# Managing through a challenging Autumn: Reflections on the dry start to 2025 and management of our mixed-farming systems trial

Gulbali Institute[1], September 2025

A long-term research site was established in 2024 on Charles Sturt University's "Ashmont Farm" located at Wagga Wagga in southern NSW. The experimental design uses farmlets (mini-farms) to represent different farming systems. The project is funded by the Australian Government's Future Drought Fund and seeks to understand which management systems and their components improve the resilience of the system to drought and are most profitable in the long-term. Systems include continuous cropping (canola, wheat, barley, pulse crop), phase farming (five years lucerne and 7 years cropping, including differing proportions of dual-purpose crops and vetch or a pulse as the legume break), and ley farming (2 years crop, 2 years annual pasture). Small "flocks" of Composite ewes graze the mixed-farming systems, lambing from mid-June. This year (2025) is the first full year of data collection following establishment.

Rain in late 2024 and follow-up in January and early February gave us confidence there would be good sub-soil moisture to support early sowing of dual-purpose crops. However, as we now know, the rain stopped in mid-February and there were only small falls until the break occurred in late May. Like many others in southern NSW, this impacted our ability to establish crops and management of sheep, particularly since our systems are reliant on dual-purpose crops.

To better understand these dynamics, we used satellite imagery to track spatial and temporal patterns of crop responses—both across different farmlets and for specific crop types. At present, we are using these data to validate our field assessments and establish a baseline for further analysis, such as exploring how rainfall frequency and intensity influence crop growth and yield outcomes. An example is shown in Figure 1 for capturing crop response as the normalized difference vegetation index (NDVI) throughout January to June 2025. Low NDVI values (shown in purple) indicate bare soil or weak crop development, while high NDVI values (shown in green) reflect active crop growth.


**Figure 1. Normalised difference vegetation index (NDVI) at the trial site January –June 2025**

Canola

Expecting good sub-soil moisture, we looked for opportunities to sow in March and pulled the trigger on sowing dual-purpose canola (Captain CL) on 21st March following a small rainfall event (Fig 2.). The aim was to produce some feed for pregnant ewes by mid-Autumn. Initial germination was sporadic, with a few plants germinating in mid-April, but the majority of plants germinated in mid-June. Overall plant establishment was low (average 16 plants/$m^2$). Furthermore, we have a high annual ryegrass seed bank at the site with resistance to multiple chemical groups. Following a field inspection with agronomist Nigel Clarke (Riverina Co-Operative) in July, it was decided to utilise some of the dual-purpose canola paddocks for grazing, particularly in the ley farming system, to fill the anticipated feed gap in August (following lamb marking). Weeds were controlled in other paddocks where annual ryegrass pressure was less and where lucerne and vetch mixture were available to graze. This gave the option to still take these canola crops through to harvest if desired.

In contrast, the main season canola (HyTTec Trident) sown immediately prior to the break on 21st May had an excellent establishment (average 64 plants/$m^2$). Canola received 150 kg urea in July along with the other crops.

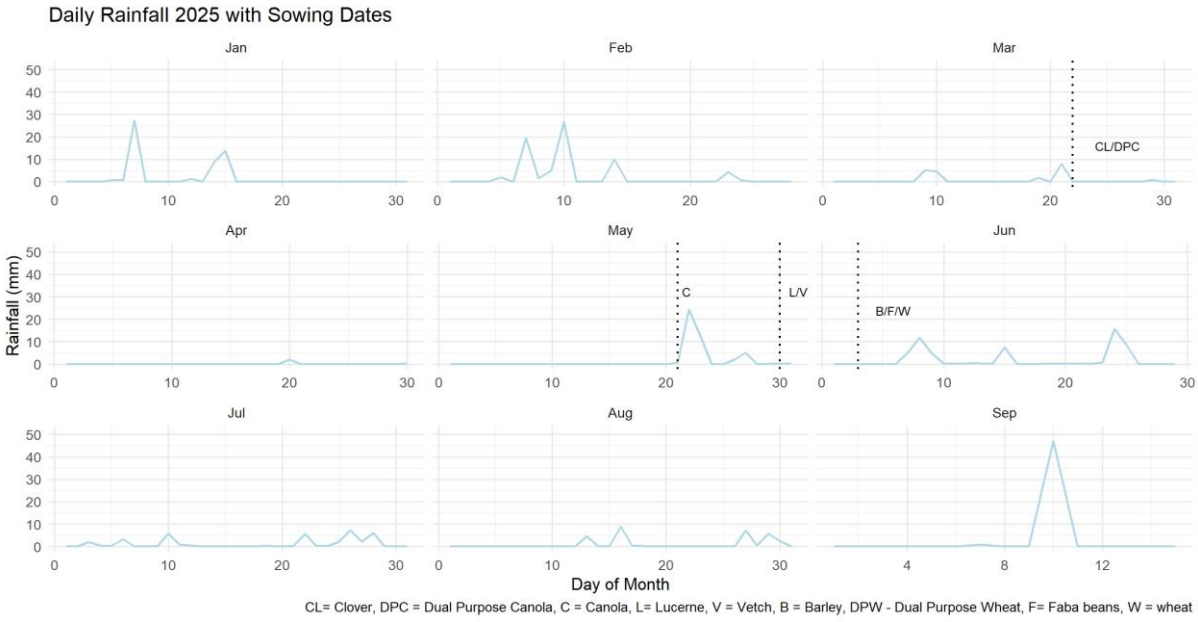


**Figure 2. Rainfall and sowing dates in 2025 at the Long Term Mixed-Farming Field Trial, Wagga Wagga**

**Figure 3. A dual-purpose canola crop in mid-August with annual ryegrass and some legume weeds**

Wheat

In both phased-farming systems we hope to establish dual-purpose wheat each year to provide sheep feed in June-August. In 2025 there were no sowing opportunities for winter-types in early Autumn (Fig. 2). We therefore made the decision to switch from a winter cultivar to the same cultivar we were sowing for our main season wheat (Ironbark). To maximise weed control it was suggested from the consultant's group that we avoid sowing dry with a disc system. Hence, we waited until after the late autumn break to sow (2$^{nd}$ June). Plant counts were much higher than target (210 plants/m$^2$), suggesting the sowing rate was higher than the drill calibration. There was plenty of biomass in the wheat crops by early August and we could have opportunistically grazed some of these crops as they did not reach stem elongation until about 20 August. However, the warm weather in early August resulted in other pastures and forages being available (including the canola crops we had decided to graze), so no wheat crops were grazed this year.

**Figure 4. Ironbark wheat sown in early June. There was a window to graze in early August, however no grazing occurred as other crops and pastures were available.**

Vetch

In the establishment year of the trial (2024), we sowed a mixture of vetch, oats, arrowleaf clover, radish and turnip in April in the system that uses vetch as the legume break in the cropping phase. These crops were grazed prior to weaning and made into hay. Due to the late break in 2025, it was decided to take the brassica species out of the mixture, thinking it would add little grazing value with late sowing. Due to sowing with a disc system and having a mixed species component, these pastures are limited to a double knockdown prior to sowing, with minimal follow up options until later in the season. Establishment of sown species has been good (81 plants/$m^2$), with a composition of: 56% oats, 34% vetch and 9% arrowleaf clover. The vetch mix along with volunteer annual ryegrass responded to the warmer conditions in early August, accumulating a large biomass. We grazed these paddocks in early September (prior to weaning).

**Figure 5. Vetch and oats pastures with volunteer annual ryegrass in mid-August**

Sheep management

Sheep were joined in confinement (which we will do each year), with all sheep removed from paddocks in January and joined as a single cohort. Sheep were fed a mixed ration of wheat, barley and faba beans, along with wheaten hay harvested from the site in 2024. Sheep maintained good condition through joining and achieved a scanning rate of 164%.

The lucerne had grown while ewes were in confinement, and ewes in the phase farming systems could complete a rotation through the four lucerne paddocks in each farmlet immediately following joining (30-35 days grazing); however, the dry Autumn slowed lucerne growth and a second grazing rotation was not possible. These ewes were set-stocked on a single lucerne paddock from 22 May and stayed in this paddock with full handfeeding of pellets with some wheaten hay (for roughage) until lamb marking. The lucerne paddock that was set-stocked will go into crop in 2026. This paddock was grazed bare by the end of lambing, however the lucerne has recovered, with 25% ground cover two weeks post-grazing. This lucerne will be terminated in spring for preparation for a canola crop.

In contrast the annual pasture paddocks in the ley faming system were bare at the end of joining and ewes in these farmlets were retained in confinement for longer before briefly grazing some stubble paddocks then returning to confinement due to lack of available feed. They were introduced to the annual ley pastures on 18 June, immediately prior to lambing, and were also hand fed through lambing while grazing the pasture paddocks. However, unlike the ewes grazing the lucerne, these ewes were rotationally grazing during the lambing period due to higher growth of the annual pastures. They stayed on the ley pastures until 11 August when they commenced grazing out the dual-purpose canola (see earlier). Whilst the ewes have been on the dual-purpose canola, the first year sown annual pastures were targeted to spray out the annual grasses. Coming into Spring these first year clover pastures (sown in March) are looking great.

**Figure 6. Ewes and lambs grazing lucerne following lamb marking**

For more details on the project please contact Shawn McGrath shmcgrath@csu.edu.au or visit the project's web page:

https://www.csu.edu.au/research/southern-nsw-drought-resilience-hub/projects/southern-nsw-drought-resilient-mixed-farming-system-trials

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