knows how to make good-quality canola hay and has a market for it.

"The key is to cut it at the right time, when there is around six to eight centimetres of flower and still plenty of leaf matter.

"There was more canola and lentil hay cut and baled in 2018 than in previous years, due to frost damage, and Johnsons is still buying these hays as a protein source for our stock feed pellets," he said.

2018 season but he felt the decision did not need to be made until just prior to the crops reaching the optimum growth stage for hay.

"The ground work needed to be done a little earlier in terms of markets, but we have the machinery, storage and labour units so we can be quite flexible, which made the decision to cut easier."

He committed a small percentage of the extra hay to markets at the time of baling to cover price risk.

The quality of the hay made from frosted grain crops last season was very good, especially canola hay, which had surprisingly good feed value, Craig said. He was also surprised by how well stock adapted to consuming canola hay.

Buyer perspective

According to Rob Diekman, National Purchasing Manager for Kapunda-based stock feed company JT Johnson and Sons, hay will continue to be a valuable commodity in 2019 and future years.

"Domestic prices for hay were very high in 2018 and weather conditions meant that many farmers were not going to be able to sell their crops for grain, so cutting for hay was a good decision," he said.

"There were a lot of paddocks cut for hay, but due to the drought and yields being lower there were no additional tonnages in the market.

"The hay in 2018 had more brown leaf than usual, which lessens the visual appeal. It was also typically shorter, with thinner stem, but had good feed analysis, which is often the case in drought years."

Export hay in particular has specific requirements, including strict chemical residue standards in some markets, Rob said.

"Certain importing countries have MRLs for chemicals and last season some growers who made hay from crops they had sprayed with Lontrel herbicide before they decided to cut them found their hay was not suitable for the export market."

This highlights the importance of growers discussing export requirements with their exporter and providing their chemical spray records to ensure they don't eliminate marketing opportunities for their crops, he said.

Moisture content is also important. The export market requires no more than 14% moisture but the domestic market can accept higher moisture levels. Hay also needs to pass a ryegrass toxicity test and some countries, including China, have a zero tolerance of any weeds or weed seeds.

"Farmers need to discuss things like growing hay and crop rotation with their agronomists and weigh up gross margins and future yield."

"They also need to decide as early as possible in a season whether or not to cut hay.

"Unless the grower is set up for hay they will require a contractor or another farmer with the necessary equipment to assist, and contractor availability can be an issue if the decision is made late.

"Another factor sometimes overlooked is the need for storage. Hay needs to be stacked in sheds rather than outside. Johnsons can assist our growers by providing a number of storage options across the State.

"There is a shortage of hay suitable for export at present so we will be encouraging farmers to consider increasing their hay production this year and can support farmers wanting to grow hay and sell to Johnsons with information on quality requirements."

N use efficiency boost from in-crop banding

GRAEME JENNINGS

Banding fertiliser nitrogen (N) into soil between cereal rows during the growing season appears to offer efficiency benefits but does not guarantee increased yield or protein.

In a three-year trial in the Wimmera and Mallee over 2016, '17 and '18, Agriculture Victoria Regional Research Agronomist Ashley Wallace found that wheat took up significantly more N from fertiliser mid-row banded below the soil surface than it did from surface-applied fertiliser.

Mid-row banding in-crop consistently produced the best N-use efficiency of the treatments included in the three-year trial, he said, which suggests potential for growers to reduce the amount of in-season N they need to apply to achieve their yield and protein targets or, in good years with high soil moisture, to achieve better yield results from the amounts of N fertiliser they are currently applying.

Mid-row banding involves placing or injecting fertiliser into the soil in every second inter-row space in a paddock – a 'skip row' configuration. This technique reduces the risk of N being lost through volatilisation, which is an issue with urea broadcast onto the soil surface, particularly when the application is not followed by enough rain to wash the fertiliser into the soil.

Ashley's findings on N fertiliser efficiency are in line with those from other research showing that less than half the fertiliser N applied to broadacre crops in Australia is taken up by the crop in the year of application, with much of the balance left behind in the soil or lost to the environment.

Previous studies have shown that applying N fertiliser in concentrated bands below the soil surface can reduce the risk of losing N to ammonia volatilisation and slow the conversion of N to nitrate, potentially reducing N loss through other mechanisms such as leaching.

In the Victorian trials the N efficiency gain from mid-row banding was often significant but the effects on grain yield and protein were variable, with results showing that application of N during the growing season can improve yield or grain protein and sometimes both, but that responses vary with fertiliser rate, season and paddock conditions plus timing and method of application.

ASHLEY WALLACE WITH SOME OF THE EQUIPMENT USED IN THE MID-ROW BANDING TRIAL THAT HAS SHOWN POTENTIAL FOR SUB-SURFACE PLACEMENT OF NITROGEN FERTILISER TO REDUCE NUTRIENT LOSS AND IMPROVE N USE EFFICIENCY IN CEREALS.

The level of variability raises questions about the cost:benefit of changing to mid-row banding for N fertiliser application, Ashley cautions, with growers considering a change to this method of application needing to be aware of the costs involved in shifting from broadcasting or banding below the seed at sowing to mid-row banding in crop.

Mid-row banding involves placing or injecting fertiliser into the soil in every second inter-row space in a paddock.

Practical considerations around mid-row banding include a need for reasonably accurate auto-steer systems, since the fertiliser is banded between rows of growing crop, and other practicalities including labour and machinery costs, with banding an inherently slower process than broadcasting or streaming fertiliser.

Changing to mid-row banding at seeding may be less expensive than switching to mid-row banding in crop, he suggests, and where high rates of N are required at sowing, mid-row banding will improve separation between seed and fertiliser, opening the way for use of higher rates without the risk of yield loss due to fertiliser toxicity.

In the first two years of Ashley's trials the average uptake of N from mid-row banded fertiliser was 60%, compared with 41-42% for surface applications. This is in line with data from previous studies showing that, on average, just 44% of the N fertiliser applied to Australian grain crops is taken up by the crop in the year of application.

In 2016, a season with high growing-season rainfall and high yield potential, Ashley measured significant yield responses to applied N in all the treatments at all the rates used, with mid-row banding resulting in significantly higher yield than any other treatment at one site in the Mallee, where it increased wheat yield by 0.3–0.5t/ha more than the other treatments.

However, in a pattern seen in many commercial cropping paddocks in the high-moisture conditions of 2016, grain protein was low, suggesting that yield might have been further increased if rates higher than the 90kg/ha maximum used

in the trial had been applied.

Rates of 90kgN/ha in 2016 and 100kgN/ha in 2017 and 2018 were applied to establish the N response/yield potential of the trial sites under the prevailing conditions. These potential-determining applications were banded below the seed at all sites except for Longerenong in 2018, where the 100kgN/ha rate was top-dressed due to the risk of fertiliser toxicity in canola.

At Ouyen in 2018, under-seed banding of the 100kgN/ha rate resulted in significant reductions in crop establishment and grain yield due to inadequate seed-fertiliser separation in the dry soil conditions at seeding.

Banding N between cereal rows during the growing season does not appear to guarantee increased yield or protein.

In 2017, banding produced no yield benefits but increased grain protein by 1% at one site. At Ultima, applying N mid-row on the soil surface or using conventional fan nozzles reduced yield, while at Longerenong, streaming N onto the soil surface resulted in better yields than those achieved with mid-row banding or application using conventional fan nozzles.

The efficiency gain from banding in 2016 averaged 46% across trials at Ultima and Longerenong but the specifics varied from site to site. At Quambatook the uptake of banded N was 63%, compared with 41-45% from mid-row surface and streaming applications, while at Longerenong the N recovery from banding was 78%, with 53-54% from mid-row surface and streaming.

Under dry conditions in the Mallee, mid-row banding of N in-season increased grain protein by 0.5-1.6% more than any other method of application but a significant yield response was measured in only one of the six field trials conducted during the three-year project.

At Ouyen, where a total of 73kgN/ha was available in the top 1.2m of soil at sowing, wheat grain yield and protein in 2018 were 49% and 40% greater at N rates of 50 and 100kgN/ha respectively than where only starter N was applied.

Banding 25-50kgN/ha below the seed at sowing or in the mid-row during the growing season resulted in higher yields than applying the same rate to the soil surface immediately after sowing, while banding 100kgN/ha below the seed at sowing significantly reduced emergence due to a fertiliser toxicity effect.

N application by mid-row banding in-season also significantly increased grain protein at Ouyen in 2018 and at Ultima in 2017.

At Longerenong, where there was 73kg/ha of available soil N in the top 1.2m at sowing in 2018 and more moisture available than at Ouyen, applying 100kg N/ha increased canola grain yield by 25% but had little effect on oil content. And N placement had little effect on grain yield or oil content, a result that could relate to

EXPLORING THE OPTIONS

Treatments in the Victorian trials involved five application methods, two rates of N – 25 and 50kgN/ha – and two times of application – at sowing and in crop at GS30. The application treatments were:

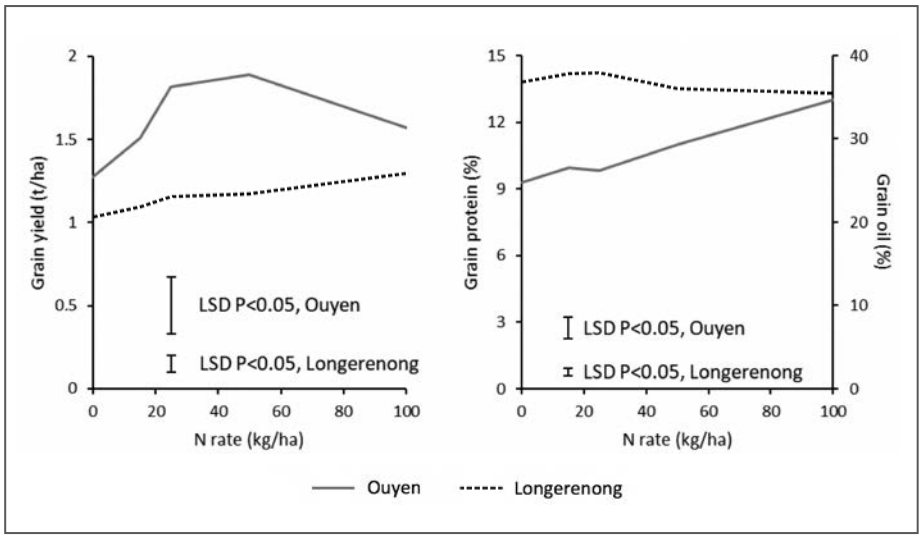
- mid-row banding of granular or liquid fertiliser applied at 35-50mm depth using a twin disc opener
- banding granular or liquid product 25mm below the seed at sowing
- mid-row placement of liquid fertiliser using ultra-high-pressure injection
- liquid fertiliser applied to the soil surface through a streaming nozzle or flat fan nozzles
- using a fertiliser spreader to top-dress in crop with a granular product.

The crops were sown on 300mm row spacing.

The mid-row banding treatments – streaming, mid row banding with a twin-disc opener and high-pressure injection - were 'skip row' treatments in which the fertiliser was applied in every second inter-row space.

Ashley Wallace, who led the research team, set out to band the in-soil fertiliser at a depth of 50mm but the actual depths achieved ranged from 35mm to the target 50mm depending on interactions between the seeder and the soil conditions.

The 2016 and '17 work was done using only wheat, but in 2018 Ashley used Kord CL Plus wheat at Ouyen and 44Y90 CL canola at Longerenong. All 2018 treatments received a light supplementary irrigation of 20mm of water pre-flowering and at early grain fill to avoid crop failure due to dry seasonal conditions and ensure meaningful N use efficiency data could be obtained from the season's work.



GRAIN YIELD AND PROTEIN/OIL CONTENT RESPONSE TO NITROGEN APPLICATION RATE AT OUYEN AND LONGERENONG IN 2018.

N tie-up or immobilisation due to how stubble was managed at the Longerenong site, Ashley suggests.

At Ouyen, however, banding N below the seed or mid-row at Ouyen increased grain yield by up to 16% more than mid-row placement using ultra-high-pressure injection or streaming nozzles and mid-row banding increased grain yield by 9-10% more than top dressing.

Placement of fertiliser N applied during the growing season did not significantly affect grain yield at either Ouyen or Longerenong but, as it did at Ultima in 2017, mid-row banding N at GS30 significantly increased grain protein at Ouyen by 9-15%; from around 10.5-11% for high-pressure injection, streaming or top-dressed to 12% for mid-row banding – while maintaining yield.

Less than half the N applied to broadacre crops in Australia is taken up by the crop in the year it's applied.

The impact on yield and grain protein/oil content was similar whether fertiliser was applied using ultra-high-pressure injection or mid-row banded with a twin disc opener, although at Ouyen, where application of N at seeding increased yield and the in-season treatment increased grain yield and protein, grain yield and protein were higher where N was mid-row banded with the disc than where ultra-high-pressure injection was used.

Ashley feels this could be due to the fact that ultra-high-pressure injection, which can cut through significant levels of surface residue and into the soil below, may disperse the N as it penetrates through the soil, whereas a disc opener concentrates the fertiliser in bottom of the furrow.

Most of the fertiliser N taken up by the wheat was recovered from the grain, Ashley said, but in the mid-row banding treatments higher N levels were also measured in the straw.

He found that post-treatment rainfall had little direct impact on the results from banding but good rain soon after application reduced N loss from N fertiliser applied to the soil surface, so the efficiency, and performance, of mid-row banding was comparatively better when there was little rainfall after application.

This suggests that, particularly where there is high risk of volatilisation due to inadequate rainfall following surface application of N fertiliser, banding of N may help improve crop uptake of fertiliser N.

Banding could also prove to impact the 'timing' of N uptake, since it seems that the concentration of nutrient in the sub-surface band delays the crop's access to it by restricting root growth within the band; a mechanism similar to that which causes 'nutrient toxicity' when seedling roots contact high concentrations of fertiliser.

This mechanism, and subsequent root growth around the band, which appears instrumental in helping improve crop uptake of applied N and so N use efficiency, seems to slow crop access to the nutrient, which may see banding tend to have an impact on protein rather than yield, even when applied at the recommended growth stage for surface application.

Previous studies have shown that later in-season applications of N tend to shift crop response from yield to protein, he said, so if it takes longer for a crop to access N from banded fertiliser, mid-row banding could shift the effect of a banded in-season N application from a yield to a protein response. This may have implications for the timing of mid-row banded N fertiliser applications.

This research was funded by Agriculture Victoria and GRDC and conducted with the assistance of Birchip Cropping Group and SANTFA staff.

Probing the potential of sandy soils

KATHERINE MAITLAND

GRDC research is improving understanding of the potential yield gains from amelioration of soil constraints in under-performing sandy soils in Southern Australia.

Deep soil disturbance can increase crop access to soil moisture and improve yields on underperforming sandy soils, according to current GRDC research exploring the potential of amelioration in sandy soils.

However, while most sandy soils have multiple constraints to root growth and water extraction, not all sites are responsive to deep cultivation and understanding and prioritising the underlying soil constraints is key to targeting where amelioration will bring cost-effective benefits, said CSIRO Senior Research Scientist Lynne Macdonald.

"A soil's reaction to soil disturbance depends on why it is not performing, so diagnosing and targeting the relevant soil constraints of Southern region sandy soils, alongside improved estimates of the yield gap, is important in balancing decisions around when to invest in amelioration and when lower-cost mitigation approaches may be more appropriate," said Dr Macdonald, who is heading the GRDC's Sandy Soils Program, an initiative exploring ways to improve the management and productivity of sandy soils in Australia's southern farming regions.

Common constraints limiting crop yields in sandy soils across southern Australia include non-wetting behaviour and poor crop establishment, soil pH and a low ability to supply and retain nutrients, she said. Sandy soils also have a natural tendency to compact and form hard-setting layers that limit root depth, reducing access to soil water and crop productivity.

Researchers involved in the program have identified opportunities to improve crop water use through amelioration measures that can be targeted to overcome physical and chemical soil constraints, boost nutrient supply from the soil profile and promote deeper-rooting crops. These measures include deep ripping, spading, topsoil slotting – incorporating topsoil at depth in the soil during a ripping pass – or deep ploughing with a mouldboard or plozza plough, a Chamberlain disc plough modified by WA growers Ben and Sean Plozza to improve its soil penetration.

CSIRO SENIOR RESEARCH SCIENTIST LYNNE MACDONALD IS LEADING A PROGRAM TO IDENTIFY HOW GROWERS CAN IMPROVE THE PRODUCTIVITY OF SANDY SOILS.

The Plozza plough is designed specifically to address water repellence in WA duplex sand-gravel soils and incorporate lime while inverting the soil.

The program is on-going, with the researchers also exploring the potential of other amelioration measures, such as incorporation of amendments, including poultry litter, at depth to capitalise on and extend the benefits of soil disturbance. Initial results suggest crop responses to measures intended to improve fertility at depth in the soil are highly dependent on seasonal conditions but Dr Macdonald sees potential in this approach to manage nutrient carry-over and crop growth responses over multiple years.

While the concept of profile amelioration is not new there a several reasons why the Sandy Soils Program has been successful in pointing the way towards improving sandy soils in Southern Australia, Dr Macdonald said.

In her recent GRDC Update paper she says results from trials conducted as part of the research program have the potential to improve returns on money invested in soil improvement by helping growers make better decisions about when to invest in soil amelioration initiatives. The starting point for good decision making and effective soil amelioration, she says, is to identify key soil constraints. The next steps are to assess the gap between estimated water-limited yield potential and the average yield currently being achieved and the seasonal risks, which are significant in the low-medium rainfall environment of southern grain-growing districts.

The gap between potential and achieved yield in southern regions with growing season rainfall of less than 300mm is estimated to be 2-3t/h.

"Yield responses to physical disruption on sands are common but not guaranteed. Considering the depth and severity of compaction and co-occurring soil constraints is important," Dr Macdonald said.

"It is also important to consider the scale of expected yield gains and the seasonal risks within the low-medium rainfall environment.

"We have been conducting trials to determine how much yield can be increased through physical amelioration alone and how much larger gains might be if fertilisers or organic amendments are also incorporated as deep as 30-60cm into the profile. The responses we have achieved demonstrate high seasonal variability, with risks of neutral or negative yield responses depending on the seasonal balance in early crop growth and profile moisture available for grain filling."

Understanding the impact of placement depth and amendment form on the timing of nutrient supply and water-use is important in maximising the potential for yield gains from soil amelioration, she said.

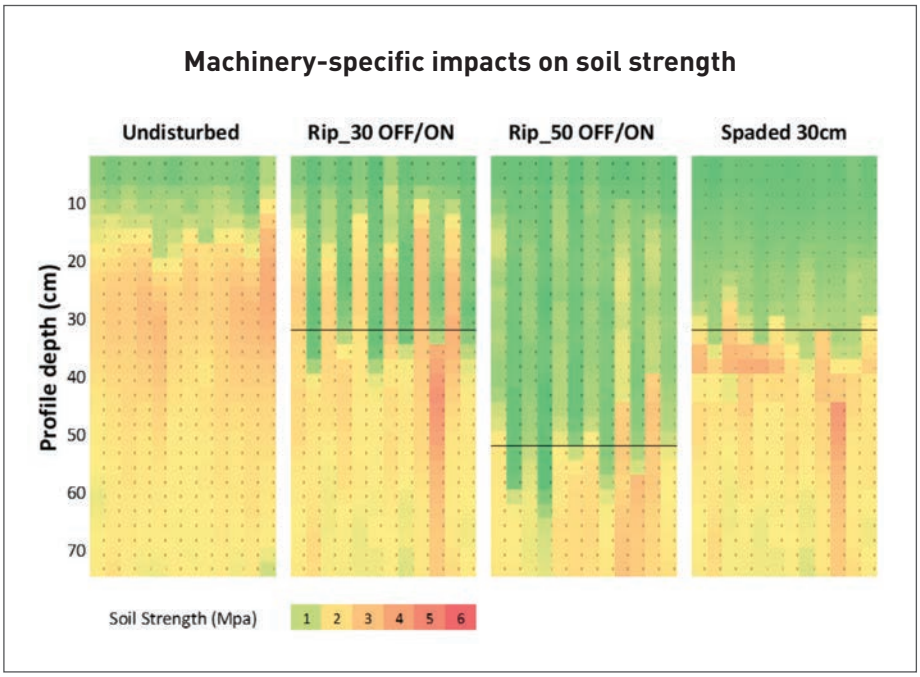
Experiments that have shown that physical interventions including ripping, spading and deep cultivation can improve crop productivity in sandy soils with compacted and hard setting layers have also identified interactions with site, season and crop sequence that highlight the need to better understand post-amelioration agronomy, she said.

"The extent and cost-effectiveness of the opportunity to further increase yield through incorporating amendments such as fertilisers, manure and crop biomass is less well understood.

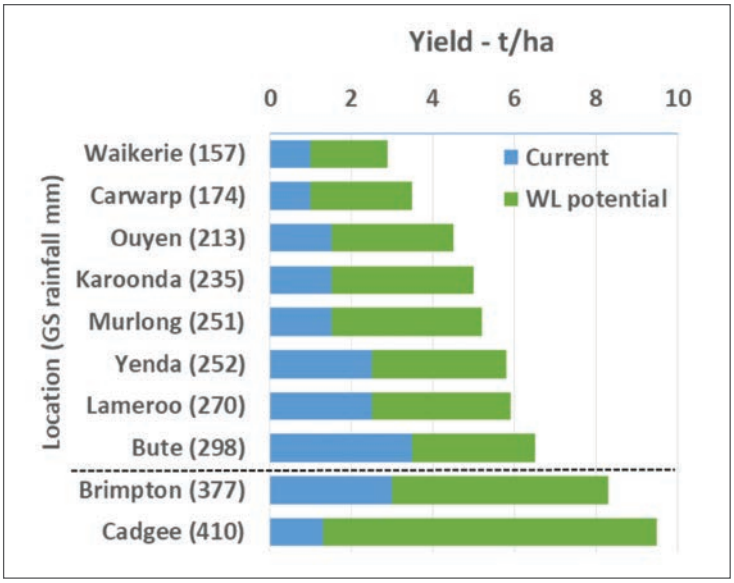
"Depth of placement and type of amendment influence crop rooting depth, the timing of nutrient supply and access to profile moisture. These factors in turn influence the balance of crop growth, development and grain filling."

Working depth has a significant impact on the effectiveness of soil disturbance in reducing soil strength, she said.

"We found that shallow ripping (20 cm) had little impact on soil strength and yield at a site where ripping to 30cm resulted in 0.85 t/ha greater yield.



ROOT GROWTH IS SLOWED MODERATELY WHERE SOIL STRENGTH IN THE TOP 20 TO 30CM OF SANDY SOILS IS IN THE ORDER OF 1.5 MEGAPASCALS [MPA]. ROOT GROWTH IS SLOWED STRONGLY WHERE SOIL STRENGTH IS GREATER THAN 2.5MPA AND SEVERELY AT SOIL STRENGTH IS GREATER 3.5MPA. RIPPING TO 30 CM CAN RESULT IN DEFINED CHANNELLING AND AN ABRUPT INTERFACE BETWEEN DISTURBED AND UNDISTURBED SOIL. DEEPER RIPPING TO APPROXIMATELY 50 CM RESULTS IN GREATER INTER-RIP SHATTERING. SPADING RESULTS IN A CONSISTENT RELIEF OF SOIL STRENGTH TO THE DEPTH OF OPERATION BUT AN ABRUPT INTERFACE AT THE MAXIMUM WORKING DEPTH.



	Repellent	Acid	Physical
Waikerie			Severe
Carwarp			Severe
Ouyen			Severe
Karoonda	Severe		Moderate
Murlong	Moderate		Severe
Yenda		<4.8	Severe
Lameroo	Low		Moderate
Bute	Low		Low
Brimpton	Moderate		Moderate
Cadgee	Severe	<4.8	Low

FIGURE 1: PRELIMINARY ESTIMATES OF WATER-LIMITED YIELD POTENTIAL AND CURRENT ATTAINABLE YIELDS ACROSS THE PROJECT REGION (LEFT) AND THE PRIMARY SOIL CONSTRAINTS IDENTIFIED AT KEY PROGRAM TRIAL SITES [RIGHT].

Ripping to 50 cm and topsoil also reduced soil strength in the inter-rip zone more than ripping to 30 cm depth. Deep cultivation improved yield by 0.4t/ha.

"Deep cultivation has had lasting impact at two sites where physical constraints were identified, with spading resulting in a cereal gain of approximately 2t/ha over three years of cereal years and gains of approximately 0.5t/ha in the fourth year."

The operating parameters of rotary spaders (speed, blade rotation and depth) can affect the uniformity of soil mixing and uneven mixing can result in 'pockets' or 'hot-spots' when adding and incorporating soil amendments such as lime, gypsum or clay or attempting to disperse and dilute the effects of acid or water-repellent soil layers, for example, identified as inhibiting root growth.

Uniformity of mixing can be improved by optimising working speed, blade rotation and mixing depth, she said, and project partners at the University of South Australia are using computer modelling in efforts to improve understanding of the impact of machinery set-up on soil mixing performance.

The Sandy Soils Program is a collaboration between the CSIRO, the University of South Australia, Primary Industries and Regions SA, Mallee Sustainable Farming Inc., AgGrow Agronomy, Trengove Consulting, Eyre Peninsula Agricultural Research Foundation, Lower Eyre Agricultural Development Association and MacKillop Farm Management Group.

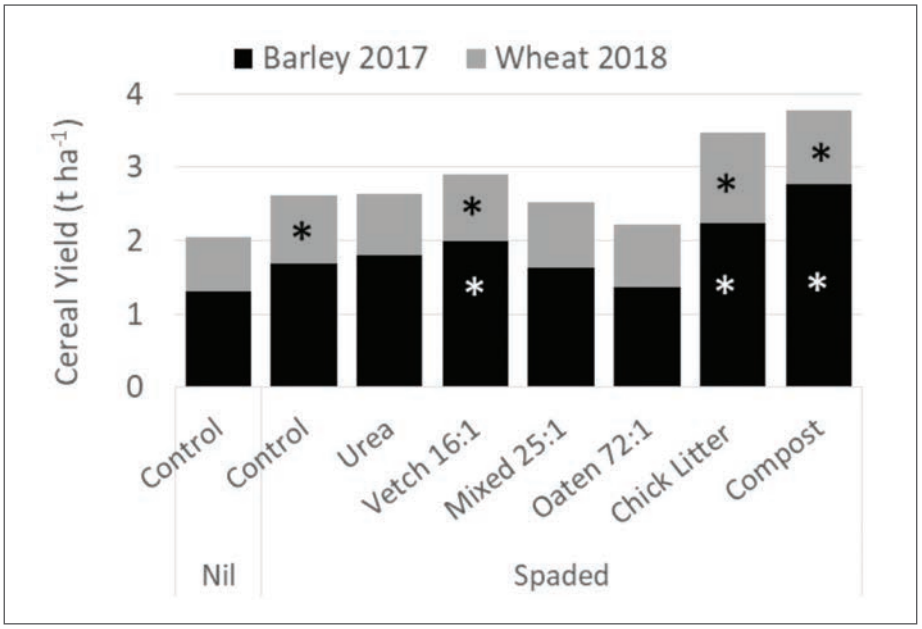


FIGURE 2: CEREAL YIELDS IN RESPONSE TO SPADING AND AMENDMENT INCORPORATION AT OUYEN, VIC. BARS SHOW YIELD IN TWO CONSECUTIVE YEARS FOLLOWING ESTABLISHMENT IN 2017. ASTERISK (*) INDICATES A SIGNIFICANT WITHIN-YEAR DIFFERENCE FROM THE UNSPADED (NIL) CONTROL. THE TRIAL INCLUDED TWO CONTROLS – UNDISTURBED SOIL AND SOIL THAT WAS SPADED WITH NO ADDITIONAL INPUTS. THE TREATMENTS WERE SPADING PLUS INCORPORATION OF UREA, POULTRY LITTER, COMPOST AND THREE HAYS – VETCH, OATEN HAY AND A MIXTURE OF THE TWO (C:N RATIOS INDICATED).

Simple concepts, remarkable results

KRISTIN MURDOCK

Family company Thomas Foods International [TFI] has grown from an Adelaide-based livestock-trading business to a global food giant in just 30 years.

According to TFI CEO Darren Thomas, that remarkable growth and the accompanying transition from livestock trading to multi-dimensional food processing and retailing in the US, China and numerous other countries, has been achieved by applying a few simple strategies: "Assemble the best team of people, create a competitive advantage and produce the number one product to the highest quality and at the best price."

These strategies, he suggests, can also be applied by farmers looking to improve and expand their businesses.

So too can elements of his crisis management in the wake of the fire that destroyed the company's Murray Bridge meat processing works in January last year: communication, clear plan, be visible, leadership.

Despite the fire, Darren told growers at the recent SANTFA annual conference, his and the company's passion for challenge and strong connection to the farming community remains unchanged. In fact, the company's expansion beyond the meat industry has been driven in part by a desire to provide opportunities for producers of food products other than meat.

He describes Australian produce of all types as a rare, high-value product, and said it was important growers realise that and the significance of their roles in food production. "Don't under-value what you do."

Once the Thomas family decided to move beyond livestock and meat they quickly realised they needed to own all the value chain for their products if they were to capitalise on the quality attributes of Australian produce and the opportunities provided by the large populations in overseas countries.

Today TFI is an international company with annual revenue of more than $2 billion that employs more than 3,500 people globally, processes an average of 120,000 sheep, goats and lambs and 5,000 cattle a week and supplies quality food into national markets and more than 85 overseas destinations.

THOMAS FOODS INTERNATIONAL CEO DARREN THOMAS HEADS A MULTI-MILLION DOLLAR INTERNATIONAL FOOD SUPPLY COMPANY BUT IS STILL TOTALLY COMFORTABLE IN AND AROUND MARKETS AND STOCK YARDS WHERE HE STARTED OUT BUYING AND SELLING LIVESTOCK.

The company's product range runs from meat, skins and hides though to pharmaceutical products. It has recently begun producing retail 'cook your own' food packs that are being trialled in Australian markets and is partnering with on-line giants such as Amazon, Alibaba and Uber to market a range of food products direct to consumers.

The big question is how to get young people into agriculture.

Despite its growth as a global food company, TFI's roots remain firmly and proudly in Australia, where it operates meat-processing plants at Murray Bridge and Lobethal in South Australia and Tamworth in NSW. The group also has a wholesale and distribution business that services the needs of the domestic market.

"We're Australia's largest 100% family-owned meat processing company and employ thousands of staff globally but still retain an emphasis on maintaining a strong connection to the farming community," Darren said.

"I'm a very proud South Australian but am equally proud we have spread internationally. We are not trying to compete with America though; instead we have a focus on high-end and boutique products.

"There's a big move toward organic products and it was obvious there was far more opportunity in the US market than here at home.

"The US takes 20% of Australian products and the trick to staying relevant is to get closer to the customer," he said. "It has a competitive retail environment and we need to be ever changing to keep up.

"In 2013 I stood in a paddock in the US and realised we needed to build a facility in the US to service the market there.

"Our many years of experience means we understand the challenges our customers face in remaining profitable while meeting the constantly changing tastes of the end consumer."

With markets increasingly influenced by e-commerce, TFI has also had to transform the way they sell their products, Darren said.

"We always have to have the end user in mind. There has been a huge shift in shopping habits including Uber eats delivering ready-to-make meals to the home. There are also cashless stores being developed where the customer can come in, choose their items and have the cost deducted from their funds wirelessly so there is no need to go through a checkout."

TFI has faced and overcome many challenges over the years, none bigger than the devastating fire in early January, 2018, that destroyed the Murray Bridge facility the family bought in 1999 as a struggling meat processing plant employing 300 people. In the ensuing 19 years TFI had transformed it into the largest multi-species abattoir in the world, with about 1,500 staff.

"In the immediate aftermath of the fire it was really a case of 'what do I do now?'," said Darren, who described the days immediately after the fire as 'the most interesting of my life'.

He opted for four main steps – communication, having a clear plan, being visible and displaying leadership – with a focus on staff wellbeing.

Within 10 days of the Murray Bridge fire TFI had initiated double shifts at their Lobethal plant, which enabled the company to offer every one of their 900 Murray Bridge employees, aside from labour hire workers, a position.

We always have to have the end user in mind.

Darren, who despite being a self-described optimist found it hard to stay positive at times in the wake of the fire, believes having a plan was crucial in dealing effectively with the crisis, counting honest and open communication with staff and customers as vitally important.

"Something in my training and the strength in our organisation kicked in and allowed me to think clearly when I needed it most."

Once the immediate issues had been addressed Darren and his team turned their attention to developing a new Murray Bridge facility that would, like the one lost in the fire, be the jewel in the crown of the TFI business.

Despite the production impact, the disaster was an experience that has seen the company emerge stronger that it was previously, Darren said.

"In SA we are now processing just about as many sheep and lambs with one plant as we did with two and we have plans to increase that."

Fast forward more than 12 months and his passion for agriculture and livestock remains as strong as ever and he is keen to see young people get involved in the agricultural industry.

"I see the future of farming as bright and exciting but the big question is how to get young people into ag.

"Another challenge is the rate of sheep meat consumption in Australia, which has fallen from 45kg to 8.3kg per capita over the past 50 years. However, consumption in North America and China, which are non-traditional consumers, has increased."

Darren sees a definite trend towards a more natural product – grass-fed versus feedlot, for example – and potential for consumer education about the environmental and other benefits to grow US demand for grass-fed meat.

There is also potential for growers in non-traditional products and markets, he said.

"Goat meat, for example, is the most widely eaten meat in the world; people cannot get enough of it. At the moment it's worth more per kilogram than lamb."

THOMAS FOODS INTERNATIONAL HAS DISTRIBUTION CENTRES IN THE US [PICTURED], JAPAN, CHINA, EUROPE, SOUTH AMERICA, THE MIDDLE EAST AND ASIA.

SANTFA
CONSERVATION AGRICULTURE IN ACTION

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