

OPTIMAL SOIL AND WATER MANAGEMENT INCREASES DROUGHT RESILIENCE — FROM THE PLOT TO THE PADDOCK

Drought is an inevitable part of farming in Australia, but outcomes from the *Improved drought resilience through optimal management of soils and available water* project are equipping farmers with a host of additional strategies with which they can prepare for the inevitable.

Numerous small-scale field trials across southern NSW have shown that early sowing of slower-maturing crops, diverse legume rotations and nitrogen banking can all increase profitability and productivity by increasing soil moisture availability and preventing carbon and nutrient loss under drought conditions. But proving these practices are profitable on a paddock scale is key to ensuring grower adoption.

Using on-farm demonstrations, this project has demonstrated how growers can apply the theoretical strategies profitably on a paddock scale, across different soil types, environments and land uses.

Charles Sturt University, under the Southern NSW Drought Resilience Adoption and Innovation Hub, led the project in partnership with Farming Systems Groups Riverina Plains, FarmLink Research, Central West Farming Systems and Southern Growers, in collaboration with CSIRO and the NSW Department of Primary Industries. The collaboration saw management strategies that had been tried and tested by researchers, over six years on four sites, validated on farm with growers and advisors.

The project was supported through funding from the Australian Government's Future Drought Fund Drought Resilient Soils and Landscapes Grants Program and is co-funded by the Grains Research and Development Corporation.

EARLY SOWING OF LONGER-SEASON VARIETIES

Research carried out by CSIRO in small-scale plot trials indicates early sowing of longer-season varieties can provide multiple benefits depending on the weather and type of enterprise. Early sowing can:

- utilise residual soil moisture from late summer or an early season break
- match crop phenology with the sowing date, capturing optimal flowering windows and reducing the risk of adverse seasonal conditions
- offer dual-purpose options, such as integrating grazing into the farming system
- provide logistical advantages by lengthening the sowing window.

NO WINTER FEED DEFICIT WITH EARLY SOWN DUAL-PURPOSE CROPS



Farmer:	Simon and James Finlay
Location:	Cookardinia, NSW
Soil type:	Red chromosol
Rainfall (annual):	641mm
Growing season rainfall:	623.50mm (2023)
Enterprises:	Cropping (wheat, canola), prime lamb production, cattle (steers)

Management strategy:	Early sowing dual purpose crops
Crop species:	Wheat (red) and canola
Variety:	Adagio wheat and 970 canola

AT A GLANCE

- Early sown dual-purpose wheat and canola crops reduce the risk for farmers — moving away from a feed gap to a time of feed productivity during winter.
- Incorporating dual-purpose crops into mixed farming enterprises adds flexibility to the system and provides opportunities for additional enterprises when market conditions are right.
- Dual-purpose crops have increased gross margins to a massive \$3,500 – \$4,000/ha for one southern NSW farmer.

Cookardinia farmer Simon Finlay says early sowing dual-purpose crops — wheat and canola — prevents the winter feed deficit, ensuring he can keep his stocking rate high, at around 15 dry sheep equivalents (DSE) over the winter period, in addition to having high grain yields at harvest.

Simon and his brother James run a 2000hectare mixed farming business at Cookardinia, NSW, with a strong focus on grazing dual-purpose crops.

“Cropping has always been something you do to improve your pastures, but with the value of our land increasing to around \$7,000 – \$8,500 per acre, our emphasis is on making every acre work for us,” Simon said.

“Our cropping area is now 100 per cent dual-purpose crops, growing predominantly red wheats and canola 970 — a grazing variety.”

The Finlay’s started growing red wheats about three years ago and have seen their grazing value and dry matter production increase exponentially, accompanied by high yields at the end of the year.

“We’ve been averaging 120 days of grazing minimum and talking with our agronomist we’re set for a 6 – 7t/ha yield again,” said Simon.

“When we have a full soil moisture profile, we look to sow early March and if we don’t have a full profile we sow through to May.”

“With some of our leased country we’ve brought some legumes — Balansa and arrowleaf clover — into the mix just to reset the paddock as our early sowing program means we run into some issues with annual ryegrass.”

“We keep the crop rotation short because we push the boundaries with the sowing times.”

REAPING THE BENEFITS OF DUAL-PURPOSE CROPS

As noted by Simon, dual-purpose crops are reducing the risk for farmers who choose to sow them, providing a great source of productive feed during winter.

“It’s really allowing farmers to move away from a feed gap to a time of feed productivity,” said Jeff McCormick, agronomy lecturer at Charles Sturt University.

“Dual-purpose crops allow farmers to push the sowing window earlier and earlier, as soon as soil moisture conditions are right. Farmers can be sowing in this area during late February or March — much earlier than a traditional sowing date of April or May for traditional main-season wheats.”

While many farmers continue to grow some harder wheats for milling grain, increasingly Jeff is seeing a transition to dual-purpose varieties to take advantage of both the yield increase and the grazing option.

“The *Improved drought resilience through optimal management of soils and available water* project is all about reducing environmental risk and making farming systems more resilient — supporting the mixed farming enterprise, both sheep and cattle, as well as filling the grain yield at the end of the day,” Jeff said.

“The Finlay’s have been using dual-purpose early sown wheat and canola crops in their business for several years and through this project we’ve been able to delve down into the benefits and opportunities they provide.”

Sowing during early March with follow-up rain 2 – 3 weeks after sowing, means the Finlay’s can have sheep on grazing canola paddocks within six weeks of sowing. Depending on the amount of dry matter available, sheep graze paddocks for 4 – 7 weeks, before spelling. During this time Simon, sprays out the grasses, applies urea and then set stocks the paddocks through until the end of June.

“Our lock-up date is the end of June, when buds on the canola start to form. We have to get that right otherwise it’s detrimental to the grain yield,” Simon noted.

“We sow our red wheat during late March and generally start to graze it after the first grazing of our canola, we then set stock the red wheat paddocks through until September.”

Simon aims to keep 1800kg DM/ha in front of his livestock. If the available dry matter falls below this level, he drops back the stocking rate towards to the end of the grazing period.

Having calculated dry matter content for several years, Simon and James can confidently forecast how much dry matter is in front of the stock out to six weeks in advance.

James takes several pasture measurements throughout the season and all assessments are made based on kilograms of dry matter per hectare, stock growth rates and moisture content.

“James can now go into any paddock and visually assess and calculate dry matter levels. He feeds this into our feed budgets, and it gives us a good idea of where we’re heading — it’s great,” said Simon.

“Knowing how much feed we have in front of the stock allows us to make well-informed management decisions. We can increase or decrease our stocking rates, bring stock home from other blocks to finish them off or sell stock if there’s not enough feed to finish them properly.”

Simon is downsizing his lamb trading operation and using the grazing crops for additional feed to carry his breeders through the winter period. Ewes lamb down during autumn onto pasture and Simon moves them onto the grazing crops during winter, allowing the pasture paddocks to recover before spring.

“The biggest difference dual-purpose crops have made to our farming business is they have prevented our winter feed deficit,” Simon said.

“Incorporating dual-purpose crops into our program means we can keep our stocking rates high from autumn through winter — our winter stocking rate is around 15 DSE/ha, which is pretty high — while our pastures recover.”

“They provide a great feedbase for our livestock. We can hit the crops hard and eat them right down, and we know they’ll recover. It gives us piece of mind and allows us to look after our perennial pastures a lot more.”

“We’re also finding the grazing crops help spread our risk during drought and over the drier months,” he said.

“Our containment yards also come into play during the dry times. We can get our stock to a desired weight and then turn them onto the grazing crops to finish them off.”

ARE WE MAKING REAL MONEY FROM DUAL-PURPOSE CROPS?

The detail is in the numbers. Table 1 shows the days grazing, DSE days/ha value and grain yields over the period 2022 – 2023 for red wheat and canola 970. To put some of those numbers in perspective, the wheat paddock Cooka 1 in 2023 had over 3500 sheep graze the 32ha paddock at some stage during the 57 days grazing period. The 2022 canola crop in the same paddock grazed 512 lambs for 90 days.

Yield estimates for canola, particularly in dry or very wet years, are a key part of James’ and Simon’s planning.

“If we believe grazing the crops will give us more dollars per hectare, we’re very happy not to put the headers into the paddock, we’ll graze them through,” Simon explained.

“We’re doing a lot more of this. We’re literally sitting down and working out a feed budget and saying, this is how much feed we’ll have and we’re crunching the numbers.”

“Normally we find if our canola 970 yields are under about 1.2t/ha, we’re better to keep grazing them and we’ll graze them right through to December if we can manage them.”

TABLE 1. DSE DAYS PER HECTARE, GRAIN YIELDS AND GROSS MARGINS FOR DUAL-PURPOSE CROPS, COOKARDINIA, NSW.

YEAR (PADDOCK)	CROP	DAYS GRAZING	DSE DAYS/HA	GRAIN YIELD (T/HA)
2022 (Cooka 1)	Canola	90	2304	3.2
2022 (Clover north)	Wheat	127	2337	3.2
2023 (Cooka 1)	Wheat	57	2395	5.6
2023 (Cooka 2)	Wheat	77	4563	4.5
2023 (Clover north)	Canola	35	1722	2.4
2023 (Clover south)	Canola	44	2170	2.1

The certainty of feed over the winter months also allows Simon and James to trade cattle when markets are right and opportunities present.

“We can buy cattle with confidence knowing we can achieve a daily weight gain of 1.2 – 1.8kg/day on our grazing crops. We can hit market specifications and turn them off over a relatively short period — a value-add to our business,” Simon said.

The value-add grazing crops bring to their business will see the Finlay’s continue to grow them long into the future.

“I can’t stress enough the benefits of growing grazing crops, particularly the ability to fill the winter deficit and graze crops right throughout the year,” said Simon.

“Traditionally in cropping enterprises you would sow paddocks and then you wouldn’t do anything with them for the next nine months while the crop grows and then it’s harvested. Incorporating grazing crops into our rotations means our cropping paddocks are only out of production for 6 – 10 weeks, until the crop is established and can be grazed.”

“With our red wheats and canola 970, we can graze our paddocks across most of the calendar year.”

“Grazing crops are all we know. I don’t believe we can make this country work if we’re not grazing our crops.”

“We’re pushing the boundaries, but we need to in order to cover our input costs. With input costs continuing to increase, it can cost us around \$800 – \$1000/ha to grow these crops.”

“Grazing crops are our cotton — we’ve got country that is now making a \$1,500 – \$2000/ha gross margin, compared with the ‘normal’ \$1,200 – \$1,500/ha gross margin from grazing. Then if we harvest a 2.5t/ha yield off the canola, we’re talking \$3,500 – \$4,000/ha gross margins — that’s massive.”

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